6 Air Quality

6.1 Introduction

6.1.1 This chapter of the ES has been produced by SLR Consulting Ltd (SLR). The chapter sets out an assessment of the likely air quality effects associated with the Proposed Development described in Chapter 3. It describes the scope, relevant legislation and guidance, the methodology, the baseline conditions in the study area, and then provides a description of the impacts of the development and the potential significant effects. It includes consideration of inherent mitigation and any further mitigation measures required to prevent, reduce, or offset any significant adverse residual effects. This Chapter is supported by the following appendices:

- Appendix 6.1 – Air Quality Assessment
- Appendix 6.2 – Air Quality Scope_1.2 AG comments (05/08/2025)
- Appendix 6.3 – LBH Air Quality Neutral (AQN) & Air Quality Positive Requirements (30/09/2025)
- Appendix 6.4 - Scoping Comments from Air Quality Officer

Scope

6.1.2 In relation to air quality, the key aspect of the Proposed Development is the operation of emergency back-up generators. Electricity for operation of the data centre is provided from connections to the national electricity transmission network; however, given the nature of data centres and their requirement to have an available electricity supply at all times, the data centre requires emergency back-up generators. The back-up generators require routine testing and maintenance that result in combustion emissions released to air. The back-up generators will be fuelled by Hydrotreated Vegetable Oil (HVO) or diesel. The assessment has considered potential effects from the planned routine testing and maintenance operations as well as an unplanned grid outage scenario.

6.1.3 In addition to the assessment of back-up generator emissions, the scope of the assessment provides a traffic emissions screening assessment. The scoping is addressed in further detail in paragraph 6.2.1.

Legislation, Policy and Guidance

Legislation

6.1.4 The relevant legislation is described in detail in Appendix 6.1, Section 1.1. The key legislation relevant to the air quality assessment are:

- Air Quality Standards Regulations 2010[1] (AQSR);
- Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020; and

[1] The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

- The Air Quality (England) Regulations 2000 (as amended).

Air Quality Assessment Levels

6.1.5 The ambient air quality standards of relevance to this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 6.1. These are primarily based upon the Air Quality Objectives Local Authorities are responsible for achieving. The $PM_{2.5}$ AQSR AQAL has also been included for completeness.

Table 6.1 Relevant Ambient AQALs

Pollutant	AQAL (µg/m^3)	Averaging Period	Reference
Nitrogen dioxide (NO_2)	40	Annual mean	Air Quality (England) Regulations 2000
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)	
Particles (as PM_{10})	40	Annual mean	
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)	
Particles (as $PM_{2.5}$)	20	Annual mean	Air Quality Standards Regulations (as amended)
	10	Annual mean (by 2040)	Environmental Targets (Fine Particulate Matter) (England) Regulations 2023
	10	Annual mean (by 2030)	Mayor of London (London Environment Strategy)

Table 6.2 Human Health relevant Exposure

AQAL Averaging Period	AQALs Should Apply At	AQALs Should Not Apply At
Annual mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

Policy

6.1.6 The relevant policy is described in detail in Appendix 6.1, Section 1.2. The key policy

- National Planning Policy Framework (NPPF)[2]:
- Planning Practice Guidance (PPG) [3]
- London Plan[4]
- London Borough of Hillingdon (LBH) Local Plan[5]
- LBH Air Quality Action Plan covers the period 2019-2024[6]
- LBH Air Quality Action Plan 2025-2030 (Consultation draft)[7]

Guidance

6.1.7 This assessment has been informed by the principles contained within the guidance documents below.

- Defra: Local Air Quality Management Technical Guidance (TG22) (LAQM.TG22)[8];
- Defra: $PM_{2.5}$ Targets: Interim Planning Guidance[9];
- Greater London Authority (GLA): London Local Air Quality Management Technical Guidance (LLAQM.TG(19))[10];
- GLA: London Plan Guidance, Air Quality Neutral (the 'GLA AQN guidance')[11];
- GLA: London Plan Guidance, Air Quality Positive (the 'GLA AQP guidance')[12];
- Environment Agency (EA): Air emissions risk assessment for your environmental permit[13];
- EA: Specified generators: dispersion modelling assessment[14];

[2] National Planning Policy Framework, Ministry of Housing, Communities & Local Government. December 2024.
[3] Planning Practice Guidance Air Quality, Ministry of Housing, Communities & Local Government. November 2019.
[4] Mayor of London, The London Plan, (2021).
[5] London Borough of Hillingdon, Local Plan: Part 1 (Strategy Policies), November 2012.
[6] London Borough of Hillingdon, Air Quality Action Plan 2019 - 2024, May 2019
[7] London Borough of Hillingdon, Air Quality Action Plan 2025 - 2030, Consultation Draft
[8] Local Air Quality Management Technical Guidance (TG22), Published by Defra in partnership with the Scottish Government, Welsh Government and Department of Agriculture, Environment and Rural Affairs. May 2025.
[9] Defra, $PM_{2.5}$ Targets: Interim Planning Guidance, published 4 October 2024.
[10] Mayor of London, London Local Air Quality Management Technical Guidance LLAQM.TG(19), (2019).
[11] GLA, London Plan Guidance, Air Quality Neutral, (2023).
[12] GLA, London Plan Guidance, Air Quality Positive, (2023).
[13] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.
[14] https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment.

- Environmental Policy Implementation Community (EPIC) (formerly EPUK) and the Institute of Air Quality Management (IAQM): Land-Use Planning and Development Control: Planning for Air Quality[15] (IAQM guidance); and
- Defra: Air quality appraisal: damage cost guidance (hereafter referred to as the 'Defra damage cost guidance')[16].

6.2 Assessment methodology

Scoping

6.2.1 The scoping process has included both a pre-application meeting with LBH (undertaken on 12th August 2025 with written responses received included as Appendix 6.2 and 6.3) and a formal EIA Scoping Request (response received 14th November 2025 included as Appendix 6.4) LBH. The report set out the proposed scope of the air quality assessment in full, and detailed which elements would be scoped in or out of this ES Chapter. The below list summarises what is scoped 'in' and scoped 'out' of the assessment as a result of pre-application meeting and subsequent correspondence.

Scoped in:

- Detailed dispersion modelling of generator emissions (NO_2, PM_{10} and $PM_{2.5}$) – the routine testing and maintenance of the back-up generators and use in grid outage scenarios. Inclusion of the adjacent Data Centre to the west in the detailed dispersion model with other emission sources considered through incorporation of local baseline monitoring data
- Cumulative Impact Assessment – the inclusion of the following potential future Data Centres emissions in the future baseline: Union Park (LBH planning ref. 75111/APP/2020/1955 and 75111/APP/2022/1007); Tudor Works (LBH planning ref. 38421/APP/202021/4045); Hayes Digital Park (LBH planning ref. 78343/APP/2025/719); West London Technology Park (Buckinghamshire Council planning ref: PL/24/0754/OA) (SoS Ref: APP/N0410/W/24/3347353);
- Traffic Emissions Screening Assessment – The trip generation during the construction and operational phases will be subject to a screening assessment.
- Air Quality Neutral (AQN), Air Quality Positive and Damage Cost Calculation (DCC).

Scoped out:

- Construction Phase Dust Assessment – Construction operations are largely associated with alterations to buildings (including deconstruction of a section of Unit 2), fabrication and installation of plant, with no major excavation or earthworks. It is envisaged that industry standard construction dust control measures would be included in a Construction Environmental Management Plan required by planning condition.

[15] EPIC (formerly EPUK) and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.
[16] Defra: *Air quality appraisal: damage cost guidance*, March 2023. Available at: https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance.

- Assessment of Impacts on Ecological Receptors – The Site falls within the SSSI Impact Risk Zone for '*energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/combustion*' >50MW energy input. Given the generators are operated in a back-up provision they are not considered to fall within the same category as the examples, which are continuously operating plant. For context, the nearest SSSI is 5km distant. On this basis, assessment of impacts on ecological receptors is scoped out.

Methodology

Dispersion Modelling of Back-up Generator Emissions

6.2.2 A detailed methodology is provided in Appendix 6.1, Section 2.

6.2.3 The US American Meteorological Society and Environmental Protection Agency Regulatory Model (AERMOD v13) dispersion model was used for the assessment; this model is widely used and accepted by the Environment Agency for undertaking such assessments and its predictions have been validated against real-time monitoring data. The modelling has included local meteorology, topographical and building effects.

6.2.4 The Proposed Development includes a total of 32 back-up generators across the two buildings DC01 (20 back-up generators across 4 Data Halls) and DC02 (12 back-up generators across 2 Data Halls). The generator emission parameters have been derived on the basis of manufacturer's design and specifications and based on diesel as opposed to HVO as a worst case approach (set out in Table 2-1 of Appendix 6.1).

6.2.5 The operating scenarios modelled include the following:

- Routine Maintenance Operations – the predictable, managed testing and maintenance activity; these include:
  - Monthly generator by generator tests (various test types taking between 15 minutes and 2 hours per test, a total of 11 hours per year per generator); and
  - Quarterly Data Hall Block tests where multiple generators operate to support the power load of a Data Hall (2-hours duration, a total of 8 hours per year per generator).
- Emergency Outage Operations (all back-up generators operating required to support the Site load) – the unpredictable emergency grid outage any time during the year requiring plant to operate for the required outage duration. Outages are typically durations of seconds to minutes, as a precautionary approach a 24 outage hours have been assessed.

6.2.6 The scenarios above have been assessed cumulatively with other emission sources (see Cumulative Impact Approach in Appendix 6.1, Section 2.2).

Traffic Emissions Screening

6.2.7 The change in traffic flows as a result of the Proposed Development has been screened against the criteria set out in IAQM guidance. If the Proposed Development trips are not above criteria presented, then a detailed impact assessment is consequently not required. Impacts can therefore be described as having an 'insignificant' effect on local air quality.

6.2.8 The indicative screening criteria relevant for this assessment are as follows (specific to a development located inside of or within 200m of an AQMA):

- A change of Light-Duty Vehicle (LDV) flows of more than 100 as 24-hour annual average daily traffic (AADT); and/or
- A change of Heavy-Duty Vehicle (HDV) flows of more than 25 as 24-hour AADT.

Air Quality Neutral

6.2.9 An Air Quality Neutral Assessment has been carried out in accordance with the GLA London Plan Guidance[11]. The guidance provides a methodology to evaluate the projected emissions from both building operations and associated transport against established benchmarks for specific land-use categories. Emissions from buildings and transport are assessed separately, to determine whether they are below the benchmarks and therefore can be considered 'air quality neutral'.

Transport Emissions

6.2.10 Table 4.1 of the Air Quality Neutral Guidance outlines benchmark trip rates for various land-use categories. The Proposed Development is most appropriately assessed under the 'Storage and Distribution' or 'Industrial' classifications, both of which have a benchmark of 6.5 annual car trips per square metre. This has been used to establish the Transport Emissions Benchmark (TEB) for comparison with predicted operational trips.

Building Emissions

6.2.11 Table 3.1 of the Air Quality Neutral guidance does not provide Building Emissions Benchmarks (BEB) for diesel generators, the benchmarks are focused on heating and use of gas. Paragraph 3.1 states that:

"Solid and liquid biomass/non-biomass fired appliances also emit fine particulate matter in addition to NOx. The benchmark emission rate for particulate matter is zero. Any development that uses solid or liquid fuels for primary or secondary heating will therefore not be Air Quality Neutral and will require mitigation or offsetting (see section 5)".

6.2.12 On the basis that the back-up generators operate on diesel or HVO, i.e. a liquid, the assessment has progressed to reviewing mitigation and off-setting payments via a Damage Cost Calculation (DCC).

6.2.13 The DCC has followed Defra's 'Air quality appraisal: damage cost guidance'[16] applying the 'Damage costs toolkit', using the Central Estimate.

Air Quality Positive

6.2.14 The AQP Guidance categorises air quality positive approaches and measures into: 'Better design and reducing exposure'; 'Building emissions'; 'Transport emissions'; and 'Innovation and futureproofing'. The adopted measures, how they will be implemented and the technical assessments supporting them, have been summarised in an Air Quality Positive Matrix.

Predicting effects

Assessment of Impacts and Significance

Annual Mean Impacts

6.2.15 Descriptors for predicted annual mean impacts applied in this assessment are taken from the IAQM guidance. The matrix for assessment against annual mean AQALs is reproduced in Table 6.3.

Table 6.3 Annual Mean Impact Descriptor Matrix

Long Term Average Concentration at Receptor in Assessment Year	Change in Concentration Relative to AQAL			
	1% (A)	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Note: (A) Changes <0.5% will be described as Negligible.				

Short-terms Impacts

6.2.16 As back-up generator emissions are short duration and intermittent, the impacts have been considered in terms of the probability of an exceedance of threshold values using the approach defined in Environment Agency guidance as described in Appendix 6.1, Section 2.1. The thresholds relate to the AQALs and are consistent with IAQM impact descriptors as set out in Table 6.4. The EA guidance provides the following framework to apply to the calculated probability:

- Probabilities of 1% or less indicate exceedances of threshold are highly unlikely;
- Probabilities of less than 5% indicate exceedances of threshold are unlikely; and
- Probabilities of 5% or more indicate there is potential for the exceedances of threshold.

Table 6.4 Short-term Impact Descriptor Matrix

Short-term Process Contribution as % of the AQAL	Magnitude of Change	Impact Descriptor
10% or less	Negligible	Negligible
11-20%	Small	Slight
21-50%	Medium	Moderate
>51%	Large	Substantial

Significance

6.2.17 The EPIC & IAQM guidance requires a judgment on the significance of the 'effect' as 'significant' or 'not significant'. Primarily this is based upon the impact descriptors (i.e. it states 'it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not have a significant effect'). Other considerations may also have a bearing, for example:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts;
- The worst-case assumptions adopted when undertaking the prediction of impacts; and
- The extent to which the Site has adopted best practice to eliminate and minimise emissions.

6.2.18 The above factors have been considered when determining the significance of effect.

Geographic Scope

6.2.19 The modelling has been undertaken using a receptor grid across OpenSource mapping data of the study area. A receptor grid was applied extending 2.5km from the Site. A review of the preliminary modelling results confirmed the extent was appropriate due to impacts becoming insignificant or highly unlikely at distances greater than this (as demonstrated in the results section below). In addition, the modelling has included both discrete sensitive receptors and dedicated grids over residential areas to capture the maximum impacts in each area (this is described in further detail in Appendix 6.1, Section 2.1).

Temporal Scope

6.2.20 Baseline air quality is projected to improve year on year according to both Defra and the GLA, due to vehicle emissions improvements and other policy measures. The assessment has considered the impacts and potential effects against a present day (year 2025) air quality baseline. This represents a precautionary approach as it combines operational emissions with the highest predicted background. No further assessment of future years operation has been undertaken. The Damage Cost Calculation however as required, considers a 30-year period.

Consultation

6.2.21 In addition to the EIA scoping report, a pre-application meeting was held on 12th August 2025 with LBH and their air quality consultant. The meeting included discussion of the scope of the air quality assessment as well as aspects of the methodology. The outcome of this meeting is set out in paragraph 6.2.1.

Assumptions and Limitations

6.2.22 Assumptions and limitations in the assessment inputs and methodology are set out below. Where assumptions have been made, they have followed the precautionary principle.

- The emissions have been based upon a Caterpillar C175-20 operating on diesel fuel as a precautionary approach compared to HVO fuel.
- The generator specification sheet does not specify the proportions of particulate matter which would be emitted as PM_{10} and $PM_{2.5}$. Therefore all particulate has been modelled as PM_{10} and $PM_{2.5}$. which is a precautionary approach.

- Selective Catalytic Reduction (SCR) systems efficiency increase with exhaust temperature. As a precautionary approach it has been assumed that NO_x emissions during the first 20 minutes of a generator's operations will be unabated, in reality the SCR starts to abate NO_x soon after start-up and is typically fully effective in 5 to 15 minutes. A time-weighted 1-hour average emission rate has been applied to account for the 'warm-up'.
- The monthly testing regime includes tests ranging from 15 minutes to 2 hours. A precautionary approach has been adopted in the local air quality impact assessment and each test, even if it occurs for less than 1 hour, has been treated as a total hour run. In addition, all hours, even if SCR if fully effective (i.e. the generator is at operating temperature and catalyst fully effective), have been modelled at the time-weighted average 'warm-up' emission rate.
- A NO_x to NO_2 conversation ratio of 35% has been applied to the 32 back-up generator emissions in accordance with the EA's recommended precautionary approach for calculating 1-hour average NO_2 concentrations. The EA's Air Quality Modelling and Assessment Unit (AQMAU) suggest that within 500m of a pollutant source, the conversion factor is likely to be closer to 15%[17], as such the reported concentrations represent a precautionary assessment.
- The baseline concentrations applied in the assessment have been based upon the most recent monitoring data (i.e. measured PM_{10} and $PM_{2.5}$ data from the closest , known as 'Hillingdon', and NO_2 data from the HIL 20 diffusion tube rounded up to 30µg/m^3). The LAEI future year projections present an improvement in baseline concentrations, as such the assessment has adopted a precautionary approach.

6.3 Baseline conditions

LAQM Review and Assessment

6.3.1 The Site is located within the London Borough of Hillingdon's administrative area for LAQM. The latest publicly available LAQM report has been reviewed, which at the time of writing is the 2024 Annual Status Report[18] (ASR). The Site is located within the 'Hillingdon AQMA', which covers the southernmost two thirds of the borough. However, the Site does not lie within an Air Quality Focus Area (defined as an area that exceeds the annual mean Limit Value for NO_2 and has locations with high human exposure).

Site Setting and Sensitive Receptors

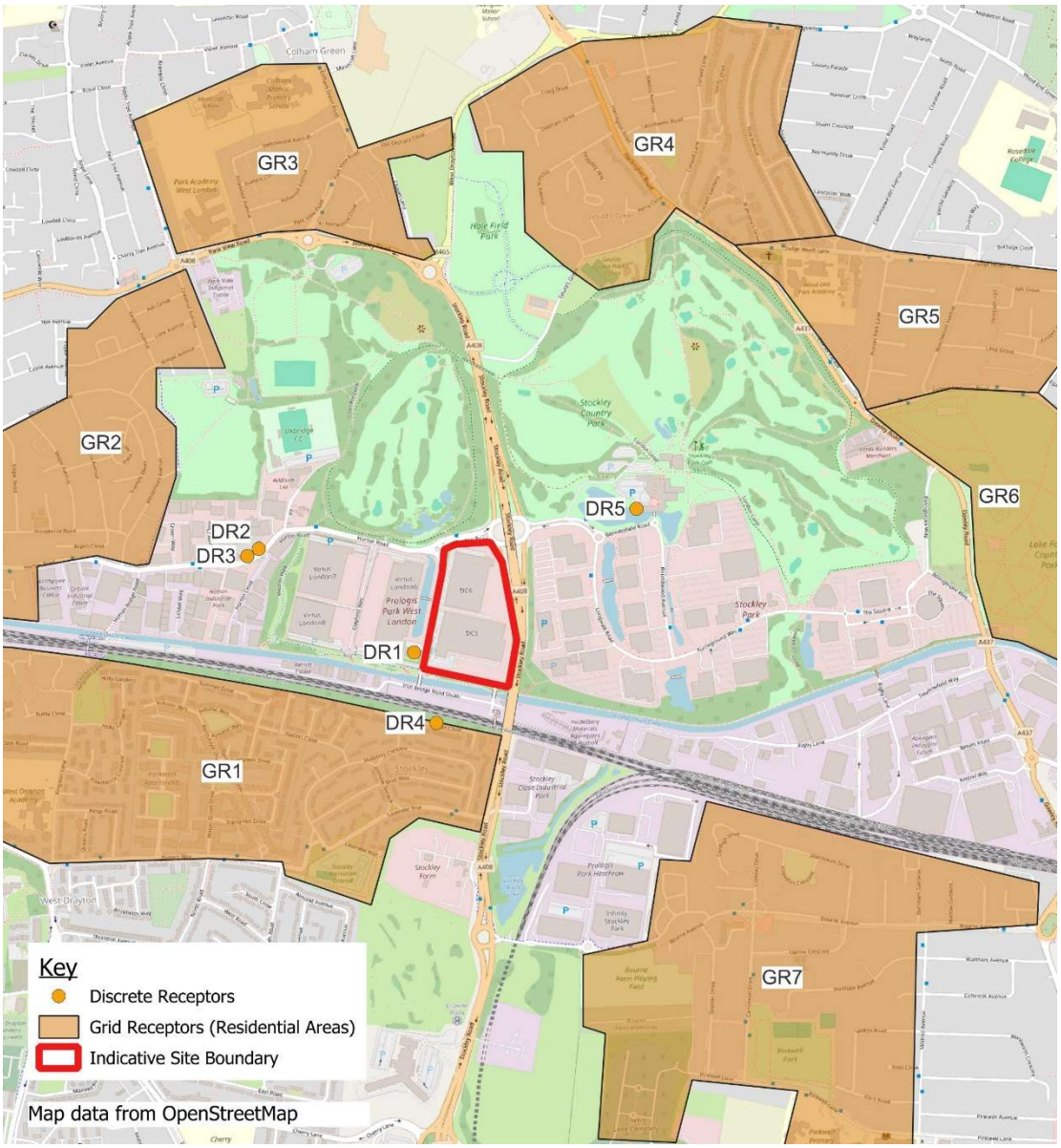
6.3.2 Sensitive receptors in the surrounding area are detailed in Table 6.5 and shown in Figure 6.1. Receptors have been selected on the basis of the criteria defined in Table 6.2, and within the context of the ES all have been considered as high sensitivity. In order to capture the highest impacts over large residential areas, grid receptors have been generated (GR1 to GR7). The closest receptors not in residential areas have been modelled as discrete receptors (DR1 to DR5).

[17] AQMAU reference: AQMAU-C1457-RP01 Project title: Diesel generator short term NO2 impact assessment. 2016
[18] The London Borough of Hillingdon (2024), Air Quality Annual Status Report, 2024, May 2024.

Table 6.5 Modelled Sensitive receptors

ID	Description	Relevant Exposure Period
DR1	Busy Bees Nursery	All (Long and Short Term)
DR2	Horton Rd (residential property north)	All (Long and Short Term)
DR3	Horton Rd (residential property south)	All (Long and Short Term)
DR4	Emden Close Play Area	Short Term (1-hour)
DR5	Travel Lodge Hotel	Short Term (1-hour and 24-hour)
GR1	Stockley (residential area to south)	All (Long and Short Term)
GR2	Yiewsley (residential area to west)	All (Long and Short Term)
GR3	Colham Green (residential area and schools to north)	All (Long and Short Term)
GR4	Goulds Green (residential area and riding school to north east)	All (Long and Short Term)
GR5	Hayes (residential area and schools to north west)	All (Long and Short Term)
GR6	Lake Farm (Country Park and Academy)	All (Long and Short Term)
GR7	Pinkwell, Bourne (residential area and Schools)	All (Long and Short Term)

Figure 6.1 Site Setting and Receptors



Current Air Quality Baseline

6.3.3 Pollutant concentrations monitored during 2020 and 2021 (i.e. affected by the COVID-19 pandemic) are expected to be atypical and have not been considered for the determination of baseline conditions.

Automatic Air Quality Monitoring

6.3.4 The closest continuous automatic air quality monitor is the 'Hillingdon' monitor classified as an 'urban background' site (the location (HILL 01) is illustrated in Figure 6.2). The NO_2, PM_{10} and $PM_{2.5}$ data for 2022 – 2024 is presented in Table 6.6. There are no exceedances of the AQALs recorded at the monitor and annual mean concentrations in general show a gradual decline through the period.

Table 6.6 Automatic Air Quality Monitoring Results (HILL 01)

Pollutant	Year	Data Capture %	Annual Mean (µg/m^3)	Short-term Statistics
NO_2	2022	99.76%	28	0 hourly means >200µg/m^3
	2023	98.80%	25	0 hourly means >200µg/m^3
	2024	99.12%	23	0 hourly means >200µg/m^3
PM_{10}	2022	65.47%	14	0 daily means >50µg/m^3
	2023	97.02%	14	3 daily means >50µg/m^3
	2024	99.70%	13	0 daily means >50µg/m^3
$PM_{2.5}$	2022	65.47%	7	n/a
	2023	97.01%	8	n/a
	2024	99.70%	7	n/a

Passive Diffusion Tube Monitoring

6.3.5 LBH monitor annual mean concentrations of NO_2 using passive diffusion tubes. The locations of the closest monitoring locations are illustrated in Figure 6.2. The details and results for these monitoring locations are presented in Table 6.7.

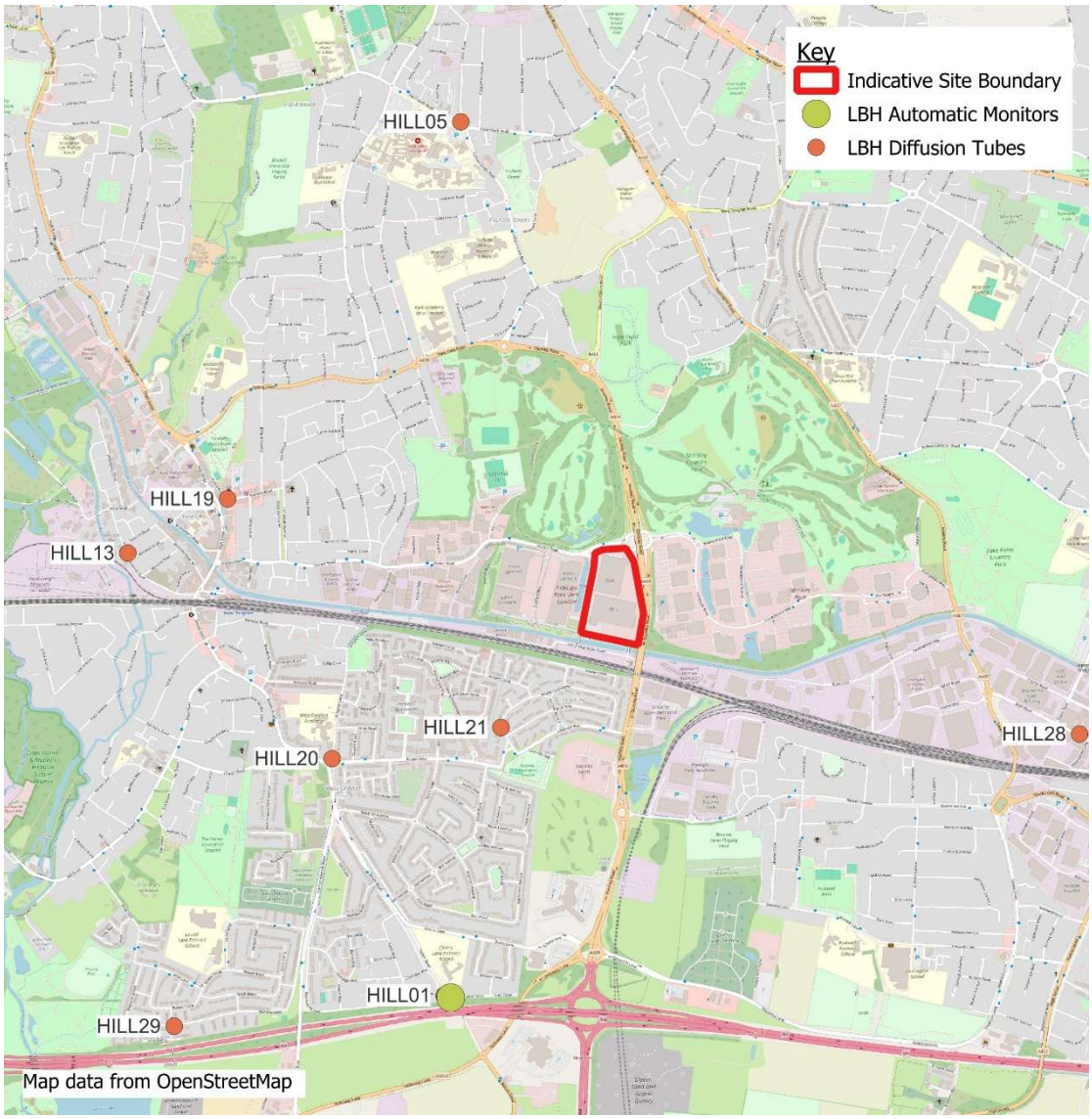
Table 6.7 Passive Diffusion Tube Monitoring

Site ID	Site Type	2023 Data Capture %	Annual Mean NO2 Concentration (µg/m^3)	
			2022	2023
HILL 05	Roadside	100%	27.8	26.7
HILL 13	Roadside	91.7%	21.0	21.3
HILL 19	Background	100%	28.7	26.2
HILL 20	Background	100%	34.5	29.2
HILL 21	Background	100%	27.9	24.5
HILL 28	Roadside	83.3%	27.1	21.4
HILL 29	Background	100%	25.2	24.1

6.3.6 As shown in Table 6.7, annual mean NO_2 concentrations have remained below the AQAL (40µg/m^3) at all the monitors across the period presented (2022 – 2023). There is generally a decline in annual mean concentrations between 2022 and 2023, potentially in part due to the expansion of the Ultra Low Emission Zone (ULEZ).

6.3.7 The empirical relationship given in LAQM.TG22 states that exceedances of the 1-hour mean AQAL for NO_2 is unlikely to occur where annual mean concentrations are <60µg/m^3. This indicates that an exceedance of the 1-hour mean AQAL was unlikely to have occurred at the above locations for the period assessed.

Figure 6.2 Air Quality Monitoring Locations



Future Air Quality Baseline

6.3.8 The GLA and Transport for London provide a database of geographically referenced pollutant emissions (the London Atmospheric Emissions Inventory (LAEI)). The LAEI includes emissions from line sources (e.g., road transport), area sources (e.g. aviation, domestic and commercial fuel) and point sources (e.g. Part A and Part B processes). These modelled emissions are used to provide ground level concentration maps at a 20m x 20m resolution for key pollutants including NO_2, PM_{10} and $PM_{2.5}$ across Greater London.

6.3.9 A review of the 2025 projections indicates they broadly align with recent LBH monitoring data:

- From the east to southwest of the Site, annual mean NO_2 concentrations are projected to be 20-25µg/m^3;
- From the west to northeast of the Site, annual mean NO_2 concentrations are projected to be 15-20µg/m^3;

- At the roadside of busier roads, e.g. A408 and Sipson Road, there are locations of annual mean NO_2 concentrations of 25-30µg/m^3; and
- PM_{10} annual mean concentrations are 10-15µg/m^3 across residential areas and 15-20µg/m^3 closer to busier roads; and
- $PM_{2.5}$ annual mean concentrations of 7.5-10µg/m^3 and 10-12.5µg/m^3 closer to busier roads.

6.3.10 The mapped projections for 2030 show:

- Annual mean concentrations are projected to decrease to 15-20µg/m^3 in the wider area around the Site;
- At the roadside of busier roads, e.g. A408 and Sipson Road, there is a reduction in concentrations with a few remaining locations of 20-25µg/m^3.
- PM_{10} annual mean concentrations are 10-15µg/m^3 across residential areas and 15-20µg/m^3 closer to busier roads (i.e. no significant difference from 2025).; and
- $PM_{2.5}$ annual mean concentrations of 7.5-10µg/m^3 and 10-12.5µg/m^3 closer to busier roads (i.e. no significant difference from 2025).

6.4 Inherent design mitigation

Air Quality Positive

6.4.1 Mitigation has been incorporated into the design following consideration of measures and approaches set out in the GLA's AQP Guidance. An AQP Matrix detailing the adopted measures, how they will be implemented and the technical assessments supporting them, is set out in Appendix 6.1, Section 5. The key measures are summarised below:

- Back-up generators will be capable of operating on HVO: HVO is a more sustainable option over diesel reducing global climate impacts and results in lower NOx and PM emissions. The intention is to utilise HVO when available (diesel fuel has been considered in the impact assessment as a precautionary approach).
- Provision of SCR NOx abatement: The Proposed Development would be capable of meeting AQALs with provision of back-up generators without SCR, meeting the minimum EA regulatory requirements of 2000 mg/Nm^3 (at 5% O_2). The back-up generators will be provided SCR NOx abatement reducing emissions to 250 mg/Nm^3 (at 5% O_2) which goes beyond the minimum regulatory requirement.
- Minimisation of testing hours: To meet the definition of 'back-up' plant under the Medium Combustion Plant Directive the maximum limit to testing is 50 hours per year. The proposed routine testing and maintenance plan is less than half this with a planned 19 hours per year.
- A flue height review was incorporated into the design process to ensure that AQALs would not be exceeded and dispersion optimised within landscape and visual design constraints. The Site's Back-up generator flues are provided with an unimpeded vertical discharge at 12.5m above ground with no structures above them.
- The proposed change of use to a data centre will significantly reduce vehicle trips. The Transport Assessment predicts a 96% reduction in vehicle trips which will reduce the Sites contribution to traffic pollution from the surrounding roads.

6.5 Potential effects prior to additional mitigation

Traffic Emissions Screening Assessment

6.5.1 The Transport Assessment[19] submitted with this Planning Application provides the projected daily trip rate associated with the current consented use at the Site and the proposed Data Centre (see Table 6.8). The projected trip rate associated with the change in use will result in a 96% reduction. Given the reduction in vehicle trips, a detailed assessment is not considered to be required, whilst the magnitude of the beneficial effect of this reduction has not been quantified, it can be concluded that there will be no significant adverse effects.

6.5.2 At this point in time no contractors have been appointed to deliver any of the proposed changes to which this planning application relates, as such detailed traffic predictions for the construction phase are not available. Consequently, it is proposed that the details of the impact of future construction traffic will come forward via planning condition in the form of a Construction Management Plan to include the proposed construction logistics. However, proposed construction traffic trips are anticipated to fall far below the projected daily trip rate associated with the consented use (with reference to Table 6.8), as such impacts are likely to be beneficial compared to the consented use, and it can be concluded that there would be no significant adverse effect.

Table 6.8 Development Trips Review (Daily Trips)

Mode	Consented Use - Projected Future Trip Rate	Data Centre – Projected Future Trip Rate	Change
Cars	1419	99	-1320
LDV's	1164	26	-1138
HGVs	925	2	-923
Total	3508	127	-3381

Back-up Generator Emissions - Testing and Maintenance Scenario

Annual Mean Impacts

6.5.3 The predicted annual mean impacts, inclusive of cumulative impact, at receptor locations relevant for 'annual mean' exposure for NO_2, PM_{10} and $PM_{2.5}$ are presented in Appendix 6.1, Section 3.1.1.

6.5.4 The process contribution (PC: the concentration of pollutant at the receptor location that is attributable to emissions from the back-up generators at the Proposed Development) does not exceed 1% of the AQAL at any receptor for any pollutant. The Predicted Environmental Concentration (PEC: PC + baseline + modelled PC from adjacent Data Centre) does not exceed 94% of the AQAL at any of the modelled receptor locations. The annual mean impacts can be described as 'negligible' at all relevant receptors, and therefore effects are considered 'not significant'.

[19] Transport Planning Associates, Units 1 & 2, Iron Bridge Road North, Stockley Park, Hillingdon. Project Reference: 2509-048/TN/01

1-Hour Mean Nitrogen Dioxide Impacts

6.5.5 The predicted risk of 1-hour mean NO_2 impacts are presented in Appendix 6, Section 3.1.2. The probability of impacts being greater than 'slight' (i.e. 20% of the AQAL) is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

24-Hour Mean PM_{10} Impacts

6.5.6 The predicted risk of 24-hour mean PM_{10} impacts are presented in Appendix 6, Section 3.1.3. The probability of impacts being greater than 'slight' (i.e. 20% of the AQAL) is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

Back-up Generator Emissions - Outage Scenario

Annual Mean Impacts

6.5.7 The predicted annual mean impacts as a result 24 outage hours, , at receptor locations relevant for 'annual mean' exposure are presented in Appendix 6.1, Section 3.2.1, for NO_2, PM_{10} and $PM_{2.5}$.

6.5.8 The PC does not exceed 1% of the AQAL at any receptor. The PEC does not exceed 96% of the AQAL at any of the modelled receptor locations. The impacts can be described as 'negligible' at all relevant receptors, and therefore the effect can be considered 'not significant'.

1-Hour Mean Nitrogen Dioxide Impacts

6.5.9 The predicted risk of 1-hour mean NO_2 impacts for 24 outage hours are presented in Appendix 6.1, Section 3.2.2. The probability of impacts being greater than 'slight' is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

24-Hour Mean PM_{10} Impacts

6.5.10 In the context of the 24 outage hours considered, it is not statistically possible to exceed the AQAL (i.e. 50µg/m^3 as a 24-hour mean not to be exceeded more than 35 times a calendar year). Therefore, effects on air quality are considered 'not significant'.

6.6 Additional Mitigation

6.6.1 The conclusion of the assessment is that effects from the Proposed Development with regards to road traffic and generators emissions will be 'not significant'. As such no further mitigation is required.

6.7 Residual effects

6.7.1 The conclusion of the assessment, which considers embedded mitigation, is that effects from the Proposed Development with regards to road traffic and back-up generators emissions will be 'not significant', and no further mitigation is required. As such residual effects are 'not significant'. However, where required following the AQN Assessment set out below, emissions have been offset via 'damage cost' payments to LBH.

Air Quality Neutral Assessment

Transport Emissions

6.7.2 Table 4.1 of the Air Quality Neutral Guidance outlines benchmark trip rates for various land-use categories. The Proposed Development is most appropriately assessed under the 'Storage and Distribution' or 'Industrial' classifications, both of which have a benchmark of 6.5 annual car trips per square metre. The Proposed Development has an approximate gross internal area (GIA) of 75,185m^2 resulting in a Transport Emissions Benchmark (TEB) of 488,703 car trips per year, below which according to the guidance, the development will be considered air quality neutral.

6.7.3 The Transport Assessment[20] submitted with this Planning Application predicts an annual trip rate of 46,355. This is significantly below (approximately 10% of) the TEB and therefore the Proposed Development can be considered air quality neutral with regard to transport emissions. Further, the Transport Assessment concludes that "*the proposed change of use to a datacentre will significantly reduce traffic […] the development represents a clear improvement in transport and highways terms*" compared to the current consented use (planning ref. 39207/APP/2020/2188).

Building Emissions

6.7.4 The annual emissions have been calculated based upon the proposed testing and maintenance schedule and the back-up generator emission parameters for NOx and particulate. The total emissions are predicted to be 3.46 tonnes per annum of NOx, and 0.04 tonnes per annum of particulate (Appendix 6 Section 5 sets out the DCC). The derived damage cost will be allocated by LBH to initiatives aimed at enhancing air quality in the surrounding area, offsetting any residual effects.

6.8 Implications of Climate Change

6.8.1 The UK Climate Change Risk Assessment (CCRA3)[21] published by the Government has highlighted "Risks to people and the economy from climate-related failure of the power system" as one of the priorities for further adaptation action. The effects of increased precipitation, higher temperatures, and more frequent extreme weather are considered conditions likely to stress grid infrastructure and raise outage risks. Therefore, measures have been identified for both hardening the network and improving its operation through advanced "smart" solutions. Notwithstanding, widespread long duration outages are extremely rare and this assessment has modelled 24 outage hours which is considered sufficiently precautionary approach to incorporate implications of climate change.

[20] Transport Planning Associates, Units 1 & 2, Iron Bridge Road North, Stockley Park, Hillingdon. Project Reference: 2509-048/TN/01
[21] HM Government, UK Climate Change Risk Assessment 2022, 17 January 2022

6.9 Cumulative effects

Back-up Generator Emissions - Testing and Maintenance Scenario

Annual Mean Impacts

6.9.1 The predicted annual mean impacts, inclusive of cumulative impact from future sources, at receptor locations relevant for 'annual mean' exposure for NO_2, PM_{10} and $PM_{2.5}$ are presented in Appendix 6.1, Section 4.1.1.

6.9.2 The PC does not exceed 1% of the AQAL at any receptor. The Predicted Environmental Concentration (PEC: PC from Proposed Development + future baseline inclusive of other committed Data Centre developments) does not exceed 94% of the AQAL at any of the modelled receptor locations. The cumulative annual mean impacts can be described as 'negligible' at all relevant receptors, and therefore effects are considered 'not significant'.

1-Hour Mean Nitrogen Dioxide Impacts

6.9.3 The predicted risk of 1-hour mean NO_2 impacts are presented in Appendix 6.1, Section 4.1.2, alongside cumulative impacts. The probability of impacts being greater than 'slight' (i.e. 20% of the AQAL) is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

24-Hour Mean PM_{10} Impacts

6.9.4 The predicted risk of 24-hour mean PM_{10} impacts are presented in Appendix 6.1, Section 4.1.3, alongside cumulative impacts. The probability of impacts being greater than 'slight' (i.e. 20% of the AQAL) is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

Back-up Generator Emissions - Outage Scenario

Annual Mean Impacts

6.9.5 The predicted annual mean impacts as a result 24 outage hours, inclusive of cumulative impact from future sources, at receptor locations relevant for 'annual mean' exposure are presented in Appendix 6.1, Section 4.2.1, for NO_2, PM_{10} and $PM_{2.5}$.

6.9.6 The PC does not exceed 1% of the AQAL at any receptor. The PEC does not exceed 96% of the AQAL at any of the modelled receptor locations. The impacts can be described as 'negligible' at all relevant receptors, and therefore the effect can be considered 'not significant'.

1-Hour Mean Nitrogen Dioxide Impacts

6.9.7 The predicted risk of 1-hour mean NO_2 impacts for 24 outage hours are presented in Appendix 6.1, Section 4.2.2, alongside cumulative impacts. The probability of impacts being greater than 'slight' is less than 1% and therefore considered 'highly unlikely'. Therefore, effects on air quality are considered 'not significant'.

24-Hour Mean PM_{10} Impacts

6.9.8 In the context of the 24 outage hours considered, it is not statistically possible to exceed the AQAL (i.e. 50µg/m^3 as a 24-hour mean not to be exceeded more than 35 times a calendar year). Therefore, effects on air quality are considered 'not significant'.

6.10 Summary

6.10.1 The chapter sets out an assessment of the likely air quality effects associated with the Proposed Development. The Proposed Development incudes back-up generators, which are required for ensuring uninterrupted power supply, they will operate on Hydrotreated Vegetable Oil or diesel. Embedded mitigation, proposed as part of the Air Quality Positive approach includes, amongst other measures, Selective Catalytic Reduction systems on all back-up generators to reduce NOx emissions. The scope has considered traffic-related emissions, and combustion emissions from emergency back-up generators during both routine testing and emergency outage scenarios. The key findings of the assessment are:

- The projected vehicle trip rate associated with the change in use will result in approximately a 96% reduction compared to the current consented use. The need for a detailed assessment has therefore been screened out. The reduction in vehicle trips on the surrounding network has the potential to result in a beneficial impact, and it can be concluded there will be no significant adverse effect.
- Routine testing and maintenance operations are predicted to result in negligible impacts on regulatory standards for NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations; and no significant risk of exceeding short-term standards. The effects are considered 'not significant'.
- A precautionary scenario of 24 hours of emergency outage operation has been considered in the assessment. In combination with the routine testing and maintenance, this is predicted to result in negligible impacts on regulatory standards for NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations; and no significant risk of exceeding short-term standards. The effects are considered 'not significant'.
- The cumulative effects with potential future Data Centres (as described in paragraph 6.2.1) are considered 'not significant'.
- Impacts are 'not significant'. Notwithstanding, further off-setting of impacts is proposed in line with the Air Quality Neutral assessment, for which a Damage Cost Calculation has been completed. The derived damage cost will be allocated by LBH to initiatives aimed at enhancing air quality in the surrounding area, offsetting any residual effects.

6.10.2 A summary of the assessment is set out in Table 6.9 overleaf.

6.11 Assessor information

Chapter	Responsibility	Name	Qualifications	Assessor information
Chapter 6	SLR Consulting Limited	M Fitzpatrick	BSc, MSc	23 Year Air Quality Consultancy Experience

Table 6.9 Summary of effects

Receptor	Receptor sensitivity	Description of potential impact	Proposed mitigation	Residual effect	Significant / not significant
Construction Phase					
Sensitive Human Receptors	High	PM_{10}, $PM_{2.5}$ and NO_x from Construction traffic exhaust emissions affecting air quality close to local road network.	None specifically required for impacts would be negligible. Construction Environmental Management Plan	Negligible	Not Significant
Operation Phase					
Sensitive Human Receptors	High	Back-up generator emissions of NO_2, PM_{10} and $PM_{2.5}$ affecting local air quality at receptor locations as a result of routine testing and maintenance, and emergency outage operations.	Inherent design mitigation: SCR NO_x abatement, optimised flue heights, minimised operating hours. Plus, off-setting through Air Quality damage cost financial contributions to LBH for air quality improvement measures.	Negligible	Not Significant
Sensitive Human Receptors	High	PM_{10}, $PM_{2.5}$ and NO_x from Operational traffic exhaust emissions affecting air quality close to local road network.	None specifically required for impacts. Travel Plan	Negligible	Not Significant

6.12 Mitigation commitments Summary

Table 6.10 Summary for Securing Mitigation

Identified receptor	Type and purpose of additional mitigation measure (prevent, reduce, offset, enhance)	Means by which mitigation may be secured (e.g. planning condition / legal agreement)	Delivered by	Auditable by
Construction Phase				
Sensitive Human Receptors	Construction Environmental Management Plan	Planning Condition	Contractor	LPA
Operation Phase				
Sensitive Human Receptors	Inherent design mitigation: SCR NO_x abatement, optimised flue heights, minimised operating hours. Off-setting: Via Air Quality damage cost financial contributions to LBH for air quality improvement measures.	Planning Condition	Developer / Operator	LPA