Environmental Permit Application

Air Emissions Risk Assessment – Iron Mountain Data Centre

Iron Mountain Data Centre Limited

Prepared by:

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Making Sustainability Happen

Revision Record

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Basis of Report

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1.0 Introduction

SLR Consulting Ltd (SLR) has been instructed by Iron Mountain UK Data Centre Limited to prepare a bespoke Environmental Permit (EP) application for the Iron Mountain Data Centre LON-1 (the Site) located on 724-729 Dundee Road, Slough, SL1 4JU

Electricity for operation of the data centre is provided from connections to the local electricity transmission network; however, given the nature of data centres and their requirement to always have an available energy supply, the data centre incorporates 11 diesel-fired Stand-By-Generators (SBG):

- 6 x MTU DS3100 (HV) generators (existing SBGs, installed before 20th December 2018), each with a thermal rated input of 5.43 MWth);
- 3 x Caterpillar 3516E (existing SBGs, installed before 20th December 2018), each with a rated thermal input of 7.857 MWth; and
- 2 x MTU DS3100 (LV) generators (new SBGs, installed in c. 2020), each with a thermal rated input of 7.057 MWth. MTU (HV) generators; installed circa 2006;

The aggregated total combustion capacity for the Site will be 70.265 MWth (input).

The purpose of the SBGs is to provide back-up electrical power to the data centre if electricity is not available from the local transmission network (e.g. brown or black-out) or if there is an internal failure of power supply. They are not proposed for use in any grid balancing capacity (e.g. Short-Term Operating Reserve).

This report presents the AERA undertaken to support the EP application and is concerned with emissions to air only.

1.1 Scope of Assessment

The scope of the assessment is limited to the point source combustion emissions to air from the SBGs at the Site. The release of nitrogen oxides (NO_x) has been assessed.

The objective of the study is to assess the impact of emissions against the relevant Air Quality Standards for the protection of human health and the relevant Critical Levels and Loads for the protection of designated ecological receptors.

2.0 Legislation and Relevant Guidance

2.1 Environmental Permitting Regulations

The installation will be regulated under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR). Guidance relating to the EPR and of relevance to this assessment is discussed below.

2.1.1 AERA Guidance

The 'Air emissions risk assessment for your environmental permit'[1] guidance (termed the 'AERA guidance' throughout the remainder of the report) produced by the EA is intended to assist operators in assessing risks to air when applying for a permit under the EPR.

2.1.2 Data Centre Guidance

The EA has released draft guidance for Data Centres; 'Data Centre FAQ Headline Approach[2]', and 'Guidance on Air Dispersion Modelling for Back-up Engine Arrays at Data Centres (IED Chapter II)[3]' which sets out their approach to the permitting and regulatory aspects for Data Centres within the context of the IED and EPR for 1.1A Combustion Activities 'Chapter II' sites aggregated to >50MWth input.

Also of relevance is the EA's 'Guidance on dispersion modelling for oxides of nitrogen assessment from specified generator'[4]. The guidance proposes methods for statistical analysis of impacts from short-term operation (e.g. using hypergeometric probability distribution) and a framework for acceptable probabilities of impact.

2.2 Air Quality Legislation and Guidance

2.2.1 Air Quality Standards Regulations

The Air Quality Standards Regulations 2010[5] (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC) and the Fourth Daughter Directive (2004/107/EC) within UK legislation. The AQSR includes Limit Values, Target Values, and Objectives for the protection of human health and the environment.

Following the UK's withdrawal from the EU, the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[6] was introduced to mirror revisions to supporting EU legislation.

2.2.2 US AEGLs

Acute Exposure Guideline Levels (AEGLs) represent short-term exposure limits for toxic airborne chemicals and have been established for nitrogen dioxide (NO_2). AEGL values are developed by the National Advisory Committee for Acute Exposure Guideline Levels for

[1] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

[2] Environment Agency, 'Data Centre FAQ Headline Approach', Data Centre FAQ DRAFT version 21.0 to TechUK for Discussion 15/11/22.

[3] Appendix A to the Supplementary Combustion Sector (Part A Installations) Basic Pre-Application Advice Document - Guidance on Air Dispersion Modelling for Back-up Engine Arrays at Data Centres (IED Chapter II) - 2022

[4] https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

[5] The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001.

[6] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument No. 1313.

Hazardous Substances, which is a United States (US) federal advisory committee, and they are not a regulatory standard in the UK.

2.2.3 Air Quality Strategy

The Air Quality (England) Regulations 2000 (as amended) provide the statutory basis for the Air Quality Objectives Local Authorities must adhere to. The latest AQS for England was published in 2023[7]. The AQS provides the delivery framework for air quality management across England for local authorities and summarises the air quality standards and objectives operable within England for the protection of public health and the environment. The objectives of relevance to this assessment are provided in Table 2-1.

These AQS objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (referred to as ‘relevant exposure’). Table 2-2 provides an indication of those locations. Where any of the prescribed Air Quality Objectives are not likely to be achieved, the local authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality and achieve compliance.

2.2.4 Applied AQALs

The Air Quality Assessment Levels (AQALs) applied in this assessment are provided in Table 2-1.

Table 2-1: 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)	Air Quality (England) Regulations 2000
	940	10-minute and 1-hour mean	US-EPA AEGL-1
	38,000 and 23,000	10-minute and 1-hour mean	US-EPA AEGL-2
Nitrogen Monoxide (NO)	4,400	1-hour mean	AERA Guidance EAL

Table 2-2: 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

[7] Defra, Air Quality Strategy: Framework for Local Authority Delivery, April 2023.

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
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
10-minute mean	All locations where members of the public might reasonably be exposed for a period of 10 minutes or longer	-

2.3 Protection of Nature Conservation Sites

Sites of nature conservation importance at an international, national, and local level are provided environmental protection from developments, including from atmospheric emissions. Standards for the protection of ecological receptors are known as Critical Levels (CLe) (for airborne concentrations) and Critical Loads (CLo) (for deposition rates).

The AERA guidance requires that ecological habitats should be assessed against relevant standards if they are located within the following set distances from the Site:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the Site; and
- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) Ancient Woodland (AW) and Sites of Nature Conservation Interest (SNCI) within 2km of the Site.

2.3.1 Critical Levels (CLe)

CLe are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The relevant CLe for the protection of vegetation and ecosystems are presented in Table 2-3.

Table 2-3: Relevant Critical Levels

Pollutant	Critical Level (µg/m^3)	Averaging Period	Habitat
NO_x	30	Annual mean	All
	200	Daily mean	Where a) ozone is below the AOT40 Critical Level and b) SO_2 is below the lower Critical Level of 10µg/m^3
	75		All other

2.3.2 Critical Loads (CLo)

CLo are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. CLo are set for the deposition of various substances to sensitive ecosystems. Deposition of nitrogen can cause eutrophication and acidification; the relevant CLo are presented in Section 4.5.

3.0 Assessment Methodology

The assessment methodology comprises dispersion modelling (see Appendix A for EA modelling checklist), with statistical analysis of the probability of short-term impacts occurring, and deposition calculations for assessment of impacts on ecological receptors.

3.1 Dispersion Modelling

3.1.1 Dispersion Model

For this assessment the AERMOD model[8] has been applied; this model is widely used and accepted by the EA for undertaking such assessments and its predictions have been validated against real-time monitoring data by the US Environmental Protection Agency (EPA). It is therefore considered a suitable model for this assessment.

Model validation studies[9] for AERMOD generally suggest that for the vast majority of cases it is able to predict maximum short-term high percentiles concentrations well within a factor of two and the latest evaluation study for AERMOD shows the composite (geometric mean) ratio of predicted to observed short-term averages from 'test sites' (where real-time monitoring data is available to validate model performance), to be between 0.96 and 1.2.

3.1.2 Model Domain and Receptors

The modelling has been undertaken using a receptor grid across a map of the study area. This allows the maximum ground level concentration outside the Site boundary to be assessed.

A nested receptor grid extending 5km from the Site was applied as follows:

- 200m x 200m at 20m grid resolution;
- 1,000m x 1,000m at 50m grid resolution;
- 2,000m x 2,000m at 200m grid resolution; and
- 5,000m x 5,000m at 500m grid resolution; and
- 10000m x 10000m at 1000m grid resolution.

In addition, the modelling of discrete sensitive receptor locations has been undertaken to assess the impact at relevant exposure locations for annual mean impact and facilitate the discussion of results. Human and ecological receptors are discussed in the following sections.

3.1.2.1 Human Receptors

Twenty locations surrounding the Site, representing worst-case locations have been selected to inform the risk assessment in terms of relevant exposure, as detailed in Table 3-1 and displayed in Figure 3-4. An additional receptor has also been included to represent the revoked AQMA at an area of short-term exposure (Refer to Section 4).

[8] Software used: Lakes AERMOD View, (Executable Aermod_24142).

[9] US EPA, AERMOD: Latest Features and Evaluation Results, EPA-454/R-03-003, June 2003.

Table 3-1: Modelled Human Receptors

Model ID	Receptor Type	X	Y	Z (m)
AQMA_0	Within AQMA	496528	180171	1.5
RESI_1	Residential Building Façade	495116	181908	1.5
RESI_2	Residential Building Façade	495035	181894	1.5
RESI_3	Residential Building Façade	495005	181844	1.5
RESI_4	Residential Building Façade	494742	181810	1.5
RESI_5	Residential Building Façade	494877	181875	1.5
RESI_6	Residential Building Façade	494891	181870	1.5
RESI_7	Residential Building Façade	494931	181855	1.5
RESI_8	Residential Building Façade	494970	181841	1.5
RESI_9	Residential Building Façade	494907	181863	1.5
RESI_10	Residential Building Façade	494856	181872	1.5
RESI_11	Residential Building Façade	494802	181888	1.5
RESI_12	Residential Building Façade	494757	181842	1.5
COMM_13	Commercial Building Façade	494755	181710	1.5
COMM_14	Commercial Building Façade	495076	181842	1.5
COMM_15	Commercial Building Façade	495138	181742	1.5
COMM_16	Commercial Building Façade	494797	181696	1.5
COMM_17	Commercial Building Façade	494844	181682	1.5
COMM_18	Commercial Building Façade	494891	181669	1.5
COMM_19	Commercial Building Façade	494929	181658	1.5
COMM_20	Commercial Building Façade	494974	181645	1.5

3.1.2.2 Ecological Receptors

The designated ecological sites within the set screening distances are presented in Table 3-2 and their locations are presented in Figure 3-5 and Figure 3-6.

Table 3-2: Ecological Receptors

Ref.	Designation	Name	Approx. Distance to Site (km)
ER1	LNR	Haymill Valley	0.4
ER2	LNR	Cocksherd Wood	0.9
ER3	AW	Only listed as 'Ancient Woodland'(A)	1.5
ER4	SAC	Burnham Beeches	2.5
ER5	SAC	Windsor Forest and Great Park	6.9
ER6	SPA / Ramsar	Southwest London Waterbodies	8.5
ER7	SAC	Chilterns Beechwoods	9.1

3.1.3 Topography

The presence of elevated terrain can significantly affect the dispersion of pollutants and the resulting ground level concentration. Elevated terrain reduces the distance between the plume centre line and the ground level, thereby increasing ground level concentrations. Elevated terrain can also increase turbulence and, hence, plume mixing with the effect of increasing concentrations near to a source and reducing concentrations further away.

AERMOD utilises digital elevation data to determine the impact of topography on dispersion from a source. Topography was incorporated within the modelling using 30m resolution Shuttle Radar Topography Mission (SRTM) terrain data files. Data was processed by the AERMAP function within AERMOD to calculate terrain heights and has been incorporated into the model, as illustrated in Figure 3-1.

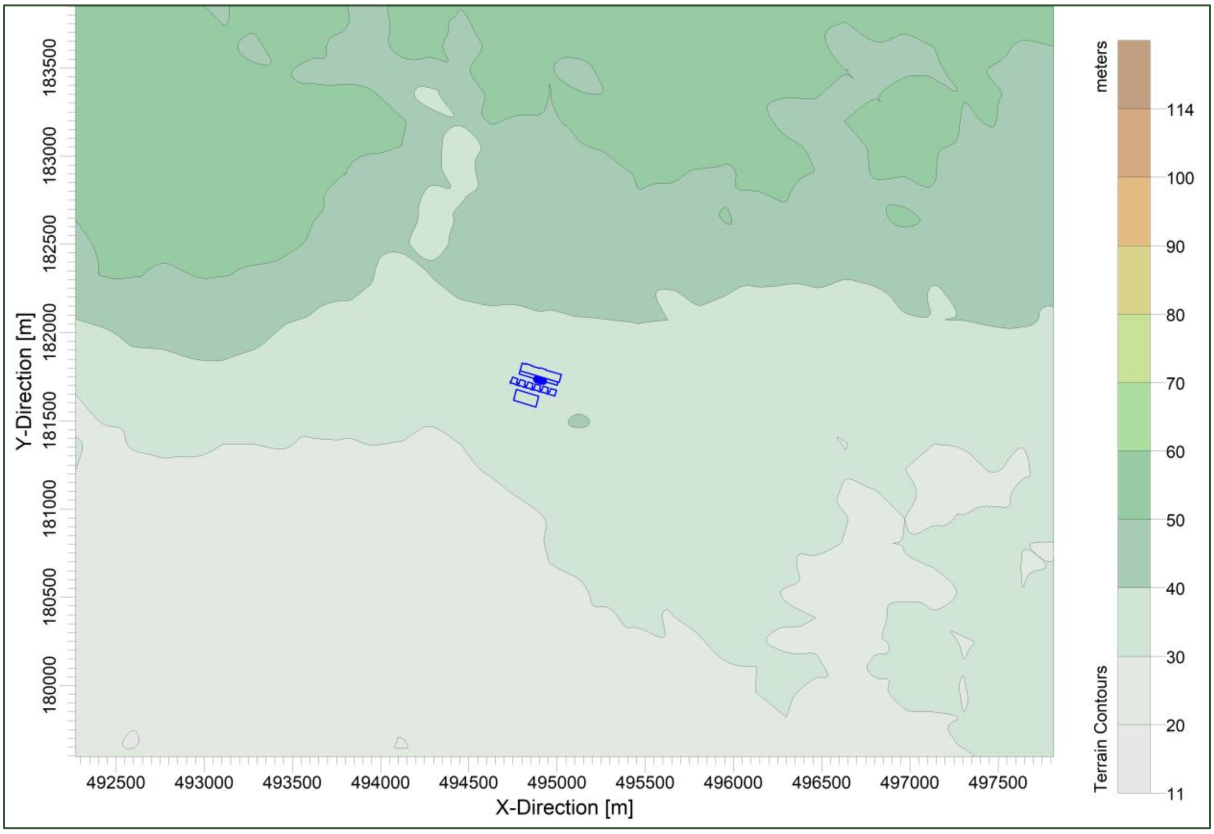

Figure 3-1: Topography

3.1.4 Building Downwash

Building downwash occurs when turbulence, induced by nearby structures, causes pollutants emitted from an elevated source to be displaced and dispersed rapidly towards the ground, resulting in elevated ground level concentrations. Building downwash has been considered for buildings that have a maximum height equivalent to at least 40% of the emission height and which are within a distance defined as five times the lesser of the height or maximum projected width of the building.

The integrated Building Profile Input Programme (BPIP) module within AERMOD was used to assess the potential impact of building downwash upon predicted dispersion characteristics. Buildings and structures input to the model are represented in Figure 3-2.

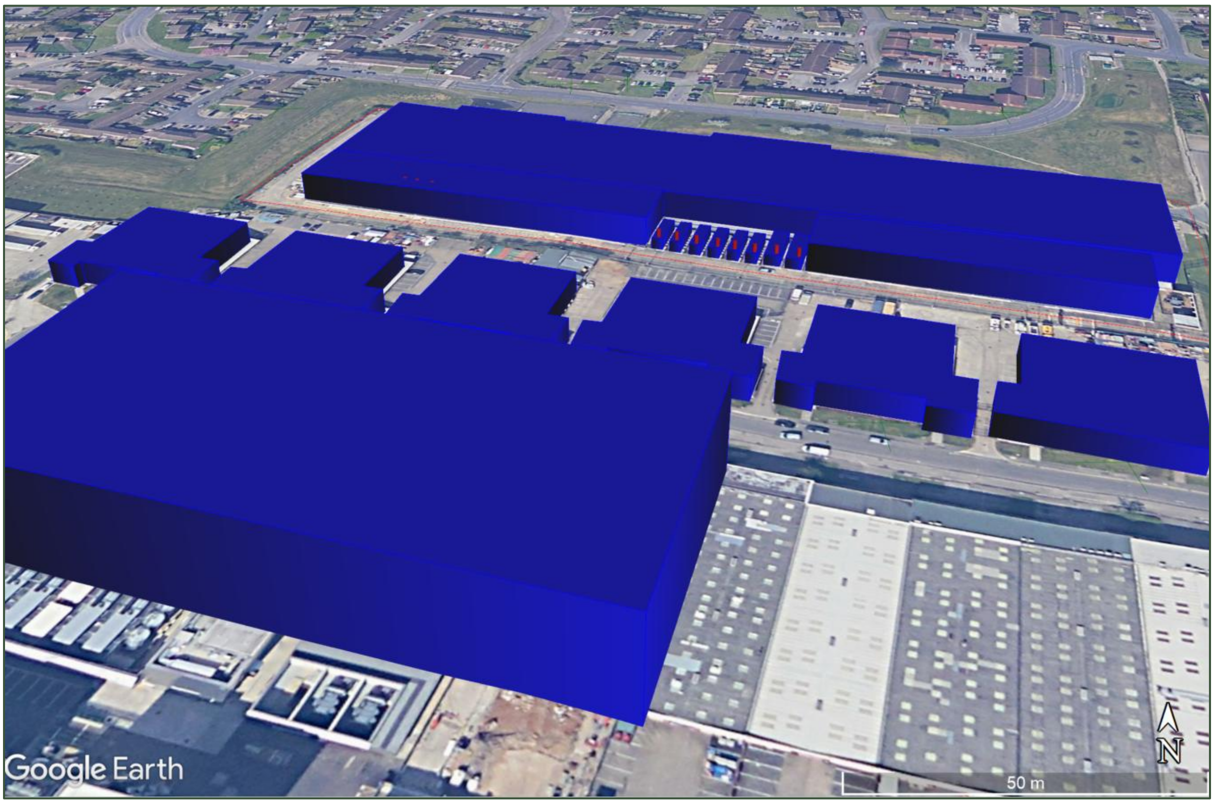

Figure 3-2: Modelled Buildings and Structures

3.1.5 Meteorological Data and Preparation

Meteorological data from the Heathrow meteorological station (5 years of hourly sequential data for 2020-2024 inclusive) was obtained in .met format from the data supplier and converted to the required surface and profile formats for use in AERMOD using AERMET View meteorological pre-processor. Details specific to the station location were used to define the surface characteristics; albedo, bowen ratio and surface roughness, applied in the conversion (see Table 3-3). A windrose is presented in Figure 3-3.

Table 3-3: Applied Surface Characteristics

Zone (Start)	Zone (End)	Albedo	Bowen Ratio	Surface Roughness (m)
0	30			0.028
30	60			0.025
60	90			0.036
90	120			0.006
120	150			0.074
150	180	0.17	0.84	0.075
180	210			0.075
210	240			0.075
240	270			0.055
270	300			0.084
300	330			0.084

Zone (Start)	Zone (End)	Albedo	Bowen Ratio	Surface Roughness (m)
330	0			0.084

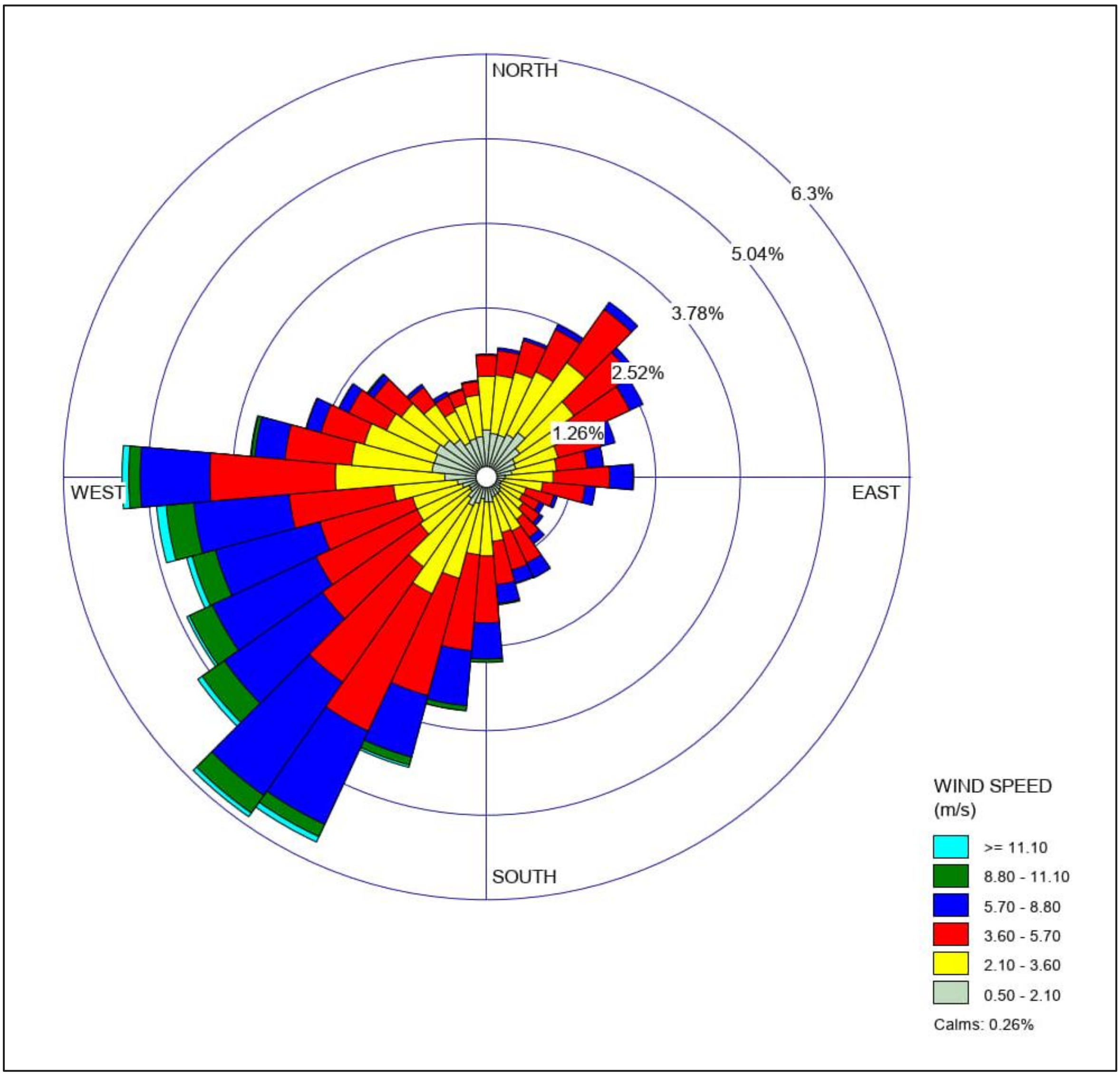

Figure 3-3: Heathrow Windrose (2020 – 2024)

3.2 Assessment of Impacts on Air Quality

3.2.1 Treatment of Model Output

The assessment of impacts against the AQALs is undertaken using model output as described in Table 3-4.

As per the EA guidance[4] on conversion ratio for NO_x and NO_2, it has been assumed that 70% of NO_x is present as NO_2 in relation to long-term impacts and 35% of NO_x is present as NO_2 in relation to short-term impacts.

In relation to NO, it is assumed that 90% of NO_x is present as NO in relation to short-term impacts. This follows an EA decision document[10].

Table 3-4: Model Output

Averaging Period	Model Output – Process Contribution (PC)	Predicted Environmental Concentration (PEC)
NO_2 1-hour mean. Not to be exceeded more than 18 times a calendar year	99.79%ile of 1-hour means. Threshold violation file (threshold set at 200µg/m^3 minus 2x annual mean background, converted to NOx assuming 35% of NOx present as NO_2) counts number of hours per annum exceeding threshold.	PC + 2 x annual mean background. Probability of exceedance calculated as per Section 3.2.2.
NO_2 1-hour mean (US AEGL-1)	Threshold violation file (threshold set at 956µg/m^3 minus 2x annual mean background, converted to NO_x assuming 35% of NO_x present as NO_2) counts number of hours per annum exceeding threshold.	PC + 2 x annual mean background. Probability of exceedance calculated as per Section 3.2.2.
NO_2 10-min mean (US AEGL-1)	As above. PC and threshold violation file factored by 1.34	PC + 2 x annual mean background. Probability of exceedance calculated as per Section 3.2.2.
NO 1-hour mean (EAL)	Modelled as NO_x.	PC + 2 x annual mean background
Annual mean NO_2	Annual mean from 5 met. years (factored for operational hours).	PC + annual mean background
NO_x daily mean CLe	Maximum 24-hour mean (factored from the 1-hour mean 100%ile where relevant to operational hours).	PC + 2 x annual mean background
NO_x annual mean CLe / CLo	Annual mean from 5 met. years (factored for operational hours).	PC + annual mean background

3.2.2 Statistical Analysis of Short-term Impacts

To assess the likelihood of exceedances of the standards occurring from the infrequent operation of the SBGs, the following approach has been adopted:

- The impact of the SBGs has been modelled for 8,760 hours of the year to ensure that the operating hours coincide with the worst-case dispersal conditions with the model set to count the number of exceedance hours (threshold violation file in AERMOD).
- For the 1-hour mean 99.79%ile, the ‘hypergeometric probability distribution’ approach as defined in EA guidance[4] has been applied. The cumulative distribution factor of 2.5 is applied in the case of consecutive operating hours.
- For the 1-hour maximum (and 10-minute maximum) averaging periods, the cumulative probability has been applied (number of exceedances / valid meteorological hours x number of operating hours or start-up events).

[10] Permitting Decision – Variation EPR/EP3507SL/V002 (19/12/2024).

The EA guidance provides the following framework to apply to the calculated probability of impacts occurring:

- Probabilities of 1% or less indicate exceedances are highly unlikely;
- Probabilities of less than 5% indicate exceedances are unlikely; and
- Probabilities of 5% or more indicate there is potential for the exceedances and may not be considered acceptable on a case-by-case basis.

3.2.3 Assessment of Annual Impact and Significance

To assess the potential impact on air quality, the predicted exposure is compared to the AQALs, and the results of the dispersion modelling have been presented in tabulated concentrations at discrete receptor locations to facilitate the discussion of results.

In accordance with the EA's AERA guidance, the impact is considered to be insignificant or negligible if:

- The long-term process contribution is <1% of the long term AQAL; and
- The short-term process contribution is <10% of the short term AQAL.

For process contributions that cannot be considered insignificant further assessment has been undertaken and the Predicted Environmental Concentration (PEC: PC + existing background pollutant concentration) determined for comparison as a percentage of the relevant AQAL.

3.3 Assessment of Impacts on Vegetation and Ecosystems

3.3.1 Calculation of Contribution to Critical Loads

Deposition rates were calculated using empirical methods recommended by the EA AQTAG06[11]. Dry deposition flux was calculated using the following equation:

Dry deposition flux (μg/m^2/s) = ground level concentration (μg/m^3) x deposition velocity (m/s)

Wet deposition occurs via the incorporation of the pollutant into water droplets which are then removed in rain or snow and is not considered significant over short distances compared with dry deposition and therefore for the purposes of this assessment, wet deposition has not been considered. The applied deposition velocities are as shown in Table 3-5.

Table 3-5: Applied Deposition Velocity

Chemical Species	Recommended Deposition Velocity (m/s)	
NO_2	Grassland	0.0015
	Woodland	0.0030

The predicted deposition rates were converted from μg/m^2/s to units of nitrogen deposition and acid equivalent deposition as detailed in Table 3-6.

[11] EA, AQTAG06 – Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air, March 2014 version.

Table 3-6: Applied Deposition Conversion Factors

	Conversion from NO_2 µg/m^2/s to:	Factor
N Deposition	N kg/ha/year	95.9
Acid Deposition	keq/ha/year	6.84

3.3.2 Calculation of PC as a Percentage of Acid CLo Function

The calculation of the process contribution of N to the acid CLo function has been carried out according to the guidance on Air Pollution Information System (APIS)[12], which is as follows:

> "*The potential impacts of additional sulphur and/or nitrogen deposition from a source are partly determined by PEC, because only if PEC of nitrogen deposition is greater than CLminN will the additional nitrogen deposition from the source contribute to acidity. Consequently, if PEC is less that CLminN only the acidifying affects of sulphur from the process need to be considered:*
>
> *Where PEC N Deposition < CLminN*
>
> *PC as % CL function = (PC S deposition/CLmaxS)*100*
>
> *Where PEC is greater than CLminN (the majority of cases), the combined inputs of sulphur and nitrogen need to be considered. In such cases, the total acidity input should be calculated as a proportion of the CLmaxN.*
>
> *Where PEC N Deposition > CLminN*
>
> *PC as %CL function = ((PC of S+N deposition)/CLmaxN)*100*"

3.3.3 Assessment of Impacts and Significance

In addition to the AERA guidance, the EA's Operational Instruction 66_12[13] details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for international sites, 'no likely damage' for SSSIs, or 'no significant pollution' for other sites, as follows:

- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for international sites and SSSIs;
- PC does not exceed 10% short-term CLe for NOx for international sites and SSSIs;
- PC <100% long-term CLe and/or CLo for other conservation sites; and
- PC <100% short-term CLe for NOx (if applicable) for other conservation sites.

Where impacts cannot be classified as resulting in 'no likely significant effect', more detailed assessment may be required depending on the sensitivity of the feature in accordance with the EA's Operational Instruction 67_12[14]. This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

The guidance provides the following further criteria:

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[12] APIS, http://www.apis.ac.uk/

[13] EA Operational Instruction 66_12 – Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

[14] EA Operational Instruction 67_12 – Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

- If the PEC does not exceed 100% of the appropriate limit it can be assumed there will be no adverse effect;
- If the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
- If the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
- If the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- If the background is currently above the limit and the additional PC is large – cannot conclude no adverse effect.

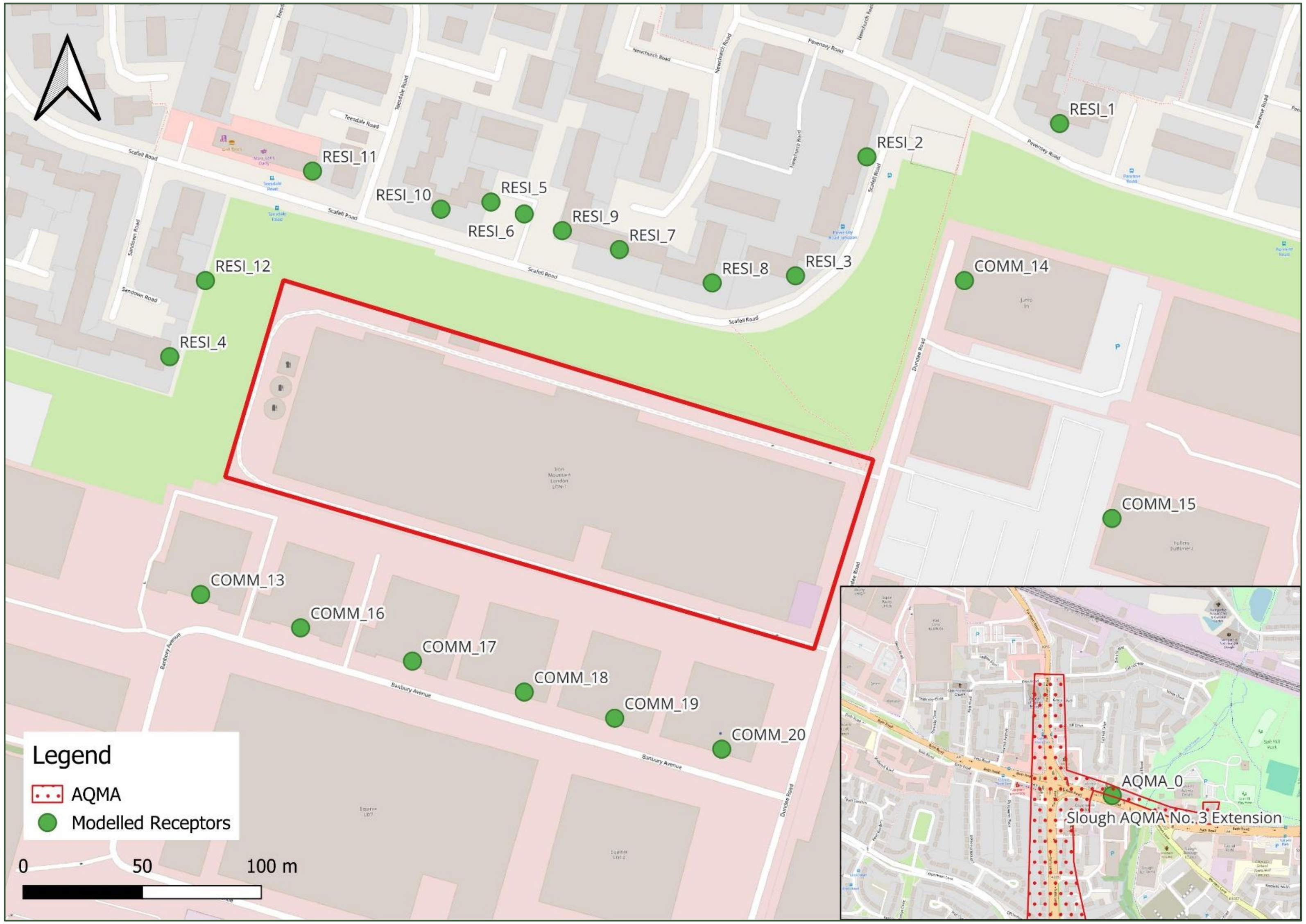

Figure 3-4: Modelled Human Receptor Locations

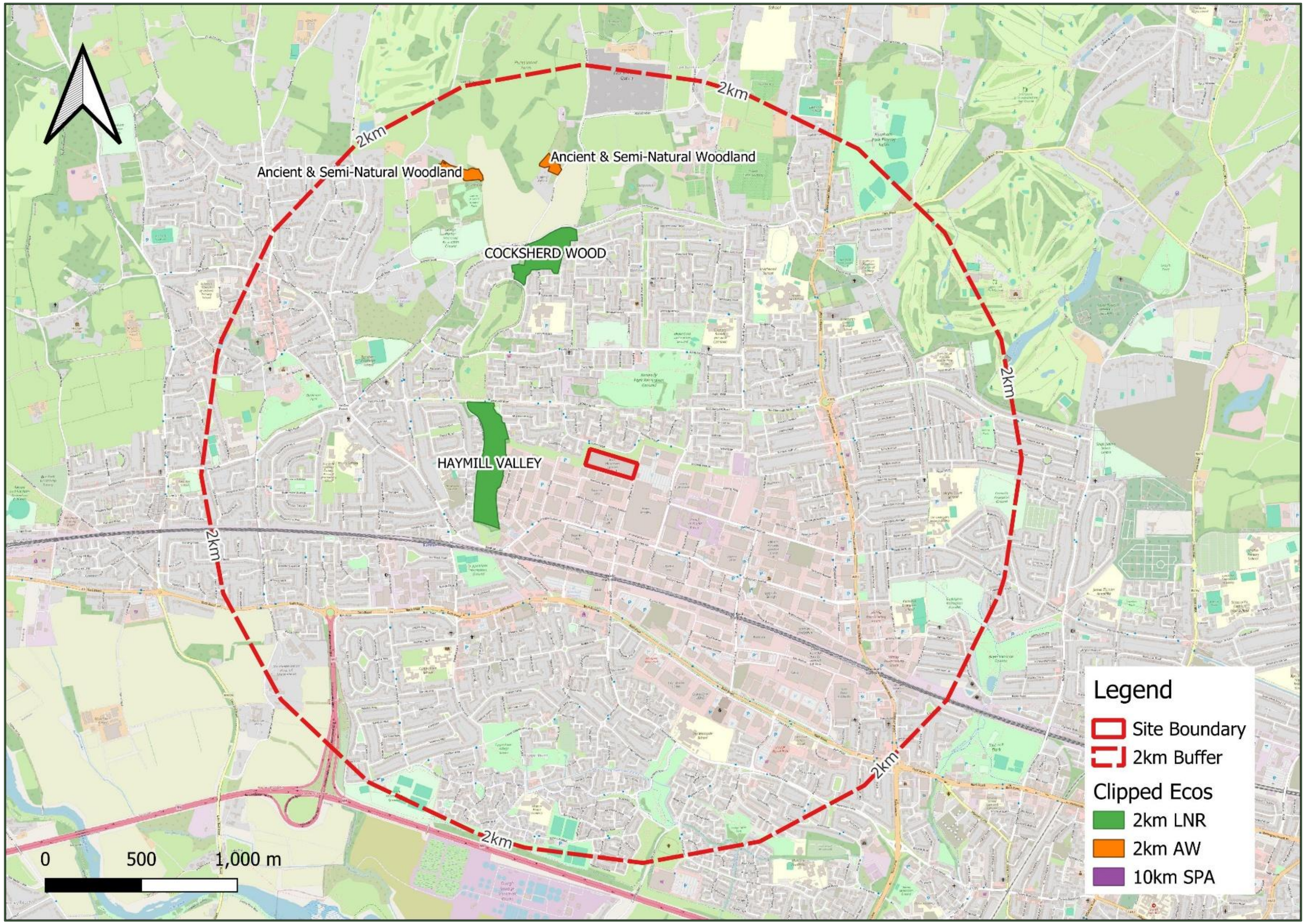

Figure 3-5: Modelled Ecological Receptor Locations (2km)

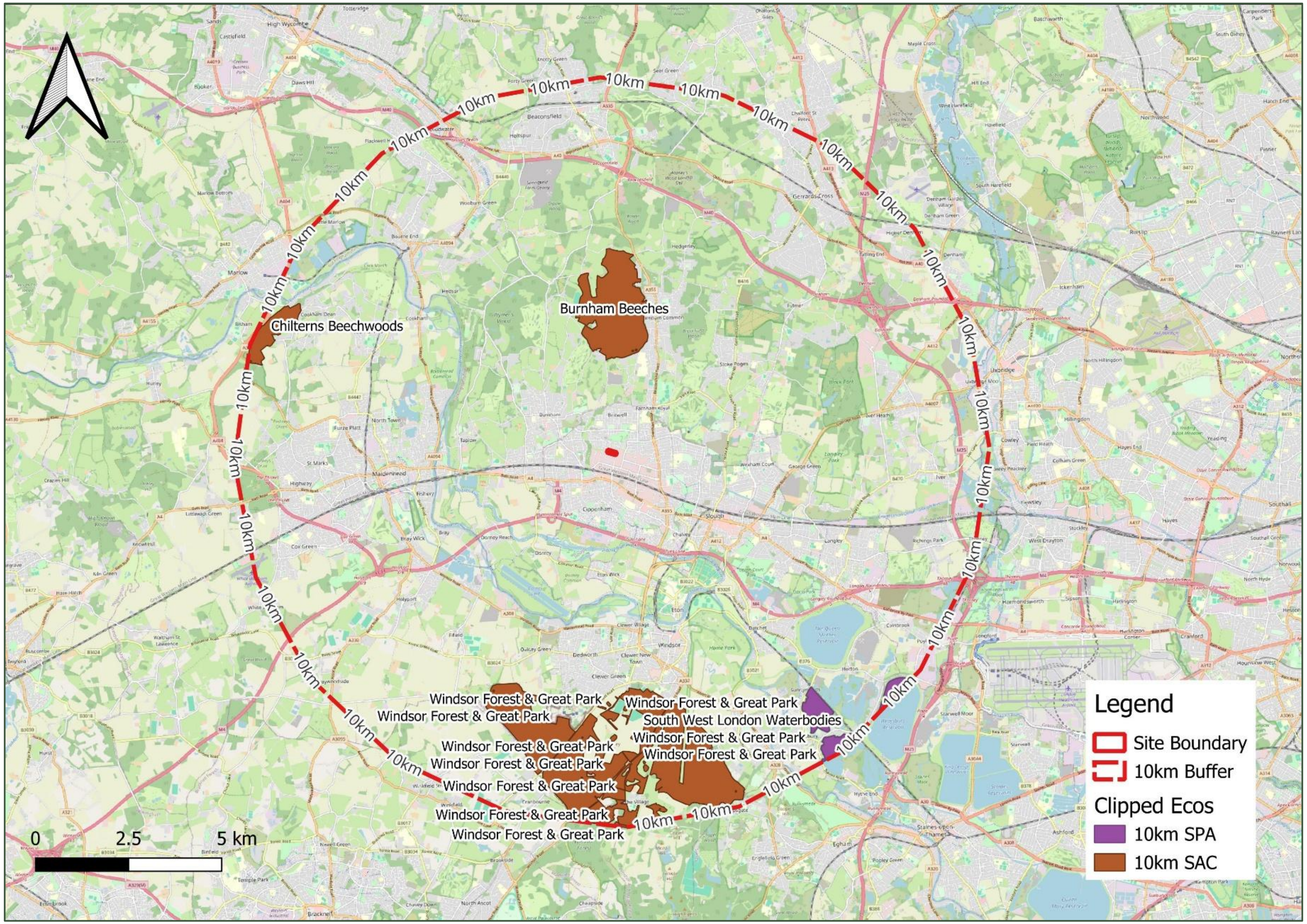

Figure 3-6: Modelled Ecological Receptor Locations (10km)

4.0 Baseline Environment

4.1 LAQM Review and Assessment

Slough Borough Council (SBC), in fulfilment of statutory requirements, has conducted an on-going exercise to review and assess air quality within their administrative area. The latest publicly available LAQM report at the time of writing is the 2025 Annual Status Report[15] (ASR).

SBC presently has five AQMAs declared for exceedances of the NO_2 annual mean AQAL at locations of relevant exposure.

The closest AQMA(s) to the Site are Slough AQMA 1 and AQMA 3 Extension, approximately 2 km from the Site boundary, having been declared for exceedances of the annual mean NO_2 objective. Both AQMAs have been recommend for revocation according to the latest ASR which states:

- AQMA 1 has shown no exceedance of 40 µg/m^3 since 2017 and concentrations have been below 36 µg/m^3 from 2018 onwards. As such, revocation of this AQMA commenced in 2024 and is due to be concluded in Summer 2025.
- AQMA 3's first year of compliance was achieved in 2022 and has showed sustained concentrations below 30 µg/m^3. As such, it is recommended that both the AQMA 3 and AQMA 3 Extension are revoked.

At the time of writing there has been no formal revoke of the AQMAs in place, despite the ASR statements. As such these AQMAs have been considered within this assessment, despite their distance from sources, to consider potential interaction.

4.2 Review of Air Quality Monitoring

4.2.1 Automatic Air Quality Monitoring

SBC undertook automatic (continuous) monitoring within their administrative area at five locations. From review of both local and national automatic monitoring networks, the nearest automatic monitor is the 'Salt Hill (Slough- town-centre - SLH 4)' monitor, located >2.2km to the southeast of the Site, however no data was collected as this site from 2022-2024. A second monitoring station 'Slough Windmill Bath Road' (SLH 12) is 2.2km, also southeast of the Site. Data from these stations are presented in Table 4-1 and Table 4-2.

Table 4-1 SLH 12 Monitoring Sites: Details

Monitoring Station	Monitoring network	Site Classification	x	y	Distance from site (m)
SLH 4	SBC	Urban Background	496599	180156	2,290
SLH 12	SBC	Roadside	496528	180171	2,350

Table 4-2 SLH 12 Monitoring Sites: Details – NO_2

Site ID	2024 Data Capture %	2022	2023	2024
SLH 4	0%	no data	no data	no data
SLH 12	98.9%	28.7	25.5	22.4

[15] Slough Borough Council, 2025 Air Quality Annual Status Report (ASR), June 2025.

Table 4-3 SLH 12 Monitoring Sites: Details – PM_{10}

Site ID	2024 Data Capture %	2022	2023	2024
SLH 4	0%	no data	no data	no data
SLH 12	94.4%	19.8	17.0	16.5

4.2.2 Passive Diffusion Tube Monitoring

Passive NO_2 diffusion tube monitoring is currently undertaken by SBC at numerous locations, in fulfilment of their statutory LAQM obligations. SBC undertook non-automatic (i.e. passive) monitoring of NO_2 at 88 sites (118 diffusion tubes).

The details and results of the monitoring locations closest to the Site (i.e. within 2km) are presented in Table 4-4 and Table 4-5 respectively, whilst their locations are illustrated in Figure 4-1. All monitoring data presented has been ratified by SBC.

Table 4-4: Passive Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Distance to Site (m)
		X	Y	
SLO 107	Roadside	495457	182550	960
SLO 106	Kerbside	495488	182538	970
SLO 108	Urban Background	495668	182430	1,017
SLO 41	Other	493960	181355	1,021
SLO 31	Suburban	496200	181900	1,315
SLO 101	Kerbside	494101	180708	1,327
SLO 102	Urban Background	494199	180637	1,331
SLO 42	Other	493493	181378	1,453
SLO 103	Kerbside	493784	180662	1,569
SLO 104	Suburban	493812	180572	1,615
SLO 105	Urban Background	493592	180737	1,662
SLO 111	Urban Background	496489	182270	1,673
SLO 110	Suburban	496529	182243	1,704
SLO 109	Suburban	496526	182276	1,710
SLO 30	Roadside	496397	180341	2,079
SLO 122	Kerbside	496167	179975	2,206

Table 4-5: Passive Diffusion Tube Monitoring Sites: Results

Site ID	2024 Data Capture %	2022	2023	2024
SLO 107	no data	no data	no data	no data
SLO 106	no data	no data	no data	no data
SLO 108	no data	no data	no data	no data
SLO 41	no data	no data	no data	no data

Site ID	2024 Data Capture %	2022	2023	2024
SLO 31	no data	no data	no data	no data
SLO 101	no data	no data	no data	no data
SLO 102	no data	no data	no data	no data
SLO 42	no data	no data	no data	no data
SLO 103	no data	no data	no data	no data
SLO 104	no data	no data	no data	no data
SLO 105	no data	no data	no data	no data
SLO 111	no data	no data	no data	no data
SLO 110	no data	no data	no data	no data
SLO 109	no data	no data	no data	no data
SLO 30	no data	23.4	no data	no data
SLO 122	100%	28.0	18.4	16.9

The tables above demonstrate that there is limited data available within the study domain. The data that is available demonstrates that annual mean NO_2 and PM_{10} concentrations have been below the AQAL (40µg/m^3) at all the monitors across the period presented (2022-2024). Where available, comparison of 2022 concentrations with 2024 concentrations show a general decline across all monitors, this in line with predicted local air quality trends and SBC's desire to revoke AQMAs.

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 monitors for the period assessed.

4.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution. The data sets include annual average concentration estimates for NO_x and NO_2 using a reference year of 2021 (the year in which comparisons between modelled and monitored concentrations are made)[16].

The Defra mapped annual mean background concentrations for the base year adopted (2024 – the latest year of SBC monitoring data) for the grid squares containing the Site and modelled human receptor locations are presented in Table 4-6.

The mapped background concentrations are well below the respective annual mean AQALs.

Table 4-6: Defra Background Pollutant Concentrations (2025)

Grid Square (X, Y)		Annual Mean Background Concentration (µg/m^3)	
		NO_x	NO_2
494500	181500	17.6	13.1
494500	182500	14.3	10.9

[16] Defra, Background Mapping data for local authorities - 2021.

Grid Square (X, Y)		Annual Mean Background Concentration (µg/m^3)	
		NO_x	NO_2
495500	182500	15.9	11.9
495500	181500	20.6	15.0
AQAL		**-**	***40***

4.4 Application of Baseline Data

The background concentrations applied in this assessment are presented in Table 4-7.

Table 4-7: Applied Background Concentrations

Location	NO_2	Data Source
All Receptors Outside AQMA	15.0	Max of Defra Background Maps
Receptor 'AQMA_0' within AQMA 1 & 3	22.4	Monitoring Station SLH 12 for NO_2 and PM_{10}, Max of Defra Background Maps for $PM_{2.5}$.

4.5 Baseline Conditions at Ecological Receptors

The APIS is a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology.

APIS, and Defra's compliance data hub[17], in addition to online literature sources and satellite imagery has been used to provide information on:

- Identification of whether the habitats present are sensitive to effects caused by potential emissions;
- Current baseline concentrations (Table 4-8);
- CLo functions for acidity (Table 4-9); and
- Background ozone concentrations (Table 4-10).

For listed designated sites the closest averaged grid square has been applied for background concentrations. For local sites the APIS 'Search by Location' function was used to facilitate the data collection.

Table 4-8: Baseline Levels, Nitrogen Critical Loads and Current Loads

ID	APIS CLo Class	Annual Mean (µg/m^3)		CLo Applied (kg N/ha/yr)	Current Load (kg N/ha/yr)
		NO_x	SO_2		
ER1	Broadleaved, mixed & yew woodland	22.38	2.90	10	23.38
ER2	Broadleaved, mixed & yew woodland	18.15	2.34	10	23.66
ER3	Broadleaved, mixed & yew woodland	15.57	1.64	10	23.8

17 https://compliance-data.defra.gov.uk/

ID	APIS CLo Class	Annual Mean (µg/m^3)		CLo Applied (kg N/ha/yr)	Current Load (kg N/ha/yr)
		NO_x	SO_2		
ER4	Beech forests on acid soils	15.50	1.50	10	23.8
ER5	Beech forests on acid soils	14.00	1.20	10	22.3
ER6	Standing open water and canals (A)	n/a	n/a	n/a	n/a
ER7	Juniper on heaths or calcareous grasslands	11.30	0.80	5	14.8
Table note: (A) No associated CLo					

Table 4-9: Acid Critical Load Functions and Current Loads

ID	APIS CLo Class	CLo Function (keq/ha/yr)			Current Load (keq/ha/yr)
		CLmaxS	CLminN	CLmaxN	N
ER1	Broadleaved, mixed & yew woodland	2.516	0.142	2.658	1.81
ER2	Broadleaved, mixed & yew woodland	1.691	0.357	2.048	1.84
ER3	Broadleaved, mixed & yew woodland	1.695	0.357	2.052	1.84
ER4	Unmanaged Broadleafed/Coniferous Woodland	2.544	0.142	2.901	1.8
ER5	Unmanaged Broadleafed/Coniferous Woodland	2.406	0.142	2.763	1.7
ER6	Standing open water and canals(A)	n/a	n/a	n/a	n/a
ER7	Calcareous grassland	4	1.071	5.071	1.1
Table note: (A) Freshwater habitat is not sensitive to acid deposition.					

Table 4-10: Background Ozone Concentrations (2024)

ID	Relevant Grid Square (X, Y)	AOT40c (µg/m^3 hours)
ER1	494500,181500	5075
ER2	494500,182500	5311
ER3	494500,183500	5461
ER4	494500, 184500	5552
ER5	492500,175500	5573
ER6	500500,175500	5121
ER7	48500,185500	5664
	CLe	***6,000***

On review of annual mean SO_2 concentrations (Table 4-8) and background ozone concentrations (Table 4-10), these are all below the relevant CLe.

Given this, it is appropriate to apply the 24-hour mean CLe of 200µg/m^3 in the assessment.

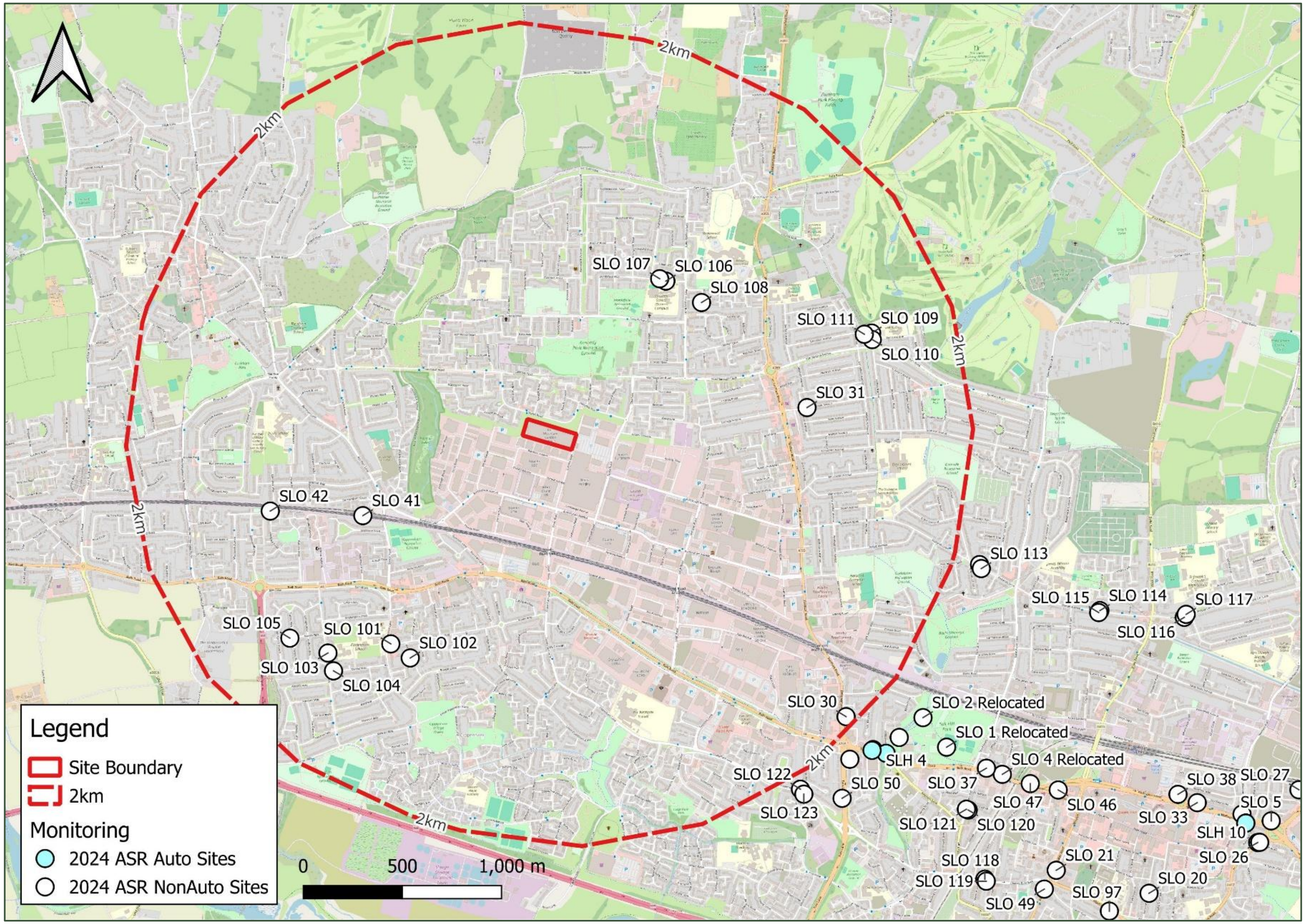

Figure 4-1: Local Monitoring Locations Relative to Site

5.0 Emissions to Atmosphere

5.1 Emission Points

The emission points to air comprise 11 containerised SBGs supplying back up power across two 'powertrains'; High Voltage (HV) power train 1,2,3 and Low Voltage (LV) power train 4,5,6 as listed in Table 5-1.

Table 5-1: Emissions Sources

Source No.	Source Name	Source Generator	Power train	x	y	Source Discharge Height (meters above ground level)
1	LV7	MTU DS3100	4,5,6	494815	181762	8.1
2	LV6	MTU DS3100	4,5,6	494818	181761	8.1
3	LV5	CAT 3516E	4,5,6	494823	181759	8.1
4	HV6	MTU DS3100	1,2,3	494885	181736	5.2
5	HV5	MTU DS3100	1,2,3	494890	181735	5.2
6	HV4	MTU_DS3100	1,2,3	494895	181733	5.2
7	HV3	MTU_DS3100	1,2,3	494900	181731	5.2
8	HV2	MTU_DS3100	1,2,3	494904	181730	5.2
9	HV1	MTU_DS3100	1,2,3	494909	181729	5.2
10	LV4	CAT_3516E	4,5,6	494920	181726	5.2
11	LVR	CAT_3516E	4,5,6	494915	181728	5.2

There are only two containerised SBGs model types at the Site; the CAT 3516E and the MTU DS3100.

Although the SBGs have been installed at different dates, in the absence of stack monitoring data it has been assumed that all generators operate in accordance with manufacturer's specifications with the following assumptions applied:

- Flow rates and temperatures - based on specific manufacturer's specifications;
- oxygen content and moisture - based on MTUDS3100 specifications;
- emissions concentrations - based on CAT3516E specifications; and
- velocity - based on the specified flow rates and on-site measured diameter of the stacks.

These applied emission parameters are provided in Table 5-2.

Table 5-2: Emissions Parameters (per Generator)

Parameter	Generator Type	Generator Type
Generator Brand / Model	CAT 3516E	MTU DS3100
Stack Internal Diameter (m)	0.35	0.35
Actual Flow Rate (Am3/s)	10.4	8.6
Velocity (m/s)	108.34	89.39
Emission Temperature (°C)	493	550
Moisture Content (%)	7.1	7.10
Oxygen Content (%)	9.6	9.57
Volume Flow (Nm^3/s) (A)	2.31	1.77
NOx Concentration (mg/Nm^3) (A)	2,319	2,319
PM Concentration (mg/Nm^3) (A)	20	20
NOx Emission (g/s)	5.4	4.1
PM Emission (g/s)	0.05	0.04
Table note: (A) Normalised to 273K, dry, 5% O2 assuming in-stack oxygen concentration of 9% (dry) and moisture content 12%.		

5.2 Operational Scenarios

The proposed data centre operating scenarios assessed are:

- **Maintenance Schedule Model (MSM)** - Routine testing representing operation of the SBGs during regular testing and maintenance procedures. The testing regime for the MSM scenarios is presented in Table 5-3; and
- **Loss Of Off-Site Power (LOOP)** - the unpredictable emergency grid outage any time during the year requiring the maximum plant to operate for the required outage duration (considered as a maximum of 72 hours). The LOOP scenario is presented in Table 5-4.

MSM1 and MSM3 scenarios have been split into ‘a’ and ‘b’ to account for consecutive testing of SBGs at different discharge heights; with scenarios ‘a’ - LV5 / LV6 / LV7 discharging at 8.1m AGL and scenarios ‘b’ - LVR / LV4 discharging at 5.2m AGL.

Table 5-3: Maintenance Schedule Model (MSM) Testing Regime

Test Name	Test Description	Generators	Frequency	Test Duration	Engine Loading	Tested concurrently or consecutively?	Max No. operated in any 1 hr period	Max No. operated in any 24 hr period	Cumulative Annual Duration
MSM1a	On-load testing LV power train 4,5,6	3 - LV5 / LV6 / LV7	Annual	400 mins (6.7 hr)	100%	Consecutively – tested individually	1	3	20.0 hr
MSM1b	On-load testing LV power train 4,5,6	2 - LVR / LV4	Annual	400 mins (6.7 hr)	100%	Consecutively – tested individually	1	2	13.3 hr
MSM2	On-load testing HV power train 1,2,3	6 - HV1 / HV2 / HV3 / HV4 / HV5 / HV6	Once per quarter	30 mins (0.5 hr)	100%	Consecutively – tested individually	1	6	8.0 hr
MSM3a	Off-load testing LV power train 4,5,6	3 - LV5 / LV6 / LV7	Once a month	5 mins (0.08 hr)	100%	Consecutively – tested individually	3	3	3.0 hr
MSM3b	Off-load testing LV power train 4,5,6	2 - LVR / LV4	Once a month	5 mins (0.08 hr)	100%	Consecutively – tested individually	2	2	2.0 hr
MSM4	Off-load testing HV power train 1,2,3	6 - HV1 / HV2 / HV3 / HV4 / HV5 / HV6	Once a month	5 mins (0.08 hr)	100%	Consecutively – tested individually	6	6	1.0 hr
MSM5	Black building test	11 - LVR / LV4 / LV5 / LV6 / LV7 / HV1 / HV2 / HV3 / HV4 / HV5 / HV6	Annual	30 mins (0.5 hr)	100%	Concurrently – all generators	11	11	5.5 hr

Table 5-4: Loss of Off-Site Power (LOOP) Scenarios

Test Name	Test Description	Generator Names	Frequency	Duration	Engine Loading	Tested concurrently or consecutively?	Max No operated in any 1 hr period	Max No operated in any 24 hr period	Cumulative Annual Duration
LOOP	Loss of Off-Site Power	LVR / LV4 / LV5 / LV6 / LV7 / HV1 / HV2 / HV3 / HV4 / HV5 / HV6	n/a	72 hours	100%	Concurrently – all generators	11	11	72 hrs (max)

5.3 Cumulative Scenarios

The report 'Impacts of Data Centre Clusters'[18] has been adopted by the EA for consideration of cumulative impacts of Data Centres.

The report provides a methodology for assessing the cumulative (in-combination) air quality impacts of clusters of data centres, focusing on short-term NO_2 emissions from SBGs, which are not well captured when sites are assessed individually, this is especially prevalent in locations such as Slough Trading Estate, where many data centres are collocated, creating clusters with very large aggregated generator capacity.

Based on the findings of this report a cumulative air quality assessment should be undertaken where screening indicates that emissions from multiple data centres could interact and result in a material combined impact.

The stated screening criteria applies where the following criteria are met:

- MSM scenarios:
    - There are two or more data centres located within a distance of 250 m;
    - The aggregated/combined thermal input based on one generator at each site in the cluster being tested exceeds 15 MWth; and
    - Relevant human receptors are present within 200 m of any of the individual data centres in the cluster or 'combined source area[19]'.
- LOOP scenarios:
    - There are two or more data centres located within a distance of 350 m;
    - The aggregated thermal input of all generators across the cluster exceeds 500 MWth; and
    - Relevant human receptors are present within 500 m of any of the individual data centres in the cluster or 'combined source area.

Based on this screening criteria, there are two Data Centre Sites within 250m of the Site

- LDN 7 with 17 generators;
    - 4 No. 5.7 MWth (~22.9 MWth)
    - 12 No. 6.8 MWth (~82.3 MWth)
    - 1 No. 8 MWth (~22.9 MWth)
- LDN 6 with 24 generators
    - 3.8 MWth (22.9 MWth).

The combined thermal input from a single generator from each site is below 15 MWth (~11.8 MWth). A cumulative assessment of MSM scenarios is therefore not required.

The aggregated thermal input of all generators across this cluster (within 350m) does not exceed 500 MWth. A cumulative assessment of LOOP scenarios is therefore not required.

[18] Logika Group (trading name of Air Quality Consultants Limited), (2024) Methodology for assessing the in-combination air quality impact of clusters.

[19] Rather than modelling every backup generator stack separately across a data centre cluster, the report groups several nearby generators (typically within the same building or campus) into one 'combined source area' that represents their aggregate source parameters as a single effective source for dispersion purposes.

6.0 Assessment Results

This section presents the results from the dispersion modelling assessment.

6.1 Routine Testing and Maintenance (MSM)

6.1.1 Annual Mean NO_2 Impacts

Predicted maximum annual mean NO_2 impacts at the modelled receptor locations for all scenarios are summarised in Table 6-1. All annual mean results have been factored down by the 'cumulative operation hours' for each scenario, with the Sum, or combined, PC for all scenarios presented (refer to Table 5.3).

The annual mean PCs are <1% of the AQAL and therefore 'insignificant'.

Table 6-1: MSM - Maximum Annual Mean NO_2 AQAL ($\mu g/m^3$)

Receptor	MSM1a	MSM1b	MSM2	MSM3a	MSM3b	MSM4	MSM5	Sum PC	Sum PC as % of AQAL
AQMA_0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	0.0%
RESI_1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	0.1%
RESI_2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
RESI_5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
RESI_11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
RESI_12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
COMM_13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
COMM_14	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
COMM_15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
COMM_16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
COMM_17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2%
COMM_18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
COMM_19	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%
COMM_20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1%

6.1.2 1-hour Mean NO_2 Impacts

6.1.2.1 AQAL

Predicted maximum 1-hour mean (99.79%ile) NO_2 PCs and PECs impacts at worst affected modelled receptor locations for all scenarios are presented as a summary in Table 6-2.

All modelled scenarios result in occurrences on the modelled receptor grid where the PEC exceeds 200µg/m^3. The probability of exceedance, however, is 'highly unlikely', due to the low number of 'cumulative operational hours.

Table 6-2: MSM - Maximum Annual Mean NO_2 AQAL

Scenario	PC (µg/m^3)	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
MSM1a	166	83%	196	98%	26	0.0%
MSM1b	184	92%	214	107%	376	0.0%
MSM2	710	355%	740	370%	10	0.0%
MSM3a	166	83%	196	98%	26	0.0%
MSM3b	184	92%	214	107%	146	0.0%
MSM4	272	136%	302	151%	1887	0.0%
MSM5	1,223	611%	1,253	626%	1887	0.0%

6.1.2.2 AEGL

The 1-hour mean and 10-minute mean (100%ile) NO_2 PCs and PECs are below the AEGL-1 at the modelled receptor locations (Table 6-3 and

Table 6-4), except for MSM5 (black building test). The probability of exceedances occurring is however limited to 0.6% (highly unlikely) for the 1-hour AEGL and 2.1% (unlikely) for the 10-minute AEGL.

Table 6-3: MSM - Maximum - 1-hour Mean NO_2 AEGL

Scenario	PC (µg/m^3)	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
MSM1a	200	21%	230	25%	0	-
MSM1b	247	26%	277	29%	0	-
MSM2	854	91%	884	94%	0	-
MSM3a	200	21%	230	25%	0	-
MSM3b	247	26%	277	29%	0	-
MSM4	317	34%	347	37%	0	-
MSM5	1,480	157%	1,510	161%	101	0.6%

Table 6-4: MSM - Maximum - 10-minute Mean NO_2 AEGL

Scenario	PC (µg/m^3)	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
MSM1a	269	29%	299	32%	0	-
MSM1b	331	35%	361	38%	0	-
MSM2	1,145	122%	1,175	125%	0	-
MSM3a	269	29%	299	32%	0	-
MSM3b	331	35%	361	38%	0	-
MSM4	425	45%	455	48%	0	-
MSM5	1,983	211%	2,013	214%	363	2.1%

6.1.3 1-hour Mean NO Impacts

The 1-hour mean NO PECs are below the AQAL at the modelled receptor locations (Table 6-5). No exceedances are recorded.

Table 6-5: MSM - Maximum -1-hour Mean NO AQAL

Scenario	PC (µg/m^3)	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL
MSM1a	516	12%	546	12%
MSM1b	636	14%	666	15%
MSM2	2,196	50%	2,226	51%
MSM3a	516	12%	546	12%
MSM3b	636	14%	666	15%
MSM4	816	19%	846	19%
MSM5	3,806	87%	3,836	87%

6.1.4 Impact on Critical Levels

The annual mean NO_x impacts are presented in Table 6-6, for Scenario MSM5 (Black building test), which results in the highest grams per second, per year, of all the MSM scenarios tested. The results for this scenario are as follows:

- The maximum predicted annual NOx PC is <100% of the long-term CLe at the LNR and AW;
- The maximum predicted annual NOx PC is <1% of the long-term CLe at the SAC and SPA;

As such, the impacts are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).

Table 6-6: MSM - Maximum Annual Mean NO_x Critical Level

ID	Designation	NO_x PC	PC as % of AQAL
ER1	LNR	<0.1	<0.1%
ER2	LNR	<0.1	<0.1%
ER3	AW	<0.1	<0.1%
ER4	SAC	<0.1	<0.1%
ER5	SAC	<0.1	<0.1%
ER6	SPA / Ramsar	<0.1	<0.1%
ER7	SAC	<0.1	<0.1%

The 24-hour mean NO_x impacts are presented in Table 6-7. for Scenario MSM5 (Black building), which results in the highest impact of all the MSM scenarios tested. The results for this scenario are as follows:

- The maximum predicted 24-hour NOx PC is <10% of the short-term CLe at the SPA and one of the SACs.
- The maximum predicted 24-hour NOx PC is >10% of the short-term CLe at two of the SACs, but the PEC is not exceeded at these locations.
- The maximum predicted 24-hour NOx PC is <100% of the short-term CLe at the LNR and AW.

As such, the impacts are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).

Table 6-7: MSM – 24-hour Mean NO_x Critical Level

ID	Designation	PC	PC as % of CLe	PEC	PEC as % of CLe
ER1	LNR	176.9	88.5%	221.7	110.8%
ER2	LNR	81.4	40.7%	117.7	58.8%
ER3	AW	47.9	24.0%	79.1	39.5%
ER4	SAC	37.6	18.8%	68.6	34.3%
ER5	SAC	21.5	10.8%	49.5	24.8%
ER6	SPA / Ramsar	15.2	7.6%	n/a	n/a

ID	Designation	PC	PC as % of CLe	PEC	PEC as % of CLe
ER7	SAC	13.4	6.7%	36.0	18.0%

6.1.5 Impact on Critical Loads

The impacts on the nitrogen deposition and acid CLo are presented in Table 6-8 and Table 6-9 for Scenario MSM5 (Black Building Test), which results in the highest grams per second, per year, of all the scenarios tested. The results for this scenario are as follows:

- The maximum predicted annual NOx PC is <100% of the long-term CLo at the LNR and AW;
- The maximum predicted annual NOx PC is <1% of the long-term CLo at the SAC and SPA;

As such, the impacts are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).

Table 6-8: MSM – Nitrogen Deposition Critical Load

ID	Designation	Applied CLo (kg N/ha/yr)	Annual Mean PC (kg N/ha/yr)	PC as % of CLo
ER1	LNR	10	<0.1	<0.1%
ER2	LNR	10	<0.1	<0.1%
ER3	AW	10	<0.1	<0.1%
ER4	SAC	10	<0.1	<0.1%
ER5	SAC	10	<0.1	<0.1%
ER6	SPA / Ramsar	n/a	<0.1	<0.1%
ER7	SAC	5	<0.1	<0.1%

Table 6-9: MSM – Acid Deposition Critical Load

ID	Designation	CLo Function for Assessment	CLo for Assessment (keq/ha/yr)	PC (keq/ha/yr)	PC as % of CLo
ER1	LNR	CLmaxN	2.658	<0.1	<0.1%
ER2	LNR	CLmaxN	2.048	<0.1	<0.1%
ER3	AW	CLmaxN	2.052	<0.1	<0.1%
ER4	SAC	CLmaxN	2.901	<0.1	<0.1%
ER5	SAC	CLmaxN	2.763	<0.1	<0.1%
ER6	SPA / Ramsar	n/a	n/a	n/a	n/a
ER7	SAC	CLmaxN	5.071	<0.1	<0.1%

6.2 Loss-of-Offsite Power (LOOP)

6.2.1 Annual Mean NO_2 Impacts

Predicted annual mean NO_2 impacts at the modelled receptor locations for a 72-hour LOOP are summarised in Table 6-10. There are no exceedances of the AQAL predicted.

Table 6-10: LOOP – Annual Mean NO_2 AQAL

ID	PC (µg/m³)	PC as % of AQAL	PEC (µg/m³)	PEC as % of AQAL
AQMA_0	<0.1	0.1%	22.4	56.1%
RESI_1	0.8	1.9%	15.8	39.4%
RESI_2	0.9	2.3%	15.9	39.8%
RESI_3	1.2	3.0%	16.2	40.5%
RESI_4	0.3	0.8%	15.3	38.3%
RESI_5	0.9	2.3%	15.9	39.8%
RESI_6	1.1	2.8%	16.1	40.3%
RESI_7	1.3	3.3%	16.3	40.8%
RESI_8	1.3	3.3%	16.3	40.8%
RESI_9	1.3	3.2%	16.3	40.7%
RESI_10	0.9	2.2%	15.9	39.7%
RESI_11	0.5	1.1%	15.5	38.6%
RESI_12	0.3	0.8%	15.3	38.3%
COMM_13	0.5	1.2%	15.5	38.7%
COMM_14	1.0	2.4%	16.0	39.9%
COMM_15	0.8	1.9%	15.8	39.4%
COMM_16	0.6	1.4%	15.6	38.9%
COMM_17	1.0	2.5%	16.0	40.0%
COMM_18	0.6	1.4%	15.6	38.9%
COMM_19	0.4	0.9%	15.4	38.4%
COMM_20	0.3	0.8%	15.3	38.3%

6.2.2 1-hour Mean NO_2 Impacts

6.2.2.1 AQAL

Table 6-11 presents the probability of exceedances of the 1-hour mean NO_2 AQAL occurring for a 72-hour LOOP. There is the potential for exceedance of the AQAL is at four of the modelled receptor locations.

Table 6-11: LOOP – 1-hour Mean (99.79%ile) NO_2 AQAL

ID	PC	PC as % of AQAL	PEC (µg/m³)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
AQMA_0	60	30%	90	45%	-	-
RESI_1	457	228%	487	243%	994	0.1%
RESI_2	495	247%	525	262%	1,371	3.2%
RESI_3	589	294%	619	309%	1,783	32.6%
RESI_4	725	363%	755	378%	284	0.0%
RESI_5	1,074	537%	1,104	552%	821	0.0%
RESI_6	1,223	611%	1,253	626%	1,115	0.3%
RESI_7	639	320%	669	335%	1,856	43.2%
RESI_8	666	333%	696	348%	1,887	48.2%
RESI_9	949	474%	979	489%	1,473	6.6%
RESI_10	1,207	603%	1,237	618%	486	<0.1%
RESI_11	742	371%	772	386%	468	<0.1%
RESI_12	805	403%	835	418%	320	<0.1%
COMM_13	568	284%	598	299%	597	<0.1%
COMM_14	507	254%	537	269%	1,340	2.6%
COMM_15	618	309%	648	324%	940	<0.1%
COMM_16	605	302%	635	317%	678	<0.1%
COMM_17	1,142	571%	1,172	586%	911	<0.1%
COMM_18	492	246%	522	261%	662	<0.1%
COMM_19	792	396%	822	411%	354	<0.1%
COMM_20	517	259%	547	274%	325	<0.1%

6.2.2.2 AEGL

As displayed in Table 6-12 and Table 6-13, for a 72-hour LOOP, there are potential exceedances of the 1-hour mean and 10-minute mean AEGL-1 at some of the modelled receptor locations.

When considered within the context of the AEGL scale, these exceedances are small exceedances of the AEGL-1 and do not approach the AEGL-2 levels (PEC's being an order of magnitude lower).

Table 6-12: LOOP – 1-hour Mean NO_2 AEGL-1

ID	PC	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
AQMA_0	67	7.2%	97.4	10.4%	-	-
RESI_1	493	52.5%	523.4	55.7%	-	-
RESI_2	568	60.5%	598.4	63.7%	-	-
RESI_3	677	72.0%	706.9	75.2%	-	-
RESI_4	1,051	111.8%	1,080.7	115.0%	2	2%
RESI_5	1,454	154.6%	1,483.6	157.8%	41	34%
RESI_6	1,321	140.5%	1,350.6	143.7%	49	40%
RESI_7	769	81.8%	798.7	85.0%	-	-
RESI_8	744	79.1%	773.6	82.3%	-	-
RESI_9	1,183	125.8%	1,212.5	129.0%	21	17%
RESI_10	1,480	157.5%	1,510.2	160.7%	96	79%
RESI_11	986	104.9%	1,016.3	108.1%	8	7%
RESI_12	1,058	112.6%	1,088.3	115.8%	7	6%
COMM_13	641	68.2%	670.8	71.4%	-	-
COMM_14	566	60.2%	596.0	63.4%	-	-
COMM_15	782	83.1%	811.5	86.3%	-	-
COMM_16	703	74.8%	733.1	78.0%	-	-
COMM_17	1,232	131.1%	1,262.0	134.3%	101	83%
COMM_18	712	75.7%	741.8	78.9%	-	-
COMM_19	1,104	117.5%	1,134.2	120.7%	7	6%
COMM_20	625	66.5%	654.7	69.6%	-	-

Table 6-13: LOOP – 10-minute Mean NO_2 AEGL-1

ID	PC	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL	Exceedance Counts	Probability of Exceedance
AQMA_0	90	9.6%	120.3	12.8%	-	0%
RESI_1	661	70.3%	691.1	73.5%	-	0%
RESI_2	762	81.0%	791.6	84.2%	1	1%
RESI_3	907	96.5%	937.1	99.7%	26	21%
RESI_4	1,408	149.8%	1,438.0	153.0%	53	44%
RESI_5	1,948	207.2%	1,977.8	210.4%	206	169%
RESI_6	1,770	188.3%	1,799.6	191.4%	185	152%
RESI_7	1,030	109.6%	1,060.1	112.8%	56	46%
RESI_8	996	106.0%	1,026.5	109.2%	58	48%
RESI_9	1,585	168.6%	1,614.6	171.8%	202	166%
RESI_10	1,983	211.0%	2,013.5	214.2%	275	226%
RESI_11	1,322	140.6%	1,351.6	143.8%	75	62%
RESI_12	1,418	150.9%	1,448.2	154.1%	84	69%
COMM_13	859	91.3%	888.6	94.5%	21	17%
COMM_14	758	80.7%	788.5	83.9%	1	1%
COMM_15	1,047	111.4%	1,077.3	114.6%	50	41%
COMM_16	942	100.2%	972.2	103.4%	42	35%
COMM_17	1,651	175.6%	1,680.9	178.8%	363	298%
COMM_18	954	101.5%	983.8	104.7%	10	8%
COMM_19	1,480	157.4%	1,509.6	160.6%	55	45%
COMM_20	837	89.0%	867.1	92.2%	8	7%

6.2.3 1-hour Mean NO Impacts

The 1-hour mean NO PCs and PECs are below the AQAL at the modelled receptor locations (Table 6-14). No exceedances are recorded.

Table 6-14: LOOP – 1-hour Mean NO AQAL

ID	PC (µg/m³)	PC as % of AQAL	PEC (µg/m³)	PEC as % of AQAL
AQMA_0	168	3.8%	198	4.5%
RESI_1	1261	28.7%	1291	29.3%
RESI_2	1462	33.2%	1492	33.9%
RESI_3	1728	39.3%	1758	40.0%
RESI_4	2560	58.2%	2590	58.9%
RESI_5	3604	81.9%	3634	82.6%
RESI_6	3380	76.8%	3410	77.5%
RESI_7	1887	42.9%	1917	43.6%
RESI_8	1912	43.5%	1942	44.1%
RESI_9	2999	68.2%	3029	68.8%
RESI_10	3739	85.0%	3769	85.7%
RESI_11	2508	57.0%	2538	57.7%
RESI_12	2686	61.0%	2716	61.7%
COMM_13	1630	37.0%	1660	37.7%
COMM_14	1453	33.0%	1483	33.7%
COMM_15	2010	45.7%	2040	46.4%
COMM_16	1808	41.1%	1838	41.8%
COMM_17	3168	72.0%	3198	72.7%
COMM_18	1830	41.6%	1860	42.3%
COMM_19	2809	63.8%	2839	64.5%
COMM_20	1594	36.2%	1624	36.9%

6.2.4 Impact on Critical Levels

The annual mean NO_x impacts are presented in Table 6-6, for Scenario LOOP, which has been factored to 72 operational hours.   The results for this scenario are as follows:

- The maximum predicted annual NOx PC is <100% of the long-term CLe at the LNRs and AW;
- The maximum predicted annual NOx PC is <1% of the long-term CLe at the SACs and SPA;

As such, the impacts are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).

Table 6-15: LOOP – Maximum Annual Mean NO_x Critical Level

ID	Designation	NO_x PC	PC as % of AQAL
ER1	LNR	0.2	0.6%
ER2	LNR	0.1	0.2%
ER3	AW	<0.1	0.1%
ER4	SAC	<0.1	0.1%
ER5	SAC	<0.1	<0.1%
ER6	SPA / Ramsar	<0.1	<0.1%
ER7	SAC	<0.1	<0.1%

The 24-hour mean NO_x impacts are presented in Table 6-7. for Scenario LOOP. The results for this scenario are as follows:

The results for this scenario are as follows:

- The maximum predicted 24-hour NOx PC is <10% of the short-term CLe at one of the SACs (ER7).
- The maximum predicted 24-hour NOx PC is >10% of the short-term CLe at two of the SACs and the SPA (ER4, ER5, ER6), but the PEC is not exceeded at these locations.
- The maximum predicted 24-hour NOx PC is <100% of the short-term CLe at one LNR (ER2) and the AW (ER3).
- The maximum predicted 24-hour NOx PC is >100% of the short-term CLe at an LNR (ER1) and the PEC is predicted to be exceeded.

As such, impacts are considered to cause 'no likely damage' at the European designations (SAC & SPA). There are potential exceedances of the daily mean NOx CLe at the a LNR when assuming a >24-hour outage duration.

Table 6-16: Testing and Maintenance – 24-hour Mean NO_x Critical Level

ID	Designation	PC	PC as % of AQAL	PEC (µg/m^3)	PEC as % of AQAL
ER1	LNR	268.1	134.1%	312.9	156.4%
ER2	LNR	165.6	82.8%	201.9	101.0%
ER3	AW	92.9	46.4%	124.0	62.0%
ER4	SAC	53.9	26.9%	84.9	42.4%
ER5	SAC	32.5	16.2%	60.5	30.2%
ER6	SPA / Ramsar	22.9	11.4%	n/a	n/a
ER7	SAC	11.3	5.6%	33.9	16.9%

6.2.5 Impact on Critical Loads

The impacts on the nitrogen deposition and acid CLo are presented in Table 6-8 and Table 6-9. The results for this scenario are as follows:

- The maximum predicted annual NOx PC is <100% of the long-term CLo at the LNR and AW;

- The maximum predicted annual NOx PC is <1% of the long-term CLo at the SAC and SPA;

As such, the impacts are considered to cause ‘no likely damage’ at the European designations (SAC & SPA) and ‘no significant pollution’ at the local designations (LNR &AW).

Table 6-17: Testing and Maintenance – Nitrogen Deposition Critical Load

ID	Designation	Applied CLo (kg N/ha/yr)	Annual Mean PC (kg N/ha/yr)	PC as % of CLo
ER1	LNR	10	<0.1	0.4%
ER2	LNR	10	<0.1	0.1%
ER3	AW	10	<0.1	0.1%
ER4	SAC	10	<0.1	0.1%
ER5	SAC	10	<0.1	<0.1%
ER6	SPA / Ramsar	n/a	n/a	n/a
ER7	SAC	5	<0.1	<0.1%

Table 6-18: Testing and Maintenance – Acid Deposition Critical Load

ID	Designation	CLo Function for Assessment	CLo for Assessment (keq/ha/yr)	PC (keq/ha/yr)	PC as % of CLo
ER1	LNR	CLmaxN	2.658	<0.1	<0.1%
ER2	LNR	CLmaxN	2.048	<0.1	<0.1%
ER3	AW	CLmaxN	2.052	<0.1	<0.1%
ER4	SAC	CLmaxN	2.901	<0.1	<0.1%
ER5	SAC	CLmaxN	2.763	<0.1	<0.1%
ER6	SPA / Ramsar	n/a	n/a	n/a	n/a
ER7	SAC	CLmaxN	5.071	<0.1	<0.1%

7.0 Conclusions

The assessment has considered potential impacts on air quality from the Site SBGs as a result of routine testing and maintenance operations, non-routine Loss-of-Offsite Power . The key findings are summarised in the following sections.

Routine Testing and Maintenance (MSM):

- Annual mean NO_2 impacts associated with the proposed routine testing and maintenance schedule are predicted to be insignificant at all the modelled human receptor locations.
- The probability of exceedance of the 1-hour (99.79%ile) is 'highly unlikely', due to the low number of 'cumulative operational hours.
- predicted exceedances of the 1-hour mean and 10-minute NO_2 AEGLs at the modelled human receptor locations, are 'highly unlikely' for all on and off-load testing and 'unlikely' for a Black Building Test.
- There are no predicted exceedances of the 1-hour mean NO EAL at the modelled human receptor locations.
- Impacts on designated ecological sites are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).

Loss-of-Offsite Power (LOOP):

- Annual mean NO_2 impacts associated with a hypothetical 72-hour emergency outage are predicted to be insignificant at all the modelled human receptor locations.
- The probability of exceedance of the 1-hour mean NO_2 AQAL is 'likely' at some of the modelled receptor locations.
- There are potential exceedances of the 1-hour mean (>5% probability) and 10-minute (>5% probability) NO_2 AEGLs at some of the modelled human receptor locations.
- There are no predicted exceedances of the 1-hour mean NO EAL at the modelled human receptor locations.
- Impacts on the annual mean CLe and CLo designated ecological sites are considered to cause 'no likely damage' at the European designations (SAC & SPA) and 'no significant pollution' at the local designations (LNR &AW).
- There are potential exceedances of the daily mean NO_x CLe at a local ecological sites when assuming a >24-hour outage duration.

Appendix A EA Modelling Checklist

Environmental Permit Application

Air Emissions Risk Assessment – Iron Mountain Data Centre

Iron Mountain Data Centre Limited

SLR Project No.: 410.066934.00001

30 June 2026

Table A-1: Modelling Checklist

Item	Yes/No	Details / Reason for Omission
Location map	Yes	Figure 3-4
Site plan	Yes	Figure 3-2
Pollutants modelled and relevant EALs	Yes	Table 2-1, Table 2-3
Details of modelled scenarios	Yes	Section 5.2
Details of relevant ambient concentrations	Yes	Section 4.0
Model description and justification	Yes	Section 3.1
Special model treatment used	Yes	Section 3.2.1
Table of emission parameters used	Yes	Table 5-2
Details of modelled domain and receptors	Yes	Section 3.1.2
Details of meteorological data used	Yes	Section 3.1.5
Details of terrain treatment	Yes	Section 3.1.3
Details of building treatment	Yes	Section 3.1.4
Details of modelling deposition	Yes	Section 3.3
Model uncertainty and sensitivity	Yes	Section 3.1.1
Assessment of impacts	Yes	Section 0
Contour plots	No	Gridded outputs required multiple conversion factors for, process, operational hours and combining concentrations.
Model input files	Yes	Appendix C

Appendix B Model Files (electrotonic only)

Environmental Permit Application

Air Emissions Risk Assessment – Iron Mountain Data Centre

Iron Mountain Data Centre Limited

SLR Project No.: 410.066934.00001

30 June 2026

File Name	YEAR	MODELLING SCENARIO
IM_v1_24	2024	Annual Mean NO_2, 1-hour mean NO_2 and NO
IM_v1_AEGL_24	2024	1-hour AEGL exceedances
IM_v1_AEGL10min_24	2024	10-minute AEGL exceedances
IM_v1_ECO_24	2024	Annual mean and 24 hour NOx.

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