Chapter 8: Air Quality

TOPIC	AIR QUALITY
AUTHOR	Air Quality Consultants Ltd
COMPARISON OF EFFECTS	The assessment presented within this ES Chapter is based on the revised proposals (referred to as the 'Proposed Development'), as described in ES Volume 1, Chapter 0 'Preface' and ES Volume 1, Chapter 4 'The Proposed Development'. A comparison of the findings and conclusions of this assessment against those of the December 2018 ES in relation to air quality is provided in the section of this ES Chapter titled '*Comparison of Effects*'.
SUPPORTING APPENDIX	***ES Volume 3 – Appendix: Air Quality***: Annex 1: Construction Dust Assessment Procedure; Annex 2: EPUK & IAQM Planning for Air Quality Guidance; Annex 3: Professional Experience; Annex 4: Modelling Methodology; Annex 5: 'Air Quality Neutral'; Annex 6: Construction Mitigation; Annex 7: Policy Context; Annex 8: Air Quality Positive Statement; Annex 9: References; Annex 10: Glossary.
KEY CONSIDERATIONS	The London Borough of Southwark (LBS) has declared the entire northern part of the borough as an Air Quality Management Area (AQMA), due to exceedances of the annual mean nitrogen dioxide (NO_2) and the 24-hour mean particulate matter (PM_{10}) objectives. Activities associated with the demolition and construction works of the Proposed Development will give rise to a risk of dust impacts at existing sensitive receptors during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Based on the LBS Technical Guidance for Demolition and Construction[1] the site is considered to be a high risk site and therefore mitigation measures to control dust are detailed. In addition, the potential for construction vehicle emissions to impact upon local air quality has been qualitatively assessed. Once operational, the Proposed Development (Options 1 and 2) will not lead to significant changes in vehicle flows on local roads, and a detailed assessment of road traffic impacts has thus been screened out of the assessment. The proposals for the development include life-safety generators, the emissions from which could impact upon air quality at existing residential properties and the nearby hospital, as well as at the retail and outpatients space within the Proposed Development itself. The main air pollutants of concern related to diesel life-safety generators are NO_2 and PM_{10}. In terms of the potential air quality effects, the assessment considers: • the impacts of the testing of the proposed diesel life-safety generators on concentrations of NO_2 and PM_{10}, at existing local sensitive receptors, in the proposed year of opening; • the impacts of existing and proposed emissions sources of NO_2 and PM_{10} on future users of the Proposed Development; • whether or not the Proposed Development is 'air quality neutral'; and • the cumulative impacts on air quality of the Proposed Development in combination with Cumulative Schemes identified in the local area.
CONSULTATION	An EIA Scoping Report was prepared and submitted to the LBS for discussion on the 24th September 2018 in relation to the 2018 Environmental Statement (ES) (see ***ES Chapter 2 – EIA Methodology (Volume 1)***). Informal feedback on the Scoping Report was received from the LBS on the 29th November 2018 in the form of a high-level review (the 'LBS Review') with recommendations for consideration within the ES. The LBS Review comments were incorporated where appropriate within the 2018 ES that was submitted in support of the 2018 planning application to the LBS. A summary of the key points raised in the LBS Review in terms of the approach and methodology is presented within Annex A of this ES Chapter. This table signposts where these issues have been addressed within the chapter. - The assessment follows a methodology further discussed and agreed with LBS via email correspondence between Ken Andrews (Environmental Protection Team, LBS) and Nicole Holland (Air Quality Consultants) held in November 2018. In addition to the Scoping Process, the 2018 ES was reviewed by an independent third party (Land Use Consultants (LUC)) on behalf of the LBS. The feedback received from LUC on the 2018 ES was responded to at the time and has been, as relevant be incorporated into this 2021 ES, thus ensuring that the 2021 ES for the revised scheme is comprehensive in terms of scope and addressed requested clarifications and points raised previously by LUC on behalf of the LBS under Regulation 25 of the EIA Regulations. The LUC review comments and subsequent responses relating to the air quality assessment have been considered in this ES Chapter where relevant. The 2018 scoping process was undertaken in detail and has provided the Applicant, Trium and Air Quality Consultants with sufficient knowledge of the site and the surrounding area to be able to determine the scope of the EIA for the 2021 revised scheme. In October 2020, an EIA scoping note was issued to the GLA (see ***ES Chapter 2 – EIA Methodology (Volume 1)***). The note confirms that in determining the scope of the EIA for the amended scheme, reference has been made to the September 2018 Scoping Report, the November 2018 LBS Review, the 2018 ES and the LUC Review. A further scoping discussion (virtual) was held with the GLA on 8th September 2021 to review and confirm the approach to the EIA.

ASSESSMENT METHODOLOGY

Assessment Criteria

Health Criteria

8.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely (even in sensitive population groups) or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The '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[2] and the Air Quality (England) (Amendment) Regulations 2002[3].

8.2 The UK-wide objectives for nitrogen dioxide (NO_2) and particulate matter (PM_{10}) were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour NO_2 objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3[4]. Measurements have also shown that the 24-hour PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3.

8.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. The Department for Environment, Food and Rural Affairs (Defra) explains where these objectives will apply in its Local Air Quality Management Technical Guidance (LAQM.TG16). The annual mean objectives for NO_2 and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean 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 mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

8.4 EU Directive 2008/50/EC[5] sets limit values for NO_2, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for NO_2 are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and the Department for Transport's (DfT's) Joint Air Quality Unit (JAQU).

8.5 The relevant air quality criteria for this assessment are provided in **Table 8.1**.

[1] Southwark Council (2016) Technical Guidance for Demolition and Construction. Available: https://www.southwark.gov.uk/assets/attach/3011/Technical-Guidance-for-Demolition-Construction.pdf
[2] The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.
[3] The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.

[4] Defra (2021) Review & Assessment: Technical Guidance LAQM.TG16 April 2021 Version, Defra, Available: https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf
[5] The European Parliament and the Council of the European Union (2008) Directive 2008/50/EC of the European Parliament and of the Council.

Table 8.1 Air Quality Criteria 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 [a]
	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 [b]
	Annual mean	40 µg/m^3
Fine Particles ($PM_{2.5}$)[c]	Annual mean	25 µg/m^3

[a] This can be expressed as a 99.79th percentile of hourly mean concentrations.
[b] This can be expressed as a 90.4th percentile of 24-hour mean concentrations.
[c] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

GLA $PM_{2.5}$ Target

8.6 The London Environment Strategy[6] published in May 2018 set a target to achieve, by 2030, the guideline value for annual mean $PM_{2.5}$ concentrations of 10µg/m^3, which was set by the World Health Organisation (WHO) in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy considers the 2005 guideline value of 10µg/m^3. While there is no explicit requirement to assess against the GLA target of 10µg/m^3, it has nevertheless been included within this assessment.

Construction Dust Criteria

8.7 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[7] [8] has been used (the GLA's SPG[9] recommends that the assessment be based on the latest version of the IAQM guidance). Full details of this approach are provided in ***ES Volume 3 – Appendix: Air Quality, Annex 1***.

8.8 The LBS's Technical Guidance for Demolition and Construction[1], which sets out further specific requirements for developments within the Borough, has also been used.

Screening Criteria for Road Traffic Assessments

8.9 Environmental Protection UK (EPUK) and the IAQM[10] recommend a two-stage screening approach to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in ***ES Volume 3 – Appendix: Air Quality, Annex 2***, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in ***ES Volume 3 – Appendix: Air Quality, Annex 2***) inside an AQMA are a change in flows of more than 25 heavy duty vehicles or 100 light duty vehicles per day. 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*".

Screening Criteria for Point Source Assessments

8.10 The Proposed Development ' does not incorporate any centralised combustion plant as the energy strategy relies on non-combustion methods for provision of heat and hot water. The Proposed Development does, however, include diesel-fired emergency generators for provision of essential power in the event of complete power cut to the building. Although emergencies of this sort are not anticipated to occur, the generator will require routine testing, which will result in emissions to air. The flues for the plant will be routed to roof level of the tallest point of the building, discharging 1 m above the rooftop plant enclosure.

8.11 EPUK and the IAQM have developed an approach to determine whether emissions from point sources, such as generators, have the potential for significant air quality impacts. The first step of the approach, as described in ***ES Volume 3 – Appendix: Air Quality, Annex 2***, is to screen the emissions and the emissions parameters to determine whether an assessment is necessary:

"*Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, 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 nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

8.12 This screening approach requires professional judgement, and the experience of the consultants preparing the assessment is set out in ***ES Volume 3 – Appendix: Air Quality, Annex 3***.

8.13 If it is determined that an assessment of the point source emissions is required, then there is a further stage of screening that can be applied to the model outputs. The approach is that any change in concentration smaller than 0.5% of the long-term environmental standard will be *negligible*, regardless of the existing air quality conditions. Any change smaller than 1.5% of the long-term environmental standard will be *negligible*, so long as the total concentration is less than 94% of the standard, and any change smaller than 5.5% of the long-term environmental standard will be *negligible*, so long as the total concentration is less than 75% of the standard. The guidance also explains that:

"*Where peak short term concentrations (those averaged over periods of an hour or less) from an elevated source are in the range 11-20% of the relevant Air Quality Assessment Level (AQAL), then their magnitude can be described as small, those in the range 21-50% medium and those above 51% as large. These are the maximum concentrations experienced in any year and the severity of this impact can be described as slight, moderate and substantial respectively, without the need to reference background or baseline concentrations. In most cases, the assessment of impact severity for a proposed development will be governed by the long-term exposure experienced by receptors and it will not be a necessity to define the significance of effects by reference to short-term impacts. The severity of the impact will be substantial when there is a risk that the relevant AQAL for short-term concentrations is approached through the presence of the new source, taking into account the contribution of other local sources*".

8.14 As a first step, the assessment of the emissions from the emergency generators within the Proposed Development has considered the predicted process contributions using the following criteria:

- is the long-term (annual mean) process contribution less than 0.5% of the long-term environmental standard?; and
- is the short-term (24-hour mean or shorter) process contribution less than 10% of the short-term environmental standard?

8.15 Where both of these criteria are met, then the impacts are negligible and thus 'not significant'. Where these criteria are breached, then a more detailed assessment, considering total concentrations (incorporating local baseline conditions), has been provided.

Defining the Baseline

Current Baseline Conditions

8.16 Existing sources of emissions within the vicinity of the Proposed Development have been established using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register[11]. Local sources have also been identified through discussion with LBS's Environmental Protection Team and through examination of the Council's Air Quality Review and Assessment reports, including the Southwark Air Quality Annual Status Report[12], published by the Council in May 2020.

8.17 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. Background concentrations have been defined using the national pollution maps published by

[6] GLA (2018) London Environment Strategy, Available: https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf
[7] The IAQM is the professional body for air quality practitioners in the UK.
[8] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction v1.1, Available: http://iaqm.co.uk/guidance/.
[9] GLA (2014) The Control of Dust and Emissions from Construction and Demolition SPG.
[10] Moorcroft and Barrowcliffe et al (2017) Land-Use Planning & Development Control: Planning For Air Quality v1.2, IAQM, London, Available: http://iaqm.co.uk/guidance/.
[11] Defra (2021) UK Pollutant Release and Transfer Register, [Online], Available: prtr.defra.gov.uk.
[12] Southwark Council (2020) Southwark Air Quality Annual Status Report 2019.

Defra[13]. These cover the whole country on a 1x1 km grid. Details of the method used to derive baseline year background concentrations are provided in ***ES Volume 3 – Appendix Air: Quality, Annex 4***.

8.18 Whether or not there are any exceedances of the annual mean EU limit value for NO_2 in the study area has been identified using the maps of roadside concentrations published by Defra[14] [15]. These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to EU data quality standards, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations[15], which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Evolution of the Baseline Conditions

8.19 If the Proposed Development was not to come forward, it is expected that the site would remain in its current state. Air quality is generally expected to improve with time, due for example to more stringent emissions standards for motor vehicles. The likely evolution of the background air quality concentrations has been determined based on background pollution concentration maps published by Defra[13] (see ***ES Volume 3 – Appendix: Air Quality, Annex 4*** for details of the methodology).

Impact Assessment Methodology

8.20 To allow flexibility in the final end uses of the scheme, two options have been assessed:

- Option 1: Where levels 1 – 10 of the Main Building are provided as D1 Use Class (medical use); and
- Option 2: Whereby levels 1 - 10 the Main Building are provided as B1b Use Class (research and development use).

8.21 In both Options the remaining levels of the Main Building and Warehouse are provided as B1(a) Office, affordable workspace (B1 / D1), D1 (community) and A1-A4 (retail).

8.22 As such, references to the Proposed Development throughout this ES Chapter, unless specified otherwise, refer to both Option 1 and Option 2.

Demolition and Construction

8.23 ***ES Chapter 5 – Demolition and Construction (Volume 1)*** outlines the proposed demolition and construction works. Consideration has been given to the potential for significant effects from the following impacts from that will occur during the demolition and construction stage:

- Dust emissions; and
- Demolition and construction site plant and traffic emissions.

Demolition and Construction Dust

8.24 The LBS's Technical Guidance for Demolition and Construction states that *"All major developments in Southwark are considered 'high risk'. The highest level of dust control, including continuous monitoring of dust deposition, will be required to be employed at all times."* Consequently, the mitigation measures set out in the GLA's SPG on The Control of Dust and Emissions During Construction and Demolition for a high risk site will be implemented during the demolition and construction phase of the Proposed Development. Guidance from IAQM[7] is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant', thus, further assessment of the risk of construction dust emissions is not required.

Demolition and Construction Traffic

8.25 Demolition and Construction works are expected to take place between Q4 2022 and Q3 2025 (as described in ***ES Chapter 5 – Demolition and Construction (Volume 1)***), and will generate traffic on the local road network throughout all phases.

8.26 ***ES Chapter 5 – Demolition and Construction (Volume 1)*** states that, during the peak construction month, the demolition and construction works will result in a maximum of 75 vehicles accessing the site per working day, of which at least 70% will be heavy duty vehicles (HDVs). Analysis of the construction traffic data for the whole works shows, however, that the maximum average number of HDVs accessing the site per day across any calendar year (i.e. the maximum AADT) is 25 HDVs. Therefore, there will be a maximum additional 25 HDV AADT on St Thomas Street (which is a one way road), which does not exceed the EPUK/IAQM screening threshold described in Paragraph 8.9 during demolition and construction of the Proposed Development under either Option 1 or Option 2. Beyond St Thomas St, construction HDVs will be dispersed on the road network in accordance with the routes designated in the construction logistics plan, but it is not expected that any road will experience increases in HDV flows of more than 25 AADT. Therefore, no significant effects are expected and the impacts of traffic emissions during the demolition and construction phase have not been considered further.

Completed Development

8.27 The operational air quality assessment considers both the:

- effects of the Proposed Development upon existing sensitive receptors from NO_2, PM_{10} and $PM_{2.5}$ and traffic emissions;
- effects from the operation of diesel generators;
- the effects of prevailing air quality conditions upon future occupiers of the Proposed Development (site suitability); and
- the consideration of whether the Proposed Development is air quality neutral/positive.

Road Traffic Impacts

8.28 The first step in considering the road traffic impacts of the Proposed Development has been to screen the Proposed Development and its traffic generation against the criteria set out in the EPUK/IAQM guidance[10], as described in ***ES Volume 3 – Appendix: Air Quality, Annex 2***. Where impacts can be screened out they will not be progressed further in the detailed assessment.

Impacts of the Proposed Emergency Diesel Generators, Wet Riser and Sprinkler Pumps

8.29 Both Option 1 and Option 2 of the Proposed Development will include three 2,500 kVA prime rated standby diesel generators, to support business essential loads in a worst case scenario where there is a loss of the building mains supply, and a 250 kVA prime rated standby diesel generator to support life safety loads. A 135 kVA wet riser diesel pump and a 141 kVA sprinkler diesel pump will also be included, as these are necessary in the event of a fire emergency.

8.30 Further details of the plant included in the assessment are provided in ***ES Volume 3 – Appendix: Air Quality, Annex 4***.

Screening Stage

8.31 The first step in considering the impacts of the emergency generators impacts has been to screen the combined pollutant emissions against the criteria set out in the EPUK/IAQM guidance[10], as described in ***ES Volume 3 – Appendix: Air Quality, Annex 2***. Where plant impacts cannot be screened out against these criteria, a further stage of screening is required, whereby the modelled contributions of the plant are compared to further screening criteria. Where impacts can be screened out there is no need to progress to a more detailed assessment.

8.32 The following sections describe the approach to dispersion modelling of the plant emissions, which has been required for this project.

Assessment Scenarios

8.33 Predictions of NO_2 and PM_{10} concentrations have been carried out assuming that the emergency generators, wet riser and sprinkler plant are installed and operational by the time the Proposed Development is completed (expected 2025, the earliest year that the Proposed Development is anticipated to be operational) see ***ES Chapter 5 – Demolition and Construction (Volume 1)***.

Modelling Methodology

8.34 The impacts of emissions from the proposed emergency diesel generators, wet riser and sprinkler pumps have been modelled using the ADMS-5 dispersion model. ADMS-5 is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. The model input parameters are set out in ***ES Volume 3 – Appendix: Air Quality, Annex 4***.

[13] Defra (2021) Local Air Quality Management (LAQM) Support Website, [Online], Available: http://laqm.defra.gov.uk/.
[14] Defra (2020) 2020 NO2 projections data (2018 reference year), [Online], Available: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data
[15] Defra (2021) UK Ambient Air Quality Interactive Map, Available: https://uk-air.defra.gov.uk/data/gis-mapping.

8.35 The air quality modelling has been carried out based on a number of necessary assumptions, detailed further in ***ES Volume 3 – Appendix: Air Quality, Annex 4***. Where possible a realistic worst-case approach has been adopted (the approach is clearly outlined within the assessment).

8.36 Entrainment of the plume into the wake of the buildings has been simulated within the ADMS-5 model. ADMS-5 takes a relatively simplistic approach to modelling building downwash effects, thus additional uncertainty is introduced when using the buildings module. In order to ensure a worst-case assessment, sensitivity tests have been carried out whereby the model has been run with no buildings and with all nearby buildings that might affect the dispersion of the energy plant emissions (including the Proposed Development buildings). The maximum predicted concentration from these two scenarios has been used throughout this assessment to ensure a reasonable worst-case scenario.

Emissions Data

8.37 The emissions data input into the model for the emergency diesel generators, wet riser and sprinkler pumps have been partially provided by the project Mechanical Engineer, with some parameters being determined using the data set out in the technical datasheets of typical models for the kVA capacity of the generators proposed, some being determined based upon the fuel consumption, fuel composition, typical operating conditions and combustion chemistry, and some being determined based on typical operating conditions for diesel generators.

8.38 Further details of the emissions data used in this assessment are provided **in *ES Volume 3 – Appendix: Air Quality, Annex 4***.

Uncertainty

8.39 The point source dispersion model used in the assessment is dependent upon emission rates, flow rates, exhaust temperatures and other parameters for each source, all of which in reality are variable as the generators will operate at different loads at different times. The actual generators to be installed within the Proposed Development will also not be confirmed until the detailed mechanical, electrical and plumbing (MEP) design stage. The assessment has, however, addressed this uncertainty by applying reasonable worst-case assumptions where necessary, and provided that the generators installed adhere to the restrictions set out in ***ES Volume 3 – Appendix: Air Quality, Annex 4***, the conclusions of this assessment will remain valid.

8.40 There are additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms. These uncertainties cannot be easily quantified, and it is not possible to verify the point-source model outputs. Where parameters have been estimated the approach has been to use reasonable worst-case assumptions. A sensitivity test has also been applied to address specific uncertainties and to ensure a worst-case assessment.

'Air Quality Neutral'

8.41 The guidance relating to air quality neutral follows a tiered approach whereby compliance with 'air quality neutral' is founded on emissions benchmarks that have been derived for both building (energy) use and road transport in different areas of London. Developments that exceed the benchmarks are required to implement on-site or off-site mitigation to offset the excess emissions.

8.42 ***ES Volume 3 – Appendix: Air Quality, Annex 5*** sets out the emissions benchmarks. The approach has been to calculate the emissions from the Proposed Development and to compare them with these benchmarks.

'Air Quality Positive'

8.43 The London Plan[16] details expectations regarding 'Air Quality Positive'. The full text is quoted in ***ES Volume 3, Appendix: Air Quality - Annex 7***, but the expectations can be summarised as follows:

- air quality should be considered at an early stage in the project design;
- existing good practice measures should be drawn together in a holistic fashion to identify which options deliver the greatest improvement to air quality, both in terms of on-site exposure and off-site impacts;
- a statement should be developed setting out how air quality can be improved across the proposed area of the development;
- these measures should be incorporated into the design; and
- delivery of an air quality positive approach is project specific and relies on the opportunities on site or in the surrounding area to improve air quality.

8.44 An Air Quality Positive statement has been prepared (See ***ES Volume 3, Appendix: Air Quality - Annex 8***), detailing the measures that have been implemented and their benefits in terms of air quality, and how the Proposed Development has done as much as practicably possible to reduce off-site impacts and reduce exposure to air pollution on-site.

Methodology for Defining Effects

Receptor Sensitivity

8.45 The 2007 Air Quality Strategy[17] explains that air quality standards and objectives were determined based on expert recommendations and represent *"levels at which no significant health effects would be expected in the population as a whole"*. The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the air quality objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance. The annual mean objectives for NO_2 and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean 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 mean objective for NO_2 applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

8.46 In terms of the Proposed Development, offices (including B1(a) and B1(b) Use Classes) do not represent relevant exposure to the national air quality objectives and have not been considered further. Hospital outpatients (under Option 1) and retail uses (applicable to both Option 1 and Option 2) within the Proposed Development are considered to represent relevant exposure to the 1-hour mean NO_2 objective.

8.47 Within this ES Chapter, all receptors where the air quality objectives apply are considered to be of high sensitivity. Locations where the objectives do not apply must be considered not to be sensitive; therefore, there are no medium or low sensitivity receptors within the context of this assessment.

Magnitude of Impact and Scale of Effect

8.48 There is no official guidance in the UK in relation to development control on how to describe air quality impacts and effects. The approach developed jointly by EPUK & IAQM has therefore been used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective.

8.49 **Table 8.2** sets out how impact descriptors have been determined within this assessment, being an adapted version of the table presented in ***ES Volume 3 – Appendix: Air Quality, Annex 2***.

Table 8.2 Air Quality Impact Scale Descriptors for Individual Receptors for All Pollutants [a]

Long-term average concentration at receptor in assessment year[b,c]				Change in concentration relative to AQAL[c,d]				
% of AQAL	Annual Mean NO_2 ($\mu g/m^3$)	Annual Mean PM_{10} ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)	0%	1%	2-5%	6-10%	>10%
75% or less of AQAL	Less than 30.2	Less than 30.2	Less than 18.9	Negligible	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	30.2 – 37.8	30.2 – 37.8	18.9 – 23.6	Negligible	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	37.8 – 41.0	37.8 – 41.0	23.6 – 25.6	Negligible	Minor	Moderate	Moderate	Major
103-109% of AQAL	41.0 – 43.8	41.0 – 43.8	25.6 – 27.4	Negligible	Moderate	Moderate	Major	Major
110% or more of AQAL	More than 43.8	More than 43.8	More than 27.4	Negligible	Moderate	Major	Major	Major

[a] Values are rounded to the nearest whole number

[16] GLA (2021) The London Plan: The Spatial Development Strategy for London, Available: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

[17] Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra.

[b] This is the 'without Proposed Development' concentration where there is a decrease in pollutant concentration and the 'with Proposed Development' concentration where there is an increase.

[c] AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

[d] Minor and Major are used as standard EIA terminology, and correspond to Slight and Substantial respectively in relevant guidance[10]

Short-term (1-hour mean) Concentrations

8.50 Given that the hourly mean nitrogen dioxide objective allows a certain number of hours with concentrations exceeding the standard, rather than being a single concentration not to be exceeded, it is not possible to usefully assign a magnitude of change. The objective allows 18 hours a year to exceed the standard of 200 µg/m^3, thus, in order for them not to be exceeded, the 19th highest hour in a year must not exceed this concentration. The 19th highest hour in a year can be expressed as a 99.79th percentile of hourly mean concentrations, and it is the Proposed Development's contribution to the 99.79th percentile of hourly mean concentrations that has been determined in this assessment, based on the generators and wet riser and sprinkler pumps operating continuously.

8.51 However, the emergency diesel generators and wet riser and sprinkler pumps, which form the focus of the assessment, only operate for infrequent, short periods for testing, and will not operate for as long as 18 hours per year, let alone continuously. As such, the assessment of short-term impacts from the diesel generators has also considered the 100th percentile of hourly NO_2 concentrations (i.e. the highest concentrations in any hour of operation, taking account of a whole year of hourly meteorological conditions to identify the worst-case).

8.52 EPUK/IAQM guidance[10] and Environment Agency guidance[18] both recommend a screening criterion of 10% of the short-term environmental standard when assessing short-term concentrations. Thus, if the 100th or 99.79th percentile of hourly mean process contributions from the generators and wet riser and sprinkler pumps is less than 10% of the objective level (<20 µg/m^3), the contribution can be considered insignificant without the need to consider total concentrations.

8.53 Where the process contribution cannot immediately be screened out, it is added to the baseline concentration to determine the total hourly mean concentrations. Where this total concentration is below 200 µg/m^3, it can be assumed that the short-term objective will not be exceeded, and the impacts are considered to be 'not significant'.

Defining the Effect

Geographic Extent of Effects

8.54 The geographic extent of the effects is identified. At a spatial level, **'site' or 'local'** effects are those affecting the site and neighbouring receptors, while effects upon receptors in the LBS beyond the vicinity of the site and its neighbours are at a **'district'** level.

8.55 Effects affecting London are at a **'regional'** level, whilst those which affect different parts of the country, or England, are considered being at a **'national'** level.

Effect Duration

8.56 Effects that result from the completed and operational phase of the Proposed Development are classed as 'permanent' or 'long-term' effects.

Direct and Indirect Effects

8.57 The operation of the Proposed Development will have a direct effect on concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ in the local area.

Categorising Likely Significant Effects

8.58 Guidance from the IAQM[7] is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. This is the latest version of the guidance upon which the assessment methodology set out in the GLA guidance[9] is based (the GLA guidance advises that the latest version of the IAQM guidance should always be used). With the 'high risk' mitigation required by LBS's Technical Guidance for Demolition and Construction[1] in place the effects will be 'not significant'.

8.59 There is no official guidance in the UK in relation to development control on how to assess the significance of operational effects. The approach developed jointly by EPUK & IAQM[10] has therefore been used.

[18] Environment Agency (2016) Air emissions risk assessment for your environmental permit, Available: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

8.60 It is important to differentiate between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this ES Chapter, the air quality assessment has used published guidance and criteria to determine the likely air quality impacts at a number of sensitive locations (See **Table 8.3**). The overall significance of the air quality effects is then determined using professional judgement, giving consideration to various factors including the magnitude of the predicted impacts and the presence of any objective exceedances; full details of the EPUK/IAQM approach are provided in ***ES Volume 3 – Appendix: Air Quality, Annex 2***. The experience of the consultants who have prepared this ES Chapter is set out in ***ES Volume 3 – Appendix: Air Quality, Annex 3***.

8.61 In addition, the different effects of the Proposed Development under both Option 1 and Option 2 will be clearly stated where relevant.

Railway Locomotive Screening Criteria

8.62 The Proposed Development lies in close proximity to London Bridge Station; Defra guidance[4] outlines that there is only the potential for an exceedance of the NO_2 objectives as a result of emissions from diesel locomotives where there is long-term exposure within 30 m of railway lines which experience large numbers of diesel locomotives (these lines are identified within the Defra guidance), and where background annual mean NO_2 concentrations are greater than 25 µg/m^3, may be at risk of elevated NO_2 concentrations. Only locations which meet these criteria require further assessment.

BASELINE CONDITIONS

Current Baseline Conditions

Industrial Sources

8.63 A search of the UK Pollutant Release and Transfer Register website[11] has not identified any significant industrial or waste management sources that are likely to affect the Proposed Development, in terms of air quality.

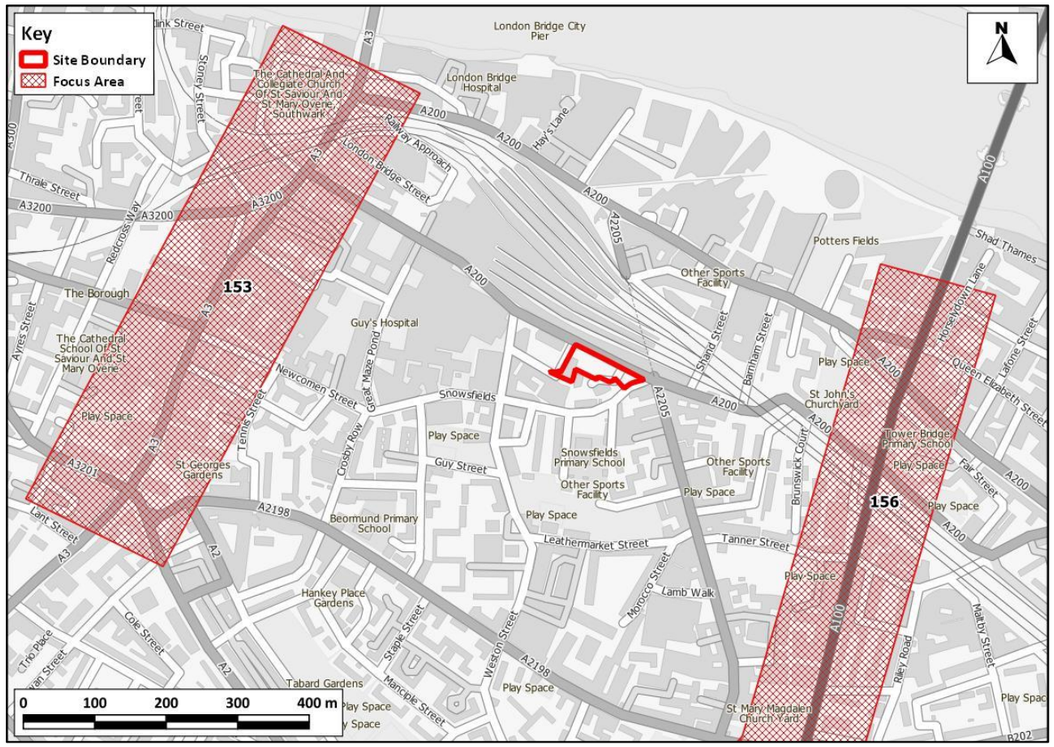
Air Quality Management Areas

8.64 LBS has investigated air quality within its area as part of its responsibilities under the LAQM regime, and has declared an Air Quality Management Area (AQMA) for exceedances of the annual mean NO_2 objective and the 24-hour mean PM_{10} objective. The AQMA encompasses the entire northern part of the borough, extending from Rotherhithe to Walworth and Camberwell and up to the boundary of the River Thames. The site lies within this AQMA.

Air Quality Focus Areas

8.65 The Proposed Development is located in close proximity to two of 187 air quality focus areas in London, these being locations that not only exceed the EU annual mean limit value for NO_2 but also locations with high levels of human exposure. The location of the Proposed Development in relation to these two air quality focus areas is shown in **Figure 8.1**.

Figure 8.1 Air Quality Focus Areas



8.66

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Local Air Quality Monitoring

8.67 LBS operates two automatic monitoring stations within the borough, however, neither of these are located in proximity to the Proposed Development. LBS also operates a number of NO_2 monitoring sites using diffusion tubes, which are prepared and analysed by Gradko (using the 20% TEA in water method). These include three located adjacent to Tower Bridge Road (A100), two located adjacent to Long Lane (A2198) and two located adjacent to Borough High Street (A3). Results for the years 2014 to 2019 are summarised in **Table 8.3** and the monitoring locations are shown in **Figure 8.2.**

Table 8.3 Summary of NO_2 Monitoring (2014-2019) [a,b]

Site No.	Site Type	Location	2014	2015	2016	2017	2018	2019
Diffusion Tubes – Annual Mean (µg/m³)								
SDT18	Roadside	Tower Bridge Road (A100)	**93.4**	**76.1**	**73.2**	**70.7**	**60.9**	**63.9**
SDT20	Kerbside	Tower Bridge Road, School fence	**79.4**	**63.3**	**65.5**	**62.6**	53.6	50.5
SDT24	Kerbside	Tower Bridge Road, Opposite Papa Johns	**97.0**	**82.9**	**83.3**	**86.9**	**63.7**	**62.1**
SDT81	Kerbside	Borough High Street (A3), opposite the junction with St Thomas Street (A200)	-	-	**103.4**	**82.3**	**67.7**	**61.2**
SDT82	Kerbside	125 Borough High Street	-	-	**91.0**	**71.0**	54.6	49.5
SDT85	Kerbside	Long Lane (A2198), adjacent to Beormund Primary School	-	-	**61.3**	59.5	-	-
SDT86	Kerbside	20 Long Lane	-	-	**61.6**	54.7	-	-
Objective			40					

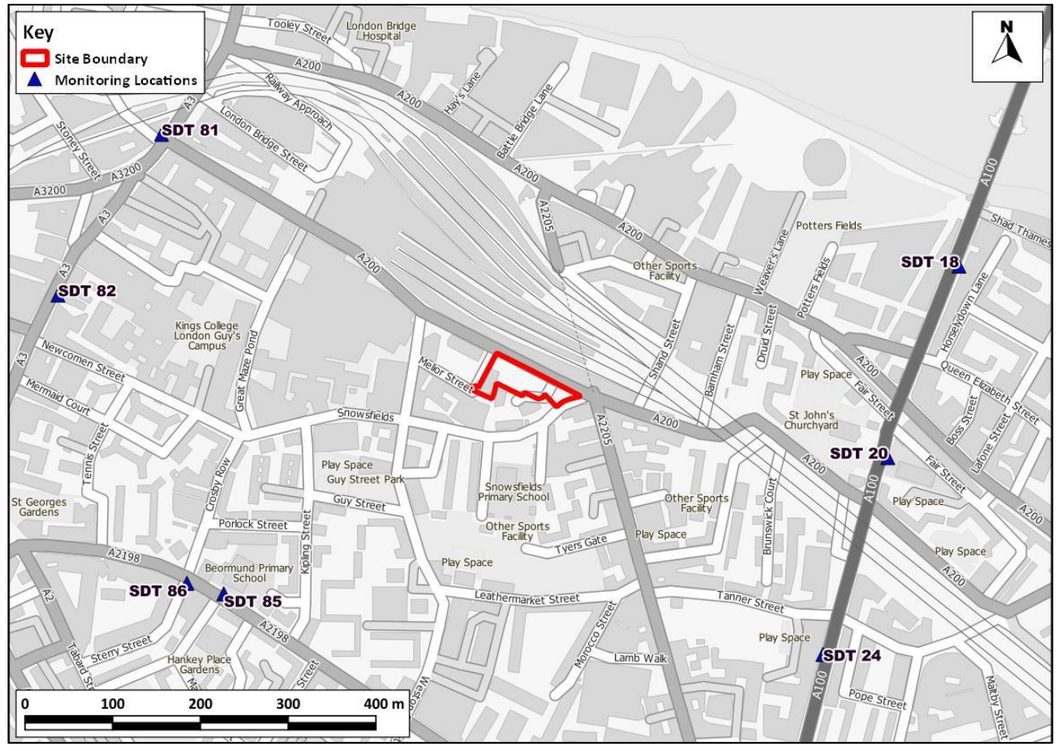
[a] Data provided by LBS. Although 2020 data are now available, they are not presented; In early 2020, activity in the UK was disrupted by the COVID-19 pandemic. As a result, concentrations of traffic-related air pollutants fell appreciably, and consequently, measured concentrations are not considered representative of typical air quality conditions and as such the 2019 data is the most recent relevant data for consideration.

[b] Exceedances of the objectives are shown in **bold**. Measured concentrations over 60 µg/m³, indicating a possible exceedance of the 1-hour mean objective, are shown in shaded grey. A proxy value of 60 µg/m³can be used to assess the likelihood of the 1-hour mean NO_2 objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 1-hour mean NO_2 objective are possible.

8.68 Exceedances of the annual mean objective were recorded at all sites in all years that the sites were operational from 2014 to 2019. Concentrations over 60 µg/m³ (indicating possible exceedances of the 1-hour objective) were also recorded at sites SDT18, SDT24 and SDT81 in 2019, and at all sites for all years that they were operational between 2014 and 2016. A trend of decreasing measured concentrations is apparent at all sites from 2014 to 2019.

8.69 Sites SDT85 and SDT86 are considered to be most representative of conditions at the Proposed Development and identified nearby sensitive receptors (see **Table 8.5** and **Figure 8.3**), as both these monitoring sites and the Proposed Development are located adjacent to A-roads with comparable volumes of traffic (St Thomas Street, adjacent to the Proposed Development, is slightly quieter than Long Lane), and are set back from any nearby major road junctions.

Figure 8.2 Diffusion Tube Monitoring Sites



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Exceedances of EU Limit Values

8.70 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedances of the annual mean NO_2 limit value. Furthermore, Defra's roadside annual mean NO_2 concentrations[15], which are used to report exceedances of the limit value to the EU, identify exceedances of this limit value in 2019 along many roads in London, including the A100 and A3200 near to the Proposed

Development. The Greater London Urban Area has thus been reported to the EU as exceeding the limit value for annual mean NO_2 concentrations. Defra's predicted concentrations for 2025, however, do not identify any exceedances within the Study Area. As such, there is not considered to be any risk of a limit value exceedance in the vicinity of the Proposed Development by the time that it is operational.

8.71 Defra's Air Quality Plan requires the GLA to prepare an action plan that will "*deliver compliance in the shortest time possible*", and the 2015 Plan assumed that a Clean Air Zone (CAZ) was required. The GLA has already implemented a Low Emission Zone (LEZ) and an Ultra Low Emission Zone (ULEZ), thus the authority has effectively already implemented the required CAZ. These have been implemented as part of a package of measures including 12 Low Emission Bus Zones, Low Emission Neighbourhoods, the phasing out of diesel buses and taxis and other measures within the Mayors Transport Strategy.

Background Concentrations

8.72 Estimated background concentrations in the study area have been determined for 2019 (for consistency with the most recent monitoring data unaffected by COVID-19 disruption, as discussed in **Table 8.3**) and the opening year 2025 using Defra's 2018-based background maps[14]. The background concentrations are set out in **Table 8.4** and have been derived as described in ***ES Volume 3 – Appendix: Air Quality, Annex 4***. The background concentrations are all predicted to be well below the objectives by the anticipated opening year of the Proposed Development of 2025.

Table 8.4 Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2025 (µg/m^3) [a]

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	27.6 – 33.3	19.5 – 20.4	12.6 – 12.9
2025	22.5 – 28.1	17.9 – 18.6	11.5 – 11.8
Objectives	40	40	25/10 [b]

[a] Exceedances of the annual mean objective are highlighted in **bold**.

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. 10µg/m^3 is the GLA target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this.

RECEPTORS AND RECEPTOR SENSITIVITY

Existing

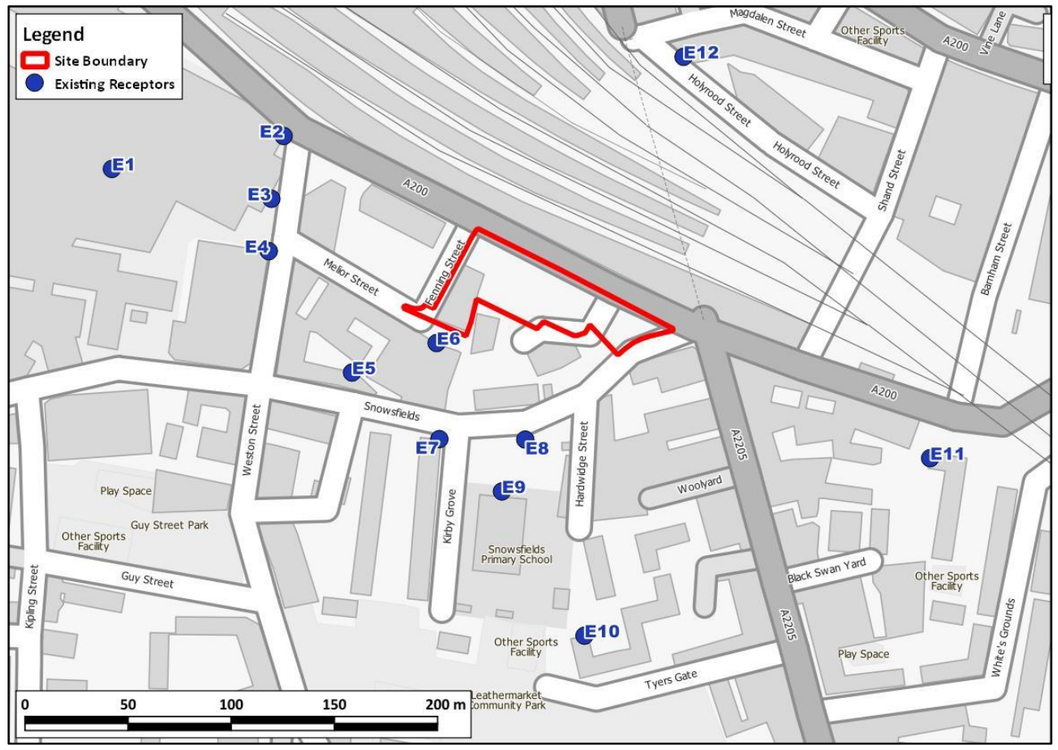
8.73 Concentrations of NO_2 and PM_{10} have been predicted at a number of locations surrounding the site. Receptors have been identified to represent worst-case exposure within these locations, being located on the façades of the residential properties closest to the site's main pollutant sources (i.e. the emergency generator flues).

8.74 Each receptor location was modelled at a range of heights. All receptors considered in the operational impact assessment are of high sensitivity. Selected receptor locations are presented in **Table 8.5** and are shown in **Figure 8.3**.

Table 8.5 Description of Existing Receptor Locations

Receptor ID	Description	Floors Modelled
E1	Guy's Hospital	10th – 30th floors
E2	Guy's Hospital, at the junction of St Thomas Street (A200) and Weston Street	Ground – 5th floors
E3	Guy's Hospital, adjacent to Weston Street	Ground – 6th floors
E4	Existing residential property located adjacent to Weston Street	Ground – 16th floors
E5	Existing residential property located adjacent to Snowsfields	1st – 4th floors
E6	Existing residential property located adjacent to Melior Street, opposite the Proposed Development site	Ground – 6th floors
E7	Existing residential property located adjacent to the junction between Snowsfields and Kirby Grove	1st – 5th floors
E8	Outdoor children's play space located adjacent to Snowsfield	Ground floor
E9	Snowsfields Primary School, set back from Kirby Grove	Ground – 5th floors
E10	Existing residential property located adjacent to Tyers Gate	Ground – 3rd floors
E11	Existing residential property set back from Crucifix Lane (A200)	Ground – 3rd floors
E12	Existing residential property located adjacent to Holyrood Street	Ground – 4th floors

Figure 8.3 Existing Receptor Locations and the Site Boundary



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Introduced

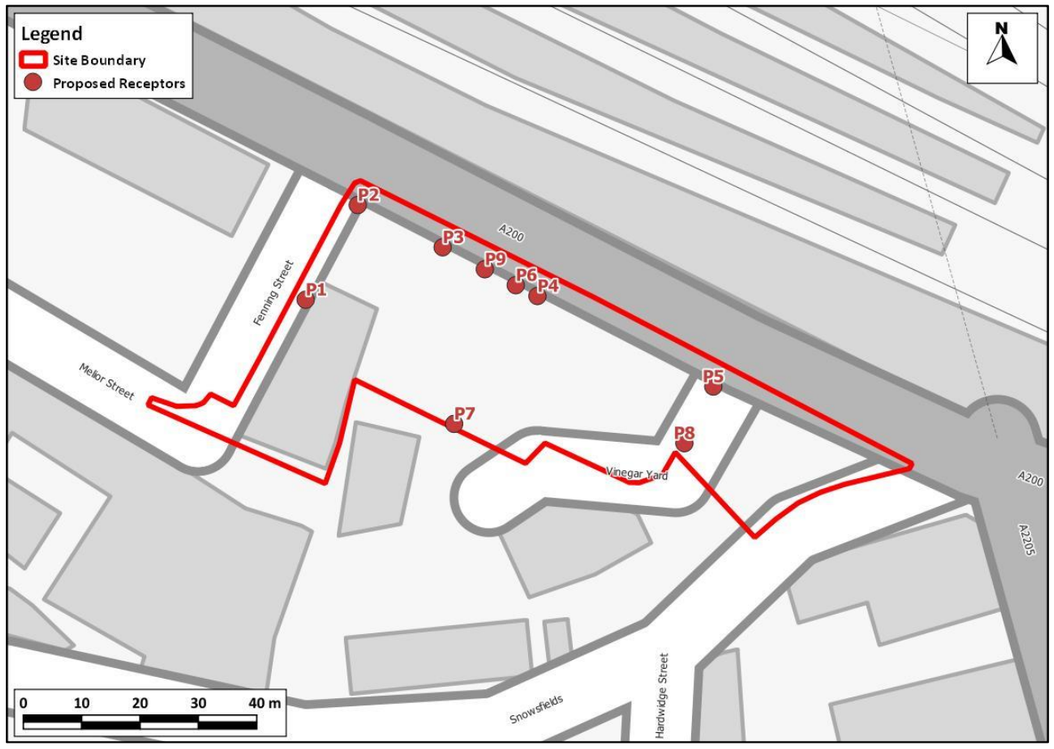
8.75 Nine receptor locations have been identified within the Proposed Development, which represent potential exposure to existing and proposed sources. Five of the identified receptors are located on the façades of the Proposed Development, which may house commercial uses at the ground floor level and outpatient uses at the upper floors, whilst the other four receptors are located at the location of the air inlets to the ventilation system. All receptors are considered to be of high sensitivity. Selected receptors are presented in **Table 8.6** and are shown in **Figure 8.4.**

Table 8.6 Description of Introduced Receptor Locations

Receptor ID	Description	Floors Modelled
P1	Ground floor retail and upper floor outpatients/research and development space	Ground to 10th floors
P2	Ground floor retail and upper floor outpatients/research and development space	Ground to 10th floors
P3	Ground floor retail and upper floor outpatients/research and development space	Ground to 10th floors
P4	Ground floor retail and upper floor outpatients/research and development space	Ground to 10th floors
P5	Ground floor retail and upper floor outpatients/research and development space	Ground to 10th floors
P6	Ventilation system air inlet	3rd and 8th floors

Receptor ID	Description	Floors Modelled
P7	Ventilation system air inlet	3rd and 8th floors
P8	Ventilation system air inlet	3rd floor
P9	Ventilation system air inlet	8th floor

Figure 8.4 Introduced Receptor Locations, Site Boundary and Site Plan



POTENTIAL EFFECTS

Completed Development

Traffic Impacts

8.76 The trip generation of both Option 1 and Option 2 of the Proposed Development on local roads (provided by Caneparo Associates, the appointed Transport Consultant) has initially been compared to the screening criteria set out in the EPUK/IAQM guidance (see ***ES Volume 3 – Appendix: Air Quality, Annex 2***). It has been confirmed by the Transport Consultant that both Option 1 and Option 2 of the Proposed Development will increase Annual Average Daily Traffic (AADT) flows by less than 25 HDVs and 100 light duty vehicles (LDVs) along all roads affected by the Proposed Development. Option 1 is predicted to generate a maximum of 59 light duty vehicle AADT movements (on St Thomas Street, where there is no predicted increase in HDV movements) and a maximum of 19 heavy duty vehicle AADT movements (on Snowfields, where the Proposed Development is predicted to increase LDVs by 29). Option 2 is predicted to generate a maximum of 16 light duty vehicle AADT movements and a maximum of 15 heavy duty vehicle AADT movements (both on Snowfields); on all other roads, both Option1 and Option 2 generate fewer vehicle movements.

8.77 As the changes in traffic flows on local roads will all be lower than the screening criteria, there is no requirement for a detailed assessment of road traffic impacts at existing receptors, and the impact on local air quality as a result of both Option 1 and Option 2 can be judged to be **'not significant'** and therefore there is no requirement for further assessment within this ES Chapter.

Energy Plant Impacts

Initial Screening Assessment of the Impacts of the Proposed Emergency Plant at Existing Properties

8.78 The calculated total NOx emission rate from the emergency diesel generator, wet riser and sprinkler plant (15 mg/s of NOx in total) proposed for both Option 1 and Option 2 exceeds the 5 mg/s screening threshold set out in the EPUK/IAQM guidance (see ***ES Volume 3 – Appendix: Air Quality, Annex 2***). As such, dispersion modelling has been undertaken, with the next screening stage considering the maximum modelled process contributions occurring as a result of emissions associated with these plant, relative to the objective levels.

8.79 The maximum predicted NO_2, PM_{10} and $PM_{2.5}$ contributions at any of the identified existing high sensitivity receptors (see **Table 8.5** and **Figure 8.3**) associated with emissions from the emergency diesel generator, wet riser and sprinkler plant are shown in **Table 8.7** which are applicable to both Option 1 and Option 2. Consideration has been given to the impacts of individual groups of plant as well as the combined contributions.

Table 8.7 Predicted Maximum Process Contributions associated with the Emergency Generator Plant Emissions at Any Existing Sensitive Receptor (µg/m³) [a] (Option 1 and Option 2)

Averaging period	Sources	Maximum Process Contribution at Any Receptor		Objective
		µg/m³	% of the Objective	
Annual Mean NO_2	All sources	0.18	0.45	40 µg/m³
99.79th %ile of 1-hour NO_2	Diesel Generators – 1-hour operation [b]	**238.1**	**119.1**	200 µg/m³
	Diesel Generators – 10-minute operation	39.7	**19.8**	200 µg/m³
	Life-safety	10.0	5.0	200 µg/m³
	Wet riser and sprinkler	10.8	5.4	200 µg/m³
100th %ile of 1-hour NO_2	Diesel Generators – 1-hour operation	**279.5**	**139.8**	200 µg/m³
	Diesel Generators – 10-minute operation	46.6	**23.3**	200 µg/m³
	Life-safety	11.9	6.0	200 µg/m³
	Wet riser and sprinkler	13.0	6.5	200 µg/m³
Annual Mean PM_{10}	All sources	0.002	0.005	40 µg/m³
90.4th %ile of 24-hour PM_{10}	All sources	1.15	2.3	50 µg/m³
Annual Mean $PM_{2.5}$	All sources	0.002	0.008	25 µg/m³
	All sources	0.002	0.02	10 µg/m³

[a] Exceedances of the screening criteria are highlighted in **bold** / shaded grey

[b] Assuming continuous operation of all plant.

8.80 The predicted maximum contributions at any existing receptor can be compared with the screening criteria described in Paragraphs 8.48 to 8.53, and the following conclusions can be drawn:

- the predicted maximum annual mean NO_2 contribution (0.45% of the objective) is below the screening criterion (0.5%);
- the predicted maximum 99.79th percentile of 1-hour mean NO_2 contribution as a result of emissions from the three 2500 kVA generators when testing occurs for 1 hour or more (119.1% of the objective) is above the screening criterion (10%);
- the predicted maximum 99.79th percentile of 1-hour mean NO_2 contribution as a result of emissions from the three 2500 kVA generators when testing occurs for 10 minutes (19.8% of the objective) is above the screening criterion (10%);
- the predicted maximum 99.79th percentile of 1-hour mean NO_2 contribution as a result of emissions from the 250 kVA generator (Life safety) (5.0% of the objective) is below the screening criterion (10%);
- the predicted maximum 99.79th percentile of 1-hour mean NO_2 contribution as a result of emissions from the wet riser and sprinkler pumps (5.4% of the objective) is below the screening criterion (10%);
- the predicted maximum annual mean PM_{10} contribution (<0.01% of the objective) is well below the screening criterion (0.5%);
- the predicted maximum 90.4th percentile of 24-hour mean PM_{10} contribution (2.3% of the objective) is well below the screening criterion (10%); and
- the predicted maximum annual mean $PM_{2.5}$ contribution (<0.01% of the objective and 0.02% of the GLA target) is well below the screening criterion (0.5%).

8.81 The maximum predicted impacts are below the screening criteria for annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations, and for 24-hour mean PM_{10} concentrations, thus no further assessment of the impacts of the proposed plant on these concentrations is required for either Option 1 or Option 2. Testing of the 250 kVA generator (Life safety), wet riser and sprinkler pumps will not result in any significant effects on the 1-hour mean NO_2 concentrations. However, the contribution of emissions from the three 2500 kVA generators during testing exceed the 1-hour NO_2 screening criterion and require further assessment.

8.82 It should be noted that although the additional traffic generated by the Proposed Development has been screened out of the assessment as the traffic volumes and associated emissions will be very small (see Paragraphs 8.76 and 8.77), there will still be some contribution from traffic emissions generated by the Proposed Development at existing receptor locations. The contribution of these traffic emissions to concentrations at existing receptor locations has not been quantified, and are considered to be negligible as the volumes of additional traffic are low. The maximum contribution of the generators and wet riser and sprinkler pumps to annual mean NO_2 concentrations is 0.18 µg/m^3 (see **Table 8.7**) at any receptor. This contribution occurs at receptor E4 and the contribution at other receptors is lower than this (ranging from 0.02 µg/m^3 to 0.12 µg/m^3). All of the existing receptors are in background locations away from busy roads[19] where baseline concentrations will be similar to background concentrations (see **Table 8.4**) and will be well below the objective. The combined contribution of generator and traffic emissions at these receptors would be slightly higher than 0.18 µg/m^3 due to the additional contribution of traffic emissions, but due to the low baseline concentrations, the impacts are considered to still be negligible (using the impact matrix in **Table 8.2**).

8.83 Additional traffic generated by the Proposed Development will contribute only a very small contribution to hourly pollutant concentrations, as additional traffic generated by Option 1 of the Proposed Development is equivalent to three additional vehicles per hour on average, and for Option 2, less than one additional vehicle per hour on average. The contribution of traffic emissions need not be considered in the assessment of short-term air quality impacts, which focusses on emissions from the generators and wet riser and sprinkler pumps.

Detailed Assessment of the Impacts of the Proposed Emergency Plant at Existing Properties

8.84 The predicted short-term impacts at each identified existing sensitive receptor (see **Table 8.5** and **Figure 8.3**) are presented in **Table 8.8** and are applicable to both Option 1 and Option 2. In instances where multiple heights have been modelled for the same receptor, the worst-case result (i.e. the result with the greatest predicted process contribution) is presented. The 100th percentile including contributions from the three 2500 kVA generators, as well as from all other plant (250 kVA generator, wet riser and sprinkler pumps) is presented to provide a conservative assessment (this assumes that all plant are tested concurrently which in reality is unlikely to occur in practice). Total concentrations have been determined by adding the contribution from emergency plant to 2 x the maximum 2025 background concentration within the area surrounding the Proposed Development (as presented in **Table 8.4**). As the largest impacts of generator emissions occur at receptors closest to the flues (which are at a height of approximately 95 m above ground level), the use of the predicted 2025 Defra background concentration to establish baseline conditions is considered to be appropriate.

Table 8.8 Predicted Maximum 100th Percentile of Total 1-Hour Mean NO_2 Concentrations at Existing Receptors (µg/m^3) [a] (Option 1 and Option 2)

Receptor ID	Maximum 100th Percentile of Total 1-hour Mean Concentrations (µg/m^3)	
	1-hour Testing	10-minute Testing [b]
E1	**341.6**	108.7
E2	**217.7**	103.9
E3	**319.9**	96.5
E4	**228.6**	93.7
E5	**204.1**	80.9
E6	**204.9**	84.8
E7	**201.1**	81.0
E8	**204.9**	84.8
E9	**203.4**	83.3
E10	124.0	62.1
E11	79.8	53.0
E12	**211.8**	91.1
Objective	*200*	

[a] Exceedances of the objective are highlighted in **bold** / shaded grey

[b] 10-minute testing of the three 2500 kVA generators; the 250 kVA generator, wet riser and sprinkler pumps are assumed to be tested for a full hour.

8.85 The testing schedule for the three 2500 kVA generators allows for 10-minute tests for 11 months of the year, and a test of up to 2 hours annually. The maximum possible 1-hour mean NO_2 concentration predicted to occur during the two-hour annual test exceeds 200 µg/m^3 at a number of receptors within the study area. During the monthly 10-minute testing, however, the maximum total concentrations are well below 200 µg/m^3.

8.86 Whilst there is a risk that receptors in the vicinity of the plant may experience 1-hour mean concentrations above 200 µg/m^3 during two hours each year, this is well below the 18 hours allowed by the objective. It is also very unlikely that generator testing will coincide with these worst-case meteorological conditions and lead to hourly concentrations that exceed 200 µg/m^3. It is therefore considered very unlikely that the proposed generator testing will result in an exceedance of the 1-hour mean NO_2 objective at any sensitive receptor. The modelling of short-term impacts assumes that all emergency generators and plant are operational throughout the year, which provides a conservative assessment.

8.87 Accordingly, therefore, the likely adverse effects of emissions from the proposed emergency plant are considered to be **'not significant'** at all existing receptors assessed for both Option 1 and Option 2.

Site Suitability

Road Traffic Impacts

8.88 The Proposed Development is adjacent to quiet roads with low traffic volumes. Although St Thomas Street, which bounds the site to the north, is an A-Road (the A200), the section of St Thomas Street at the site is a one-way street restricted for access only. Traffic volumes on St Thomas Street at the site are therefore low (382 AADT in the 2025 Baseline scenario data provided by Caneparo Associates), and their contribution to

[19] Receptor E2 is adjacent to St Thomas Street, which appears in mapping as an A-Road (the A200), but in reality this section of St Thomas St is a one-way street for access only and does not experience large volumes of traffic.

pollutant concentrations at the façade of the Proposed Development will be small. As such, concentrations at the site will likely be higher than the background concentrations shown in **Table 8.4** and much lower than the busy roadside concentrations measured at the local monitoring sites presented in **Table 8.3**. The measured concentrations in **Table 8.3** show a strong downward trend in recent years and this is expected to continue into the future, such that concentrations will be even lower in the Proposed Development opening year of 2025 than shown for 2019. Accordingly, therefore, it is expected that concentrations of all pollutants will be below the objectives at the Proposed Development under both Option 1 and Option 2 in its opening year.

Railway Impacts

8.89 Defra guidance[4] states that there is only the potential for an exceedance of the annual mean NO_2 objective as a result of emissions from railway lines where:

- there is long-term exposure within 30 m of railway lines;
- these lines see a high volume of diesel passenger trains; and
- the annual mean background concentration of nitrogen dioxide is above 25 µg/m^3.

8.90 The Proposed Development falls outside the above criteria. While there will be exposure within 30 m of the railway lines and the maximum predicted background concentration once the Proposed Development is operational (2025) exceeds 25 µg/m^3 (see **Table 8.4**), the railway lines serving London Bridge Station are not identified in the Defra guidance as having a high volume of diesel passenger trains. It is, therefore, considered that there are no material risks of an objective exceedance within the Proposed Development as a result of emission from locomotives from nearby railway lines. The impact on air quality for future users of the Proposed Development of railway emissions is considered therefore to be judged to be **'not significant'** for both Option 1 and Option 2.

Proposed Emergency Plant Impacts

8.91 The predicted short-term air quality conditions (presented as the Total 100th percentile of 1-hour NO_2 concentrations) for future users of the Proposed Development, taking account of baseline concentrations and the predicted maximum short-term process contribution associated with the proposed plant, are set out in **Table 8.9** for receptors P1 to P9 (for both Option 1 and Option 2). In instances where more than one height was modelled for a receptor, the maximum 100th percentile has been presented.

8.92 The maximum 1-hour mean NO_2 concentration predicted to occur during the two-hour annual test exceeds 200 µg/m^3 at a number of receptors within the Proposed Development. During the monthly 10-minute testing, however, the total concentrations are well below 200 µg/m^3.

8.93 Taking account of the testing schedule, 1-hour mean concentrations may exceed 200 µg/m^3 during a total of two hours each year, which is well below the 18 hours allowed by the objective. The proposed generator testing will therefore not result in an exceedance of the 1-hour mean NO_2 objective at any sensitive receptor within the Proposed Development. Accordingly, air quality for future users of the Proposed Development is, therefore, considered to be acceptable.

Table 8.9 Predicted Maximum Total 1-Hour Mean NO_2 Concentrations at Receptors within the Proposed Development in 2025 (µg/m^3) (Option 1 and Option 2)

Receptor ID	1-hour Testing	10-minute Testing
P1	**353.9**	117.3
P2	**353.9**	117.3
P3	**353.9**	117.3
P4	**353.7**	117.1
P5	**353.6**	117.0
P6	**353.7**	117.1
P7	**353.9**	117.3
P8	**353.8**	117.2
P9	**353.9**	117.3
Objective	*200*	

Summary of the Significance of Air Quality Effects

8.94 Overall, for the reasons set out above, the operational air quality effects (without mitigation) are judged to be **'not significant**' for both Option 1 and Option 2. This professional judgement is made in accordance with the methodology set out in ***ES Volume 3 – Appendix: Air Quality, Annex 2*.**

8.95 More specifically, the judgement that the air quality effects will be 'not significant' (without mitigation), takes account of the conclusions that:

- the Proposed Development will not generate a significant amount of additional traffic during construction or once operational;
- the Proposed Development will not cause any exceedances of the objectives at any existing receptor, as a result of emissions generated during testing of the proposed emergency plant; and
- predicted concentrations within the Proposed Development will be below the air quality objectives and future users of the Proposed Development will experience acceptable air quality.

MITIGATION AND MONITORING MEASURES

8.96 This section outlines mitigation measures included within the Proposed Development by design (embedded mitigation), and further recommended additional mitigation measures. See ***ES Chapter 15 – Mitigation and Monitoring (Volume 1)*** for further details. The following measures are applicable to the Proposed Development under both Option 1 and Option 2 unless stated otherwise.

8.97 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The Proposed Development incorporates the following good design and best practice measures:

- running of all generator flues to 1 m above the highest roof level within the Proposed Development, to ensure the best possible dispersion environment; and
- use of exhaust flues for the generator plant that discharge vertically upwards, unimpeded by any fixture on top of the stack (e.g. rain cowls), meeting the requirements of the Sustainable Design and Construction SPG.

Demolition and Construction

8.98 Measures to mitigate dust emissions will be required during the demolition and construction works of the Proposed Development in order to minimise effects upon nearby sensitive receptors.

8.99 As discussed in Paragraph 8.24, the LBS's Technical Guidance for Demolition and Construction requires all major developments to implement mitigation measures commensurate with a high risk site. The GLA's SPG on The Control of Dust and Emissions During Construction and Demolition describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on what monitoring should be undertaken during the construction phase. This reflects best practice experience and has been used to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in ***ES Volume 3 - Appendix: Air Quality, Annex 6***.

8.100 The mitigation measures will be included in a dust management plan (DMP). The DMP is likely to be integrated into a Code of Construction Practice and/or the CEMP, require monitoring, and be secured by suitably worded planning condition / planning obligation.

8.101 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There will not be any excessive use of water.

8.102 Assuming that the mitigation measures outlined within the guidance are implemented, the overall effect of construction dust is considered to be '**not significant**'.

8.103 Accordingly, no additional mitigation measures are considered to be required with regards to either construction dust and construction traffic.

Completed Development

8.104 The assessment has concluded that the Proposed Development will not cause any exceedances of the air quality objectives at existing receptors and that the overall air quality effect of the Proposed Development will

be 'not significant'. As such, it is considered that it is unnecessary to consider additional mitigation measures beyond the best practice design measures highlighted above.

8.105 However, based on the results for 1-hour and 10-minute testing set out in **Table 8.9** above, an annual 2-hour test will be carried out outside of the medical facility (applicable to Option 1 only) operating hours to remove the risk of exposure at this sensitive receptor.

8.106 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is transposed into English law). The local air quality plan that the GLA is required to produce in order to address limit value exceedances in its area will also help to improve air quality. The proposed changes to the LEZ and ULEZ can reasonably be expected to lead to significant improvements. The implementation of the measures in LBS's Air Quality Strategy & Action Plan, which sets out measures LBS will implement to reduce emissions from buildings and transport, as well as raising public awareness, will also help to deliver improved air quality.

AIR QUALITY NEUTRAL ASSESSMENT

Building Emissions

8.107 The Proposed Development will include three diesel 2500 kVA backup generators, a 250 kVA life-safety generator, a wet riser pump and a sprinkler pump to be located in the tallest, western section of the development. Based on information provided by Sweco Ltd (including the anticipated annual hours of operational for each plant unit) the calculated total combined NOx emission from the proposed generator units will be 259.1 kg/annum and the total PM_{10} emission will be 3.6 kg/annum.

8.108 ***ES Volume 3 – Appendix: Air Quality, Annex 5*** shows the Building Emissions Benchmarks (BEBs) for each land use category. **Table 8.10** shows the calculation of the BEBs for the Proposed Development under Option 1, whilst **Table 8.11** shows the calculation of the BEBs for the Proposed Development under Option 2. The Proposed Development includes proposed dual flexible medical and research and development uses for some of the proposed affordable workspaces; for these dual flexible uses, the lowest possible Benchmark for either of the proposed dual flexible uses has been assumed to provide a precautionary Benchmark (B1 use class for the Building Benchmark). For the proposed retail uses (use class A1-A4), the lowest, and therefore most stringent, benchmark (for A1 retail; the benchmark values for A2, A3 and A4 uses are higher, as shown in ***ES Volume 3 – Appendix: Air Quality, Annex 5***) has been assumed.

Table 8.10 Calculation of Building Emissions Benchmark for the Proposed Development – Option 1

Description		Value		Reference
A	Gross Internal Floor Area of A1 Retail (m^2)	588		KPF
		NOx	PM_{10}	
B	NOx BEB for A1 Retail (g/m^2/annum)	22.6	1.29	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
C	Gross Internal Floor Area of B1 Office (m^2)	11,274		KPF
		NOx	PM_{10}	
D	NOx BEB for B1 Office (g/m^2/annum)	30.8	1.77	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
E	Gross Internal Floor Area of D1(a) Medical or Health Services (m^2)	12,814		KPF
		NOx	PM_{10}	
F	NOx BEB for D1(a) Medical or Health Services (g/m^2/annum)	43.0	2.47	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
Total BEB NOx Emissions (kg/annum)		**912**	**52**	((A x B) + (C x D) + (E x F)) / 1000

8.109 For Option 1, the total building NOx Emission of 259.1 kg/annum is less than the total BEB NOx Emission of 912 kg/annum, and the total building PM_{10} Emission of 3.6 kg/annum is less than the total BEB PM_{10} emission of 52 kg/annum. Option 1 of the Proposed Development is thus better than air quality neutral in terms of building emissions.

Table 8.11 Calculation of Building Emissions Benchmark for the Proposed Development – Option 2

Description		Value		Reference
A	Gross Internal Floor Area of A1 Retail [a] (m^2)	618		KPF
		NOx	PM_{10}	
B	NOx BEB for A1 Retail (g/m^2/annum)	22.6	1.29	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
C	Gross Internal Floor Area of B1 Office (m^2)	24,238		KPF
		NOx	PM_{10}	
D	NOx BEB for B1 Office (g/m^2/annum)	30.8	1.77	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
E	Gross Internal Floor Area of D1(a) Medical or Health Services (m^2)	180		KPF
		NOx	PM_{10}	
F	NOx BEB for D1(a) Medical or Health Services (g/m^2/annum)	43.0	2.47	**Table A5.1** in **ES Volume 3, Appendix Air Quality: Annex 5**
Total BEB NOx Emissions (kg/annum)		**768**	**44**	((A x B) + (C x D) + (E x F)) / 1000

8.110 For Option 2, the total building NOx Emission of 259.1 kg/annum is less than the total BEB NOx Emission of 768 kg/annum, and the total building PM_{10} Emission of 3.6 kg/annum is less than the total BEB PM_{10} emission of 44 kg/annum. Option 2 of the Proposed Development is thus better than air quality neutral in terms of building emissions.

Road Transport Emissions

8.111 The Transport Emissions Benchmarks (TEBs) are based on the number of light vehicle trips generated by different land-uses, together with the associated trip lengths and vehicle emission rates. However, the GLA guidance[20] only provides trip lengths and emission rates for A1, B1 and C3 uses. As the Proposed Development includes other potential land-uses (e.g. D1 uses) it is not possible to use this methodology in the GLA guidance. However, the GLA guidance does provide an alternative methodology, based on trip rates only, and this has been followed in considering the 'air quality neutrality' of the Proposed Development in terms of transport emissions. As above, in relation to the dual flexible medical/research and development use for some of the proposed affordable workspace, a wholly medical use (D1), which provides the most stringent (lowest) Transport Benchmark, has been assumed as a worst case.

8.112 **Table A5.6** in ***ES Volume 3 – Appendix: Air Quality, Annex 5*** provides default trip rates for different development categories. This information has been used to calculate a benchmark trip rate for Option 1 of the Proposed Development in **Table 8.12**. This has then been compared with the actual trip rate of Option 1 of the Proposed Development.

Table 8.12 Calculation of Transport Benchmark Trip Rates for the Proposed Development – Option 1

Description		Value	Reference
A1 Land-Use Class			
A	Gross Internal Floor Area (m^2)	588	KPF
B	Benchmark Trip Rate (trips/m^2/annum)	43	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
C	Benchmark Trip Rate (trips/annum)	25,284	A x B
B1 Land-Use Class			
D	Gross Internal Floor Area (m^2)	9,322	KPF

[20] AQC (2014) Air Quality Neutral Planning Support Update: GLA 80371, Available: http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/GLA-AQ-Neutral-Policy-Final-Report-April-2014.pdf.aspx.

	Description	Value	Reference
E	Benchmark Trip Rate (trips/m^2/annum)	1	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
F	Benchmark Trip Rate (trips/annum)	9,322	D x E
D1 Land-use Class			
G	Gross Internal Floor Area (m^2)	14,766	KPF
H	Benchmark Trip Rate (trips/m^2/annum)	0.07	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
I	Benchmark Trip Rate (trips/annum)	1,034	H x I
Total Benchmark Trip Rate (trips/annum)		**35,640**	C + F + I

8.113 Option 1 of the Proposed Development is anticipated to generate 26,292 car trips per year (provided by Caneparo Associates, the appointed Transport Consultant); the majority of these trips are expected to be made by taxi, as the Proposed Development is 'car-free'. The Total Trip Rate of Option 1 of the Proposed Development is lower than the Total Trip Rate Benchmark of 35,640 trips/annum. As such, Option 1 of the Proposed Development is better than 'air quality neutral' in terms of transport emissions.

8.114 A benchmark trip rate has also been calculated for Option 2 of the Proposed Development in **Table 8.13**. This has then been compared with the actual trip rate of Option 2 of the Proposed Development.

Table 8.13 Calculation of Transport Benchmark Trip Rates for the Proposed Development – Option 2

	Description	Value	Reference
A1 Land-Use Class			
A	Gross Internal Floor Area (m^2)	618	KPF
B	Benchmark Trip Rate (trips/m^2/annum)	43	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
C	Benchmark Trip Rate (trips/annum)	26,574	A x B
B1 Land-Use Class			
D	Gross Internal Floor Area (m^2)	22,286	KPF
E	Benchmark Trip Rate (trips/m^2/annum)	1	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
F	Benchmark Trip Rate (trips/annum)	22,286	D x E
D1 Land-use Class			
G	Gross Internal Floor Area (m^2)	2,132	KPF
H	Benchmark Trip Rate (trips/m^2/annum)	0.07	**Table A5.6** in **ES Volume 3, Appendix Air Quality: Annex 5**
I	Benchmark Trip Rate (trips/annum)	149	G x H
Total Benchmark Trip Rate (trips/annum)		**49,009**	C + F + I

8.115 Option 2 of the Proposed Development is anticipated to generate 2,143 car trips per year (provided by Caneparo Associates, the appointed Transport Consultant). The Total Trip Rate of Option 2 of the Proposed Development is lower than the Total Trip Rate Benchmark of 49,009 trips/annum. As such, Option 2 of the Proposed Development is better than 'air quality neutral' in terms of transport emissions.

RESIDUAL EFFECTS

8.116 **Table 8.14** provides a tabulated summary of the outcomes of the air quality impact assessment of the Proposed Development; the summary applies to both Option 1 and Option 2.

Table 8.14 Summary of Residual Effects/2021 Proposed Development

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale) [a]	Effect Significance [a]	Geo	D I	P T	R IR	St Mt Lt
Demolition and Construction								
Demolition and Construction Vehicles								
Existing Receptors	High	Negligible	Not significant	L	D	T	R	Mt
Construction Dust								
Existing Receptors	High to Low	Negligible	Not significant (with mitigation)	L	D	T	R	Mt
Completed Development								
Road Traffic								
Existing Receptors	High	Negligible	Not Significant	L	D	P	IR	Lt
Receptors within the Proposed Development	High	Negligible	Not Significant	L	D	P	IR	Lt
Generator Plant								
Existing Receptors (E1 – E12)	High	Negligible	Not Significant	L	D	P	IR	Lt
Receptors within the Proposed Development (P1 – P9)	High	Negligible	Not Significant	L	D	P	IR	Lt

Notes:

Residual Effect

- Scale = Negligible / Minor / Moderate / Major
- Nature = Beneficial or Adverse

Geo (Geographic Extent) = Local (L), Borough (B), Regional (R), National (N)

D = Direct / I = Indirect

P = Permanent / T = Temporary

St = Short Term / Mt = Medium Term / Lt = Long Term

N/A = not applicable / not assessed

[a] The nature and scale of the effects of the Proposed Development have been defined using both terminology recommended by the EPUK/IAQM guidance (i.e. 'significant' / not significant') and the standard EIA terminology (i.e. 'Negligible', 'Minor Adverse' etc.). It should be noted that there is no direct /automatic correlation between the terminology recommended by the EPUK/IAQM and the standard EIA terminology, therefore, professional judgement has been used to determine the corresponding EIA significance criteria.

CLIMATE CHANGE

8.117 Air Quality is predicted to improve in the future, owing to lower emissions from road vehicles and heating and cooling plant as progressively lower emission technologies become available. The assessment, therefore, focuses on the near-term (year of opening), but the outlook for the longer term is one of improvement, both in terms of local and regional air quality, but also in terms of emissions associated with the Proposed Development itself. Climate change is a long-term effect, and significant changes in climate are not expected by 2025 (the year of opening assumed by the assessment). Climate change will, therefore, not affect air quality model predictions set out in this ES Chapter. In the longer term (2050 – 2080) changes in climate might affect the need for heating and cooling and, therefore, have an influence on the energy plant emissions associated with the Proposed Development, but significant effects are not expected as a result.

ASSESSMENT OF THE FUTURE ENVIRONMENT

Evolution of the Baseline Scenario

8.118 If the Proposed Development was not to come forward, it is expected that the site would remain in its current state. Air quality is generally expected to improve with time, particularly through the introduction of more

stringent vehicle emissions standards. Air quality conditions at the site would therefore be expected to improve and this is reflected in the predicted future baseline concentrations presented in **Table 8.3** and **Table 8.4**.

Cumulative Effects Assessment

8.119 Cumulative schemes have been outlined in ***ES Chapter 2 – EIA Methodology (Volume 1)***. The cumulative effects presented below, are applicable to both Option 1 and Option 2unless stated otherwise.

Demolition and Construction

8.120 The IAQM guidance is clear that, with appropriate mitigation measures in place, any residual construction dust effects from an individual site will be 'not significant'. The guidance also suggests that cumulative construction dust impacts are only likely where sites are within 500 m of each other. Work would also have to be taking place in areas of both sites that are close to a receptor in order for cumulative effects to occur.

8.121 In accordance with the mitigation measures set out in ***ES Volume 3 – Appendix: Air Quality, Annex 6***, if there is concurrent construction work on sites within 500 m of each other, the construction contractors should *"hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised"*.

8.122 Of the 25 cumulative schemes identified, 14 are located within 500 m of the site; namely, consented schemes 3, 5, 7, 8, 11, 12, 13, 14, 22 and 23, and submitted schemes 18, 19, 20 and 25 (as set out in Paragraph 2.97 and **Figure 2.1** in ***ES Chapter 2 – EIA Methodology (Volume 1)***). It is anticipated that all construction sites will adopt appropriate mitigation measures to limit emissions of dust, will hold regular liaison meetings recommended above and will ensure that plans are co-ordinated to minimise impacts upon the most sensitive receptors. With these measures in place, to be included in the management plans to be secured by suitably worded planning conditions/ planning obligation, the cumulative effects of the construction activities are considered to be '**not significant**'.

8.123 Additionally, as discussed in Paragraph 8.26 above, traffic generated by the construction of the Proposed Development is not expected to exceed the EPUK/IAQM screening criteria for a detailed assessment, and the impacts of emissions from construction traffic are accordingly not considered to be significant. Consequently, any cumulative effects of construction traffic are also considered to be '**not significant'**.

Completed Development

8.124 The assessment has demonstrated that the Proposed Development will have negligible impacts on annual mean concentrations, regardless of the existing baseline concentrations. As discussed in Paragraph 8.76 above, traffic generated by the operation of either Option 1 or Option 2 for the Proposed Development will not exceed the EPUK/IAQM screening criteria for a detailed assessment, and the cumulative impacts of emissions from operational traffic are considered, therefore, to be '**not significant**'.

8.125 The impact on short-term concentrations can also be screened out as being negligible for all pollutants apart from 1-hour mean NO_2. Further assessment concludes that the effect of emergency plant emissions on short-term concentrations will be not significant. The process contributions are dominated by the emergency generators, which will be operated only occasionally for testing, but which have been assumed within the assessment to be continuously operating (see assumptions in ***ES Volume 3 – Appendix: Air Quality (Annex 1)***, Paragraph A1.12). This is an extremely conservative assumption resulting in a very conservative assessment of the short-term impacts of the Proposed Development. Consequently, it can be concluded that the cumulative effects of road traffic and emergency plant emissions will be '**not significant**'.

LIKELY SIGNIFICANT EFFECTS

8.126 For the reasons set out above, the construction and operation of the Proposed Development are not considered to result in any significant effects on the existing receptors considered within this assessment in relation to air quality under both Option 1 and Option 2. In addition, the assessment has demonstrated that air quality for future users of the Proposed Development will also be acceptable.

8.127 The cumulative effects assessment also concludes that there will be no significant cumulative effects.

8.128 Overall, the Proposed Development is considered to have a non-significant effect on air quality, during both the construction and operational phases. In addition, no significant cumulative effects are considered likely.

COMPARISON OF EFFECTS

8.129 **Table 8.15** below presents the residual effects of the 2018 Proposed Development to allow for a comparison with the residual effects of the 2021 Proposed Development (**Table 8.14**).

Table 8.15 Summary of Residual Effects – 2018 Proposed Development

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale) [a]	Effect Significance [a]	Geo	D I	P T	R IR	St Mt Lt
Demolition and Construction								
Demolition and Construction Vehicles								
Existing Receptors	High	Negligible	Not significant	L	D	T	R	Mt
Construction Dust								
Existing Receptors	High to Low	Negligible	Not significant (with mitigation)	L	D	T	R	Mt
Completed Development								
Road Traffic								
Existing Receptors	High	Negligible	Not Significant	L	D	P	IR	Lt
Receptors within the Proposed Development	High	Negligible	Not Significant	L	D	P	IR	Lt
CHP, Boiler and Life-Safety Generator Plant								
Existing Receptors (E1 – E12)	High	Negligible	Not Significant	L	D	P	IR	Lt
Receptors within the Proposed Development (D1 – D8)	High[b]	Negligible	Not Significant	L	D	P	IR	Lt

Notes:

Residual Effect

- Scale = Negligible / Minor / Moderate / Major
- Nature = Beneficial or Adverse

Geo (Geographic Extent) = Local (L), Borough (B), Regional (R), National (N)

D = Direct / I = Indirect

P = Permanent / T = Temporary

St = Short Term / Mt = Medium Term / Lt = Long Term

N/A = not applicable / not assessed

[a] The nature and scale of the effects of the Proposed Development have been defined using both terminology recommended by the EPUK/IAQM guidance (i.e. 'significant' / not significant') and the standard EIA terminology (i.e. 'Negligible', 'Minor Adverse' etc.). It should be noted that there is no direct /automatic correlation between the terminology recommended by the EPUK/IAQM and the standard EIA terminology, therefore, professional judgement has been used to determine the corresponding EIA significance criteria.

[b] Most identified receptors are high, however, some (i.e. the air intake locations for the proposed offices) are not technically relevant in terms of the assessment methodology; these receptors have been included as a precaution and also to establish whether the proposed plant (including flue locations etc.) is appropriate.

8.130 The comparison demonstrates that, in terms of air quality effects on completion and occupation, the effects are consistent between the 2018 Proposed Development and the 2021 Proposed Development. The air quality effects of the completed and occupied Proposed Development are negligible and not significant (noting that CHP and boiler emissions are not relevant to the 2021 Proposed Development).

8.131 Throughout the demolition and construction phase, measures to mitigate dust emissions will be required to minimise effects upon nearby sensitive receptors. The mitigation measures will be incorporated into a dust management plan (DMP). The DMP is likely to be integrated into a Code of Construction Practice and/or the CEMP and may require monitoring. Assuming that the mitigation measures outlined within the guidance are implemented, the overall effect of construction dust is considered to be 'not significant'. In addition, no mitigation measures are considered necessary with regards to construction traffic as the effects without mitigation are 'not significant'. This conclusion is consistent with that of the air quality assessment carried out for the 2018 Proposed Development.

8.132 Cumulative air quality effects have been defined as being 'not significant' for both the 2018 Proposed Development and 2021 Proposed Development when considered cumulatively with other emerging development schemes. The cumulative effects conclusion is therefore consistent across the 2018 ES and 2021 ES.

8.133 In terms of air quality neutrality, the 2018 Proposed Development was defined as being air quality neutral both in relation to building and transport emissions. The 2021 Proposed Development is also air quality neutral in terms of both building and transport emissions.

ANNEX A

LBS Review

LBS Review - Summary of Comments	Reference in the ES Chapter / Application Documentation
Paragraph 1.45 The applicant has correctly identified the AQMAs within the LBS for the annual mean NO_2 and 24 hour mean PM_{10} Air Quality Strategy (AQS) objectives. Within the ES, the applicant should have regard to the Air Quality Focus area that is located close to the site.	Identified two close-by Focus Areas (see Paragraph 8.59 & Figure 8.1 of the ES Chapter).
Paragraph 1.46 In paragraph 202, the Institute of Air Quality Management's (IAQM) land use planning and development guidance has been correctly identified to determine if construction traffic meets the assessment criteria in Table 6.2.	The assessment has compared the anticipated demolition and construction phase traffic generation to the screening criteria outlined in Table 6.2 of the EPUK / IAQM guidance (see Paragraph 8.9).
Paragraph 1.47 In paragraph 204, it is stated that "it is anticipated that the volume of additional traffic associated with the Proposed Development will not exceed the screening criteria specified by the EPUK / IAQM guidance, and that an assessment of emissions from operational road traffic will be screened out of the air quality assessment." A comparison of the proposed scheme's net change upon road traffic should be provided to demonstrate that it does not meet IAQM's Table 6.2 assessment criteria.	The assessment demonstrates that the operational traffic generated by the Proposed Development is below the screening criteria outlined in Table 6.2 of the EPUK / IAQM guidance (see Paragraph 8.76).
Paragraph 1.48 As noted in the SR, impacts from the proposed development can be screened out of detailed assessment. As noted above, this should be proven by demonstrating that the net change in traffic flows associated with the proposed development does not meet Table 6.2 of IAQM's screening criteria. However, dispersion modelling of proposed road traffic surrounding the proposed development should be undertaken to establish pollutant (NO2, PM10 and PM2.5) concentrations at proposed receptors.	See above responses regarding screening out impacts associated with traffic generation by the Proposed Development. Taking into account the low volume of traffic generated by the Proposed Development, dispersion modelling of roads impacts has not been undertaken, either for existing receptors or for new receptors within the Proposed Development itself. Total short-concentrations of NO_2 at new receptors within the Proposed Development have been predicted utilising 2025 Defra background mapped concentrations, combined with the modelled process contribution of the proposed plant, before comparing to the 1-hour mean NO_2 objective to establish whether or not exceedances will occur (see Paragraphs 8.91 to 8.93 of the ES Chapter). This is considered to be a conservative approach as it does not take into account the effects of the ULEZ and LEZ. The annual mean NO_2, PM_{10} and $PM_{2.5}$ objectives and the 24-hour mean PM_{10} objective do not apply at the land uses that comprise the Proposed Development, and as such these objectives have not been considered in relation to new users of the development within the assessment.
Paragraph 1.49 In addition, it is recommended that a sensitivity test should be applied to consider elevated real world emission rates from diesel vehicles. It is recommended that this is undertaken and the methodology/guidance used for the sensitivity test documented.	It has not been necessary to apply a sensitivity test to roads emissions, as the impacts of roads have not been quantitatively assessed (see above).
Paragraph 1.50 The consultant has correctly identified industry standard guidance such as: - Construction dust assessment; - Institute for air quality management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction; - Mayor of London's Supplementary Planning Guidance, The Control of Dust and Emissions during construction and demolition; - Evaluating significance of air quality impact – IAQM Land-Use Planning & Development Control: Planning for Air Quality (2017); - Air Quality Neutral Assessment - Mayor of London's Supplementary Planning Guidance, Sustainable Design and Construction; and, - Air quality monitoring – Local Air Quality Management Technical Guidance 2016. Paragraph 1.51 An assessment of this guidance shown above and the conformity of the proposed development with these should be included within the ES. It is recommended that consideration is given to the Mayor of London's draft London Plan, in particular, ambitions to meet the world health organisation's particulate thresholds in section 9.1.1.	The London Plan is considered (see Paragraph A7.19 – A7.24 of the Technical Appendices). The ambition to meet the WHO's particulate thresholds (the GLA target) has not been considered in terms of new exposure as the annual mean PM objectives do not apply at receptors within the Proposed Development (see above). The main pollutant of concern regarding the proposed emergency plant is NO_2; PM impacts associated with the plant have been shown to be insignificant, including in relation to the GLA $PM_{2.5}$ target (see Paragraph 8.80 of the ES Chapter).
Paragraph 1.52 Confirmation that the locations of sensitive receptors for the model have been agreed with LBS is to be provided within the ES.	The individual locations of sensitive receptors have not been agreed with LBS, rather, locations have been selected by the consultants who have undertaken the assessment, based on their professional experience. This approach is consistent with the methodology agreed by Ken Andrews (Environmental Protection Team, LBS) on 28th November 2018.
Paragraph 1.53 It is noted that control measures including for the control of dust are to be employed. Details of these measures are to be included within the ES.	The measures proposed to address the risk of dust impacts are detailed in Paragraphs 8.99 to 8.101 of the ES Chapter and Section A6 of the Technical Appendices.