HOARE LEA

Manor Road / Richmond

Air Quality Assessment

Hoare Lea

July 2020

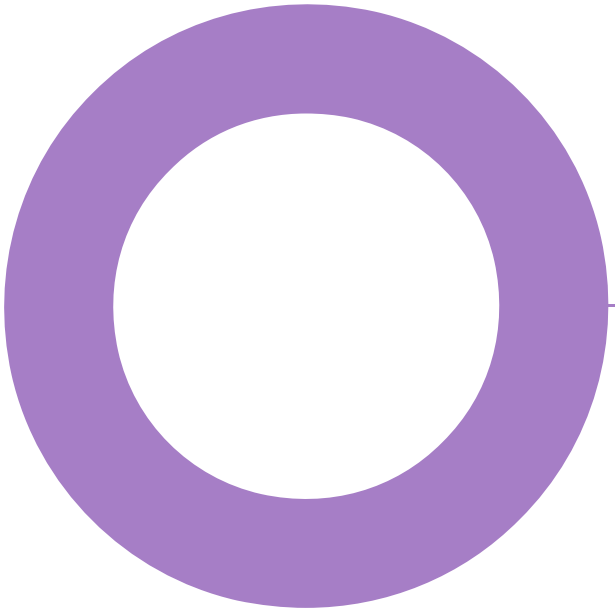
HOARE LEA

Homebase, Manor Road. Richmond, London.

Avanton Richmond Development Ltd.

AIR QUALITY
AIR QUALITY ASSESSMENT

REVISION 01 – 30 JULY 2020



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	17/07/2020	First Draft	HW	AD	KW
01	30/07/2020	First Issue	HW	AD	KW

Document reference: REP-Air Quality-1010539-5A-20200730-Manor Road-R01.docx

Contents.

Executive summary.

This air quality assessment (AQA) has been prepared by Hoare Lea on behalf of Avanton Richmond Development Ltd ('the Applicant') following further amendments to the proposed scheme for the redevelopment of the Homebase store at 84 Manor Road, North Sheen, Richmond, TW9 1YB ('the Site'). As the Amended Proposed Development is for residential uses, the annual mean objective for nitrogen dioxide (NO_2) and Particulate Matter 10 micrometres or less (PM_{10}) applies.

The Amended Proposed Development is within an Air Quality Management Area (AQMA) declared for exceedances of the annual mean NO_2 objective and the PM_{10} objective. There have been exceedances of the annual mean NO_2 objective at nearby diffusion tube monitoring sites in recent years but not at the nearby automatic monitoring station. There have not been any exceedances of the 1-hour mean NO_2, annual mean PM_{10} or 24-hour mean PM_{10} objectives at the nearby automatic monitoring station.

A risk assessment of the potential impacts of the construction phase of the Amended Proposed Development has been undertaken to identify appropriate mitigation measures. Provided these are implemented, for example through a planning condition, the residual impacts are considered to be not significant.

The need to undertake a detailed assessment of road traffic emissions associated with both the construction and the operation of the Amended Proposed Development has been scoped out because the traffic generated by the Amended Proposed Development is less than the traffic generated by the existing site use.

Exposure of users of the Amended Proposed Development once operational has been assessed using ADMS-Roads, considering the pollutants NO_2, PM_{10} and $PM_{2.5}$. There is predicted to be no exceedance of any of the air quality objectives for these pollutants and therefore the impacts on the Amended Proposed Development are not significant.

All heating and cooling of the Amended Proposed Development is to be via an electrical solution. As such, there will be no need for assessment of the impact of combustion emissions as there will be no combustion on site.

The Amended Proposed Development is air quality neutral according to the Greater London Authority's (GLA) benchmarking assessment methodology.

The overall operational air quality impacts of the Amended Proposed Development are judged to be not significant.

1. Introduction.

1.1 Amended Proposed Development.

This air quality assessment (AQA) has been prepared by Hoare Lea on behalf of Avanton Richmond Development Ltd ('the Applicant') following further amendments to the proposed scheme for the redevelopment of the Homebase store at 84 Manor Road, North Sheen, Richmond, TW9 1YB ('the Site'). A planning application for the redevelopment of the Site was submitted to London Borough of Richmond Upon Thames (LBRuT) in February 2019 (ref. 19/0510/FUL) (the 'Original Proposed Development') and was considered at LBRuT Planning Committee on 3 July 2019. The Planning Committee resolved that they were minded to refuse the Application, however on 29 July 2019 it was confirmed that the Mayor of London would act as the local planning authority for the purposes of determining the application.

Following review of LBRuT's reasons for refusal and discussions with Officers at the Greater London Authority (GLA) and Transport for London (TfL), the Applicant sought to review the scheme, with the principle aim of increasing the delivery of affordable housing through additional density and addressing other issues raised in the Mayor's Stage 2 Report. Initial scheme amendments were submitted in November 2019 ('the November 2019 Amendments') and increased the overall number of units by 48, primarily through the introduction of a new residential building known as Block E.

Following further discussions with TfL and the GLA, it was subsequently agreed that further revisions should be explored in order to deliver an improved scheme, without the need for this additional block.

The proposed changes are described in detail in the accompanying Design and Access Statement Addendum, however, of particular note is the increase in residential units from 385 within the Original Proposed Development to 454 within the Amended Proposed Development. This increases the total number of affordable units by 38 to a total of 172 affordable homes (40% by habitable room taking account of grant funding, increased from 35% as originally submitted). This increase in units and the higher affordable housing provision has been principally achieved through amendments to the height and internal layout in appropriate locations across the Site.

The proposed changes necessitate an amendment to the Application's description of development. The revised description of development (hereafter referred to as the 'Amended Proposed Development') is as follows:

Demolition of existing buildings and structures and comprehensive phased residential-led redevelopment to provide 453 residential units (of which 173 units will be affordable), flexible retail, community and office uses, provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works.

As a result of the proposed changes, this AQA has been updated in order to assess the Amended Proposed Development. The Site is on Manor Road and currently occupied by a Homebase branch and associated surface car park; it is bounded by railways lines to the south and west of the Site; to the east is Manor Road, beyond which there is a Sainsburys and residential premises; to the north of the Site are more residential and commercial premises.

The Amended Proposed Development is shown in Figure 1 within the wider context of Richmond.

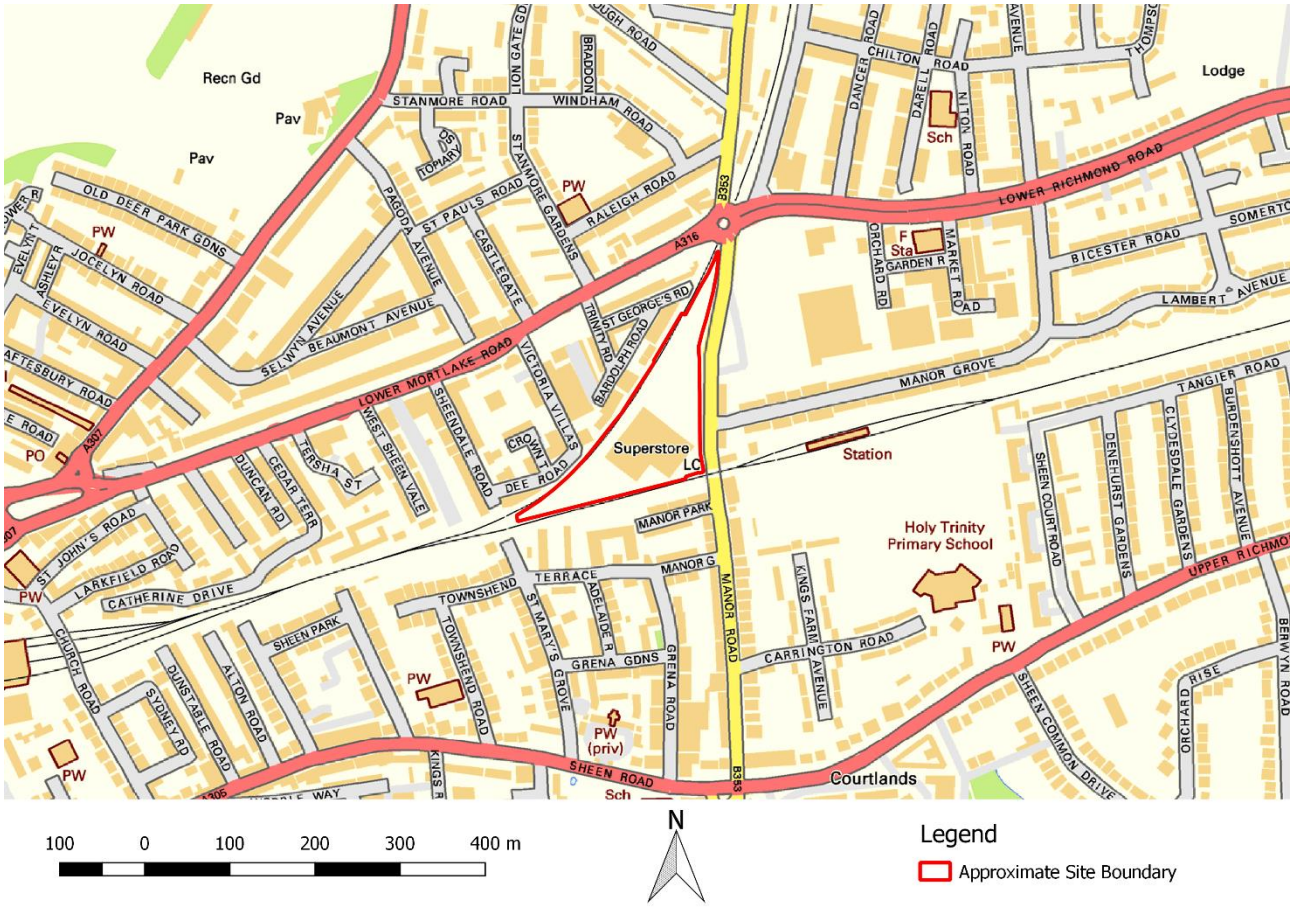


Figure 1 Location of the approximate Site boundary. Contains OS Data © Crown Copyright and Database rights 2020

The assessment describes the potential air quality impacts associated with the construction and operational phases of the Amended Proposed Development

A glossary of terms provided in section 8.

1.2 Scope of Assessment.

The scope of the assessment was provided to and agreed with Carol Lee Senior Environmental Health Pollution Practitioner (Air Quality) at the London Borough of Richmond upon Thames (LBRT) by email on the 15th July 2020 a copy of this correspondence is provided in Appendix 1 and summarised below:

- Baseline assessment will use 2019 data for LBRT
- A detailed assessment of site suitability will be undertaken
- Assessment of impacts from road traffic and energy combustion plant will be screened out
- Assessment of Construction dust will be undertaken
- An air quality neutral assessment will also be undertaken.

The railway line to the west and south of the Site is not a relevant line as detailed in Table 4.2 of the LLAQM TG16[1] document, therefore an assessment of the impact from the railway line has not been undertaken. There is considered to be no significant impact of this railway line on the Amended Proposed Development.

2. Legislation, Policy and Guidance Documents.

2.1 Air Quality Strategy and Local Air Quality Management

The Environment Act 1995 (Part IV)[2] requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries. The latter has become known as Local Air Quality Management (LAQM).

The Air Quality Strategy[3] provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants. These standards and objectives are designed to protect human health and the environment. The Strategy also sets out how the different sectors of industry, transport and local government, can contribute to achieving these air quality objectives.

Local authorities are required to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If the objectives are not achieved, the authority must declare an AQMA and should prepare an action plan within 12 months. An action plan must identify appropriate measures and policies that can be introduced in order to work towards achieving the objective(s).

The air quality objectives set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000[4], and the Air Quality (England) (Amendment) Regulations 2002[5].

The objectives for NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) are set out in Table 1. The objectives for NO_2, PM_{10} and $PM_{2.5}$ were to have been achieved by 2005, 2004 and 2020 respectively and continue to apply in all future years thereafter. It should be noted that local authorities in England have a flexible role in working towards reducing emissions and concentrations of $PM_{2.5}$.

Table 1 Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour Mean	200 µg/m^3 Not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 Not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
Fine Particles ($PM_{2.5}$) *	Annual Mean	25 µg/m^3

*The time period in LLAQM.TG19 states "Work towards reducing emissions/concentrations of fine particulate matter (PM2.5)"

The objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objective. Examples of where the annual mean objectives should apply are provided in LAQM.TG16, and include: building facades of residential properties, schools, hospitals. The annual mean objectives are not relevant for the building facades of offices or other places of work where members of the public do not have regular access, kerbsides or gardens.

The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels.

The 1-hour objective for NO_2 also applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations, pavements of busy shopping streets, carparks and bus stations which are not fully enclosed. The 1-hour objective does not apply at kerbside sites where the public do not have regular access.

2.2 EU Limit Values

The European Union has also set limit values for NO_2, PM_{10} and $PM_{2.5}$; these are legally binding and have been implemented into English legislation by The Air Quality Standards Regulations 2010[6].

The limit values for NO_2, PM_{10} and $PM_{2.5}$ are the same as the English objectives, but applied from 2010 for NO_2, 2005 for PM_{10} and 2015 for $PM_{2.5}$. The limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway).

2.3 General Nuisance Legislation

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10µm (i.e. greater than PM_{10}) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.4 Clean Air Strategy

The Clean Air Strategy (CAS)[7], published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.5 Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2019 sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

> Paragraph 54: "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."
>
> Paragraph 170: "Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable 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"
>
> Paragraph 180: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".
>
> Paragraph 181: "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."

Paragraph 183: "The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

The NPPF is supported by Planning Practice Guidance (PPG)[8].

The 'Air Quality' section of the PPG states that:

Paragraph 001 (Reference ID: 32-001-20191101): "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance relevant 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 or where the need for emissions reductions has been identified."

Paragraph 002 (Reference ID: 32-002-20191101): Plans may need to consider ways in which the development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example entail 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".

Paragraph 005 (Reference ID: 32-005-20191101): "Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and / or breach legal obligations (including those relating to the conversation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

The PPG also sets out the information that may be required in an air quality assessment, stating that:

Paragraph 007 (Reference ID: 32-007-20191101): "Assessments need to be proportional to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned".

It also provides guidance on options for mitigating air quality impacts, and makes clear that:

Paragraph 008 (Reference ID: 32-008-20191101): "Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact."

2.6 Regional Policy

2.6.1 London Plan 2016

The London Plan Consolidated with Alterations since 2011[9] sets out the spatial development strategy for London. The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years (to the period 2036) and contains policies which are harmonious to those of Development Plan Documents to the 32 London Boroughs.

The following policy relating to air quality is contained within the London Plan:

"Policy 7.14 Improving air quality

Strategic

The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

Planning Decision Development proposals should:

a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)

b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'

c) be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs).

d) ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches.

e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified. LDF preparation Boroughs should have policies that: a) 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. b) take account of the findings of their Air Quality Review and Assessments and Action Plans, in particular where Air Quality Management Areas have been designated."

2.6.2 Intend to Publish London Plan 2019

The Examination in Public on the London Plan was held between 15th January and 22nd May 2019. The Panel of Inspectors appointed by the Secretary of State issued their report and recommendations to the Mayor of London on 8th October 2019. The Mayor of London considered these recommendations and on 9th December 2019, issued to the Secretary of State his intention to publish the London Plan along with a clean and tracked version of the Intend to Publish London Plan[10] , a statement of reasons for any of the Inspectors' recommendations that the Mayor does not wish to accept and a note that sets out a range of interventions that will help achieve the housing delivery set out in the Plan.

The following policy relating to air quality is contained within the Intend to Publish London Plan:

"Policy SI1 Improving air quality

A London's air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced:

1) Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality

d) create unacceptable risk of high levels of exposure to poor air quality.

2) Development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality. Particular care should be taken with developments that are in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people.

3) Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development.

3A) Major development proposals must be at least air quality neutral and be submitted with an Air Quality Assessment.

4) Development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

6) Development proposals should ensure that where emissions need to be reduced, this is done onsite. Where it can be demonstrated that on-site provision is impractical or inappropriate, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated."

2.6.3 The London Environment Strategy

The London Environment strategy (LES), published in May 2018[11], supersedes the previous Mayor's Air Quality Strategy (MAQS) for London, published in December 2010. The LES strategy aims to reduce pollution concentrations in London to achieve compliance within the EU limit values as soon as possible. The LES commits to the continuation of measures identified in the 2002 and 2010 MAQS and sets out a series of additional measures.

Proposal 4.3.3.a states that the London Strategy provides policies in which all new large-scale developments can not only become 'Air Quality Positive', but also maintain Air Quality Neutral requirements for all other developments. Within the planning guidance for building operations and transport emissions, information about emission benchmarks for 'Air Quality Neutral' developments are set out. Any development that either meets or exceeds the benchmarks is considered Air Quality Neutral as they avoid any increase in PM and NO_x emissions. In order for the benchmarks to remain relevant, the Mayor will continue to review them. To ensure that the requirements are met, execution of the Air Quality Neutral policy will be monitored by utilising both the London Local Air Quality Management (LLAQM) and the London Plan monitoring report.

The following proposed policies relate to the planning process with regards to improving air quality:

Policy 4.2.2:	"Reduce emissions from non-road transport sources, including by phasing out fossil fuels;"
Policy 4.2.3:	"Reduce emissions from non-transport sources, including by phasing out fossil fuels;"
Policy 4.2.4:	"The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality;"
Policy 4.2.5:	"The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence-based steps to improve air quality;"
Policy 4.3.1:	"The Mayor will establish new targets for $PM_{2.5}$ and other pollutants where needed. The Mayor will seek to meet these targets as soon as possible, working with government and other partners;"

Policy 4.3.2: "The Mayor will encourage the take up of ultra-low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines;"

Policy 4.3.3: "Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality;"

Policy 4.3.4: "Work to reduce exposure to indoor air pollutants in the home, schools, workplace and other enclosed spaces."

Furthermore, the strategy outlines that negative consequences that can occur from developing air quality and climate policies in isolation, particularly with regards to energy and planning policy. Instead, integrated policy design can lead to benefits such as reducing carbon emissions by switching to zero emission vehicles simultaneously.

The Strategy also includes the focus on the 187 Air Quality Focus Areas (AQFA) declared by the GLA. Focus Areas are defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends. These are locations that not only exceed the EU annual mean limit value for NO_2 but are also locations with high human exposure. This is not an exhaustive list of London's hotspot locations, but where the GLA believe the problem to be most acute.

2.7 Local Policy

2.7.1 London Borough of Richmond upon Thames Local Plan.

The Local Plan, adopted on the 3rd July 2018 and covering the period to 2033, is the lead Local Plan document for Richmond. It sets out policies and guidance for the development of the borough over the next 15 years. It looks ahead to 2033 and identifies where the main developments will take place, and how places within the borough will change, or be protected from change, over that period. It also forms part of the development plan for the borough.

It contains the following policies related to air quality:

Policy LP 2 4.2.5 states: "*Tall or taller buildings can have a greater impact on their environment than other building types, posing problems of overshadowing, overlooking, creation of harmful micro-climates, worsening air quality and harmful effects on residents and amenity spaces. The siting and massing of new buildings will be controlled to avoid harmful intrusions into the skyline and on significant local views. In particular buildings that are higher and bulkier than their surroundings can have a visual impact over a wide area, altering the historic skyline and the character and appearance of Conservation Areas as well as open spaces. They can also dominate, obscure or detract from the setting of listed buildings and Buildings of Townscape Merit, Conservation Areas, Scheduled Monuments, Registered Parks and Gardens and the World Heritage Site at Kew.*"

Policy LP 10 B Air Quality states: "*The Council promotes good air quality design and new technologies. Developers should secure at least 'Emissions Neutral' development. To consider the impact of introducing new developments in areas already subject to poor air quality, the following will be required:*

1. an air quality impact assessment, including where necessary, modelled data;

2. mitigation measures to reduce the development's impact upon air quality, including the type of equipment installed, thermal insulation and ducting abatement technology;

3. measures to protect the occupiers of new developments from existing sources;

4. strict mitigation for developments to be used by sensitive receptors such as schools, hospitals and care homes in areas of existing poor air quality; this also applies to proposals close to developments used by sensitive receptors."

Policy LP 10 4.10.6 states: "*The Council will seek financial contributions through the use of Planning Obligations towards air quality measures where a proposed development is not air quality neutral or mitigation measures do not reduce the impact upon poor air quality.*"

2.7.2 Local Air Quality Management in Richmond.

LBRT has declared its entire borough as an AQMA for exceedances of the annual mean objective for NO_2 and the objective for PM_{10}.

LBRT's most recent Air Quality Action Plan (AQAP)[12] covers period from 2019 to 2024 and outlines the action LBRT will take to improve air quality in Richmond during this period. Its aim is to reduce concentrations of, and exposure to, pollution thereby positively impacting on the health and quality of life of residents and visitors to the borough. The actions are categorised under five broad themes:

- Monitoring of Air Quality
- Changing our Environment
- Changing Behaviour
- Tackling Pollution
- Protecting our Schools

The Amended Proposed Development is consistent with LBRT's AQAP.

2.8 Assessment Guidance.

The primary guidance documents consulted in undertaking this assessment are detailed below.

2.8.1 Mayor of London, London Local Air Quality Management Technical Guidance LLAQM.TG(19)

The Mayor of London's London Local Air Quality Management Technical Guidance[13] (LLAQM.TG(19)) was published for use by London local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.8.2 EPUK-IAQM 'Air Quality Guidance for Planning'

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

2.8.3 GLA guidance on The Control of Dust and Emissions During Construction and Demolition

The Greater London Authority produced guidance on the assessment of dust from demolition and construction[14]. This document provides a risk-based methodology for assessing construction impacts, including demolition and earthworks where appropriate.

2.8.4 Air Quality Neutral Planning Support Update: GLA 80371

Air Quality Consultants Ltd and ENVIRON UK Ltd produced guidance on behalf of the Greater London Authority on how to assess whether a development is air quality neutral. It provides benchmarks for assessing that development is consistent with the Mayor's policy.[15]

2.8.5 Air Quality Supplementary Planning Guidance June 2020

The LBRT produced a Supplementary Planning Document (SPD)[16] to help identify issues to be addressed in any application for development consent in which air quality will be an important consideration when assessing that application. It provides further advice and supplementary guidance to Richmond's Local Plan, in particular in

relation to the requirements set out in Policy LP 10, Part B. Air Quality. The guidance in the SPD has been considered throughout this assessment.

3. Methodology of Assessment.

3.1 Consultation.

The approach to the assessment was provided to and agreed with the Senior Environmental Health Pollution Practitioner (Air Quality) at the LBRT by email on the 15th July 2020, as described in section 1.2.. A copy of this correspondence is provided in Appendix 1.

3.2 Existing Air Quality in the Study Area.

A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the Site.

This desk-top study was undertaken using the following sources:

- Air quality data for Richmond, including a review of the LBRT air quality reports and local monitoring data;
- The UK Pollutant Release and Transfer Register[17];
- Background pollution maps from Defra's Local Air Quality Management (LAQM) website[18];
- Pollution Inventory from the Environment Agency[19]
- Greater London Authority LAEI Air Quality Focus Areas [20]
- Greater London Authority (GLA) modelling[21]; and
- Aerial photography from Google Maps.

3.3 Construction Phase Impacts.

Fugitive dust emissions during the construction may give rise to increased PM_{10} concentrations and dust deposition, albeit this is a temporary impact. These impacts have been assessed using the IAQM and GLA methodology (see Appendix 3) to identify appropriate mitigation measures commensurate with the risk.

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction and
- Trackout

The risk of dust emissions was assessed for each activity with respect to:

- Potential loss of amenity due to dust soiling;
- The risk of health effects due to a significant increase in exposure to PM_{10}

A desk based review using online resources of habitats and ecologically designated sites has been undertaken. No relevant ecological receptors within 50m of the Amended Proposed Development or roads used by the construction traffic have been identified.

First the potential dust emission magnitude was defined based on the scale of the anticipated works and is classified as Small, Medium or Large. Then the sensitivity of the area was defined based on the receptor sensitivity, number of receptors, and the distance from the source.

Receptors were identified within distance bands from the site boundary using aerial imagery and maps of the surrounding area (see Figure 7). The PM_{10} background concentration was also taken into account. The area was then defined as High, Medium or Low sensitivity.

The potential dust emission magnitude and the sensitivity of the area were combined to define the risk of impacts.

3.3.1 Construction Traffic

Construction Traffic Emissions Screening

The screening assessment has been undertaken with reference to the following EPUK and IAQM guidance indicative criteria:

- a change of light duty vehicles (LDV) flows of more than 100 AADT (within an AQMA); and/or
- a change of heavy duty vehicles (HDV) flows of more than 25 AADT (within an AQMA).

NRMM Emissions Screening

Non-Road Mobile Machinery (NRMM) refers to mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. NRMM emissions have been screened following IAQM guidance[22].

3.4 Operational Phase Impacts.

3.4.1 Road Traffic Impacts

The screening assessment has been undertaken with reference to the following documents:

- EPUK and IAQM guidance indicative criteria, i.e.:
  - a change of LDV flows of more than 100 AADT (within an AQMA); and/or
  - a change of HDV flows of more than 25 AADT (within an AQMA).

Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that "the criteria provided are precautionary and should be treated as indicative", and "it may be appropriate to amend them on the basis of professional judgement".

Where impacts can be screened out there is no need to progress to a more detailed assessment.

3.4.2 Combustion Plant Screening of Impacts

The assessment has been undertaken with reference to the EPUK and IAQM Guidance indicative criteria, i.e.:

- Combustion plant where the single or combined NOx emission rate is less than 5 mg/sec
- Provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.
- In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing NO_2 concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

This screening approach requires professional judgement, and the experience of the consultants preparing the assessment is set out in Appendix 6.

3.5 Operational Phase Impacts.

3.5.1 Site Suitability

A detailed assessment has been undertaken to consider the Site Suitability which refers to the exposure of future occupants of the Amended Proposed Development to existing air quality. Concentrations of NO_2, PM_{10}

and $PM_{2.5}$ have been predicted at the receptors in 2023, which is the earliest anticipated year of occupation for the Amended Proposed Development.

Concentrations at proposed receptors have been modelled using the dispersion model ADMS Roads (version 4.1.1.0)[23]. This model has been extensively validated and is widely used by regulators, government departments, consultancies and industry. Emission factors have been used from EFT v9.0 which is embedded within the ADMS-Roads model. The NOx to NO_2 calculator v7.1 has been used to convert the total NOx concentrations to NO_2 concentrations.

The model has been run using meteorological data from Heathrow Airport in the verification year of 2019. Traffic data has been sourced from the London Atmospheric Emissions Inventory (LAEI) and from the Department for Transport (DfT) and factored to the required years using TEMPro. Defra background concentrations have been used for the baseline year of 2019 and kept constant in the future year. Emissions are expected to reduce in the future but there are inherent uncertainties when predicting future emissions. Keeping the emission factors constant at the baseline year is therefore considered to be a conservative approach.

Full details of the air quality modelling methodology are provided in Appendix 4.

The following scenarios have been modelled:

- Base year traffic data (2019) with 2019 emission factors and background concentrations;
- Future year traffic data (2023) with 2019 emission factors and background concentrations;

Future year traffic data has been factored to the year 2023 using TEMPro to account for the changes in traffic as a result of other consented schemes in the vicinity of the Site. This approach considers the cumulative impacts of the Amended Proposed Development and other consented schemes on local air quality.

The proposed receptors are located at the road facing façades of the Amended Proposed Development where concentrations are expected to be greatest.

Predicted concentrations for NO_2, PM_{10} and $PM_{2.5}$ in the earliest expected opening year of 2023 are shown in Table 10.

The predicted concentrations include the contributions from road traffic and existing background concentrations and have been modelled at 14 proposed receptors. The locations of the proposed receptors are provided in Table 2 and shown in Figure 2.

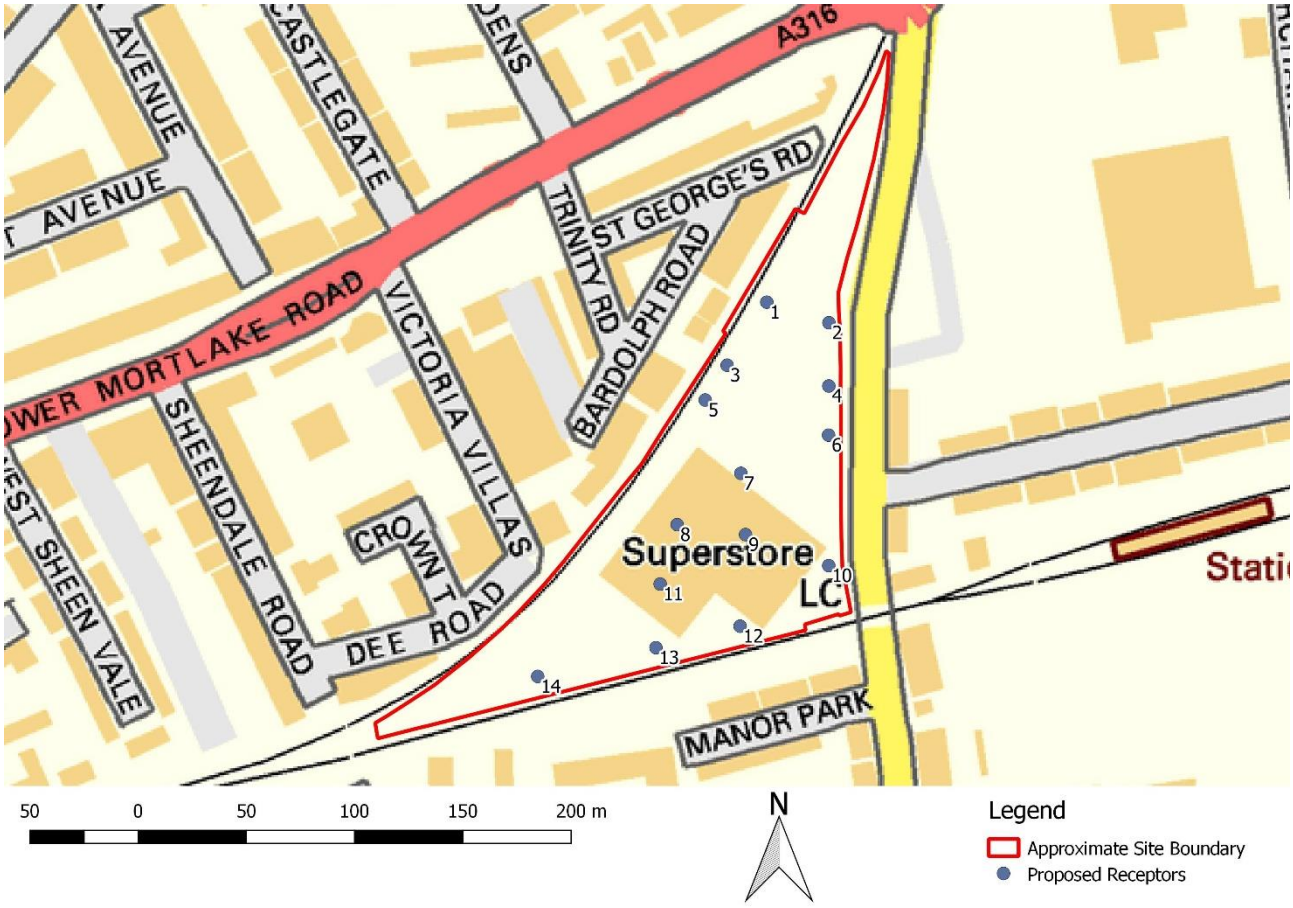


Figure 2 Location of proposed receptors. Contains OS Data © Crown Copyright and Database rights 2020.

Table 2 Modelled receptor locations within the Site boundary.

Receptor ID	Receptor Location	Grid Reference		Height (m)	Receptor Type
		X	Y		
1	Block A- NW	518931	175539	1.5, 5.7, 9	Residential
2	Block A- NE	518959	175530	1.5, 5.7, 9	Residential
3	Block A- W Central	518912	175510	1.5, 5.7, 9	Residential
4	Block A- E Central	518959	175501	1.5, 5.7, 9	Residential
5	Block A- SW	518959	175478	1.5, 5.7, 9	Residential
6	Block A- SE	518902	175494	1.5, 5.7, 9	Residential
7	Block A- S	518919	175460	1.5, 5.7, 9	Residential
8	Block B	518889	175437	1.5, 5.7, 8.9	Residential
9	Block D- NW	518921	175432	1.5, 5.0, 8.2	Residential

Receptor ID	Receptor Location	Grid Reference		Height (m)	Receptor Type
		X	Y		
1	Block A- NW	518931	175539	1.5, 5.7, 9	Residential
2	Block A- NE	518959	175530	1.5, 5.7, 9	Residential
10	Block D- E	518959	175418	1.5, 5.0, 8.2	Residential
11	Block C- NE	518881.4	175409.2	1.5, 5.0, 8.2	Residential
12	Block D- SW	518918.3	175389.8	1.5, 5.0, 8.2	Residential
13	Block C- SE	518879.5	175379.8	1.5, 5.0, 8.2	Residential
14	Block C- SW	518824.8	175366.6	1.5, 5.0, 8.2	Residential

3.5.2 Air Quality Neutral Assessment

To enable the implementation of the air quality neutral policy of the London Plan, emission benchmarks have been developed for buildings and transport, the latter of which are dependent on the zone in London where the development is located. Developers are required to calculate emissions due to building operations and transport, and to compare these emissions with the benchmarks, which are set out in Appendix 5.

Where the development's emissions exceed the benchmarks, on-site mitigation is required. Where emissions continue to exceed the benchmarks after appropriate on-site mitigation, the excess emissions need to be off-set off-site through agreement with LBRT.

3.6 Assessment of Significance.

3.6.1 Construction Dust

The IAQM and GLA guidance on the assessment of dust from demolition and construction states that the primary aim of the risk assessment is to identify site specific mitigation that, once implemented, should ensure that there will be no significant effect. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

The determination of which mitigation measures are recommended include elements of professional judgement and the professional experience of the consultants preparing this report is set out in Appendix 6.

3.6.2 Operational Impacts

The EPUK/IAQM guidance has been used to assess the potential for significant impacts as a result of vehicle emissions from traffic associated with the Amended Proposed Development. The focus of the guidance is to assess traffic emission impacts and advises on how to describe the air quality impacts and their significance.

3.6.3 Significance of Effect – Site Suitability Assessment

To determine the significance of predicted air quality impacts based upon a site suitability assessment, the EPUK/IAQM guidance states:

"Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means."

4. Baseline Air Quality.

This section sets out the available information on air quality in the vicinity of the Amended Proposed Development.

4.1 LAQM Review and Assessment.

LBRT has declared the whole borough as an AQMA for exceedances of the annual mean objective for NO_2 and the objectives for PM_{10}. The Amended Proposed Development is therefore located within an AQMA.

4.2 Local Air Quality Monitoring.

There are four automatic monitoring stations in operation in the borough. The closest automatic monitor, RHG, is approximately 3.7 km west of the Amended Proposed Development; this is a mobile monitoring station and has been located on Chertsey Road during 2017-2019[24]. This is a roadside site and its location is shown in Figure 3.

Table 3 Automatic monitoring for Richmond. Concentration in µg/m^3, 1-hour and 24-hour measurements show number of exceedances of the concentration i.e. 200 µg/m^3 for NO_2 and 50 µg/m^3 for PM_{10}.

Monitoring site and distance (km) from site boundary (approx.)	Objective	2016	2017	2018	2019
NO_2					
RHG, Mobile- Chertsey Rd, TW2, 3.7 km, Roadside	Annual mean (µg/m^3)	*	37	34	36
	Number of days with concentrations >200 µg/m^3	*	0	0	0
PM_{10}					
RHG, Mobile- Chertsey Rd, TW2, 3.7 km, Roadside	Annual mean (µg/m^3)	*	18	21	20
	Number of days with concentrations > 50 µg/m^3	*	1	1	8

*This mobile unit was located at another site therefore data is not available.

It can be seen from Table 3 that the annual mean NO_2 objective has not been exceeded at the RHG automatic monitoring site for the three-year period 2017-2019. The 1-hour objective has also not been exceeded during the same period.

PM_{10} monitoring at the RHG automatic monitoring station shows that the annual and 24-hour objectives have not been exceeded during the period 2017-2019.

LBRT also have 64 diffusion tubes in place across the borough. The diffusion tube monitoring locations within the vicinity of the Site are given in Figure 3 and the annual mean concentrations in Table 4 .

Figure 3 Local authority automatic and non-automatic monitoring locations in vicinity of the Site. Contains OS Data © Crown Copyright and Database rights 2020.

Table 4 Diffusion tube data (annual mean NO_2 concentrations µg/m^3) for the diffusion tubes located within approximately 1 km of the Site*

Site	Site Type	Distance (km) from site (approx.)	2015	2016	2017	2018	2019
17	Roadside	1.1	63	69	60	54	50
18	Roadside	0.1	67	56	58	46	46
19	Roadside	0.7	48	49	49	42	37
26	Roadside	0.4	40	40	36	36	34
27	Roadside	1.1	37	43	41	37	32
41	Kerbside	0.8	38	39	36	34	32
42	Roadside	0.7	47	82	89	72	62
43	Kerbside	1.2	80	85	78	59	46

Site	Site Type	Distance (km) from site (approx.)	2015	2016	2017	2018	2019
17	Roadside	1.1	**63**	**69**	**60**	**54**	**50**
44	Kerbside	0.4	**39**	**42**	**41**	40	37
50	Kerbside	1.0	**57**	**55**	**53**	**52**	**50**
52	Kerbside	0.8	**55**	**57**	**50**	**59**	**55**
54	Kerbside	1.0	**51**	**49**	**48**	40	40
55	Kerbside	0.9	**50**	**50**	**45**	**41**	40
74	Kerbside	0.9	37	39	**36**	**50**	**52**
Rut 02	Kerbside	0.9	**88**	**96**	**82**	**72**	**63**

* Bold indicates an exceedance of the annual mean objective

The annual mean NO_2 objective has been exceeded at 13 of the 15 diffusion tube monitoring sites in the vicinity of the Site over the last five years and at eight of the sites in the latest year (2019).

The diffusion tube monitoring data shows that the closest monitoring site, site 18, has exceeded the annual mean objective for NO_2 for the last five years. However, the site has shown a reduction of 21 µg/m^3 over this period.

Linear regression indicates that NO_2 concentrations (averaged across all sites in Table 4) decreased between 2015 and 2019 in the vicinity of the Site, however this trend is not significant.

An annual mean concentration of 60 µg/m^3 or above is often used to indicate a possible exceedance of the hourly mean NO_2 objective. It is likely that the 1-hour objective was exceeded at sites 42 and Rut 02 in the latest year with data (2019). It is considered unlikely that the 1-hour objective will be exceeded at the Amended Proposed Development based on the monitoring data provided.

4.3 Industrial Pollution.

A desk based review of potential industrial sources using the UK Pollutant Release and Transfer Register[17] and Environment Agency Pollution Inventory[19] did not identify any significant industrial or waste management sources of air pollution that are likely to affect the Amended Proposed Development with regard to air quality.

4.4 Defra Predicted Concentrations.

The background concentrations have been obtained from the national maps published by Defra[18]. These estimated concentrations are produced on a 1km by 1km grid basis for the whole of the UK. The Site falls into grid square x 518500 y 175500 and the predicted concentrations for this grid square for NO_2, PM_{10} and $PM_{2.5}$ are provided in Table 5.

Table 5 Estimated background concentrations in 2019 and 2023 in µg/m^3

Year	Background		
	NO_2	PM_{10}	$PM_{2.5}$
2019	23.1	17.1	11.9
2023	19.3	16.3	11.3

It can be seen that the modelled background concentrations are below the objective levels for all pollutants for the year with the most recent year of available data, 2019 and the expected opening year, 2023.

4.5 Greater London Authority.

4.5.1 Air Quality Focus Areas

There are a number of Air Quality Focus Areas (AQFAs) identified in London with four AQFA's in Richmond. These are locations that not only exceed the EU annual mean limit value for NO_2 but are also locations with high human exposure.

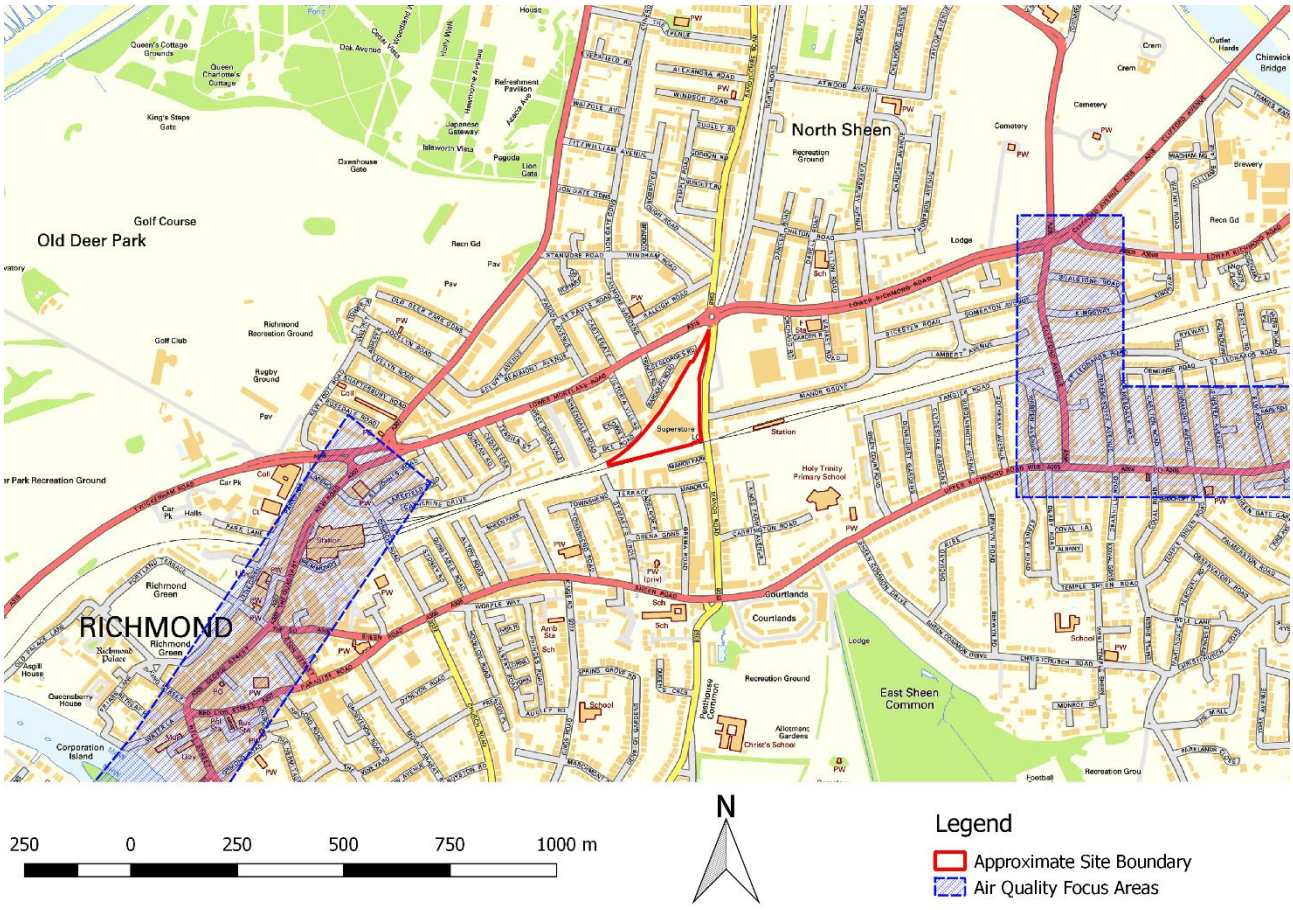


Figure 4 Air Quality Focus Areas and location of the Site in Richmond. OS Data © Crown Copyright and Database rights 2020.

The Site is located within 750 m of two declared AQFAs; Richmond Town Centre including Bridge St and Richmond Chalker's Corner/Clifford Av/A205/Upper Richmond Rd/Millstone Green.

4.5.2 London Air Emission Inventory

The GLA produce LAEI annual mean concentration maps for the whole of London on a 20m by 20m grid for a historic year (2016) and future years (2020, 2025 and 2030), which are based on a baseline year of 2013. Figure 5 and Figure 6 illustrate the annual mean NO_2 and PM_{10} concentrations in the immediate area of the Amended Proposed Development for 2020.

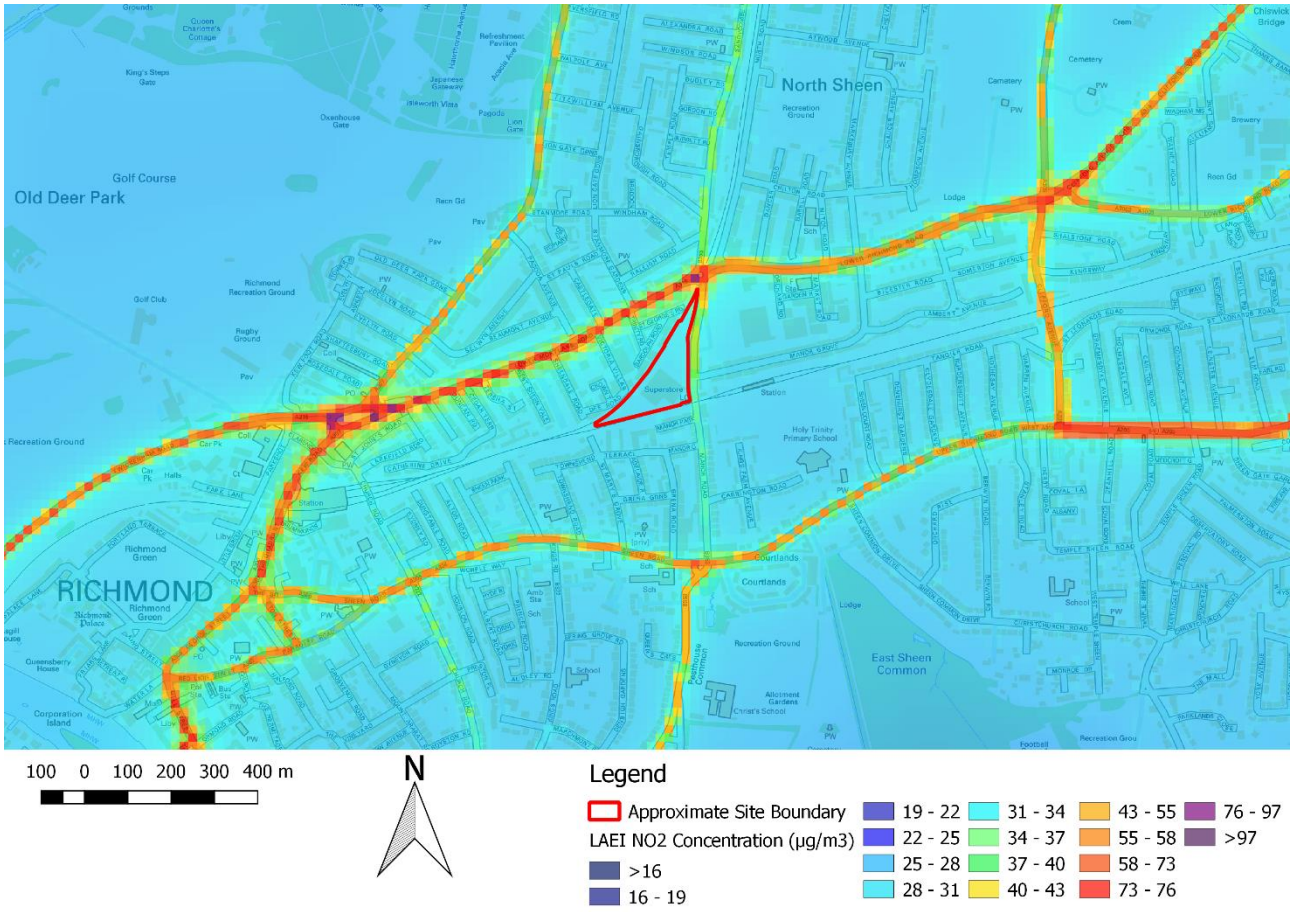


Figure 5 Modelled 2020 annual mean NO_2 concentrations (GLA, 2013), with red outline indicating approximate Site boundary OS Data © Crown Copyright and Database rights 2020

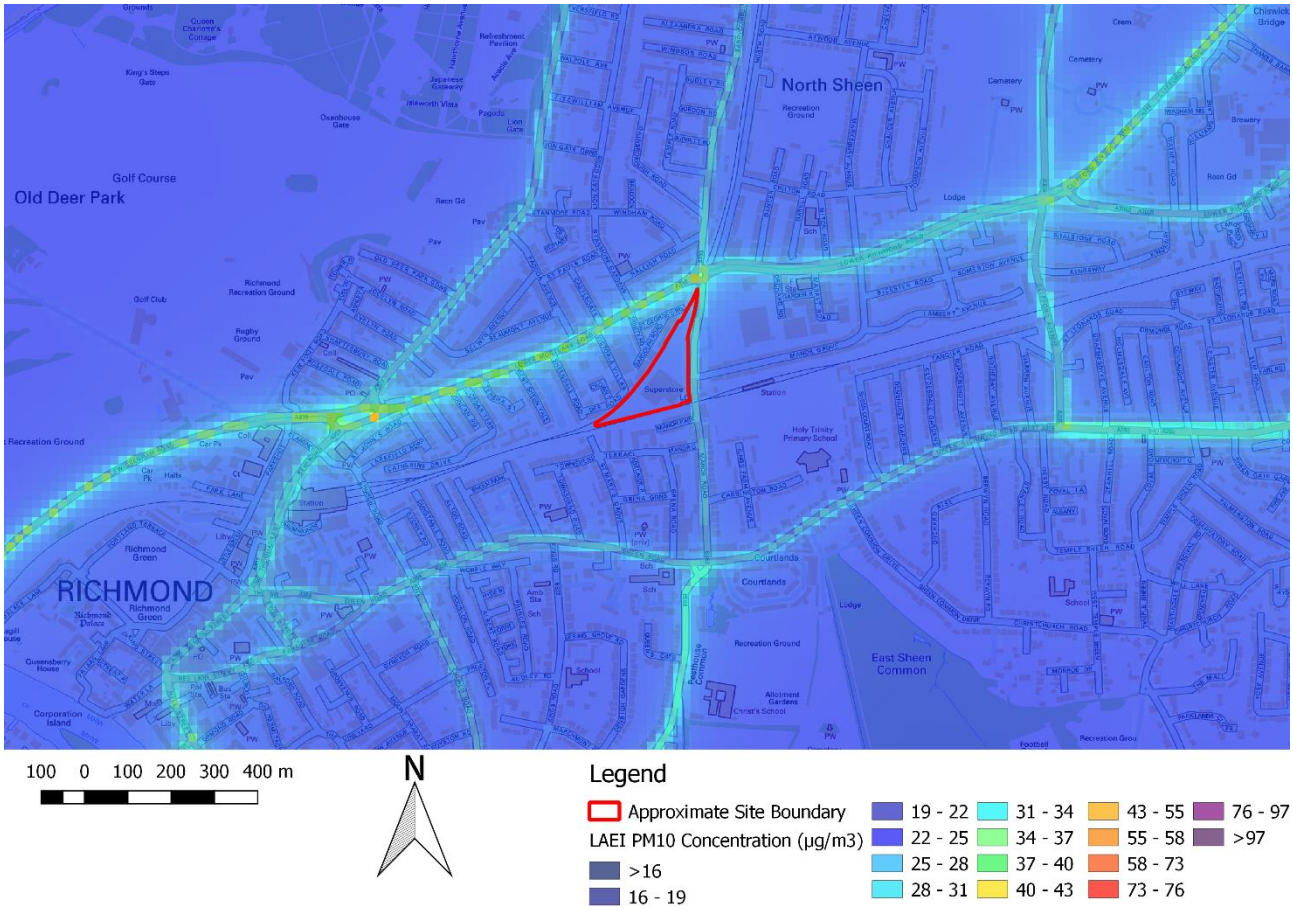


Figure 6 Modelled 2020 annual mean PM_{10} concentrations (GLA, 2013), with red outline indicating approximate Site boundary OS Data © Crown Copyright and Database rights 2020

The concentration of key pollutants in 2016 and 2020 are shown on Table 6 for the coordinates of the Amended Proposed Development. The annual mean objectives for NO_2, PM_{10} and $PM_{2.5}$ are not predicted to be exceeded in 2016 or 2020.

Table 6 Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ (grid reference x 518960, y 175480) (GLA, 2013)

Year	Pollutant Concentration - (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
2016	36.3	21.6	13.0
2020	29.2	23.4	14.3

4.6 Summary of background data.

The baseline assessment has shown that over the last five years there have been wide exceedances of the annual mean NO_2 objective at the diffusion tube monitoring sites but not at the automatic monitoring station in the vicinity of the Site. In the most recent year, 2019, the annual mean NO_2 objective was exceeded at 8 of the 15 diffusion tube monitoring sites. However, there has been an overall reduction in NO_2 concentrations across the diffusion tube monitoring sites over the five-year period between 2015 and 2019.

There have also not been any exceedances of the 1-hour mean NO_2, annual mean PM_{10} or 24-hour mean PM_{10} objectives at the roadside automatic monitoring station located at Chertsey Road, RHG.

Both the LAEI and Defra's predicted background concentrations are below the annual mean objectives for NO_2, PM_{10}, and $PM_{2.5}$ at the Site.

5. Impact Assessment.

The potential for air quality impacts during construction and operation of the Amended Proposed Development are discussed in this section.

5.1 Construction phase.

This sub-section provides the results for demolition, earthworks, construction and trackout activities associated with the Amended Proposed Development. Based on the impact assessment, appropriate mitigation has been identified.

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area as described in section 5.1.3. The two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information a higher risk category has been applied to represent the worst-case scenario.

5.1.1 Potential Dust Emission Magnitude

Demolition

The Site is currently occupied by a Homebase branch and associated surface car park, which are to be demolished. This is likely to have a total building volume between 20,000 m^3 to 50,000 m^3, with potentially dusty construction material, such as concrete. The potential dust emission magnitude from demolition activities would therefore be considered medium.

Earthworks

The Site is large at approximately 15,000 m^2, and there will be considerable earthworks proposed to include a basement in Blocks A and D. The potential dust emissions magnitude from earthworks is therefore considered to be large.

Construction

The total building volume of the Amended Proposed Development is likely to be over 100,000 m^3. The construction will be mainly concrete and masonry which have potential for high dust release. In accordance with the IAQM criteria, the potential dust emission magnitude from construction based on this detail would be large.

Trackout

It is expected that there will be an average of 10-50 outward Heavy-Duty Vehicle (HDV) trips generated during the construction phase per day. There may be short distances of unpaved road / tracks proposed as part of the Amended Proposed Development. However, given the dimension of the Site they are likely to be between 50 m to 100 m in length. The potential dust emissions magnitude from trackout is considered to be medium.

5.1.2 Summary of Potential Dust Emission Magnitude

As outlined in the IAQM guidance, the scale and nature of the works has been assessed to determine the potential dust emissions magnitude for the Site. Table 7 shows a summary of the classifications for the Amended Proposed Development for each of the activities.

Table 7 Dust Emission Magnitude for the Amended Proposed Development

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Large
Construction	Large
Trackout	Medium

5.1.3 Sensitivity of the Study Area

The area surrounding the Site consists primarily of commercial and residential premises. Figure 7 shows the Site boundary (red line) and a series of distance bands from the boundary. Note that receptors identified at a greater distance than 350 m have not been included as the IAQM Guidance[25] does not consider that there will be a material impact beyond this distance (see Appendix 3.)

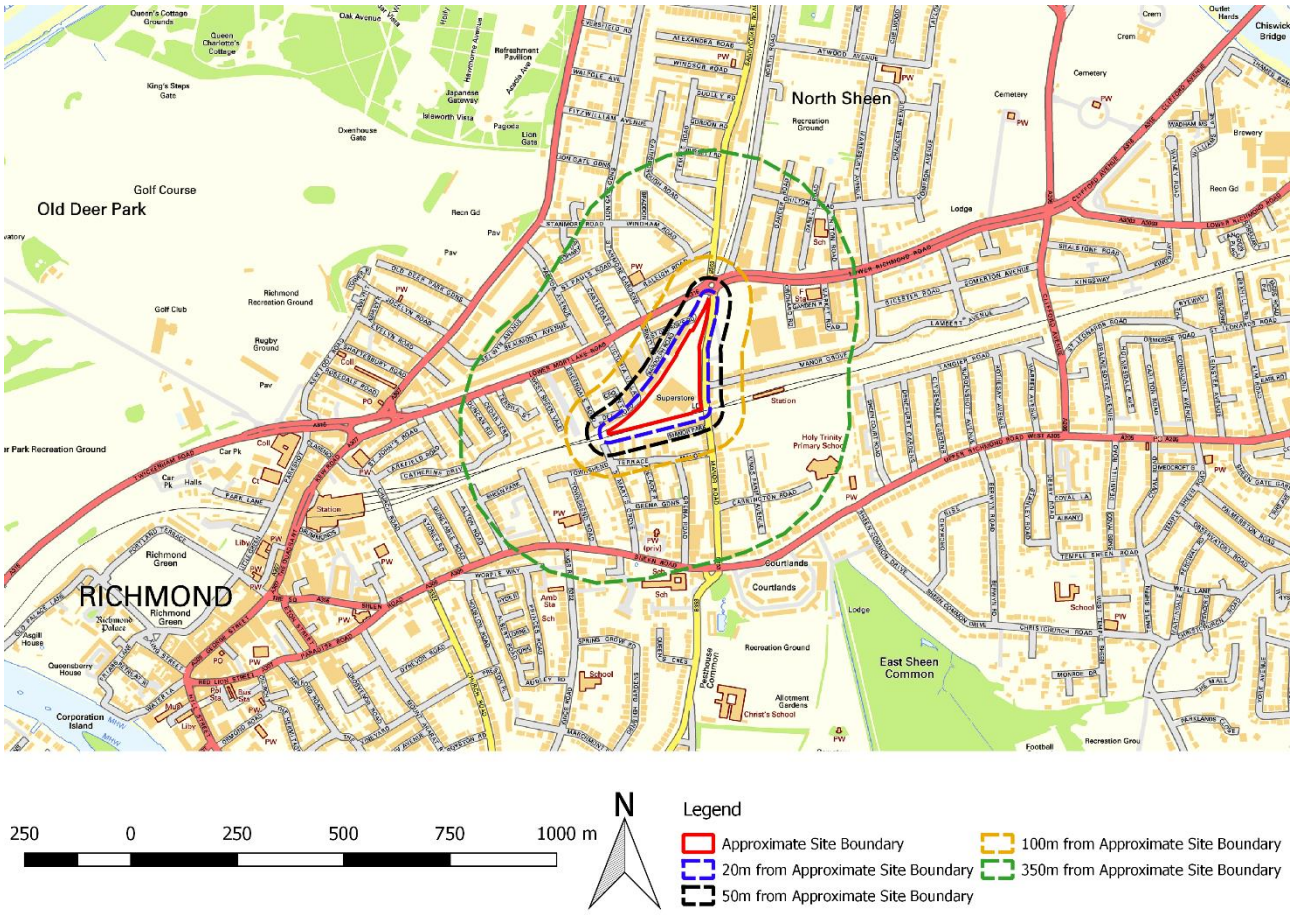


Figure 7 IAQM distance band criteria from site boundary. Contains Ordnance Survey Data © Crown Copyright 2020

5.1.4 Sensitivity of the Study Area to Dust Soiling

For the assessment of construction impacts the surrounding area is considered as a whole and the impacts at all receptors within 350 m are taken into account. Residential areas are considered to be highly sensitive to dust soiling. There are between one to ten residential receptors within 20 m of the Amended Proposed Development, and therefore the area surrounding the site is considered to be medium sensitivity.

For trackout, the distances are measured from the side of the roads used by construction traffic. Without site specific mitigation, trackout may occur from roads up to 200m from medium development sites, as measured from the Site exit, and up to 50m from the edge of the road. The Site has been classified as medium sensitivity to dust soiling for trackout.

5.1.5 Sensitivity of the Study Area to the Health Effects of PM_{10}

The LAEI forecast for 2020 modelled background PM_{10} concentrations is 23 $\mu g/m^3$. As the local PM_{10} concentration is under 24 $\mu g/m^3$ the area is considered to be of low sensitivity to the health effects of PM_{10} for all four activities.

5.1.6 Summary of Sensitivity

The sensitivity of the area is summarised for each activity in Table 8.

Table 8 Sensitivity of the Surrounding Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

5.1.7 Risk of Dust Effects

The dust emissions magnitude (section 5.1.1) is combined with the sensitivity of the area (section 5.1.3) to determine the risk of impacts with no mitigation applied. A summary of the unmitigated risk during each activity is provided in Table 9.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on the worst-case assumption that all works will be undertaken at the site boundary closest to each receptor area. Therefore, the actual risk is likely to be lower than that predicted during the majority of the construction phase.

Table 9 Summary of Potential Unmitigated Dust Risks

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

It is expected that all other developments in the vicinity of the Site will implement their own mitigation strategies to ensure that there are no off-site impacts from dust emissions. As long as this is the case, there are not expected to be any cumulative impacts from construction activities.

5.2 Construction Phase – Vehicular Pollutants.

The Site is located within LBRT AQMA and therefore the lower screening criterion (i.e. 100 LDV and 25 HDV) would apply.

Information on traffic movements anticipated during construction works was unavailable for the completion of the Air Quality Assessment. However, the development quantum is not anticipated to result in a significant increase in movements above the EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the Amended Proposed Development "can be considered to have insignificant effects" on air quality.

5.3 Construction Phase – Non-road Mobile Machinery.

Pollutants emitted by NRMM that may have the most significant potential effects on local air quality are particulate matter (PM_{10} and $PM_{2.5}$), and NOx/NO_2. Typically, NRMM is associated with construction sites and, therefore there is a potential for NRMM emissions to adversely affect local air quality as a result of the Amended Proposed Development. Within London the London Environment Strategy guidance[26] states that "Emissions from NRMM construction and maintenance activities will, where appropriate, meet or exceed the standards set out by the NRMM Low Emission Zone" as such emission from NRMM will be controlled at this Site.

However, IAQM guidance states that "Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed."

5.4 Operational Phase.

5.5 Road Traffic Emissions Screening Assessment.

Road traffic data associated with the Amended Proposed Development has been provided by Sanderson Associates, the appointed Transport Consultants for the project.

It has been indicated that the existing development has AADT flows of 1779 LDVs and HDVs. The AADT flows for the Amended Proposed Development are expected to decrease to 672 along the local road network. Therefore there will be an overall AADT reduction of 1107 LDVs and HDVs on the local road network as a result of the Amended Proposed Development.

As there is a reduction in traffic compared to the existing use there are not expected to be impacts on local air quality or any cumulative impacts as a result of the traffic generated by the Amended Proposed Development and other consented schemes. Therefore, no further assessment is required.

In accordance with the EPUK/IAQM guidance, the impacts on air quality from operational phase traffic generation are considered to be not significant.

5.6 Combustion Plant Screening Assessment.

All heating and cooling of the Amended Proposed Development is to be via an electrical solution. As such, the energy provision for the Amended Proposed Development will not involve any combustion processes or the release of any combustion emissions.

Therefore, a detailed assessment of emissions from combustion plant is not required.

5.6.1 Site Suitability

The future year (2023) with baseline (2019) emission factors and background concentrations has been used for the site suitability assessment as this will give a precautionary prediction of onsite concentrations. Table 10 shows concentrations at ground floor, first floor and second floor receptors.

There are predicted to be no exceedances of the NO_2 annual mean objective using Defra's emission factors for 2019 at any receptor on ground, first and second floor of the Amended Proposed Development.

There are predicted to be no exceedances of the annual mean objectives for PM_{10} or $PM_{2.5}$ at any receptor on ground, first and second floor of the Amended Proposed Development.

Ground level receptors represent worst case locations as they are the closest to the road source of emissions. The highest concentration for each receptor is recorded on the ground floor.

Table 10 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2023 at proposed receptors.

Receptor	Level Height (m)	NO_2		PM_{10}		$PM_{2.5}$	
		Concentration (µg/m³)	% of AQAL	Concentration (µg/m³)	% of AQAL	Concentration (µg/m³)	% of AQAL
1 - G	1.5	27.1	68	17.8	44	12.3	49
2 - G	1.5	28.1	70	17.9	45	12.4	50
3 - G	1.5	26.5	66	17.7	44	12.2	49
4 - G	1.5	27.7	69	17.9	45	12.4	49
5 - G	1.5	27.5	69	17.8	45	12.3	49
6 - G	1.5	26.3	66	17.6	44	12.2	49
7 - G	1.5	25.9	65	17.6	44	12.2	49
8 - G	1.5	25.6	64	17.5	44	12.1	49
9 - G	1.5	25.7	64	17.5	44	12.1	49
10 - G	1.5	27.1	68	17.8	44	12.3	49
11 - G	1.5	25.4	63	17.5	44	12.1	48
12 - G	1.5	25.4	64	17.5	44	12.1	48
13 - G	1.5	25.2	63	17.4	44	12.1	48
14 - G	1.5	25.1	63	17.4	44	12.1	48
1 - 1	5.7	26.6	67	17.7	44	12.2	49
2- 1	5.7	26.7	67	17.7	44	12.2	49
3- 1	5.7	26.2	65	17.6	44	12.2	49
4- 1	5.7	26.4	66	17.6	44	12.2	49
5- 1	5.7	26.2	66	17.6	44	12.2	49
6- 1	5.7	26.0	65	17.6	44	12.2	49
7- 1	5.7	25.7	64	17.5	44	12.1	49
8- 1	5.7	25.4	64	17.5	44	12.1	48
9- 1	5	25.5	64	17.5	44	12.1	48
10- 1	5	26.1	65	17.6	44	12.2	49
11- 1	5	25.3	63	17.4	44	12.1	48
12- 1	5	25.3	63	17.4	44	12.1	48
13- 1	5	25.1	63	17.4	44	12.1	48
14- 1	5	25.1	63	17.4	44	12.1	48
1 - 2	9	26.0	65	17.6	44	12.2	49
2- 2	9	25.8	64	17.5	44	12.1	49
3- 2	9	25.8	64	17.5	44	12.1	49

Receptor	Level Height (m)	NO_2		PM_{10}		$PM_{2.5}$	
		Concentration (µg/m³)	% of AQAL	Concentration (µg/m³)	% of AQAL	Concentration (µg/m³)	% of AQAL
4- 2	9	25.6	64	17.5	44	12.1	48
5- 2	9	25.4	64	17.5	44	12.1	48
6- 2	9	25.6	64	17.5	44	12.1	49
7- 2	9	25.3	63	17.5	44	12.1	48
8- 2	8.9	25.2	63	17.4	44	12.1	48
9- 2	8.2	25.2	63	17.4	44	12.1	48
10- 2	8.2	25.3	63	17.4	44	12.1	48
11- 2	8.2	25.1	63	17.4	44	12.1	48
12- 2	8.2	25.0	63	17.4	43	12.1	48
13- 2	8.2	25.0	62	17.4	43	12.1	48
14- 2	8.2	25.0	62	17.4	43	12.1	48

The maximum annual mean NO_2 concentration was recorded at R2-G and is 28.1 µg/m³ which represents 70% of the annual mean objective. NO_2 concentrations are therefore predicted to be below the annual mean objective threshold of 40 µg/m³ and well below 60 µg/m³, which is considered to be the annual mean concentration at which the short-term objective for NO_2 may be exceeded. Therefore, the annual and short-term objectives are likely to be met.

The maximum annual mean PM_{10} concentration was recorded at R2-G and R4-G and is 17.9 µg/m³ which represents 45% of the annual mean objective. Based upon the maximum predicted annual mean PM_{10} concentration, this equates to 1 day when 24-hour mean PM_{10} concentrations may be greater than 50µg/m³ therefore, the number of exceedances is within the 35-day compliance limit of the 24-hour mean air quality objective.

The maximum annual mean $PM_{2.5}$ concentration was recorded at R2-G and is 12.4 µg/m³ which represents 50% of the annual mean objective.

5.6.2 Significance of Air Quality Impacts

To determine the significance of predicted air quality impacts based upon a site-suitability assessment, such as that undertaken as part of this assessment, the EPUK & IAQM guidance states:

> "Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means."

With regards to the Amended Proposed Development, the unmitigated impact significance associated with the Amended Proposed Development has been predicted in accordance with the stated assessment methodology. The following factors have been considered when providing justification:

– The Amended Proposed Development will not introduce any new receptor into an area of exceedance of the annual or 1-hour mean NO_2 air quality objective based upon based upon detailed dispersion modelling.

- The Amended Proposed Development will not introduce any new receptor into an area of exceedance of the annual mean or 24-hour mean PM_{10} air quality objectives based upon based upon detailed dispersion modelling.

- The Amended Proposed Development will not introduce any new receptor into an area of exceedance of the annual mean $PM_{2.5}$ air quality objective based upon detailed dispersion modelling.

As no exceedances of the considered air quality objectives are predicted, mitigation measures are not required for the operational phase of the Amended Proposed Development. As such, the overall effect is considered to be 'not significant'.

5.7 Air Quality Neutral Assessment.

5.7.1 Building Emissions

There will be no combustion energy plant included as part of the Amended Proposed Development as energy demand will be met by electrical plant. Therefore there will be no building emissions under the operational phase.

5.7.2 Transport Emissions

The input data for the calculation of the transport related emissions (TRE) are shown in Table 11 and the transport emissions benchmark (TEB) input data are shown in Table 17.

The trip generation for the existing site is known and therefore has been used to calculate the TEB for both NOx and PM_{10}.

Table 11: Calculation of TRE and TEB

Description		Value	Unit
A	Annual Average Daily Traffic (Retail)	214	No. of vehicles/24 hours
B	Annual Average Daily Traffic (Residential)	458	No. of vehicles/24 hours
C	Annual Average Daily Traffic (Existing Retail Use)	1779	No. of vehicles/24 hours
D	TEB NOx	1238	kg/yr
E	Annual Emissions Generated by Development (TRE)	822	kg/yr
F	TEB PM_{10}	212	kg/yr
G	Annual Emissions Generated by Development (TRE)	141	kg/yr

The Amended Proposed Development TRE for NO_x is 822 kg/yr and for PM_{10} is 141 kg/yr. Both these TRE's are below the relevant TEB, 1,238 kg/yr NO_x and 212 kg/yr PM_{10}; and therefore, the Amended Proposed Development is considered air quality neutral with regard to transport emissions and therefore mitigation is not required.

6. Mitigation.

6.1 Construction Phase.

To mitigate the potential impacts during the construction phase it is recommended that mitigation measures consistent with the GLA's SPG and IAQM guidance are implemented. An Air Quality and Dust Management Plan (AQDMP), should be included as part of a Construction Environmental Management Plan (CEMP) and provided to the local authority prior to the commencement of works. Compliance of the AQDMP and CEMP will be secured through a suitably worded planning condition.

The following mitigation measures in Table 12 have been selected for the Amended Proposed Development based upon the dust risk categories outlined in Table 9 of this report and should be incorporated in the AQDMP:

Table 12 Fugitive dust mitigation measures that are applicable to the Amended Proposed Development

Issue	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
	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
Dust Management Plan	Develop and implement a Dust Management Plan (DMP), which may include measures to control emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} 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
	Hold regular liaison meetings with other high-risk construction sites within 500m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimized. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes
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 check of surfaces such as street furniture, cars, window sills within 100m of the site boundary, with cleaning to be provided if necessary
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked

Issue	Mitigation Measure
	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 PM_{10} 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.
Preparing and maintaining the site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is 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. If they are being re-used cover as described below
	Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and London Non- Road Mobile Machinery (NRMM) standards
	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 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where applicable)
	Produce a construction logistics plan to manage the sustainable delivery of goods and materials
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing)
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate

Issue	Mitigation Measure
	Use enclosed chutes and conveyors and covered skips
	Minimize drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
	Ensure equipment is readily available on site to clean any 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	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. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground
	Avoid explosive blasting, using appropriate manual or mechanical alternatives
	Bag and remove any biological debris or damp down such material before demolition
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
	Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
	Only remove the cover in small areas during work and not all at once
Construction	Avoid scrabbling (roughening of concrete surfaces) if possible
	Ensure sand and other aggregates are stored in bunded 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
	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery
	For smaller supplies of fine powder material ensure bags are sealed after use and stored appropriately to prevent dust
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 in continuous use
	Avoid dry sweeping of large areas

Issue	Mitigation Measure
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport
	Inspect on-site haul routes for integrity and instigate repairs to the surface as soon as 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

Potential dust effects during the construction phase are considered to be temporary in nature. The impacts are determined to be temporary as they will only potentially occur throughout the construction phase and short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine.

However, with the application of the above dust control and mitigation measures, it is considered that impacts at all receptors will be 'not significant' in accordance with the GLA guidance.

6.2 Construction Phase Road Traffic Emissions

Potential air quality impacts associated with construction phase road traffic emissions, principally HDV movements, have been screened out for further assessment with associated impacts on air quality predicted to result in an 'insignificant' effect. Therefore, mitigation measures are not considered to be required.

6.3 Construction Phase NRMM Emissions

In accordance with Part 4 of the IAQM Control of Dust and Emissions guidance, all NRMM would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effects of construction plant on local air quality would be insignificant.

6.4 Road Traffic Emissions

Potential air quality impacts associated with operational phase development trips generated by the Amended Proposed Development has been screened out in accordance with the EPUK and IAQM Guidance and the effect is 'not significant'. Therefore, no mitigation measures are required.

6.5 Energy Combustion Plant Emissions

Potential air quality impacts associated with the energy provision have been screened out from further assessment as there are no combustion processes involved. As such the impact from the energy provision will be negligible and no mitigation is required.

6.6 Site Suitability Assessment

There are not expected to be any exceedances of the relevant air quality objectives at any receptor at ground floor, first floor and second floor within the Site and therefore no mitigation is required.

Although no measures are required to mitigate the impacts of the air quality from the Amended Proposed Development, electric vehicle charge points will be provided as part of the scheme in line with the draft London

Plan. This will require provision of active charging at 20% of parking spaces and passive provision at the remaining 80% of parking spaces.

6.7 Cumulative Impacts

6.7.1 During Construction

There are not expected to be any cumulative impacts from construction activities and therefore no mitigation is required further to that set out in Table 12.

6.7.2 During Operation

There are not expected to be any cumulative impacts during the operational phased of the Amended Proposed Development and therefore no mitigation is required.

6.8 Air Quality Neutral

As the Amended Proposed Development is air quality neutral for building emissions and traffic emissions, therefore no mitigation is required.

7. Summary and Conclusions.

This AQA has been prepared following further amendments to the proposed scheme for the redevelopment of the Homebase store at 84 Manor Road, North Sheen, Richmond, TW9 1YB ('the Site'). The Site is for residential uses, therefore the annual mean objective for nitrogen dioxide (NO_2) and Particulate Matter 10 and 2.5 micrometres or less (PM_{10} and $PM_{2.5}$) applies.

The impacts of the construction work on dust and ambient PM_{10} concentrations have been assessed and the risk of dust causing a loss of local amenity and increased exposure to PM_{10} concentrations during construction works has been used to identify appropriate mitigation measures. Provided these are implemented, for example through a planning condition, the residual impacts are considered to be not significant. It is therefore considered that the Amended Proposed Development is consistent with the latest guidance relating to air quality for construction and demolition.

Exposure of future users of the Amended Proposed Development has been modelled using ADMS-Roads and there are predicted to be no exceedances of any relevant objectives for the pollutants modelled, NO_2, PM_{10}, $PM_{2.5}$.

There will be no combustion plant onsite and all energy demand will be met by electrical servicing, therefore there will be no energy emissions from the Amended Proposed Development.

The Amended Proposed Development is air quality neutral according to the Greater London Authority's (GLA) benchmarking assessment methodology.

The overall operational air quality impacts of the Amended Proposed Development are judged to be not significant.

8. Glossary of terms.

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EPUK	Environmental Protection UK
GIFA	Gross Internal Floor Area
HDV	Heavy Duty Vehicles (> 3.5 tonnes gross vehicle weight)
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LLAQM	London Local Air Quality Management
LLAQM.TG	London Local Air Quality Management – Technical Guidance
LBRT	London Borough of Richmond upon Thames
LDV	Light Duty Vehicles ($\leq$3.5 tonnes gross vehicle weight)
LES	London Environment Strategy
µg/m^3	Micrograms per cubic metre
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Particulate matter with aerodynamic diameter less than 10 micrometres
$PM_{2.5}$	Particulate matter with aerodynamic diameter less than 2.5 micrometres
PPG	Planning Practice Guidance
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
Trackout	The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site
ULEZ	Ultra Low Emission Zone

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Appendix 1 – EHO Consultation.

Andy Day

From: Carol Lee (Regulatory Services) <CarolM.Lee@merton.gov.uk>
Sent: 15 July 2020 12:48
To: Andy Day
Subject: RE: Manor Road Richmond - EHO telephone follow up - air quality assessment approach

[External email]

Hi Andy

Thank you for your email.

Yes I am the best person and apologies for bounce back – we have requested an out of office with new email but to no avail. The London Borough of Richmond upon Thames has now merged with LB Merton and LB Wandsworth, hence new email.

My comments from 2018 stand. Good news on proposed emissions from transport and buildings. Electrically powered air source heat pumps and no combustion plant are particularly welcome and will help future proof the development (ensure noise insulation is secured). As advised previously, car free would be ideal.

We now have an updated, adopted AQAP and an AQ SPD:
https://www.richmond.gov.uk/services/environment/pollution/air_pollution/air_quality_reports/progress_reports_and_air_quality_action_plans and
https://www.richmond.gov.uk/media/19206/air-quality-spd-june-2020.pdf

If you require any further information, please do not hesitate to get in touch.

Kind regards

Carol

Carol Lee
Senior Environmental Health Pollution Practitioner (Air Quality)
Regulatory Services Partnership
London Boroughs of Richmond upon Thames, Merton and Wandsworth
1st Floor Civic Centre, 44 York Street, Twickenham TW1 3BZ

Tel 07917 307 206

e-mail: carol.lee@merton.gov.uk

From: Andy Day <AndyDay@hoarelea.com>
Sent: 15 July 2020 12:24
To: Carol Lee (Regulatory Services) <CarolM.Lee@merton.gov.uk>
Subject: FW: Manor Road Richmond - EHO telephone follow up - air quality assessment approach

Hi Carole,

I tried to send the below to your Richmond email address but it bounced back, I found this Merton address in the Richmond ASR.

Are you able to advise on the below please? Are you still the best person to send this to, if not, can you please advise who it should be sent to?

Many thanks,

Andy Day
Air Quality Consultant

DDI +44 20 3668 7289
Tel +44 20 3668 7100
Mob +44 7384 548 115
Email andyday@hoarelea.com

HOARE LEA

From: Andy Day
Sent: 15 July 2020 12:20
To: Carol Lee <Carol.Lee@richmond.gov.uk>
Subject: RE: Manor Road Richmond - EHO telephone follow up - air quality assessment approach

Hi Carole,

I am following up the below as the application is being resubmitted for the below development.

I would like to clarify our assessment approach and provide another opportunity to address any comments you may have.

Our proposed approach for the air quality assessment for the development is set below –

- The assessment of baseline air quality will draw on the Council's air quality data and Defra's local background data, this will use 2019 monitoring data from the 2020 annual status report.
- The assessment of the impact of emissions from existing road traffic at proposed receptors will be undertaken using dispersion modelling.
- There will be a reduction in traffic generated by the proposed development compared to the existing site and therefore impacts from road traffic generated will be screened against the EPUK/IAQM guidance criteria.
- Energy provision for the proposed development will be from electrically powered air source heat pumps and there will be no combustion plant included as part of the development, as such an assessment of impacts from combustion plant will not be included.

- The air quality assessment will include an assessment of construction impacts on air quality and dust using the IAQM methodology, in compliance with London's SPG on 'The Control of Dust and Emissions During Construction and Demolition (2014)'.
- An air quality neutral assessment will also be undertaken.

As you flagged in the below, the slowing of traffic along manor road as a result of the level crossing will be considered within the dispersion modelling.

If you have any comments on the above please do let me know.

Many thanks,

Andy Day
Air Quality Consultant

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Tel +44 20 3668 7100
Mob +44 7384 548 115
Email andyday@hoarelea.com

HOARE LEA

From: Carol Lee <Carol.Lee@richmond.gov.uk>
Sent: 26 July 2018 13:24
To: Chris Rush <ChrisRush@hoarelea.com>
Subject: RE: Manor Road Richmond - EHO telephone follow up - air quality assessment approach

Hi Chris

Thank you for your email and sincere apologies for the delay in getting back to you. Unfortunately your email coinsided with the start of my main annual holiday.

I have pleasure in attaching our 2018 ASR with full data sets for 2017, going back 7 years. There is no tube on Manor Rd but sites 18 and 26 are closeby on the A316 and Sth Circular respectively and sites 19, 44, 42, 17, Rut 2, 52 and 50 are all nearby. 2017 appears to be a lower than average year, so please proceed with caution. We run a background site at Wetlands; you are welcome to use this data, included in the ASR.

Air Quality needs to be a consideration in this development. There is concern on the impact of the development, its location and the nature of the development.

Your proposed approach is good but I would like to add a few comments.

The whole of the London Borough of Richmond upon Thames is an AQMA and Manor Road lies between the A316 - the main road into London, and link for M3 and M4 - and the South Circular both of which are high traffic roads with exceedences of EU limit values of 40 µg/m3 for NO2 for at least the last 15 years.

Manor Road is also the location of a major level crossing for the main South West train line into central London. Down time at the level crossing at peak hours is currently 44 minutes in the hour. This results in long tailbacks at the level crossing which regularly back onto both the South Circular and the A316. At peak hours traffic is already over capacity and queues past this site with lots of stop/start motoring. Please be aware of this – it may be difficult to fully represent in modelling. Any addition to traffic at peak hours would be of concern.

The site is very close to North Sheen station, with regular direct trains to Waterloo and close to bus stops with good bus services. This will give a good PTAL rating and a car free development should be encouraged.

If you require any further information, please do not hesitate to get in touch.

Kind regards

Carol

Carol Lee
Senior Environmental Health Pollution Practitioner (Air Quality)
Regulatory Services Partnership
London Boroughs of Richmond upon Thames, Merton and Wandsworth
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Tel 020 8891 7729

e-mail carol.lee@richmond.gov.uk

From: Chris Rush [mailto:ChrisRush@hoarelea.com]
Sent: 10 July 2018 10:53
To: Carol Lee
Cc: Mark Harber; Thomas Cox
Subject: Manor Road Richmond - EHO telephone follow up - air quality assessment approach

Hi Carol,

We are progressing with an air quality assessment for a planning application of a development for a mixed use (including residential) proposal at a site that is currently used for commercial use located on Manor Road in Richmond (approximate postcode TW9 4QE - see below figure showing approximate site boundary marked with red line).

I called earlier and left a message and thought an email may be easier for you to pick up.

I am getting in contact to provide detail on the proposed approach for the air quality assessment for the development as set below –

- The assessment of baseline air quality will draw on the Council's air quality data and Defra's local background data.
- The assessment of the impact of emissions from existing road traffic at proposed receptors will be undertaken using dispersion modelling.
- We are currently in contact with the transport consultant and working to ascertain the traffic change as a result of the development. If the traffic generated by the development results in a change of less than 100 annual average daily traffic (AADT) for light duty vehicles (LDV) then impacts on existing receptors will be scoped out inline with the EPUK/IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality' January 2017. If this change exceeds 100 AADT then the impacts will be assessed.
- The assessment will be undertaken in line with the EPUK/IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality' January 2017.
- We are currently in discussions with the project engineers to ascertain if there are any gas fired boilers and or combined heat and power energy combustion systems and what data is available at this stage. These will be assessed if data is available at this early design stage. If sufficient data is not available at this design stage then detail of the likely plant proposed will be provided with a detailed assessment potentially conditioned.

- The air quality assessment will include an assessment of construction impacts on air quality and dust using the IAQM methodology, in compliance with London's SPG on 'The Control of Dust and Emissions During Construction and Demolition (2014)'. This will include assessment of demolition.
- An air quality neutral assessment will also be carried out as part of the air quality assessment for the proposed development.

I would be grateful if you can please acknowledge receipt of this email.

Also – if you can please provide your latest air quality progress report and previous five years of air quality monitoring data for the borough if this data is not included in the report that would be appreciated.

Should you have any queries or comments in relation to this please do let me know.

Best Regards,

Chris Rush
Associate

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Tel +44 161 834 4754
Mob +44 7548 345 081
Email chrisrush@hoarelea.com

HOARE LEA

Appendix 2 – Amended Proposed Development Plans.

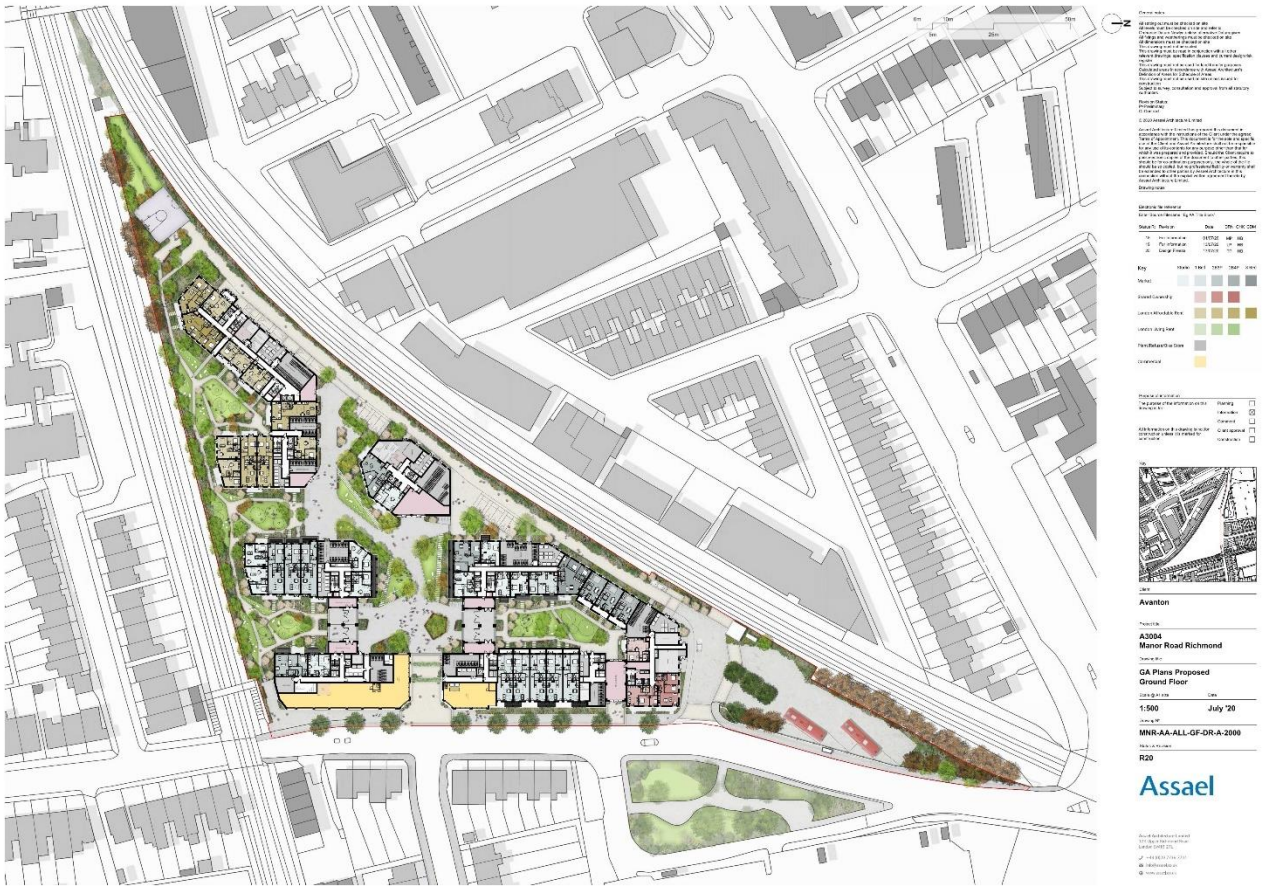

Figure 8 Proposed site plan (indicative only). Manor Road, Richmond. Source document: Assael. Drawing No.: MNR-AA-ALL-GF-DR-A-2000 Date: July 2020

Appendix 3 – GLA Construction Phase Methodology.

The following tables have been taken from the GLA supplementary planning guidance document 'The Control of Dust and Emissions During Construction and Demolition' and have been utilised to determine the sensitivity of the area and consider the risk of fugitive emissions as a result of construction activities.

Table AII-1 to Table AII-2 illustrate how the sensitivity of the area may be determined for dust soiling and human health, respectively. It should be noted that the highest level of sensitivity from each table should be considered, as recommended by the GLA.

Table AII-1: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table AII-2: Sensitivity of the Area to Human Health Effects

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m^3	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28 – 32µg/m^3	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24 – 28µg/m^3	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low	Low

		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1 – 10	Medium	Low	Low	Low	Low
Low	-	1	Low	Low	Low	Low	Low

Table AII-3 to Table AII-6 illustrate how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts with no mitigation measures applied.

Table AII-3: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table AII-4: Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table AII-5: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table AII-6: Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix 4 – Road Traffic Model Input Data.

A4.1 Model Input Parameters

Parameter	Description	Input Variable
Surface Roughness	Surface roughness of the modelling domain as a function of land use	A roughness length z_0 of 0.5m was used within the assessment area of this dispersion modelling study. This value is for 'open suburbia' and therefore considered appropriate for the surface roughness of the dispersion modelling assessment area.
Road Source Emissions	Source of the emission factors used	EFT v.9.0.1
Emission Year	Modelling year used to factor the traffic emissions	2019 for the verification year and future years.
NOx to NO_2 Conversion	Conversion from NO_x concentrations to NO_2 concentrations	NO_x to NO_2 calculator v7.1. General inputs – 2019, Richmond upon Thames London Boro, All London traffic.
Road Type	Road type within the EFT emission database	London (outer)
Elevation of Road	Height of the road link above ground level	0m no elevation – roads are at ground level
Road Width	Width of the road link	Road width obtained from Google Street View
Road Speed	Road speed in km/h	Variable based on posted limit and adjustment for road geometry in line with LAQM.TG(16).*
Meteorology	Representative hourly sequential meteorological data	Heathrow Airport 2019
Background	Background pollutant concentration considered during the modelling	See Table 5, Defra 2019 background maps 1km x 1km grid squares
Output	Output as gridded or specified points	At specified points as detailed in Table 2
Pollutant Output	Pollutants modelled and averaging time	NO_2, PM_{10} and $PM_{2.5}$ annual mean

*The road speed on Manor Road was reduced to 20 km/h based on discussions with the EHO at LBRT, as shown in Appendix 1

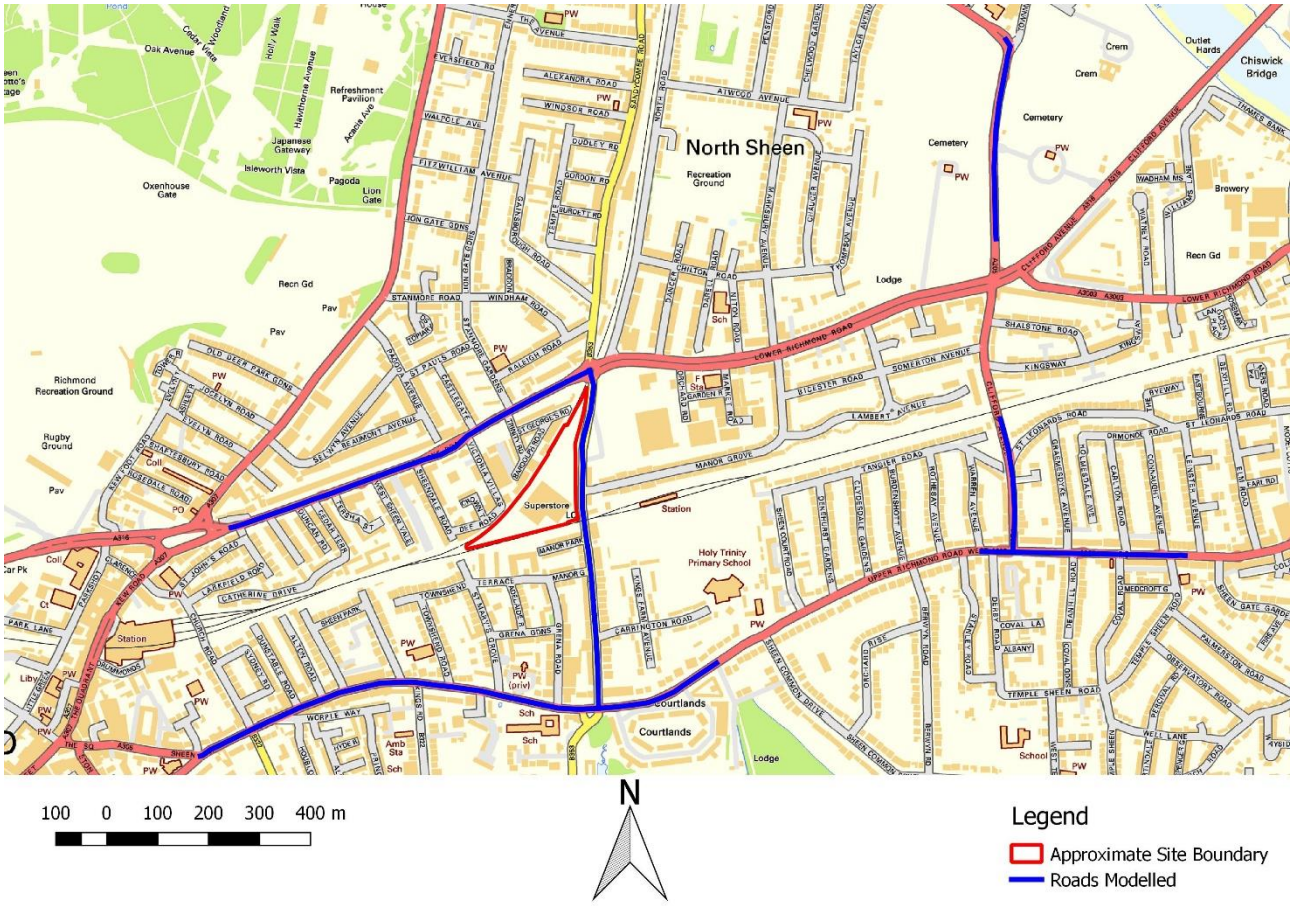

Figure 9 Modelled roads. Contains Ordnance Survey data © Crown copyright and database right 2020

Table 13 Summary of traffic data used in the assessment. Traffic flows are given in annual average daily traffic (AADT).

Road Name	LDV		HDV		Speed (km/h)	Data Source
	2019	2023	2019	2023		
Lower Mortlake Rd	1428	1411	85	83	32	DfT (2018)
Manor Rd	310	306	4	4	20	DfT (2018)
Sheen Road	521	543	41	42	26	LAEI (2016)
Upper Richmond Road	903	-	65	-	20	DfT (2018)
Mortlake Road	772	-	48	-	32	DfT (2018)
Clifford Avenue	814	-	35	-	20	DfT (2018)

The average speed along Manor Road takes in to account the level crossing by the North Sheen train station and the build-up of traffic along Manor Road.

A4.2 Background Concentrations

Background concentrations have been assumed to be the same as those published by Defra. These cover the whole country on a 1 km by 1 km grid and are published for each year from 2017 to 2030. The current maps have been verified against measurements undertaken during 2017.

Background concentrations at the Site are provided in Table 14.

Table 14 Annual Mean Background Concentrations at the Site (µg/m^3)

Grid Square	NO_2		PM_{10}	$PM_{2.5}$
	2019	2023	2019	2019
518500,175500	23.1	19.3	17.1	11.9

A4.3 Verification

A4.3.1 Background Concentrations

The verification process seeks to minimise uncertainties associated with the air quality model by comparing the model output with locally measured concentrations. The verification methodology is described in subsequent sections.

A4.3.2 Background Concentrations

Background concentrations at the monitoring sites in the verification year (2019) have been assumed to be the same as those published by Defra and are shown in Table 15.

Table 15 Annual Mean Background Concentrations at the Monitoring Sites (µg/m^3)

Grid Square	NO_2 2019
518500,175500	35.5
519500,175500	34.3
519500,176500	32.7

A4.3.3 NO_2

Most NO_2 is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the 2019 annual mean NOx concentrations at the diffusion tube monitoring sites DT 18, DT 26, DT 44, DT 50 and DT 55.

The model output of road-NOx has been compared with the 'measured' road-NOx, calculated from the measured annual mean NO_2 concentrations and the background concentrations using the NOx from NO_2 calculator v7.1 published by Defra.

The slope of the best-fit line between the 'measured' road-NOx contribution and the model derived road-NOx contribution, forced through zero, has been used to determine a primary adjustment factor). This factor has then been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations. The NOx to NO_2 calculator has then been used to determine total NO_2 concentrations from the adjusted modelled road-NOx concentrations and the background NO_2 concentrations.

The following adjustment factor has been applied to all modelled nitrogen dioxide data:

adjustment factor: 2.4222

The results imply that the model has under-predicted the road-NOx contribution. This is a common experience with this and most other models.

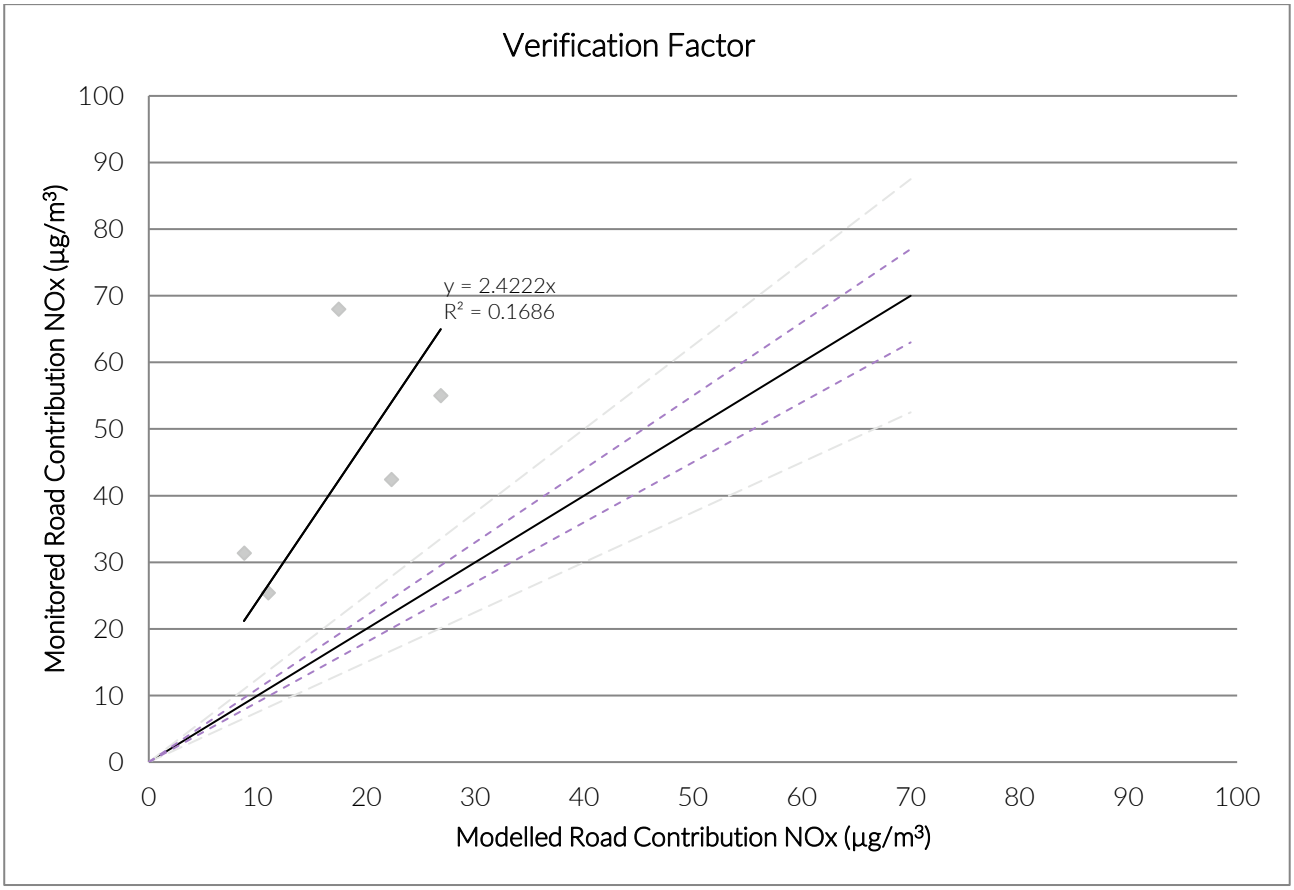

Figure 10 Comparison of measured road NOx to unadjusted modelled road NOx concentrations.

Table 15 provides the inputs for the comparison of the adjusted modelled NO_2 and monitored NO_2, which are used to calculate the adjustment factor.

Table 15 Comparison of Modelled and Monitored NO_2 Concentrations.

Monitoring Location	Modelled NOx Road Contribution (µg/m³)	Monitored NOx Road Contribution (µg/m³)	Adjusted Modelled NOx Road Contribution (µg/m³)	Monitored Total NO_2 Concentration (µg/m³)	Adjusted Modelled Total NO_2 Concentration (µg/m³)	Difference (%)
DT26	11.0	59.7	26.6	34.0	34.5	1.5
DT18	26.8	90.5	65.0	46.0	49.6	7.7
DT44	8.7	66.9	21.2	37.0	32.8	-11.4
DT50	17.5	102.3	42.3	50.0	40.8	-18.4
DT55	22.3	75.1	54.0	40.0	44.4	11.0
Adjustment Factor	2.4222					

A4.3.4 Statistical Analysis of Model Performance

LAQM.TG (16) recommends three statistical procedures that should be applied to evaluate model performance and assess the overall uncertainty. These are:

- Root mean square error (RMSE) defines the average error or uncertainty of the model. Ideally a RMSE within 10% of the air quality objective which is being assessed would be derived (for the annual mean NO_2 objective the ideal RMSE would be < 4 $\mu g/m^3$). Where the RMSE is greater than 25% of the objective being assessed (i.e. 10 $\mu g/m^3$ for the annual mean NO_2 objective) it is advised to revisit the model parameters and verification;
- Fractional bias identifies whether the model has a tendency to under-predict (positive value) or over-predict (negative value). The ideal value is zero but may range from +2 to -2; and
- Correlation coefficient provides a measure of the linear relationship between modelled and measured data. Values range between zero (no relationship) and 1 (perfect relationship).

The values for each of these methods are provided in Table 16.

Table 16 Statistical analysis of model verification.

Method	Value
RMSE	4.741
Fractional Bias	0.796
Correlation Coefficient	0.644

A4.3.5 PM_{10} and $PM_{2.5}$.

There are no PM_{10} or $PM_{2.5}$ monitors within the study area; therefore, the model outputs of road-PM have been adjusted by applying the primary adjustment factor calculated for road NO_x.

A4.4 Sensitivity Analysis.

There is some uncertainty with regard to future reductions in road traffic NOx emissions used in the EFT and the background maps. Therefore, a sensitivity analysis has been undertaken which assumes that there are no reductions in emission factors for road traffic from the base year.

The model inputs are as described above; however, emission factors from the base year (2019) have been used with the future year traffic data to predict 'no emissions reduction' NO_2 concentrations. Background concentrations have also been held at the base year for the sensitivity test.

For PM, there is no strong evidence that Defra's predictions are unrealistic and so the year-specific mapped concentrations have been used.

Appendix 5 – Air Quality Neutral.

The methodology report that supports the GLA's SPG on Sustainable Design and Construction provides guidance on the application of the air quality neutral policy.

The development's emissions are compared with the relevant emissions benchmarks to determine whether the Proposed Development is air quality neutral.

A5.1 Transport Emissions.

The TEB for the Proposed Development is calculated by multiplying the gross internal floor area of each land use class by the relevant TEB from Table 17, and summing the results.

The transport related emissions (TRE) for each land use category are calculated using the:

- Gross internal floor area (m^2) of the Proposed Development (A1-A5, B1), and/or the number of dwellings (C3, C4);
- Proposed Development trip rate (trips/annum);
- Average distance travelled (km) for each land-use class;
- Average road traffic emissions of NOx and PM_{10},

Table 17 Transport Emissions Benchmarks (TEB)

	NOx			PM_{10}		
Land Use	TEB (g/m2/Yr)					
	CAZ	Inner	Outer	CAZ	Inner	Outer
A1	169	219	249	29.3	39.3	42.9
B1	1.27	11.4	68.5	0.22	2.05	11.8
TEB (g/Dwelling/Yr)						
C3	234	558	1553	40.7	100	267

Appendix 6 – Professional Experience.

Kathryn Woolley (Hoare Lea), BSc (Hons), AMIEnvSc, MIAQM

Kathryn is a Principal Air Quality Consultant with Hoare Lea. She's is an associate Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management.

She has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Kathryn's expertise covers planning, and air quality, specifically in relation to residential developments, industrial fixed installations such as waste management centres and transportation environmental impact on developments including air traffic. Kathryn is involved in the testing and assessment of the impact of indoor air quality and how building design contributes to this.

Andy Day (Hoare Lea), BSc (Hons), MSc, AMIEnvSc, AMIAQM

Andy is an Air Quality Consultant with Hoare Lea. He is an Associate Member of the Institute of Environmental Sciences and an Associate Member of the Institute of Air Quality Management. He is a chemistry graduate with a Master's specialising in the catalysed removal of harmful volatile organic compounds (VOCs) often generated from the combustion of fuel in car engines.

Andy provided input to the research for a scientific paper involving the use of catalysts prepared by a low NOx method for the complete removal of propane and naphthalene in lab based experiments. He has contributed to research as part of his degree into the causes and effects of poor outdoor air quality as well as exposure to poor indoor air quality.

Hannah Whalley (Hoare Lea), BSc (Hons), MSc

Hannah is a Graduate Air Quality Consultant with Hoare Lea. She is a BSc Geography Graduate with a MSc in Integrated Environmental Studies from the University of Southampton.

During her MSc, Hannah further developed her skills in GIS and gained experience in methodologies of EIAs. She also acquired an in-depth understanding of environmental law and ways to measure, monitor and remediate air pollution. Within air quality, Hannah's interests lie in air pollution monitoring and management.

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