HOARE LEA

Priestley Way, Brent (Site 2). Brent Cross, London.
PDCG (Group Services) Ltd.

AIR QUALITY

AIR EMISSIONS RISK ASSESSMENT

LON1B2V3A-E1-HL-ZZ-XX-RPT-Y-80000

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Audit Sheet.

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Executive Summary

Hoare Lea have been commissioned by PDCG (Group Services) Ltd to undertake an Air Quality Risk Assessment (AQRA) of emissions to atmosphere for the proposed Priestley Way, Brent (Site 2) data centre development located within Brent Cross, London (hereafter referred to as the 'Site'). The purpose of this assessment is to support the variation of the existing Environmental Permit (EPR/QP3706LH), which covers the 16 backup generators already in place within the existing Priestley Way Data Centre (Site 1), to incorporate the proposed 40 backup generators within Site 2, bringing the total backup generators covered within EPR/QP3706LH to 56 generators.

The additional 40 generators will be utilised to maintain power in the event of a National Grid outage and will be tested for up to 30 minutes every month for ten months at up to 50% load, and up to four hours, twice per year at up to 100% load. This assessment has modelled generator emissions under the assumption of diesel fuel, when in reality the generators will be run on hydrotreated vegetable oil (HVO 100) fuel, which has a lower emission rate for oxides of nitrogen.

The assessment considers the potential impacts associated with nitrogen dioxide, particulate matter, sulphur dioxide, carbon monoxide, and total organic carbon as benzene on 17 human health receptors and 15 ecological sites for both the two testing scenarios, which follows the routine testing schedule, and the outage scenario, which represent a 48-hour National Grid outage.

The emissions have been modelled using ADMS-5 to screen the significance of impacts against the Environment Agency (EA) screening process. The 56 generators across the entirety of the site have been assessed within the model scenarios in this assessment. 2020 has been used as a background year in the assessment and the worst case meteorological year of 2017 has been used to ensure a robust assessment.

The impacts at all human health receptors during the two testing scenarios and the outage scenario were screened out at all receptors for all pollutants within the testing and outage scenario except for the annual mean and 1-hour mean NO_2 within the outage scenario. However, the outage scenario is highly unlikely to occur over a 48-hour period, as the longest outage from Elstree Substation in the last ten years was less than 3 minutes, therefore impacts can be considered to be not significant. Subsequently, annual mean and short term impacts at all receptors are either screened out and insignificant, or assessed as not significant.

Impacts as a result of the six monthly and monthly testing scenarios on ecological receptors were screened to be insignificant and all but the annual mean NOx, 24-hour mean NOx and nutrient nitrogen deposition at E1 within the six-monthly testing scenario and the annual mean NOx and 24-hour mean NOx at E1 within the monthly testing scenario. To ensure a conservative approach, the background concentration from 2020 has been used therefore concentrations in the opening year are likely to be lower than predicted. In addition, the majority of the impact is due to the background concentration already exceeding the AQO. Furthermore, NOx airborne pollutants are likely to have little impact on E1, as stated by the Air Pollution Information System (APIS). Subsequently, NOx concentrations are not considered to be an issue for the habitat types within E1. As such, the annual mean NOx impacts and nutrient nitrogen deposition impacts are considered to be not significant.

During the outage scenario, impacts were screened to be insignificant for all receptors except at E1 for annual mean NOx and nutrient nitrogen deposition as well as all but E8 and E15 for 24-hour mean NOx. However, theses impacts were all determined to be not significant as it is highly unlikely that an outage will occur for a length of 48 hours, as the longest outage at Elstree substation was less than 3 minutes in the past ten years. As such the impact at ecological sites, where not able to be screened as insignificant, have been determined to be not significant in the outage scenario due to the unlikelihood of the outage scenario occurring.

Subsequently no additional mitigation is required for the installation. However, some measured have been included within the design to reduce emissions.

1. Introduction.

Hoare Lea have been commissioned by PDCG (Group Services) Ltd to undertake an Air Quality Risk Assessment (AQRA) of emissions to atmosphere for the proposed Priestley Way, Brent (Site 2) data centre development located within Brent Cross, London (hereafter referred to as the 'Site'). The purpose of this assessment is to support the variation of the existing Environmental Permit (EPR/QP3706LH), which covers the 16 backup generators already in place within the existing Priestley Way Data Centre (Site 1), to incorporate the proposed 40 backup generators within Site 2, bringing the total backup generators covered within EPR/QP3706LH to 56 generators.

1.1 Existing Permit (Site 1).

The existing adjacent data centre, hereinafter referred to as 'Site 1', was granted an Environmental Permit (EPR/QP3706LH) for the operation of standby electricity generating plant, consisting of 16 x 7.31 megawatt thermal (MWth) generators with an aggregated thermal input of 117 MWth. The plant is to be used for emergency backup power in the event of a National Grid outage only. The installation is not expected to have any significant environmental impacts on local air quality.

1.2 Plant (Site 2).

Due to the nature of the data centre, it requires continuous power supply from the National Grid. In the event of a National Grid outage, the 40 generators (with a combined thermal input of approximately 132 MWth) will be utilised to maintain power. The generators will only be used for testing/maintenance and in an emergency power outage. They are expected to be tested for up to 30 minutes every month (for 10 months) and up to four hours twice a year. Generators are expected to be tested separately at full load (up to 100%) for the four-hour tests and may be tested in groups of up to eight at low load (up to 50%) for the 30-minute tests. In this assessment the generators have been modelled under the assumption that they will run on diesel fuel, whereas in reality, hydrotreated vegetable oil (HVO 100) fuel from sustainable sources, which has a lower emission rate for oxides of nitrogen (NO_X), is to be used. Each generator will have an individual flue, these will be grouped into four groups of ten flues, all of which will terminate at a height of 43.1 m. A copy of the most recent plans for the installation have been included in Appendix 1.

1.3 Site Setting and Study Area.

The Site is located within the London Borough of Brent's (LBB) administrative area within a Strategic Industrial Area outlined for growth[1]. The Site is also located approximately 120 m south of the London Borough of Barnet's administrative boundary. The Site is situated to the north of the North Circular Road (A406) and West of Edgware Road (A5) in Brent Cross, surrounded by other industrial buildings and commercial uses. North of the Site is Brent Reservoir, which is designated as a Site of Special Scientific Interest (SSSI). To the southwest and further north of the Site there are residential areas. The location of the Site is shown in Figure 1.

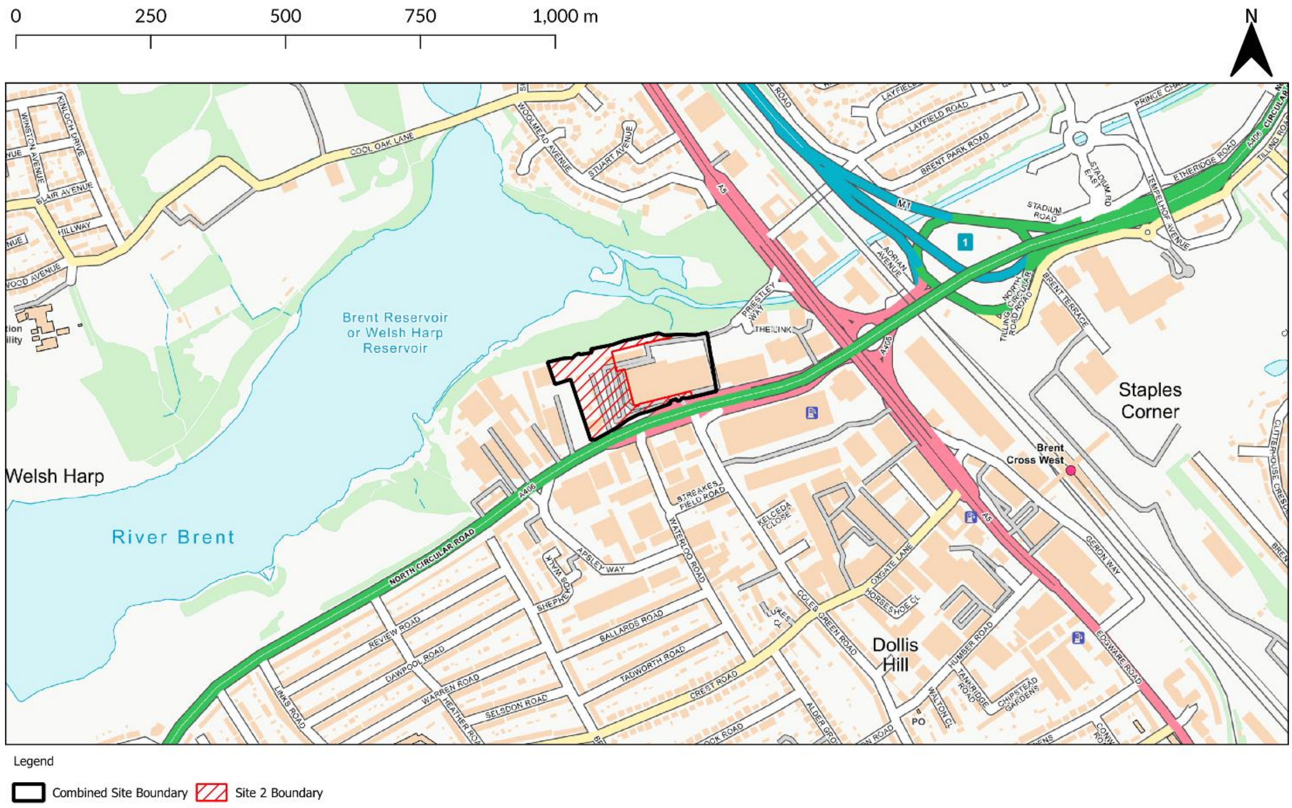

Figure 1: Location of the Site. Contains OS Data © Crown Copyright and Database rights 2024.

The Site is located within Brent Air Quality Management Area (AQMA), declared by LBB for exceedances of the annual mean nitrogen dioxide (NO_2) and 24-hour mean particulate matter (PM_{10}) Air Quality Objectives (AQO) in 2006.

The study area extends approximately 2 km for SSSIs and 10 km for Special Protection Areas (SPAs), Special Areas of Conservation (SAC) and Ramsar sites from the Site boundary, to cover existing sensitive receptors in the area in line with the Environment Agency (EA) screening distances for nature conservation sites.

1.4 Scope of the Assessment.

The operational impacts associated with the combustion sources have been assessed using a dispersion model to predict the impact at ground level utilising five years of meteorological data from London Heathrow Airport (2017 to 2021). The modelling will assess impacts of NO_2, PM_{10}, sulphur dioxide (SO_2), carbon monoxide (CO) and total organic carbon (TOC) as benzene (hereinafter referred to as benzene). The impacts will be assessed at human and ecological existing sensitive receptors for the following scenarios:

- Routine testing schedule; and
- A 48-hour outage scenario.

This assessment has been undertaken in accordance with the guidance provided by the EA in its Date Centre FAQ Headline Approach[2].

2. Legislation, Policy and Guidance Documents.

2.1 The Environment Act.

The Environment Act 2021[3] acts as the UK's new framework of environmental protection and came into force on 1st April 2022. With regard to air quality, the Environment Act establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation. These were released for $PM_{2.5}$ in 2023 and are outlined in the Environment Improvement Plan 2023[4]. The targets are a long term target of 10 µg/m^3 by 2040 and the interim annual mean concentration goal of 12 µg/m^3 by 31st January 2028.

2.2 Air Quality Standards Regulations.

The Air Quality Standards Regulations 2010 (amended in 2016) defines the policy framework for 12 pollutants known to have harmful effect on human health or the natural environment. The air quality limit values for the relevant pollutants to this assessment are displayed in Table 1.

The standards for NO_2, PM_{10}, $PM_{2.5}$, SO_2, CO and benzene are set out in Table 1. The AQOs for NO_2, PM_{10} were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter. It should be noted that all particulate matter has been assumed to be PM_{10}.

Table 1: Air Quality Standards for relevant pollutants.

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour Mean	200 µg/m^3 Not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Particulate Matter (PM_{10})†	24-hour Mean	50 µg/m^3 Not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
Fine Particulate Matter ($PM_{2.5}$) †	Annual Mean	20 µg/m^3
Sulphur dioxide (SO_2)	24-hour Mean	125 µg/m^3 not to be exceeded more than 3 times a year
	1-hour Mean	350 µg/m^3 not to be exceeded more than 24 times a year
	15-minute Mean	266 µg/m^3 not to be exceeded more than 35 times a year
Carbon Monoxide (CO)	8-hour Mean	10,000 µg/m^3
	1-hour Mean*	30,000 µg/m^3
Benzene	Annual Mean	5 µg/m^3
	1-hour Mean*	195 µg/m^3

Notes:
†Measured gravimetrically.
*An Environmental Assessment Level (EAL) as set by the Environment Agency (EA), detailed in the EA Risk Assessment Guidance[5] (formerly H1).

The objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the standard. Examples of where the annual mean objectives should apply are provided in LAQM.TG22[6], and include: building façades of residential properties, schools, hospitals. The annual mean objectives are not relevant for the building façades of offices or other places of work where members of the public do not have regular access, kerbsides or gardens.

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

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

2.3 EU and UK Legislation Relating to Combustion Plant Associated with Data Centres.

Large combustion plant (LCP) installations are defined as combustion plant with a total thermal capacity of more than 50 MWth, burning any fuel. For combustion plant with a total thermal capacity of more than or equal to 1 MWth and less than 50 MWth burning any fuel, the Medium Combustion Plant regulations directive[7] apply (MCPD). The MCPD and Industrial Emissions Directive (IED) set emission limit values (ELVs) for any new combustion plant. These ELVs must be met before the plant is commissioned.

2.3.1 Environmental Permitting Regulations.

The Environmental Permitting Regulations (EPR) as amended in 2016 to replace the EPR 2010, provide the main regulations for the environmental permitting regime and introduced requirements of the IED into UK legislation.

The EPR amendment 2018 SI 110 introduce the requirements of the MCPD into legislation and introduced requirements for the control of emissions from ‘Specified Generators’.

2.3.2 Industrial Emissions Directive.

The EU’s Industrial Emissions Directive[8] is the main EU instrument regulating pollutant emissions from industrial installations. The directive seeks to control the pollution to air, water, and land by listing methods to reduce harmful industrial emissions and promote the use of techniques that reduce pollutant emissions that are energy and resource efficient. The IED replaces previous guidance[9] on Large Combustion Plant (LCP) installations. It is important to note that the ELVs outlined in the IED apply to new combustion plant operating, on average, for more than 500 hours per year and do not apply to standby generators. The limits set out above replace the Large Combustion Plant (LCP) Directive (2001/80/EC)500-hour operating exception.

The emission limit values (ELVs) can be found in Annex V, Part 1 of the IED. New combustion plant operating less than 500 hours per year as a 3-year rolling average are exempt from meeting MCPD and IED ELVs.

For a datacentre that uses combustion plant solely for back-up and emergency standby, the 500-hour rule is a default ceiling limit if exhaust emission values are not set. The 500-hour rule applies to the air emissions for each individual flue. Any additional combustion plant on the site (other than those used solely for emergency use), such as boilers or heaters for regular heating supply, will be treated as non-emergency and therefore sufficient monitoring/ELVs and ‘Best Available Techniques’ (BAT) will apply (excluding plant below 1 MWth).

As the emissions from the plant will not be discharged through a common stack and the individual combustion plant have a rated thermal input of less than 15 MW, they will not be considered under the IED. Instead, the permit will follow the guidelines set out under the Medium Combustion Plant Directive (MCPD).

2.3.3 Medium Combustion Plant Directive.

The MCPD limits the emissions of certain pollutants into the air from combustion plant with a thermal input of 1-50 MWth. The MCPD regulates emissions of NO_X, dust emissions (as PM_{10}) and SO_2 only, with the aim of reducing those emissions and the risk they pose to human health and the environment. There are also rules in place to monitor emissions of CO, but no ELV is in place.

For installations classed under MCPD that operate generators for emergency use and fewer than 500 hours per year as a rolling 3 year average, the ELVs set out in the MCPD do not need to be met, however an environmental permit is still required.

The 500 operating hour exemption can be extended to 1,000 operating hours per year when an emergency or standby MCP is used in the case of standby power generation when the power supply is interrupted. If an MCP qualifies for a 500-hour exemption it can run for more than 500 hours per 12 months but must not exceed 2,500 hours over five years and/or 1,500 hours over three years[10].

2.3.4 Best Available Techniques (BAT)

Large facility combustion plant undertaking specific types of activity are required to use 'Best Available Techniques' (BAT)[11] to reduce emissions to the atmosphere. Competent authorities are to set emission limit values (ELVs) that ensure that, under normal operating conditions, emissions do not exceed the emission levels.

Under 'General Considerations' of the BAT Conclusions, the legislation references the following in relation to air quality:

"The BAT-AELs set out in these BAT conclusions may not apply to liquid-fuel-fired and gas-fired turbines and engines for emergency use operated less than 500 h/yr, when such emergency use is not compatible with meeting the BAT-AELs."

2.4 Habitats Regulations.

The Conservation of Habitats and Species Regulations 2017, known as the 'Habitats Regulations', transposed the European Habitats Directive into UK legislation. Following the departure of the United Kingdom from the European Union (EU) in January 2020, the Habitats Regulations were updated in January 2021 following the draft publication of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Habitats Regulations require development to not cause a "likely to have a significant effect on a European site (either alone or in combination with other plan or projects)" or, where likely significant effects cannot be discounted, development "will not adversely affect the integrity of the site". It requires an assessment to determine if significant effects (alone or in combination) are likely, followed by an 'appropriate assessment' by the competent authority, if necessary. A competent authority is defined as a public body, statutory undertaker, minister of department of government, or anyone holding public office.

The changes to the Habitats Regulations requires the transfer of functions from the European Commission to the appropriate authorities in the UK. Due to the departure from the EU, SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and instead, the updated 2019 Regulations have created a national site network where European sites are now referred to as national network sites. Many Ramsar sites overlap with SACs and SPAs and may be designated for the same or different species and habitats but do not form part of the national sites network. Despite this, all Ramsar sites remain protected in the same way as SACs and SPAs.

The Countryside and Rights of Way (CRoW) Act 2000 and the Wildlife and Countryside Act 1981 provides protection to SSSIs to ensure that development does not cause damage to habitats within these sites. Locally important sites such as National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodlands (AW) are also protected by legislation to ensure that development does not lead to a significant increase in pollution at these sites.

2.4.1 Critical Levels

Critical levels are thresholds for pollutant concentrations for vegetation and outline the concentrations below which harmful effects are unlikely to occur. The 2008 Air Quality Directive set limit values for the protection of vegetation and ecosystems, and these have been adopted by the Air Quality Strategy but are not currently set in regulations. The current critical levels, limit values and objectives are summarised in Table 2.

Table 2: Critical levels for Designated Habitat Sites.

	Description	Averaging Period	Concentration (µg/m^3)
Nitrogen Oxides			
EU Directive on Ambient Air Quality/2010 Air Quality Standards Regulations	Critical Level/Limit Value	Annual Mean	30
Environment Agency Risk Assessment Guidance	Critical Level	Daily Mean	200*
Sulphur Dioxide			
Environment Agency Risk Assessment Guidance	Critical Level for ecosystems dominated by lichens and bryophytes	Annual Mean	10
	Critical Level for all other ecosystems	Annual Mean	20
*Background ozone is below the AOT40 and SO_2 is below the critical level of 10 µg/m^3, therefore the less stringent critical level of 200 µg/m^3 can be used.			

2.4.2 NO_X 24-hour Mean

There are two critical levels for NO_X based on the annual mean and 24-hour mean concentrations, however the 24-hour mean critical level only applies where there are high concentrations of SO_2 and ozone, which is not generally considered the current situation in the UK according to the IAQM[12]. The EA guidance on air emissions risk assessment for your environmental permit states that the 200 µg/m^3 daily mean should only be assessed against if ozone is below the AOT40 critical level and SO_2 is below the lower critical level of 10 µg/m^3. The LBB and the adjacent local authority to the Site, the London Borough of Barnet are both considered compliant with the Ozone AOT40 long term objective according to Defra[13]. For this assessment the highest background SO_2 concentration is 1.6 µg/m^3, which is comfortably below the lower critical level of 10 µg/m^3. Subsequently, the NO_X daily mean will be assessed against 200 µg/m^3 within this assessment in line with the EA guidance.

2.4.3 Critical Loads

Critical loads are determined for nutrient nitrogen on the type of species or habitat being affected. Critical loads are only available for SSSI and European sites and can be obtained from the Air Pollution Information System (APIS).

However, no critical loads are available for the Brent Reservoir SSSI. As such, the critical load range for broadleaved woodland and critical load functions for unmanaged woodland have been utilised within this assessment, as woodland is the habitat type at the closest point of the Brent Reservoir SSSI to the Site. The critical loads are displayed in Table 3.

Table 3: Critical Load for Woodlands.

Critical Load		
Broadleaved Woodland		
Critical Load Range (kgN/ha/yr)	10-20	
Unmanaged Woodland		
Critical Load Function (keq/ha/yr)	CLmaxS	2.3541
	CLminN	0.357
	CLmaxN	2.7111

2.5 Assessment Guidance.

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

2.5.1 Environment Agency:

2.5.1.1 Risk Assessment for Specific Activities: Environmental Permits

The Air Emissions section of the EA guidance[14] has been referred to in the assessment of emissions to air from the generators. Included within the Air Emissions Risk Assessment (AERA) guidance are:

- An approach for undertaking screening assessments;
- Information on when detailed atmospheric modelling in required; and
- Environmental Assessment Levels (EALs) for a range of pollutants against which impact may be assessed.

2.5.1.2 Specified Generators: Dispersion Modelling Assessment

The Dispersion Modelling Assessment Guidance[15] outlines the requirements for completing detailed dispersion modelling for specified generators for which the purpose is to generate electricity, or a group of such combustion plant located at the same site, operated by the same operator, and having the same purpose, between 1 and 50 MWth. The generators within this assessment are not classed as specified generators as their primary use is for emergency backup power, however, the guidance includes useful information on modelling methodology and results presentation, which has been utilised within this assessment.

2.5.1.3 Environmental Permitting: Air Dispersion Modelling Reports

This guidance[16] outlines the information needed in an air quality assessment that has been prepared in support of an environmental permit application.

2.5.2 Mayor of London, London Local Air Quality Management Technical Guidance

The Mayor of London's London Local Air Quality Management Technical Guidance (LLAQM.TG(19))[17] was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.5.3 Defra and Environment Agency 'Air Emissions Risk Assessment' Guidance

Defra and the Environment Agency (EA) have released online guidance[18] to assist in completing an air emissions risk assessment with regards to obtaining an environmental permit. It outlines methodology to calculate the impact of emissions, and the environmental standards that must be achieved. It provides screening criteria to identify process contributions that will result in an insignificant impact and will not require detailed modelling.

2.5.4 Environment Agency Data Centre FAQ Headline Approach

This document[19] may provide relevant guidance on the approach to permitting and regulatory aspects for data centres within the context of the IED and Environmental Permitting Regulations for 1.1A Combustion Activities for sites aggregated to a thermal input greater than 50 MW_{th}.

Under these definitions and whilst operating under the 500-hour rule, generators used solely for back-up and emergency standby are not explicitly defined by set emission limit values or BAT conclusions.

3. Operational Periods

3.1 Generator Information

There will be up to 40 Rolls Royce MTU 20V4000G94LF generators being installed, details of which are displayed in Table 81 of Appendix 2, bringing the total number of generators across the site to 56. This assessment has been completed based on emission rates for diesel fuel being used, when in reality the fuel is likely to be HVO 100 fuel. HVO 100 fuel is expected to reduce the emissions of NO_X, however, to retain a robust assessment approach, reduction in emissions has not been accounted for within the assessment to remain consistent with the Air Quality Assessment submitted for the planning application (22/4185) for the Site.

3.2 Testing Scenario

The backup generators are only to be used for testing purposes in line with the routine testing and maintenance schedule (hereinafter referred to as 'the testing scenario') or in the event of an emergency power outage in the event of a National Grid failure.

The testing scenario will be completed as follows:

- Generators will be tested individually for up to four hours twice per year at up to 100% load; and
- Generators will be tested in groups of up to eight for up to 30 minutes for the remaining ten months at up to 50% load in order to test start signals, coordination between generators and generator start-up.

3.3 Modelled Scenarios

To ensure the testing scenario as set out in section 3.2 and the outage scenario are accurately represented in the model, all 56 generators across the entire site have been assessed as part of the dispersion modelling. The 16 generators installed as part of Site 1 will be modelled using the same model inputs, including emission rates, as were used in the application submitted for the existing permit (EPR/QP3706LH). The following scenarios have been modelled:

- Six Monthly Testing Scenario:
  - 40 generators modelled individually for four hours twice per year at 100% load.
  - 16 generators modelled individually for four hours twice per year at 100% load.
- Monthly Testing Scenario:
  - 40 generators modelled in groups of eight for one hour for the remaining ten months at 50% load. As the model is run in hourly periods the emission rates are reduced by 50% to account for the 30 minute test.
  - 16 generators modelled in groups of eight for one hour for the remaining 10 months at 10% load. As the model is run in hourly periods, the emissions rates are reduced by 50% to account for the 30 minute test.
- Outage Scenario:
  - 36 generators modelled at 100% load for a 48-hour emergency outage period (four generators dedicated as swing generators).
  - 16 generators modelled at 75% load for a 48-hour emergency outage period. These generators have been run at 75% load to represent four generators dedicated as swing generators).

The six-monthly testing scenario has been represented in the model by running one generator at 100% load for a whole year and then factoring the annual mean outputs by 448/8760 to account for 448 hours of run time. This is representative of all 56 generators being tested individually, one after another for 4 hours, twice per year.

As 30 minutes cannot be run in ADMS-5, the monthly testing scenario has been represented by eight generator being run for the whole year with emission rates reduced by 50% and factoring to 70/8760, which will represent 7 hours per month for ten months.

To account for the differences in flue height, flue diameter, flue location, and emission rates between the Site 1 and Site 2 generators, two models have been run for each test scenario, one representative of all generators having the Site 1 emission rates and flue parameters, and the other representative of all generators having the

Site 2 emission rates and flue parameters. The maximum concentration at each receptor from the two models for each testing scenario will be presented in this assessment. As the Site 1 and Site 2 generators will not be tested simultaneously, there is no chance that there will be combined impacts during the testing scenarios as such this approach is considered robust and will observe the maximum impact at each receptor.

The outage scenario will be represented in the model by running 52 generators at 100% load, for the entire year, factoring annual mean outputs to 48/8760 to represent the 48-hour outage period. Short term outputs will be calculated using relevant percentiles for hourly concentrations. During this scenario, 36 of the 40 generators for Site 2 will be running as four generators are dedicated swing generators. These are reserved to step in should one of the 40 generators be inoperable due to maintenance when required, therefore during an outage scenario, a maximum of 36 could be operational. It has been assumed that all 16 Site 1 generators will be operational in an outage scenario. An outage scenario is the only case where the Site 1 and Site 2 generators would be operational at the same time, they have therefore both been included within the same model to account for combined impacts.

The testing schedule equates to 13 hours of operation per generator per year, which is below the criteria of 500 hours per year per generator, therefore the installation does not have to meet the ELVs as set out in the MCPD.

Over the past ten years there have been only three outages at Elstree (the substation expected to serve the installation) with a maximum duration of less than 3 minutes. Therefore, it is considered very unlikely that the generators would run for the 48-hour period during an emergency power outage. However, the 48-hour outage scenario has been included to ensure a highly conservative, robust assessment.

To calculate the short term impacts associated with the two testing scenarios and the 48-hour outage scenario, hypergeometric distribution has been used. Hypergeometric distribution allows the calculation of the probability of exceeding the 24-hour, hourly and 15-minute mean standards, by taking into account the periods throughout the year with the highest concentration and comparing them against the relevant standards for each pollutant. For example, when calculating the likelihood of the 1-hour mean NO_2 standard being exceeded, the 19^{th} highest concentration hour is taken from the modelling scenario, if this is below the standard of 200 µg/m^3, then there is less than a 1% chance of this being exceeded.

Although testing is only anticipated to occur during normal working hours (9 am to 5 pm), the model has been run across all hours of the year in order to capture the worst-case short term impacts.

The percentiles for each pollutant have been outlined in the methodology. Where the probability of these percentiles is:

- 1% or less – the chance of an exceedance is highly unlikely;
- Less than 5% - the chance of an exceedance is unlikely as long as the generators operational lifetime is no more than 20 years; and
- Greater than or equal to 5% - there is a potential for exceedances.

4. Methodology of Assessment.

4.1 Existing Air Quality in the Study Area.

A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the Site. This desk-top study was undertaken using the following sources:

- Air quality data for LBB, including a review of LBB air quality reports and local monitoring data from LBB[20];
- Background pollution maps taken from Defra's Local Air Quality Management (LAQM) website[21];
- London Atmospheric Emissions Inventory (LAEI) modelled annual mean concentrations from the GLA[22];
- Pollution Inventory from the Environment Agency[23]
- The UK Ambient Air Quality Interactive Map[24];
- Ordnance Survey data and aerial photography from Google Maps.

4.2 Energy Impacts

Impacts associated with the plant at the installation were modelled using the ADMS-5 (v.5.2.2.0) dispersion model. ADMS-5 is an extensively validated Gaussian plume air dispersion model, and is used by regulators, government departments, consultancies and industry. The model is able to simulate the entrainment of the plume in the wake of buildings.

The assessment considers the emissions of NO_2, PM_{10}, SO_2, CO and Benzene at existing human health and ecological receptors.

It should be noted that to ensure a worst case approach, it has been assumed throughout this assessment that benzene represents 100% of TOCs.

4.3 Sensitive Receptors

4.3.1 Human Health Receptors

Table 4 provides details of the human health receptors included in the assessment and the locations of the existing receptors are illustrated in Figure 2. Existing receptors have been identified based on worst case nearby human exposure close to the Site. Receptors R1 to R12 are the same as those included in the assessment undertaken for the data centre at Site 1 (EPR/QP3706LH).To ensure a complete assessment of nearby residential receptors, five additional existing receptors (R13 to R17) to the north and south of the Site have been included alongside those assessed at Site 1 (EPR/QP3706LH).

Table 4: Modelled Existing Receptor Locations

Human Health Receptor ID	Description	Receptor Type	Easting	Northing	Height (m)
R1	Ardley Close	Residential/School	521219	186289	1.5
R2	North Circular Road	Residential	521908	186906	1.5
R3	A5	Residential	522244	187776	1.5
R4	Edgeware Road	Residential	523145	186613	1.5
R5	Dallas Road	Residential	522488	187736	1.5
R6	Travel Lodge	Leisure	522512	187433	1.5
R7	Brent Park Road	Residential	522687	187586	1.5
R8	Layfield Road	Residential	522626	187650	1.5
R9	Woolmead Avenue	Residential	522331	187549	1.5

Human Health Receptor ID	Description	Receptor Type	Easting	Northing	Height (m)
R10	Builders Warehouse	Commercial/Industrial	522409	187231	1.5
R11	Self-Storage Warehouse	Commercial/Industrial	522470	187137	1.5
R12	Retail	Retail	522297	187114	1.5
R13	Woolmead Avenue	Residential	522218	187518	1.5
R14	Woolmead Avenue	Residential	522177	187527	1.5
R15	Dehar Crescent	Residential	522016	187569	1.5
R16	Coles Green Road	Residential	522420	186984	1.5
R17	Ballards Road	Residential	522313	186819	1.5

A 3 km by 3 km grid with a resolution of 30 m has also been modelled to cover the surrounding area. The extent of which is given in Table 5.

Table 5: Modelled Grid Extent for Human Health

	Start	Finish	Number of Points
X	520684	523684	100
Y	185691	188691	100
Z	1.5	1.5	1

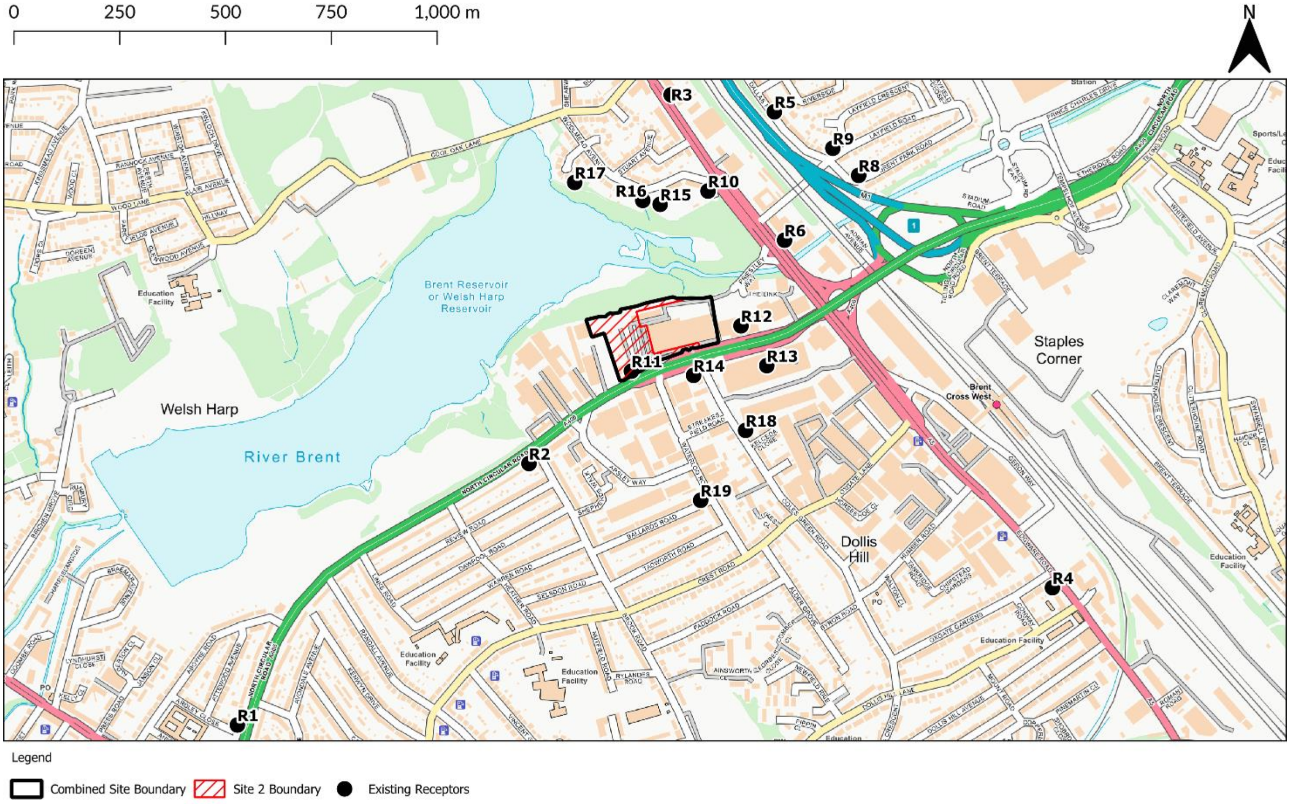

Figure 2: Existing Receptors in the vicinity of the Site. Contains Ordnance Survey Data © Crown Copyright 2024.

It should be noted that the existing receptors identified above are considered to be worst-case locations in terms of sensitivity to poor air quality. However, this is not an exhaustive list and there may be other locations within the vicinity of the Site which may experience air quality impacts as a result of emissions generated by the installation that have not been individually assessed, but contour plots have been included to cover these.

4.3.2 Ecological Receptors

The EA Guidance on Air Emissions Risk Assessments[14] outlines which ecological sites should be considered as sensitive receptors within dispersion modelling studies. They are:

- SPAs, SACs or Ramsar sites within 10 km of the installation; and
- SSSIs, NNRs, LNRs, LWS and Ancient Woodland within 2 km of the installation.

Within 2 km of the Site there is one SSSI (Brent Reservoir) and 14 LWS. There are no European habitat sites within 10 km of the Site. A habitat screening report (EPR/QP3706LH/A001) was completed for Site 1 to identify designated ecological sites surrounding the installation site.

The location of Brent Reservoir SSSI and the surrounding LWS are displayed in Figure 3 with details to follow in Table 6. Due to the size and proximity of Brent Reservoir SSSI, this has been assessed in the models using a grid, extents of which are outlined in Table 7.

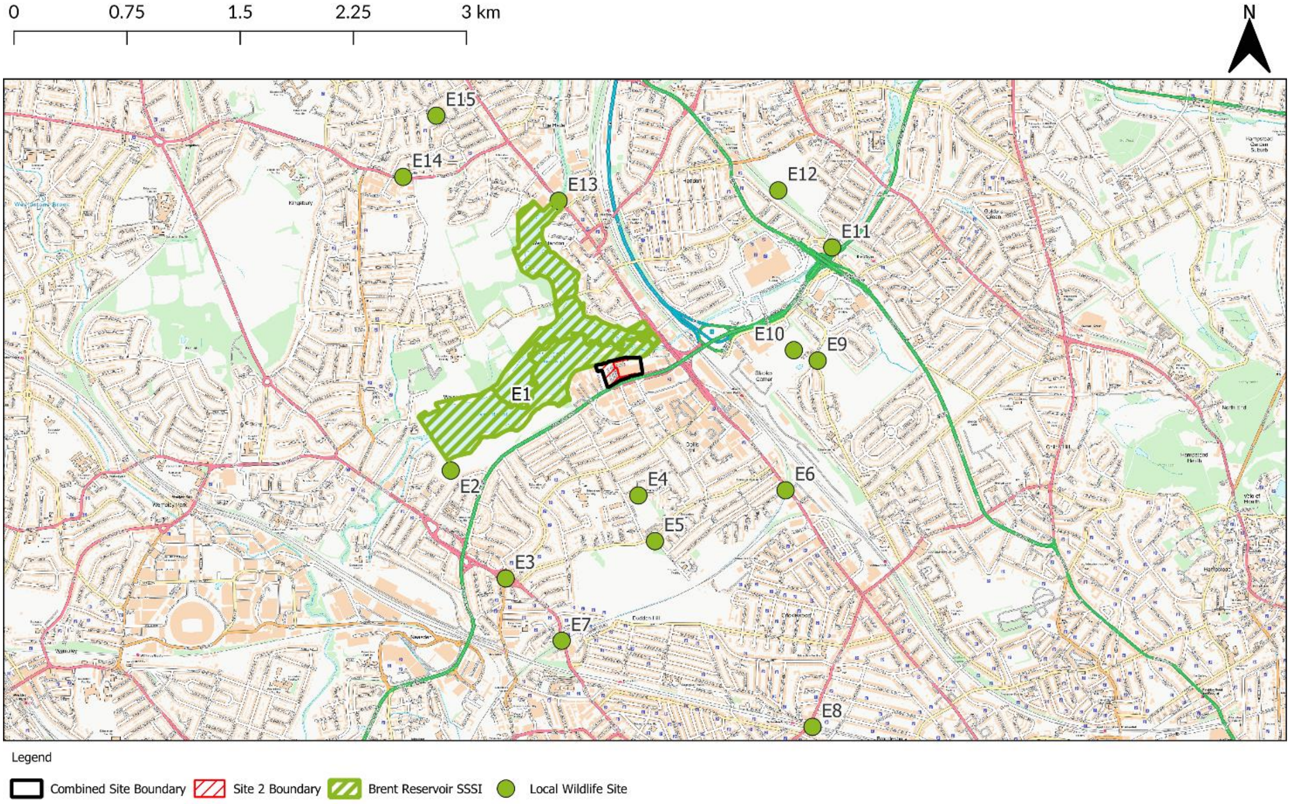

Figure 3: Modelled Ecological Receptor Locations. Contains Ordnance Survey Data © Crown Copyright 2024.

Table 6: Modelled Ecological Receptor Locations.

Ecological Receptor ID	Description	Easting	Northing
E1	Brent Reservoir SSSI	Covered by a Grid with resolution of 15 m centred on the Site, details of which are displayed in Table 7.	
E2	Harp Island Local Wildlife Site	521084	186549
E3	Grange Roundabout Nature Area Local Wildlife Site	521448	185835
E4	Dollis Hill Reservoir Local Wildlife Site	522327	186384
E5	Gladstone Park Local Wildlife Site	522437	186082
E6	Dudding Hill Loop between Cricklewood and Harlesden Local Wildlife Site	523303	186419
E7	Railway Cutting Local Wildlife Site	521819	185423

Ecological Receptor ID	Description	Easting	Northing
E8	Metropolitan Line between Kilburn and Neasdon Local Wildlife Site	523482	184852
E9	Clitterhouse Playing Fields Local Wildlife Site	523516	187278
E10	Clarefield Park Local Wildlife Site	523358	187346
E11	Lower Dollis Brook Local Wildlife Site	523612	188026
E12	Hendon Park and Northern Line Local Wildlife Site	523255	188404
E13	Silk Stream and Burnt Oak Brook Local Wildlife Site	521798	188336
E14	Kingsbury Road Bank Local Wildlife Site	520768	188494
E15	Meadow Way Copse Local Wildlife Site	520988	188899

It should be noted that E8 is greater than 2 km from the Site, however it has been included for completeness as it was included within the air quality assessment completed for Site 1 for EPR/QP3706LH as it is part of the Metropolitan Line between Kilburn and Neasden LWS.

While the above list includes designated sites in line with the EA's guidance on "Air emissions risk assessment for your environmental permit"[14]. Potential impacts on non-designated sites, such as Old St Andrews Churchyard, can be determined where relevant from the plume figures in section 6.

Table 7: Modelled Grid Extent for Brent Reservoir SSSI

	Start	Finish	Number of Points
X	520840	522000	77
Y	186595	187480	59
Z	0	0	1

4.4 Human Health Background Concentrations

Defra's background concentrations for the 1 km x 1 km grid square that the Application Site falls within has been used for NO_2, PM_{10}, SO_2, CO and Benzene background concentrations in the assessment. 2020 has been used as the background year, where data is available, to align with the assessment undertaken for the adjacent site (planning reference 20/1828) undertaken, in the case of CO the latest available year is 2010. For short term concentrations, the annual mean background is doubled, in line with the EA guidance outlined in Section 4.10.1. The annual mean and short term background concentrations, where applicable, are listed in Table 8 and Table 9 respectively.

Table 8: Annual Mean Background Concentration for Assessing Human Health Receptors.

Annual Mean Background Concentration Utilised within this Assessment (µg/m³)			
Receptors	NO_2	PM_{10}	Benzene
R1, R2	25.8	18.7	0.54
R3, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15	28.9	18.6	0.53
R4	22.8	17.2	0.53
R16, R17	23.2	17.4	0.54

Table 9: Short Term Background Concentrations for Assessing Human Health Receptors.

Short Term Background Concentrations Utilised within this Assessment (µg/m³)								
Receptors	NO_2 (1-hour)	PM_{10} (24-hour)	SO_2 (24-hour)	SO_2 (1-hour)	SO_2 (15-minute)	CO (8-hour)	CO (1-hour)	Benzene (1-hour)
R1, R2	51.6	37.4	4.6	4.6	4.6	484.0	484.0	1.1
R3, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15	57.8	37.2	4.4	4.4	4.4	492.0	492.0	1.1
R4	45.6	34.4	4.6	4.6	4.6	482.0	482.0	1.1
R16, R17	46.4	34.8	4.8	4.8	4.8	488.0	488.0	1.1

4.5 Ecological Site Background Concentrations

As Brent Reservoir is classed as a SSSI, the background concentrations can be taken from APIS for E1. For all other ecological receptors, the background concentrations have been taken from Defra's predicted concentrations. The nutrient nitrogen and acidification values for the grid square that the receptors fall within have been taken from APIS. The relevant background concentrations for assessing impacts on ecological receptors are displayed in Table 10 below.

Table 10: Background Concentrations for Assessing Ecological Receptors.

Receptors	NO_X (µg/m³)	SO_2 (µg/m³)	Nutrient Nitrogen (kg N/ha/a)	Acidification Nitrogen (keq/ha/a)	Acidification Sulphur (keq/ha/a)
E1	35.3	1.9	11.6	0.8	0.2
E2	39.1	2.3	10.7	0.9	0.2
E3, E7	41.0	2.5	10.7	0.9	0.2
E4, E5	34.6	2.4	10.7	0.9	0.2
E6	34.0	2.3	11.3	1.0	0.2
E8	34.3	2.3	11.3	1.0	0.2
E9, E10	44.2	2.3	11.4	1.0	0.2

Receptors	NO_X (µg/m^3)	SO_2 (µg/m^3)	Nutrient Nitrogen (kg N/ha/a)	Acidification Nitrogen (keq/ha/a)	Acidification Sulphur (keq/ha/a)
E11, E12	38.5	2.1	11.5	1.0	0.2
E13	31.3	2.2	11.0	0.9	0.2
E14, E15	28.4	2.1	10.9	0.9	0.2

4.6 Plant Emission Rates

The emission rates for the Phase 2 generators have been provided by the generator supplier (AVK) and have been presented in Table 11. The emissions rates for the Site 1 generators are the same as those used within the AERA (C73-P05-R01) submitted for the existing permit (EPR/QP3706LH). This has been done to allow for model results to be comparable with the previous assessment for Site 1. The emissions rates for the Site 2 generators have been sourced from the generator manufacturer to allow for assessment of the most realistic and robust scenario. Further information on model inputs is given in Table 81 of Appendix 2.

Table 11: Plant Emissions Rates for Modelled Pollutants

Pollutant	Emission Rate (g/s)				
	Site 2 Generators		Site 1 Generators		
	Outage Scenario and Six Monthly Testing Scenario (100% Load)	Monthly Testing Scenario (50% Load)	Outage Scenario (75% Load)	Six Monthly Scenario (100% Load)	Monthly Scenario (10% Load)
NO_X	7.051	2.673	4.06	6.08	0.84
PM_{10}	0.0210	0.0540	0.0207	0.0184	0.0046
SO_2	0.00300	0.00200	0.00207	0.00276	0.00037
CO	0.333	0.533	0.260	0.280	0.280
Benzene	0.057	0.047	0.048	0.048	0.066

4.7 Calculation of Long and Short Term Emissions

4.7.1 Human Health

In the two testing scenarios, each generator has been run all year round, with a factor then being applied to determine the annual mean PC for the number of hours run. The six-monthly testing scenario was factored to 448/8760 to represent a total of 448 running hours and the monthly test scenario was factored to 70/8760 to represent a total of 70 running hours. For the outage scenario, 52 generators will run at the same time for a whole year, the annual mean output has then been factored to 48/8760 to represent 48 hours out of the whole year in line with the EAs guidance for an Air Emissions Risk Assessment for Environmental Permits[5].

For short term impacts, different percentiles have used within the assessment scenarios to represent the highest permissible concentration for each pollutant for the relevant time period. The percentiles used within the outage scenario represent the 1% and 5% risk of the short term AQO being exceeded for the number of operating hours. It should be noted that during the monthly testing scenario and the outage scenario there are not enough operational days to cause an exceedance of the PM_{10} 24 hour AQO, which allows35 days per year above 50 µg/m^3. Additionally, for the SO_2 24-hour mean AQO, there are not enough operational days within the outage scenario to cause an exceedance of the permissible 3 days per year above 125 µg/m^3. As such, these AQOs have not been considered within this scenario. The 5% risk has been presented in this assessment as this is considered unlikely to occur, however the 1% risk, which is considered highly unlikely to occur, has been included within Appendix 3 for reference. The percentiles used within this assessment, where applicable, are displayed for each short term objective in Table 12.

Table 12: Short term air quality objectives and relevant percentiles for evaluation of impacts

Pollutant	Time period	Objective (µg/m^3)	Permissible	Percentile					
				Six-monthly Testing Scenario		Monthly Testing Scenario		Outage Scenario	
				1% Risk	5% Risk	1% Risk	5% Risk	1% Risk	5% Risk
NO_2	1-hour Mean	200	18 hours per year	97.637	97.180	62.865	58.973	76.36	72.28
PM_{10}	24-hour Mean	50	35 days per year	-	-	-	-	-	-
SO_2	24-hour Mean	125	3 days per year	95.068	92.055	0.548	0.023	-	-
	1-hour Mean	350	24 hours per year	96.598	96.062	77.123	73.779	65.24	60.62
	15-minute mean	266	35 x 15-minute periods per year	98.667	98.493	91.404	90.297	99.99	99.99
CO	8-hour mean	10000	None	100	100	99.989	99.932	99.99	99.90
	1-hour mean	30000	None	100	100	99.989	99.932	99.99	99.90
Benzene	1-hour Mean	195	None	100	100	99.989	99.932	99.99	99.90

Note: "–" During both the testing scenarios and the outage scenario there will not be enough operational hours to exceed the PM_{10} 24-hour mean AQO allowing 35 exceedances of 50 µg/m^3 and during the outage scenario there will not be enough operational hours to cause an exceedance of SO_2 24-hour mean AQO allowing 3 exceedances.

In line with EA Guidance[25], the hourly mean SO_2 concentration from the model has been multiplied by a factor of 1.34 to represent a 15-minute mean concentration. This approach has not been used to represent a 24-hour or 8-hour mean, as these have been directly output from the ADMS model.

4.7.2 Ecological Sites

4.7.2.1 24-hour Mean NOx

To calculate the 24-hour mean NOx the percentiles listed in Table 13 were used for the respective scenario to represent a 5% probability of exceedance of the 24-hour mean NOx limit. The output from ADMS were in a 24-hour format, which were then factored to 7/24 for the monthly testing scenario to represent 7 hours of operation per day and 8/24 for the six-monthly testing scenario to represent the 8 hours of operation per day.

Table 13: 24-hour Mean NOx objective and relevant percentiles for evaluation of impacts

Pollutant	Time Period	Objective (µg/m³)	Permissible	Percentile		
				Six-monthly Testing Scenario	Monthly Testing Scenario	Outage Scenario
NOx	24-hour Mean	200	None	100	99.73	97.53

4.7.2.2 Acidification and Nutrient Nitrogen Deposition

In order to calculate acidification and nutrient nitrogen deposition, the following deposition velocities and conversion factors have been used, as displayed in Table 14. The annual mean output from the model is first multiplied by the deposition velocity, the result is then multiplied by the conversion factors in order to be able to assess against nutrient nitrogen deposition or acidification of nitrogen or sulphur, respectively.

Table 14: Factors for Conversion of Annual Mean Concentrations to Nutrient Nitrogen and Acid Deposition

Pollutant	Deposition Velocity – Grassland (m/s)	Deposition Velocity – Woodlands (m/s)	Conversion Factor (µg/m³ to kg N/ha/a)	Conversion Factor (µg/m³ to keq /ha/a)
NO_X (as NO_2)	0.0015	0.003	96	6.84
SO_2	0.012	0.024	-	9.84

As the nearest habitat type to the site is woodland within the Brent Reservoir SSSI, the deposition velocity for woodlands has been used for all ecological receptors to present a robust assessment.

4.7.3 NO_X to NO_2 Conversion

Annual mean oxides of nitrogen and the 99.79th percentile of 1-hour mean oxides of nitrogen (NO_X) concentrations have been modelled in ADMS-5. The approach recommended by Defra/Environment Agency online guidance[25] has been used to estimate annual mean NO_2 concentrations and 99.79th percentiles of 1-hour mean NO_2 concentrations from the modelled NO_X output assuming:

- Annual mean NO_2 concentrations = annual mean NO_X concentrations x 0.7; and
- 99.79 percentiles of 1-hour mean NO_2 concentrations = 99.79 percentiles of 1-hour mean NO_X multiplied by 0.35.

4.8 Meteorological Data

The model has been run using meteorological data from Heathrow for the five year period 2017-2021 with all meteorological hours being run, the highest concentrations were observed in 2017. Meteorological data from 2017 has therefore been used as a reasonable worst case for this assessment. Further information on the meteorological inputs is provided in Appendix 2. It is not possible to predict future meteorological conditions, subsequently in order to maintain a robust assessment, the time varying emission file represented the generators running at the start of each month in the worst case meteorological year of 2017. It has therefore been assumed that the meteorological conditions used in the modelling assessment are representative of the potential meteorological conditions in the future during testing.

4.9 Building Downwash

The buildings within and surrounding the Site can have an effect on the dispersion of emissions from the generators. For this assessment the buildings within the Site boundary, Site 1, and two units to the west of the Site have been included within the model. The parameters of which are outlined in Table 15. The buildings included within the model are displayed in Figure 17 of Appendix 2.

Table 15: Modelled Building Parameters

Building	X	Y	Height (m)	Length (m)	Width (m)	Angle (°)
Central Section of Site Building	522149	187198	40.1	94.2	37.1	165.0
North Section of Site Building	522134	187244	40.1	42.0	15.7	77.0
East Section of Site Building	522181	187192	40.1	26.5	58.4	77.0
Adjacent Site Central Section	522270	187217	15.4	65.3	152.6	167.1
Adjacent Site Generator Room	522311	187267	17.5	23.0	49.3	166.0
Adjacent Site Sub Station	522203	187256	21.0	22.1	68.8	166.0
Lumanor Building	522061	187125	10.0	25.1	73.1	74.5
Vanguard Building	522094	187139	10.0	26.1	89.8	72.2

4.10 Assessment of Significance.

4.10.1 Human Health Energy Impacts

The EA guidance for the initial screening stages for undertaking air emissions risk assessment in supporting of environmental permit applications says that the process contribution (PC) can be screened out as insignificant at human health receptors if the following criteria are met:

- The short-term PC is less than 10% of the short-term environmental standard; and
- The long-term PC is less than 1% of the long-term environmental standard.

The EAs guidance on the undertaking of dispersion modelling for backup generators says that where the hypergeometric probability of achieving the relevant short term AQO is:

- Less than 1% - the risk of exceedance is highly unlikely;
- Less than 5% - the risk of exceedance is unlikely as long as the generator plants operational lifetime is no more than 20 years; and
- Greater than or equal to 5% - there is a risk of exceedance and the regulator must consider if it is acceptable.

The above criteria have been used within this assessment to identify potential exceedances of the long term and short term AQOs due to emissions associated with the testing of the generators and an outage scenario.

There is also a second stage of screening if the impact cannot be screened out in the first stage. If both of the following requirements are met then no further assessment is required and impacts are likely to be insignificant. This assessment has modelled all impacts, therefore in the case that one or none of the following are met, further consideration to significance will be required.

- The short term PC is less than 20% of the short term environmental standards minus twice the long term background concentration; and
- The long term PEC is less than 70% of the long term environmental standards.

At the detailed modelling stage, there are no criteria to determine whether:

- PCs are significant; and
- PECs are insignificant or significant.

The judgement of significant at the detailed modelling stage must therefore be based on site specific circumstances using professional judgement.

4.10.2 Ecological Energy Impacts

The EA guidance for undertaking air emissions risk assessment in supporting of environmental permit applications says that PCs can be screened out as insignificant at SSSIs if the following criteria are met:

- The short-term PC is less than 10% of the short-term environmental standard; and
- The long-term PC is less than 1% of the long-term environmental standard.

Emissions that affect LWS are insignificant if the following criteria are met:

- The short-term PC is less than 100% of the short-term environmental standard; and
- The long-term PC is less than 100% of the long-term environmental standard.

As with human health, the EAs guidance on the undertaking of dispersion modelling for backup generators and the second stage of screening and judgement of significance at the detailed modelling stage is the same for ecological sites.

4.11 Limitations and Assumptions

In order to undertake a robust assessment, the following worst case assumptions have been made throughout this assessment:

- No improvement has been made in background concentrations since the previous assessment;
- Five years of meteorological data were run and the worst case year of 2017 has been modelled to report the highest ground level concentrations in line with the AQA completed for the planning application;
- In the model, losses of the pollutant emitted is not taken into consideration which is considered a conservative approach;
- During the testing scenario model, it has been assumed that the Phase 2 generators will run at 100% load in the 6-monthly tests and 50% load in groups of eight in the monthly test when in reality this is likely to be lower;
- Site 1 generators have been modelled using the same model inputs that were used in the application for the existing permit (EPR/QP3706LH). It has been assumed that these are correct and representative of their operation;
- The two testing scenarios are anticipated to occur during normal working hours (9 am to 5 pm), however all hours of the year have been considered within the model to capture the worst case meteorological hours; and
- Within the model, emission rates from diesel fuel have been used, in reality the fuel will be HVO 100 fuel from a sustainable source, which has a lower NOx emission rate than diesel.

We are also considering the limitation of the ADMS-5 model, which is an approved model by the EA for this type of assessment:

- The ADMS-5 model is a steady state model, assuming constant and continuous emissions over the time averaging period of modelling and constant meteorological conditions between the source and the receptor.

By incorporating the worst-case assumptions described above, the results should be considered as the upper limit of the model uncertainty. The actual predicted ground concentrations are likely to be lower than those reported in this assessment.

5. Baseline Environment.

This section sets out the available information on air quality in the vicinity of the Site.

5.1 Air Quality Monitoring Data

5.1.1 Nitrogen Dioxide

LBB currently operate three automatic monitoring stations at roadside sites and one automatic station at an industrial site. The closest automatic monitoring station to the Site is Neasden Lane (ID: BT5), an industrial monitoring site located approximately 2 km to the southwest of the Site. Exceedances of the annual mean NO_2 AQO for NO_2 have been recorded at this station in 2016 and 2017, but in no other years between 2015 and 2021 based on LBB's latest Air Quality Annual Status Report[26].There were also exceedances of the 1-hour mean NO_2 AQO in 2016, but not in any other year between 2015 and 2021.

Concentrations for 2020 and 2021 have not been presented due to reduced traffic levels as a result of Government implemented lockdowns during the COVID-19 pandemic. Monitored annual mean concentrations for 2020 and 2021 are not considered to be representative of 'normal' air quality conditions and therefore are not included in the baseline assessment. Monitoring data for 2019, the most recent representative year of monitoring, for the nearest monitoring sites are provided in Table 16 and visualised in Figure 4 below.

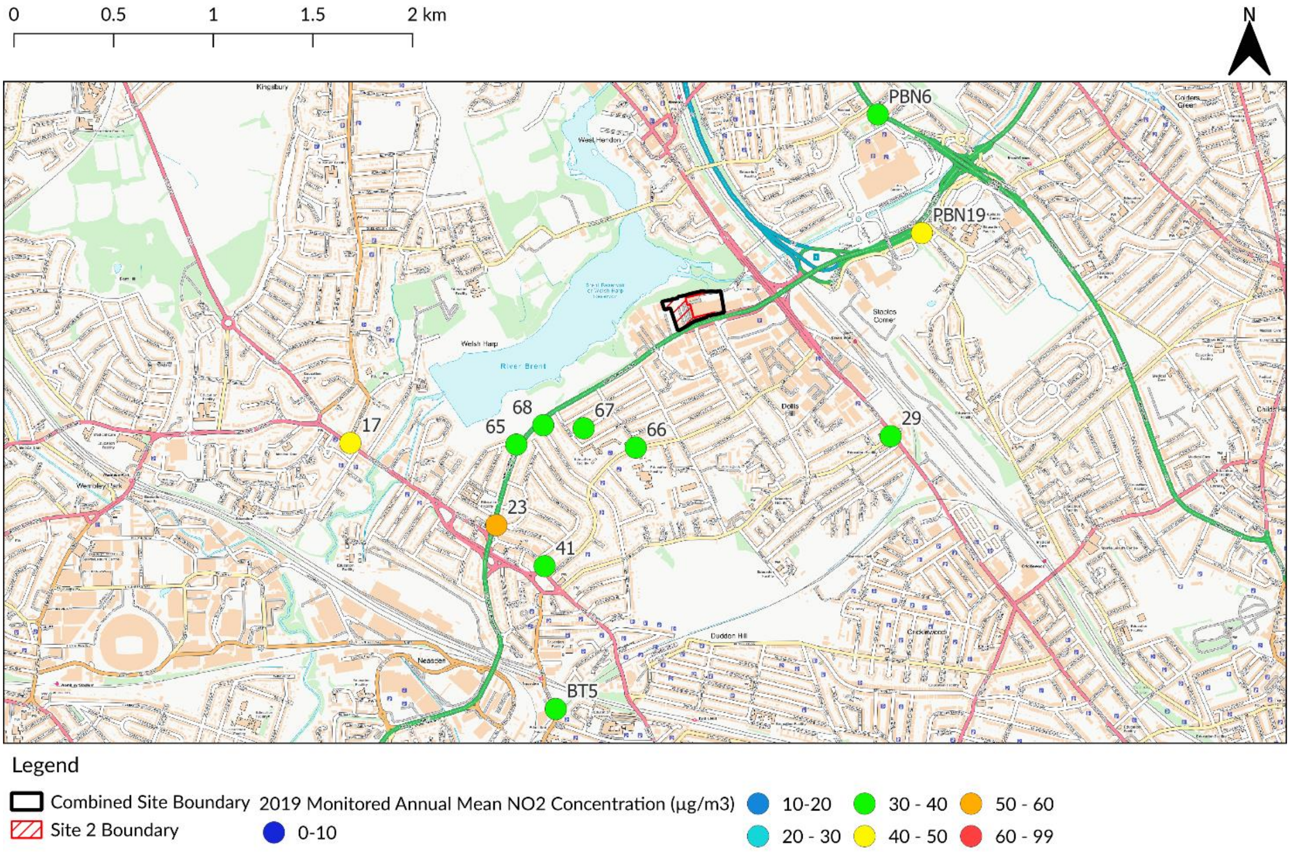

Figure 4: Location of NO_2 monitoring sites in the vicinity of the Site. Contains OS Data © Crown Copyright and Database rights 2024.

Table 16: NO_2 Automatic Monitoring Station within 2 km of the Site

Monitoring station and distance (m) from site boundary (approx.)	Objective	2015	2016	2017	2018	2019
NO_2						
Neasdon Lane (BT5), 2 km	Annual mean concentration (µg/m^3)	38.8	**44.0**	**45.0**	38.0	38.0
	Number of hours with concentrations >200 µg/m^3	0	**25**	17	1	2

The Neasdon Lane automatic monitoring station last exceeded the 1-hour mean NO_2 objective in 2016 and since then the 1-hour mean NO_2 objective has not been exceeded above the permitted 18 hours per year. For PM_{10}, the annual mean objective has not been exceeded in the last five years, but the 24-hour mean AQO was exceeded in 2016.

In addition to automatic monitoring station, LBB currently monitor annual mean NO_2 concentrations across the borough at 45 passive diffusion tube monitoring locations, 43 of which are roadside locations and two of which are background locations. Within 2 km of the Site are seven passive diffusion tube monitoring locations operated by LBB, and a further two passive diffusion tube monitoring locations operated by the London Borough of Barnet, as the Site is close to the border between LBB and the London Borough of Barnet. The annual mean concentrations for those located within the vicinity of the Site are shown in Figure 4 and detailed in Table 17 below.

Table 17: Passive diffusion tube monitoring results within the vicinity of the Site.

Site ID	Site Type	Site Name	Distance (km) from Site (approx.)	Annual Mean NO_2 Concentration (µg/m^3)				
				2015	2016	2017	2018	2019
66	Roadside	Junc. Heather Rd/Tanfield Ave	0.6	-	-	-	LD	34.6
67	Roadside	Dawport Road f/o 24	0.7	-	-	-	LD	33.4
68	Roadside	Junc. Randall Ave/next to 730 NCR	0.8	-	-	-	LD	37.6
65	Roadside	Junc. Aybone Rd/ 517 NCR	1.0	-	-	-	LD	35.9
29	Roadside	Junc. Dollis Hill Lane/Cricklewood B/W	1.1	74.1	86.0	55.6	LD	35.3
PBN19	Roadside	Rear of 7-12 Dyson Court, Tilling Road	1.2	52.3	52.2	49.1	47.2	41.6
PBN6	Roadside	347 Hendon Way	1.3	41.7	50.6	49.5	41.4	37.5
23	Roadside	Junc. North Circular Rd/Chartley Ave	1.3	93.2	115.4	93.9	LD	59.7
41	Roadside	R/O 246 Neasden Lane	1.4	60.7	74.4	60.1	LD	39.3
22	Roadside	Junc. Kingsbury Rd/Edgware Rd	1.6	56.7	65.1	58.1	LD	38.1
17	Roadside	Junc. Old Church Lane/Neasden Lane	1.7	55.4	67.5	55.7	LD	42.7

Site ID	Site Type	Site Name	Distance (km) from Site (approx.)	Annual Mean NO_2 Concentration (µg/m^3)				
				2015	2016	2017	2018	2019
Note: Exceedances of the NO_2 AQO of 40 µg/m^3 are shown in **bold**. NO_2 annual means in excess of 60 µg/m^3, indicating a potential exceedance of the 1-hour NO_2 objective are in **bold and underlined**. LD – Low data capture								

Between 2015 and 2018, seven of the 11 passive diffusion tube monitoring locations were in operation, and exceedances of the annual mean NO_2 AQO were recorded at all operational sites in each of these years. In 2019, the most recent year with representative monitoring data, all 11 of the nearby passive diffusion tube monitoring locations were in operation. Exceedances of the annual mean NO_2 AQO were recorded at three out of the 11 locations, PBN19, 23 and 17.

Passive diffusion tube monitoring locations 65 and 68 are located 1 km and 0.9 km from the Site respectively. These diffusion tubes are located on the A406, the same road that bounds the Site to the south. In 2019, the most recent year with representative monitoring data, passive diffusion tube monitoring location 65 recorded an annual mean NO_2 concentration of 35.9 µg/m^3, and passive diffusion tube monitoring location 68 recorded an annual mean NO_2 concentration of 37.6 µg/m^3. As such, in 2019, there were no recorded exceedances of the annual mean NO_2 AQO for NO_2 at these locations.

5.1.2 Particulates and Dust (PM_{10} and $PM_{2.5}$)

At the closest automatic monitoring station to the Site (Neasdon Lane), there have been no recorded exceedances of the annual mean PM_{10} AQO between 2015 and 2019, as outlined in Table 18. There was also an exceedance of the 24-hour mean PM_{10} AQO in 2016, but in no other years between 2015 and 2019.

Table 18: PM_{10} Automatic Monitoring Results within 2 km of the Site.

Monitoring station and distance (m) from site boundary (approx.)	Objective	2015	2016	2017	2018	2019
PM_{10}						
Neasdon Lane (BT5), 2 km	Annual mean concentration (µg/m^3)	31.0	31.0	30.0	28.0	26.0
	Number of days with concentrations > 50 µg/m^3	15	37	29	22	11

Neasden Lane automatic monitoring location does not monitor $PM_{2.5}$ concentrations.

5.2 Background Air Quality Data

5.2.1 Defra Predicted Concentrations

National maps produced by Defra provide background concentrations of key pollutants for the whole of the UK. These estimated concentrations are produced on a 1 km by 1 km grid basis. The Site falls into grid square X 522500 Y 187500 and the predicted concentrations for this grid square for NO_2, NO_X, PM_{10} and $PM_{2.5}$ in 2020 the model assessment year, and the current year of 2024, are shown in Table 19.

Table 19: Predicted Background Concentrations of NO_2, NO_X, PM_{10} and $PM_{2.5}$ in 2020 and 2024.

Year	Predicted Background Concentration (µg/m^3)			
	NO_2	NO_X	PM_{10}	$PM_{2.5}$
2020	28.9	44.8	18.6	12.3
2024	24.2	36.2	17.8	11.7

As shown in Table 19, the predicted background concentrations are below the relevant air quality objectives for all pollutants.

5.2.1.1 Sulphur Dioxide

LBB do not currently monitor background concentrations of SO_2. As such, Defra modelled background pollution data[27] for SO_2 from the latest year with available data (2020) for the grid square in which the Site is located, has been used to understand the baseline conditions.

Table 20: Predicted Background Concentrations of SO_2 in 2020.

Year	Predicted Background Concentration (µg/m^3)
	SO_2
2020	2.21

5.2.1.2 Carbon Monoxide

LBB do not currently monitor background concentrations of CO. As such, Defra modelled background pollution data[27] for CO from the latest year with available data (2010) for the grid square in which the Site is located, has been used to understand the baseline conditions.

Table 21: Predicted Background Concentrations of CO in 2010.

Year	Predicted Background Concentration (µg/m^3)
	CO
2010	246

5.2.1.3 Benzene

LBB do not currently monitor background concentrations of Benzene. As such, Defra modelled background pollution data[27] for Benzene from the latest year with available data (2020) for the grid square in which the Site is located, has been used to understand the baseline conditions.

Table 22: Predicted Background Concentration of Benzene in 2020.

Year	Predicted Background Concentration (µg/m^3)
	Benzene
2020	0.53

5.3 Greater London Authority

5.3.1 Air Quality Focus Areas

AQFAs are locations that not only exceed the annual mean limit value for NO_2 but are also locations with high human exposure. The nearest AQFA to the Site is shown in Figure 5 below and is located approximately 50 m of the east of an AQFA (Neasden Junction inc Neasden Lane/Dudden Hill)). Additionally, the Site is located approximately 530 m to the south of another AQFA (Hendon M1 and A5).

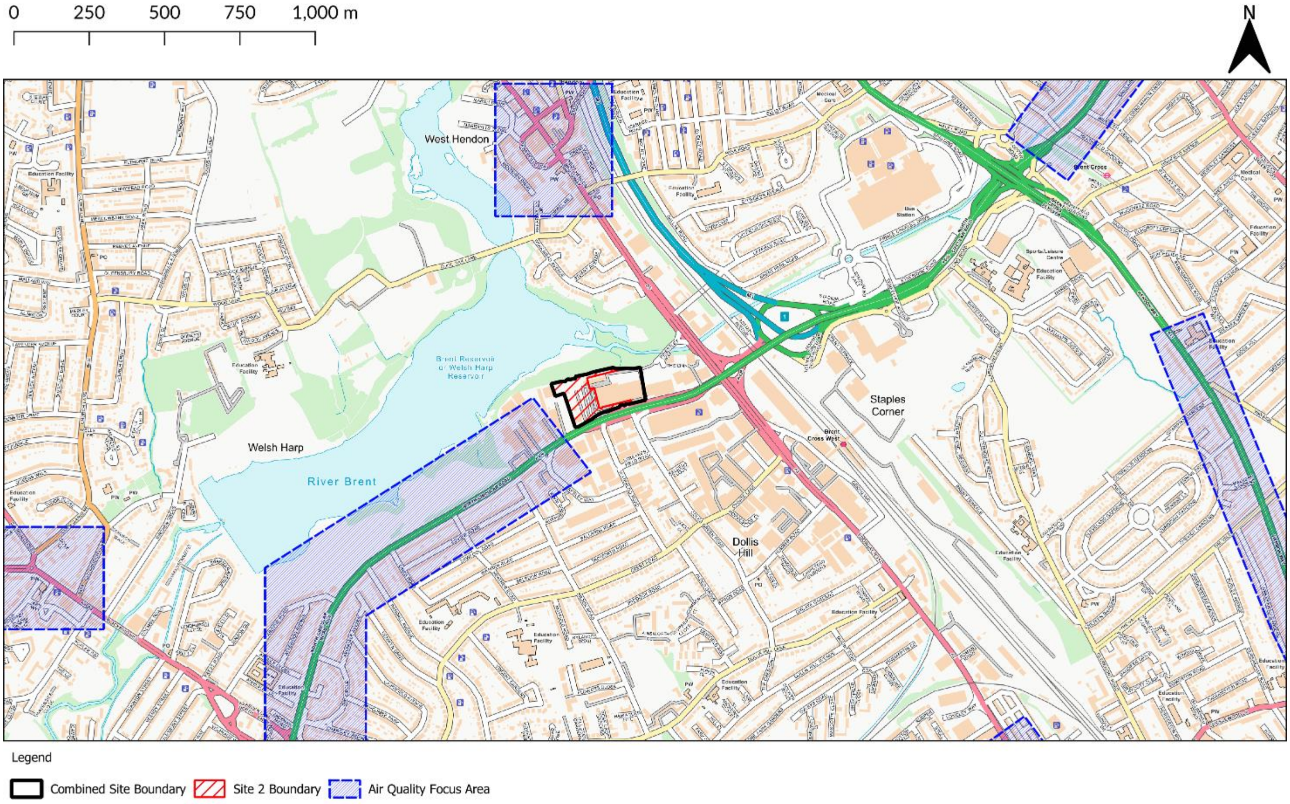

Figure 5: Air Quality Focus Areas in the vicinity of the Site. Contains OS Data © Crown Copyright and Database rights 2024.

5.3.2 Pollution Maps

The GLA produce LAEI annual mean concentration maps for the whole of London on a 20 m by 20 m grid for a historic year (2019) which are based on a baseline year of 2019.

The LAEI concentration maps of NO_2 and PM_{10} are shown in Figure 6 and Figure 7.

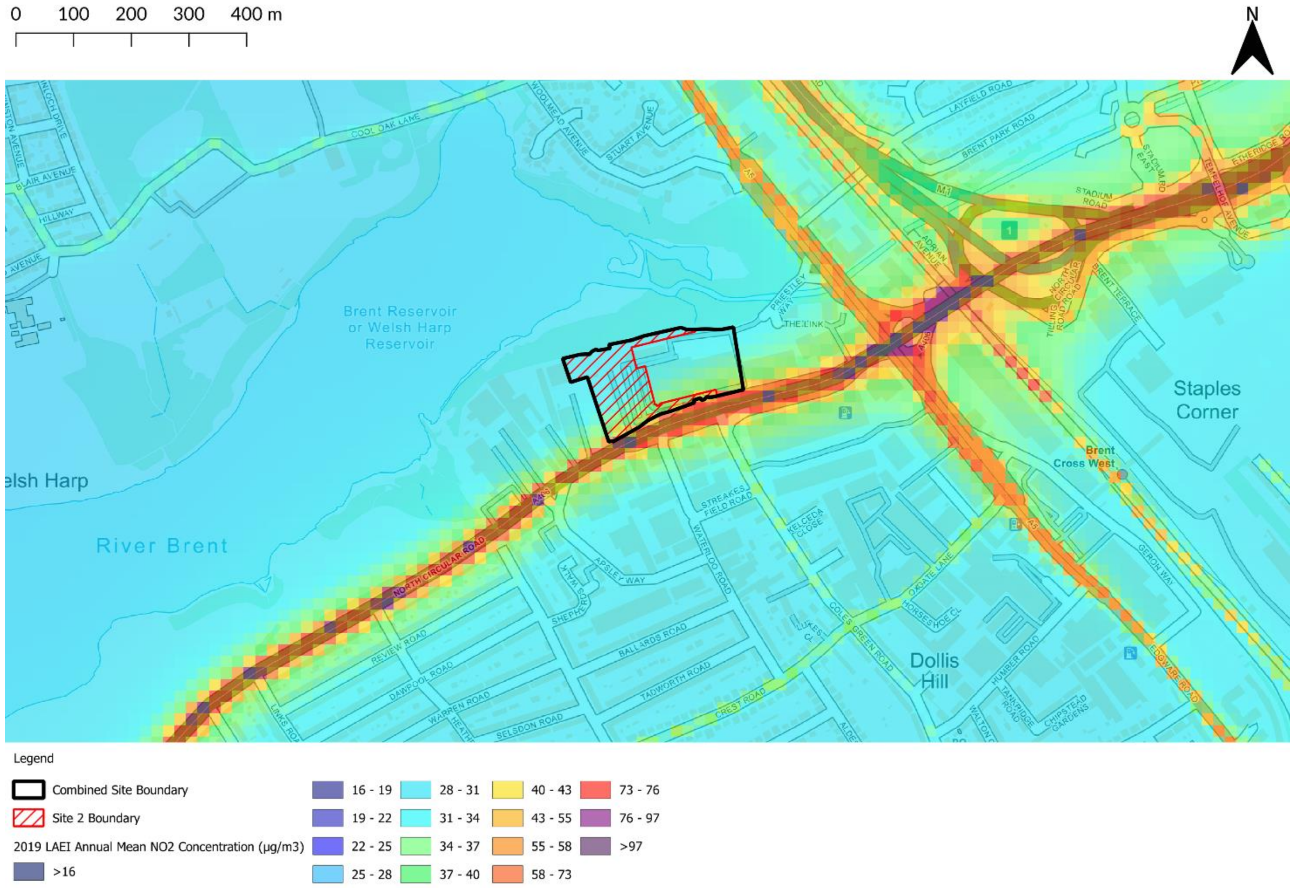

Figure 6: LAEI NO_2 concentration map. Contains OS Data © Crown Copyright and Database rights 2024.

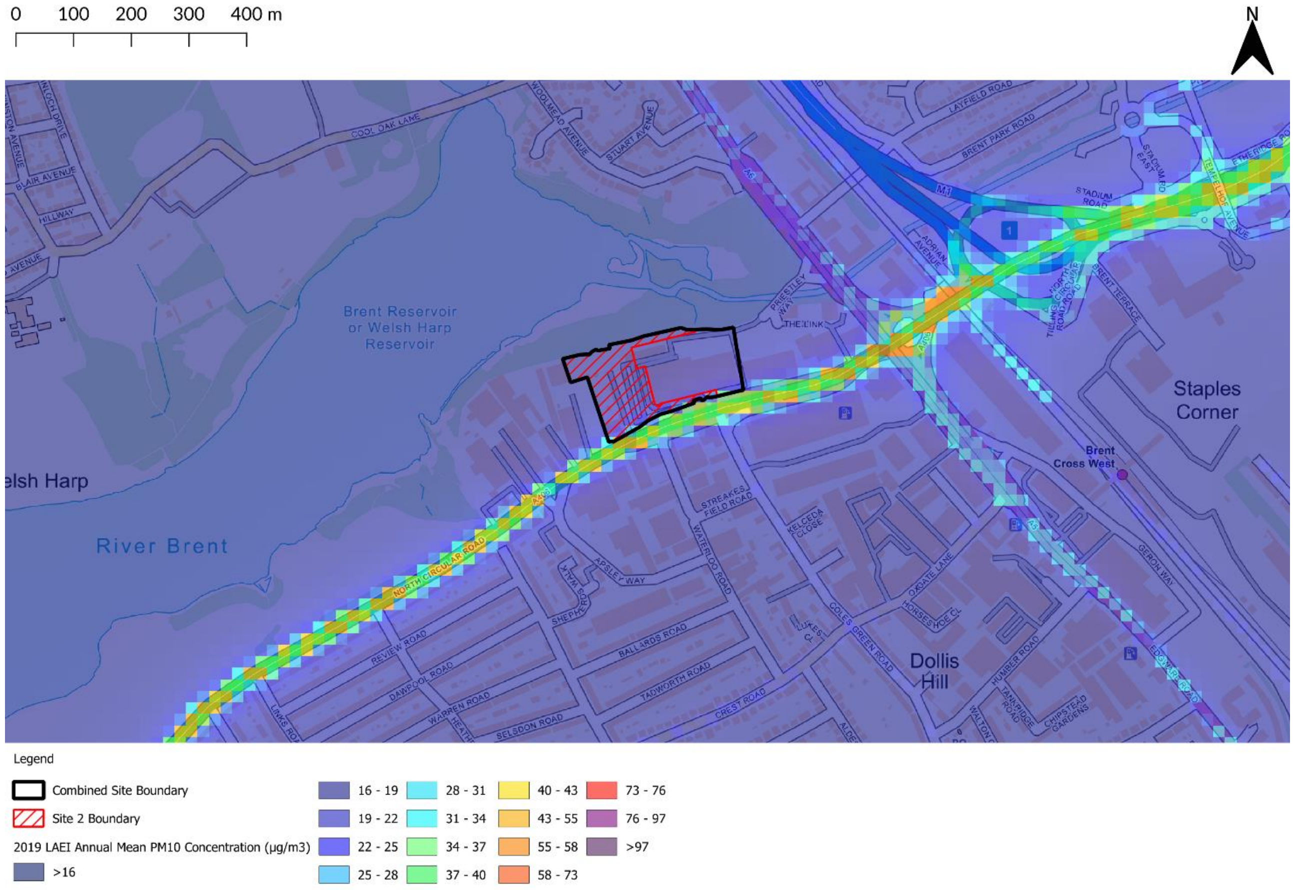

Figure 7: LAEI PM_{10} concentration map. Contains OS Data © Crown Copyright and Database rights 2024.

The worst-case concentrations of key pollutants have been taken from the southern façade of the building close to North Circular Road (A406) in 2019 and are shown in Table 23.

Table 23: 2019 Annual mean LAEI Concentrations of NO_2 and PM_{10}.

Year	Pollutant Concentration (µg/m^3)	
	NO_2	PM_{10}
2019	45.9	25.4

Table 23 above shows that the 2019 predicted pollutant concentrations are in exceedance of the AQO for both NO_2 and PM_{10}.

5.4 Industrial Pollution

A desk-based review of potential industrial sources using the Pollution Inventory[28] from the Environment Agency and the UK Pollutant Release and Transfer Register[29] identified nine potential industrial/waste management sources of air pollution within 2 km of the Site, as listed in Table 24. However, none of these potential sources have released pollutants to the air from 2015 and onwards and therefore they that are not likely to affect the Site with regard to air quality.

Table 24: Industrial/Waste Management Sources of Air Pollution within 2 km of the Site from 2015 onwards.

Source Name	Source Type	Air Pollutant Release
Land at Neasdon Goods Yard	Disposal of non-hazardous waste	None
European Metal Recycling Limited	Disposal of non-hazardous waste	None
Donoghue: Claremont Road	Disposal of non-hazardous waste	None
Cricklewood Railway Yard	Disposal of non-hazardous waste	None
Hendon Waste Transfer Station	Disposal of non-hazardous waste	None
Huyton Waste Transfer Station	Disposal of non-hazardous waste	None
Upside Railway Yard	Disposal of non-hazardous waste	None
Cripps Skips	Disposal of non-hazardous waste	None
Cricklewood North Waste Transfer Station	Disposal of non-hazardous waste	None

5.5 Summary of Baseline Data.

In 2019, the most recent year with available representative monitoring data, there were recorded exceedances of the annual mean NO_2 AQO at two out of the nine nearby passive diffusion tube monitoring locations.

At the closest automatic monitoring station to the Site (Neasdon Lane), the annual mean NO_2 AQO for NO_2 have been exceeded twice since 2015, but not in 2019, the most recent year with available representative monitoring data. Since a recorded exceedance of the 1-hour mean NO_2 AQO in 2016, there have been no exceedances since.

There have been no recorded exceedances of the annual mean PM_{10} AQO between 2015 and 2019 at Neasdon Lane automatic monitoring station. There was an exceedance of the 24-hour mean PM_{10} AQO in 2016, but in no other years between 2015 and 2019. Neasden Lane automatic monitoring location does not monitor $PM_{2.5}$ concentrations.

Table 25: Summary of Background Data.

Assessment Year	Predicted Background Concentration (µg/m^3)					
	NO_2	NO_X	PM_{10}	SO_2	CO	Benzene
2020	28.9	44.8	18.6	2.21	246	0.53

6. Human Health Assessment.

The potential for air quality impacts on human health from the operation of the Plant are assessed in this section.

It should be noted that receptors R6, R10, R11 and R12 are not representative of receptors where the annual mean AQO applies and as such are not included within the screening against any annual mean AQO.

6.1 Testing Scenario – Six Monthly

The following outlines the results of the dispersion modelling for the six-monthly tests within the testing scenario. As outlined in section 3.2, the generators will be tested individually every six months for four hours. To represent the worst case meteorological conditions in the model, a single generator has been run at 100% load for all hours of the year and factored to represent 448 operational hours, to represent the 56 generators being run individually for four hours every six months.

6.1.1 NO_2

Annual mean and 1-hour mean PC of NO_2 have been assessed against the annual mean and 1-hour mean objective of 40 µg/m³ and 200 µg/m³ respectively at 13 and 17 existing receptors respectively. The 5% risk of there being an exceedance of the 1 hour mean has been calculated using the 96.05th percentile.

6.1.1.1 Annual Mean

The annual mean PC are shown in Table 26.

Table 26: Step 1 Screening of NO_2 Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m³)	PC % of Annual Mean AQO	Significance
R1	<0.1	0.1%	Insignificant
R2	0.1	0.2%	Insignificant
R3	0.1	0.2%	Insignificant
R4	<0.1	0.1%	Insignificant
R5	0.1	0.4%	Insignificant
R7	0.1	0.3%	Insignificant
R8	0.1	0.4%	Insignificant
R9	0.3	0.7%	Insignificant
R13	0.2	0.6%	Insignificant
R14	0.2	0.4%	Insignificant
R15	0.1	0.2%	Insignificant
R16	0.2	0.5%	Insignificant
R17	0.1	0.2%	Insignificant

In line with step 1 of the screening assessment, the maximum annual mean PC in concentration as a percentage of the AQO is below 1% for all receptors and impacts associated with the NO_2 annual mean are therefore insignificant.

6.1.1.2 1-hour Mean

The 1-hour mean PC are displayed in Table 27.

Table 27: Step 1 Screening of NO_2 1-hour Mean Concentrations from the Testing Scenario on Human Health

Receptor ID	PC (µg/m^3)	% of 1-hour Mean AQO	Significance
R1	2.9	1.5%	Insignificant
R2	13.5	6.8%	Insignificant
R3	10.5	5.2%	Insignificant
R4	4.6	2.3%	Insignificant
R5	10.8	5.4%	Insignificant
R6	21.8	10.9%	Potentially Significant
R7	9.8	4.9%	Insignificant
R8	10.3	5.1%	Insignificant
R9	21.4	10.7%	Potentially Significant
R10	33.5	16.8%	Potentially Significant
R11	28.6	14.3%	Potentially Significant
R12	20.7	10.3%	Potentially Significant
R13	23.6	11.8%	Potentially Significant
R14	20.3	10.2%	Potentially Significant
R15	10.7	5.3%	Insignificant
R16	23.0	11.5%	Potentially Significant
R17	11.5	5.8%	Insignificant

The 1-hour PC at eight receptors, R6, R9, R10, R11, R12, R13, R14, and R16, are predicted to exceed 10% of the short term AQO and therefore cannot be screened out under step 1. The extent of the 10% exceedance is displayed in Figure 8.

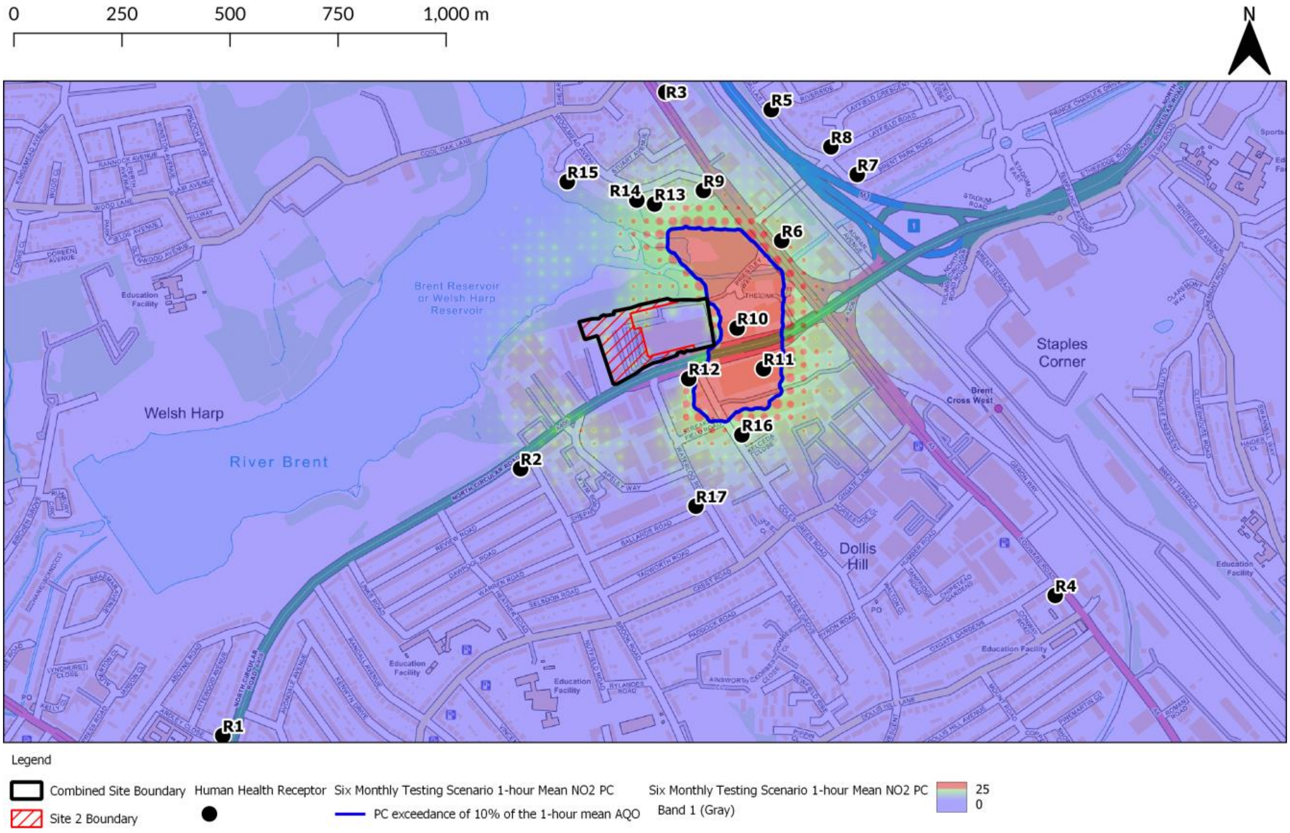

Figure 8: Extent of the PC Exceedance of the 1-hour mean NO_2 AQO within the Six Monthly Testing Scenario. Contains OS Data © Crown Copyright and Database rights 2024.

The PC exceedance from step 1 triggers step 2 of the screening process, displayed in Table 28.

Table 28: Step 2 Screening of NO_2 1-hour Mean Concentrations from the Testing Scenario on Human Health

Receptor ID	PC (µg/m^3)	1-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 1-hour mean AQO minus twice the long-term background	PEC (µg/m^3)	Significance
R6	21.8	142.2	15.3%	79.6	Insignificant
R9	21.4	142.2	15.1%	79.2	Insignificant
R10	33.5	142.2	23.59%	91.3	Potentially Significant
R11	28.6	142.2	20.10%	86.4	Potentially Significant
R12	20.7	142.2	14.53%	78.5	Insignificant
R13	23.6	142.2	16.63%	81.4	Insignificant
R14	20.3	142.2	14.28%	78.1	Insignificant
R16	23.0	142.2	15.0%	69.4	Insignificant

In line with step 2 of the screening process, the short term PC is greater than 20% of the 1 hour mean NO_2 AQO minus twice the long term background concentration at R10 and R11, all other receptors are below 20% and impacts are therefore screened out as insignificant. The 1 hour mean NO_2 PEC at R10 and R11 is 91.3 µg/m^3 and 86.4 µg/m^3 respectively, which are less than 50% of the 1 hour mean NO_2 AQO. It is therefore considered unlikely that the 1 hour mean NO_2 AQO will be exceeded at R10 and R11 and impacts can be considered not significant.

6.1.2 Particulate Matter

Annual mean concentrations of PM_{10} have been assessed against the annual mean objective of 40 µg/m PM_{10} at 13 existing receptors. The results are presented below in Table 29.

Table 29: Step 1 Screening of PM_{10} Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the AQO is below 1% for all receptors and impacts associated with the PM_{10} annual mean are therefore likely to be insignificant.

As previously mentioned, the generators will only be tested during working hours (9am to 5pm). Therefore, the maximum test time per day for the worst case scenario is eight hours per day; testing two generators for four hours each per day (totalling 40 days of operation per year within this scenario). As such, it is highly unlikely that the 24-hour mean PM_{10} AQO will be exceeded. Step 1 of the screening process for 24-hour mean PM_{10} concentrations are displayed in Table 30.

Table 30: Step 1 Screening of PM_{10} 24-hour Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the AQO is below 1% for all receptors and impacts associated with the PM_{10} 24-hour mean are therefore likely to be insignificant.

As a worst case, it is assumed that the emission rate used within this assessment for particulate matter could represent $PM_{2.5}$ and would therefore be the same as PM_{10}. As all annual mean PM_{10} impacts are insignificant, it is likely that the $PM_{2.5}$ impacts would also be insignificant as the PC of <0.1 is less than 1% of the $PM_{2.5}$ annual mean AQO of 25 µg/m^3.

6.1.3 SO_2

24-hour mean, 1-hour mean and 15-minute mean concentrations of SO_2 have been assessed against the 24-hour mean objective of 125 µg/m^3, the 1-hour mean objective of 350 µg/m^3 and the 15-minute mean objective of 266 µg/m^3 at 17 existing receptor locations. The results are presented below in Table 31.

Table 31: Step 1 of Screening for SO_2 24-hour Mean, 1-hour Mean and 15-minute Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	24-hour Mean			1-hour mean			15-minute mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R6	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R10	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant
R11	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant
R12	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant

Receptor ID	24-hour Mean			1-hour mean			15-minute mean		
	PC ($\mu g/m^3$)	PC % of AQO	Significance	PC ($\mu g/m^3$)	PC % of AQO	Significance	PC ($\mu g/m^3$)	PC % of AQO	Significance
R14	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the predicted short-term SO_2 concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently SO_2 emissions from the installation can be considered insignificant in line with EA guidance.

6.1.4 CO

8-hour mean, and 1-hour mean concentrations of CO have been assessed against the 8-hour mean objective of 10,000 $\mu g/m^3$ and the 1-hour mean objective of 30,000 $\mu g/m^3$ at 17 existing receptor locations. The results are presented below in Table 32.

Table 32: Step 1 Screening for CO 8-hour Mean and 1-hour Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	8-hour Mean			1-hour mean		
	PC ($\mu g/m^3$)	PC % of AQO	Significance	PC ($\mu g/m^3$)	PC % of AQO	Significance
R1	1.0	<0.1%	Insignificant	1.9	<0.1%	Insignificant
R2	2.9	<0.1%	Insignificant	3.6	<0.1%	Insignificant
R3	1.6	<0.1%	Insignificant	2.6	<0.1%	Insignificant
R4	1.1	<0.1%	Insignificant	2.5	<0.1%	Insignificant
R5	1.5	<0.1%	Insignificant	2.4	<0.1%	Insignificant
R6	3.1	<0.1%	Insignificant	3.3	<0.1%	Insignificant
R7	1.4	<0.1%	Insignificant	2.5	<0.1%	Insignificant
R8	1.4	<0.1%	Insignificant	2.4	<0.1%	Insignificant
R9	2.9	<0.1%	Insignificant	3.7	<0.1%	Insignificant
R10	4.5	<0.1%	Insignificant	4.8	<0.1%	Insignificant
R11	4.0	<0.1%	Insignificant	4.9	<0.1%	Insignificant
R12	3.7	<0.1%	Insignificant	5.9	<0.1%	Insignificant
R13	3.2	<0.1%	Insignificant	4.3	<0.1%	Insignificant
R14	2.7	<0.1%	Insignificant	3.7	<0.1%	Insignificant
R15	1.7	<0.1%	Insignificant	2.8	<0.1%	Insignificant
R16	4.2	<0.1%	Insignificant	4.5	<0.1%	Insignificant
R17	2.5	<0.1%	Insignificant	3.0	<0.1%	Insignificant

In line with step 1 of the screening process, the predicted short-term CO concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently CO emissions from the installation are likely to be insignificant in line with EA guidance.

6.1.5 Benzene

Annual mean and 1-hour mean concentrations of benzene have been assessed against the annual mean objective of 5 µg/m^3 and the 1-hour mean objective of 195 µg/m^3 at 13 and 17 existing receptors respectively.

6.1.5.1 Annual Mean

The annual mean results are presented below in Table 33.

Table 33: Step 1 of Screening for Benzene Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the predicted annual mean Benzene concentration are all below 1% of the relevant AQO, subsequently Benzene emissions from the installation can be considered insignificant in line with the EA guidance.

6.1.5.2 1-hour Mean

The annual mean results are presented below in Table 34.

Table 34: Step 1 of Screening for Benzene 1-hour Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	0.3	0.2%	Insignificant
R2	0.6	0.3%	Insignificant
R3	0.5	0.2%	Insignificant
R4	0.4	0.2%	Insignificant
R5	0.4	0.2%	Insignificant
R6	0.5	0.3%	Insignificant

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R7	0.4	0.2%	Insignificant
R8	0.4	0.2%	Insignificant
R9	0.6	0.3%	Insignificant
R10	0.8	0.4%	Insignificant
R11	0.8	0.4%	Insignificant
R12	1.0	0.5%	Insignificant
R13	0.7	0.4%	Insignificant
R14	0.6	0.3%	Insignificant
R15	0.5	0.2%	Insignificant
R16	0.8	0.4%	Insignificant
R17	0.5	0.3%	Insignificant

In line with step 1 of the screening process, the predicted short-term Benzene concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently Benzene emissions from the installation are likely to be insignificant in line with the EA guidance.

6.2 Testing Scenario – Monthly

The following outlines the results of the dispersion modelling for the monthly tests within the testing scenario. As outlined in section 3.2, the generators will be tested in groups of up to eight for 30 minutes every month, excluding the months where the six-monthly test occurs. To represent this in the model, a group of eight generators has been run at 50% load for a total of 70 hours, to represent the worst meteorological hours for 56 generators being run in groups of eight for 30 minutes every month for ten months of the year.

6.2.1 NO_2

Annual mean and 1-hour mean PC of NO_2 have been assessed against the annual mean and 1-hour mean objective of 40 µg/m^3 and 200 µg/m^3 respectively at 13 and 17 existing receptors respectively. The 5% risk of there being an exceedance of the 1-hour mean has been calculated using the 62.87th percentile.

6.2.1.1 Annual Mean

The annual mean PC are shown in Table 35.

Table 35: Step 1 Screening of NO_2 Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of Annual Mean AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	0.1	0.1%	Insignificant
R3	0.1	0.1%	Insignificant
R4	<0.1	0.1%	Insignificant
R5	0.1	0.2%	Insignificant
R7	0.1	0.1%	Insignificant
R8	0.1	0.1%	Insignificant
R9	0.2	0.3%	Insignificant
R13	0.1	0.3%	Insignificant
R14	0.1	0.2%	Insignificant
R15	<0.1	0.1%	Insignificant
R16	0.1	0.2%	Insignificant
R17	<0.1	0.1%	Insignificant

In line with step 1 of the screening assessment, the maximum annual mean PC in concentration as a percentage of the AQO is below 1% for all receptors and impacts associated with the NO_2 annual mean are therefore insignificant.

6.2.1.2 1-hour Mean

The 1-hour mean PC are displayed in Table 36.

Table 36: Step 1 Screening of NO_2 1-hour Mean Concentrations from the Testing Scenario on Human Health

Receptor ID	PC (µg/m^3)	% of 1-hour Mean AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant

Receptor ID	PC (µg/m^3)	% of 1-hour Mean AQO	Significance
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R6	0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R10	0.1	<0.1%	Insignificant
R11	<0.1	<0.1%	Insignificant
R12	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening assessment, the maximum annual mean PC in concentration as a percentage of the AQO is below 10% for all receptors and impacts associated with the NO_2 1-hour mean are therefore insignificant.

6.2.2 Particulate Matter

Annual mean concentrations of PM_{10} have been assessed against the annual mean objective of 40 µg/m PM_{10} at 13 existing receptors. The results are presented below in Table 37.

Table 37: Step 1 Screening of PM_{10} Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant

Receptor ID	PC (µg/m³)	PC % of AQO	Significance
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the AQO is below 1% for all receptors and impacts associated with the PM_{10} annual mean are therefore likely to be insignificant.

As previously mentioned, the generators will only be tested during working hours (9am to 5pm). Therefore, the maximum test time per day for the worst case scenario is eight hours per day; testing two generators for four hours each. As such, it is highly unlikely that the 24-hour mean PM_{10} AQO will be exceeded.

There is not expected to be any contribution to the monthly testing scenario percentile of 24-hour PM_{10} concentrations as the generators will not be operational for enough days over the course of the year. The generators will be tested within this scenario in groups of eight for 30 minutes, equalling a total of 7 operational hours, or one operational day per month, over the course of 10 months, there are only 10 operational days. It is therefore highly unlikely that the monthly testing scenario will cause an exceedance of the permissible 35 days above 50 µg/m³, subsequently the change in concentrations at these existing receptors can be considered insignificant and do not need to be assessed further.

As a worst case, it is assumed that the emission rate used within this assessment for particulate matter could represent $PM_{2.5}$ and would therefore be the same as PM_{10}. As all annual mean PM_{10} impacts are insignificant, it is likely that the $PM_{2.5}$ impacts would also be insignificant as the PC of <0.1 is less than 1% of the $PM_{2.5}$ annual mean AQO of 25 µg/m³.

6.2.3 SO_2

24-hour mean, 1-hour mean and 15-minute mean concentrations of SO_2 have been assessed against the 24-hour mean of 125 µg/m³, 1-hour mean objective of 350 µg/m³ and the 15-minute mean objective of 266 µg/m³ at 17 existing receptor locations. The results are presented below in Table 38.

Table 38: Step 1 of Screening for SO_2 24-hour Mean, 1-hour Mean and 15-minute Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	24-hour mean			1-hour mean			15-minute mean		
	PC (µg/m³)	PC % of AQO	Significance	PC (µg/m³)	PC % of AQO	Significance	PC (µg/m³)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant
R6	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant

Receptor ID	24-hour mean			1-hour mean			15-minute mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R10	<0.1	<0.1%	Insignificant	0.1	<0.1%	Insignificant	0.2	0.1%	Insignificant
R11	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	0.2	0.1%	Insignificant
R12	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the predicted short-term SO_2 concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently SO_2 emissions from the installation can be considered insignificant in line with EA guidance.

6.2.4 CO

8-hour mean, and 1-hour mean concentrations of CO have been assessed against the 8-hour mean objective of 10,000 µg/m^3 and the 1-hour mean objective of 30,000 µg/m^3 at 17 existing receptor locations. The results are presented below in Table 39.

Table 39: Step 1 Screening for CO 8-hour Mean and 1-hour Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	8-hour Mean			1-hour mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R1	13.2	0.1%	Insignificant	24.6	0.1%	Insignificant
R2	37.9	0.4%	Insignificant	46.0	0.2%	Insignificant
R3	20.8	0.2%	Insignificant	33.3	0.1%	Insignificant
R4	13.8	0.1%	Insignificant	33.2	0.1%	Insignificant
R5	19.7	0.2%	Insignificant	30.8	0.1%	Insignificant
R6	29.8	0.3%	Insignificant	39.8	0.1%	Insignificant
R7	16.6	0.2%	Insignificant	26.8	0.1%	Insignificant
R8	17.7	0.2%	Insignificant	26.3	0.1%	Insignificant
R9	37.4	0.4%	Insignificant	47.5	0.2%	Insignificant
R10	55.5	0.6%	Insignificant	59.9	0.2%	Insignificant
R11	51.1	0.5%	Insignificant	62.7	0.2%	Insignificant
R12	49.6	0.5%	Insignificant	77.8	0.3%	Insignificant
R13	42.1	0.4%	Insignificant	55.4	0.2%	Insignificant

Receptor ID	8-hour Mean			1-hour mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R14	37.7	0.4%	Insignificant	50.5	0.2%	Insignificant
R15	22.6	0.2%	Insignificant	35.5	0.1%	Insignificant
R16	57.0	0.6%	Insignificant	61.9	0.2%	Insignificant
R17	33.2	0.3%	Insignificant	37.7	0.1%	Insignificant

In line with step 1 of the screening process, the predicted short-term CO concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently CO emissions from the installation are likely to be insignificant in line with EA guidance.

6.2.5 Benzene

Annual mean and 1-hour mean concentrations of benzene have been assessed against the annual mean objective of 5 µg/m^3 and the 1-hour mean objective of 195 µg/m^3 at 13 and 17 existing receptors respectively.

6.2.5.1 Annual Mean

The annual mean results are presented below in Table 40.

Table 40: Step 1 of Screening for Benzene Annual Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the predicted annual mean Benzene concentrations are all below 1% of the relevant AQO, subsequently Benzene emissions from the installation can be considered insignificant in line with the EA guidance.

6.2.5.2 1-hour Mean

The 1-hour mean results are presented below in Table 41.

Table 41: Step 1 of Screening for Benzene 1-hour Mean Concentrations from the Testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	2.2	1.1%	Insignificant
R2	4.1	2.1%	Insignificant
R3	2.9	1.5%	Insignificant
R4	2.9	1.5%	Insignificant
R5	3.3	1.7%	Insignificant
R6	6.3	3.2%	Insignificant
R7	3.4	1.7%	Insignificant
R8	3.5	1.8%	Insignificant
R9	5.2	2.7%	Insignificant
R10	7.2	3.7%	Insignificant
R11	7.6	3.9%	Insignificant
R12	9.9	5.1%	Insignificant
R13	5.4	2.8%	Insignificant
R14	4.9	2.5%	Insignificant
R15	3.4	1.7%	Insignificant
R16	5.5	2.8%	Insignificant
R17	3.6	1.8%	Insignificant

In line with step 1 of the screening process, the predicted short-term Benzene concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently Benzene emissions from the installation are likely to be insignificant in line with the EA guidance.

6.3 Outage Scenario

The following outlines the results of the dispersion modelling to represent concentrations in the event of a national grid outage. It has been assumed that of the 56 generators, 52 generators will run at 100% load and 4 will be reserved as swing generators for the 48-hour outage scenario.

6.3.1 NO_2

Annual mean and 1-hour concentrations of NO_2 have been assessed against the annual mean and 1-hour mean objective of 40 µg/m^3 and 200 µg/m^3 respectively at 13 and 17 existing receptors respectively.

6.3.1.1 Annual Mean

The results for the annual mean NO_2 concentrations are displayed in Table 42.

Table 42: Step 1 of Screening for NO_2 Annual Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of Relevant AQO	Significance
R1	0.1	0.2%	Insignificant
R2	0.4	0.9%	Insignificant
R3	0.4	1.1%	Potentially Significant
R4	0.2	0.6%	Insignificant
R5	0.7	1.7%	Potentially Significant
R7	0.7	1.7%	Potentially Significant
R8	0.7	1.8%	Potentially Significant
R9	1.2	3.1%	Potentially Significant
R13	1.0	2.5%	Potentially Significant
R14	0.8	1.9%	Potentially Significant
R15	0.4	0.9%	Insignificant
R16	0.8	2.0%	Potentially Significant
R17	0.3	0.8%	Insignificant

In line with step 1 of the screening process, there are eight receptors where the PC exceeds 1% of the relevant AQO, and therefore they cannot be screened out under step 1. The extent of the exceedance is shown in Figure 9. The impacts at the remaining receptors are likely to be insignificant.

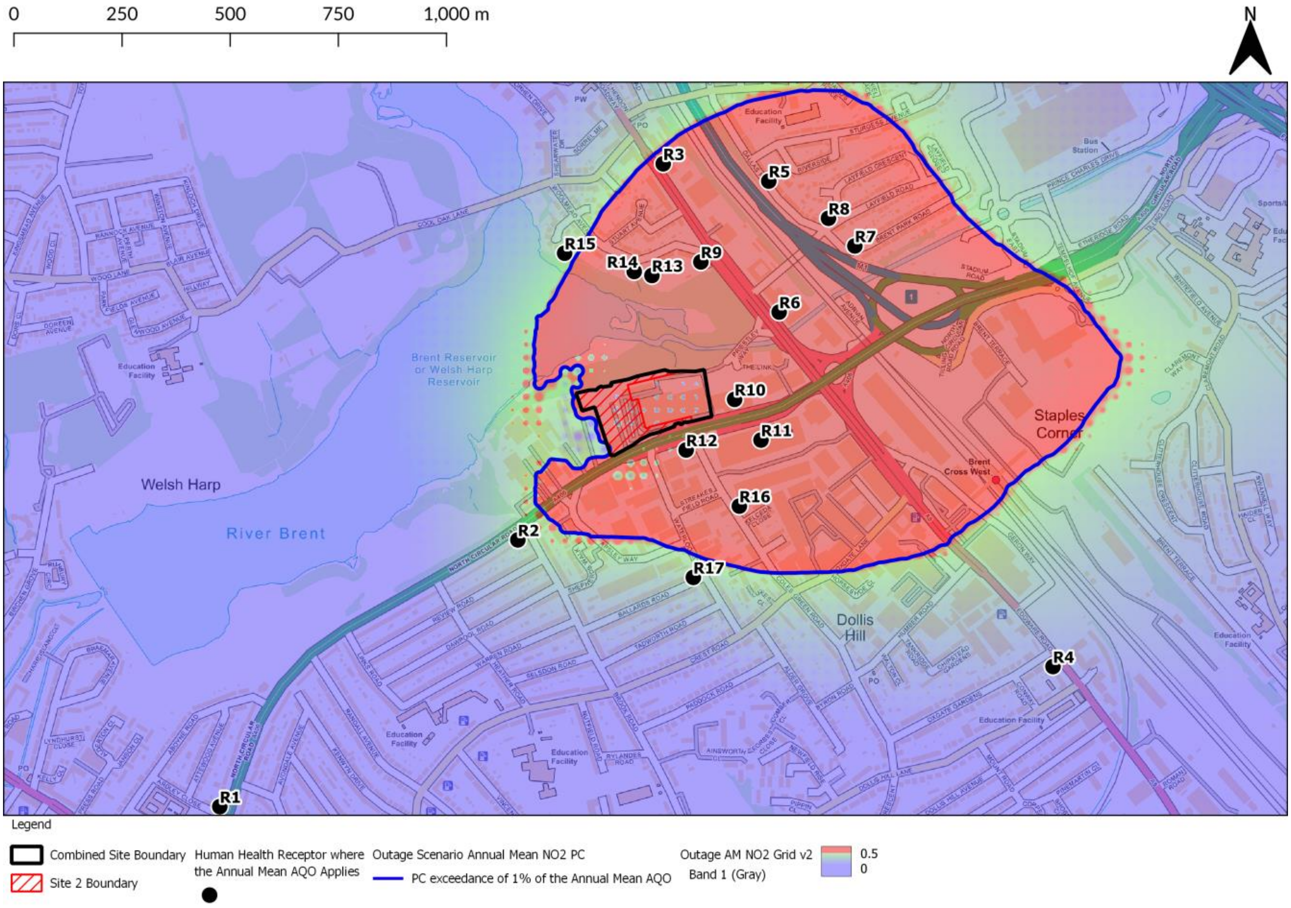

Figure 9: Extent of the PC Exceedance of the Annual Mean NO_2 AQO within the Outage Scenario. Contains OS Data © Crown Copyright and Database rights 2024.

There are residential receptors located within the area exceeding 1% of the annual mean NO_2 AQO near to R2 in, as outlined in Figure 9. Though not included within the model, the receptors outlined in Figure 9 are considered worst case receptors and the receptors within this area will therefore likely experience similar impacts to R9, R13, R14 and R16 due to their proximity.

Step 2 of the screening process for annual mean impacts are displayed in Table 43.

Table 43: Step 2 of Screening for NO_2 Annual Mean Concentrations from the Outage Scenario on Human Health

Receptor ID	PEC (µg/m^3)	PEC % of Relevant AQO	Significance
R3	29.3	73.4%	Potentially Significant
R5	29.6	74.0%	Potentially Significant
R7	29.6	73.9%	Potentially Significant
R8	29.6	74.0%	Potentially Significant
R9	30.1	75.3%	Potentially Significant
R13	29.9	74.7%	Potentially Significant
R14	29.7	74.2%	Potentially Significant
R16	24.0	60.0%	Insignificant

Seven of the eight receptors in Table 43 experience a PEC greater than 70% of the AQO and therefore the impact is identified as potentially significant at these receptors. The maximum concentration occurs at R9 with a concentration of 30.1 µg/m^3, giving a headroom of 25% to the annual mean NO_2 AQO. Furthermore, the 48-hour long outage scenario is very unlikely to occur, as over the past 10 years the longest outage at Elstree Substation lasted no longer than 3 minutes. Additionally, the PEC are still below the annual mean NO_2 AQO, even though the modelled scenario assumes no improvement from the Site 1 assessment, and other worst case assumptions such as diesel fuel and worst case meteorological conditions have been considered. Therefore, it is not likely that the installation will contribute towards an exceedance of the AQO. Subsequently, the annual mean NO_2 impacts at all receptors are likely to be not significant in line with the EA guidance.

6.3.1.2 1-hour Mean

The results for a 5% risk of exceedance of the 1-hour mean are shown in Table 44 for step 1 of the screening process.

Table 44: Step 1 of Screening for 5% Risk of there being an Exceedance of the NO_2 1-hour Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of Relevant AQO	Significance
R1	<0.0	<0.0%	Insignificant
R2	<0.0	<0.0%	Insignificant
R3	<0.0	<0.0%	Insignificant
R4	<0.0	<0.0%	Insignificant
R5	1.3	0.6%	Insignificant
R6	39.0	19.5%	Potentially Significant
R7	10.9	5.5%	Insignificant
R8	6.1	3.1%	Insignificant
R9	3.4	1.7%	Insignificant
R10	116.6	58.3%	Potentially Significant
R11	38.6	19.3%	Potentially Significant
R12	0.3	0.1%	Insignificant
R13	0.2	0.1%	Insignificant
R14	<0.0	<0.0%	Insignificant
R15	<0.0	<0.0%	Insignificant
R16	<0.0	<0.0%	Insignificant
R17	<0.0	<0.0%	Insignificant

There is one receptor, R10, from step 1 of the screening process where impacts may be potentially significant, the extent of which is displayed in Figure 10.

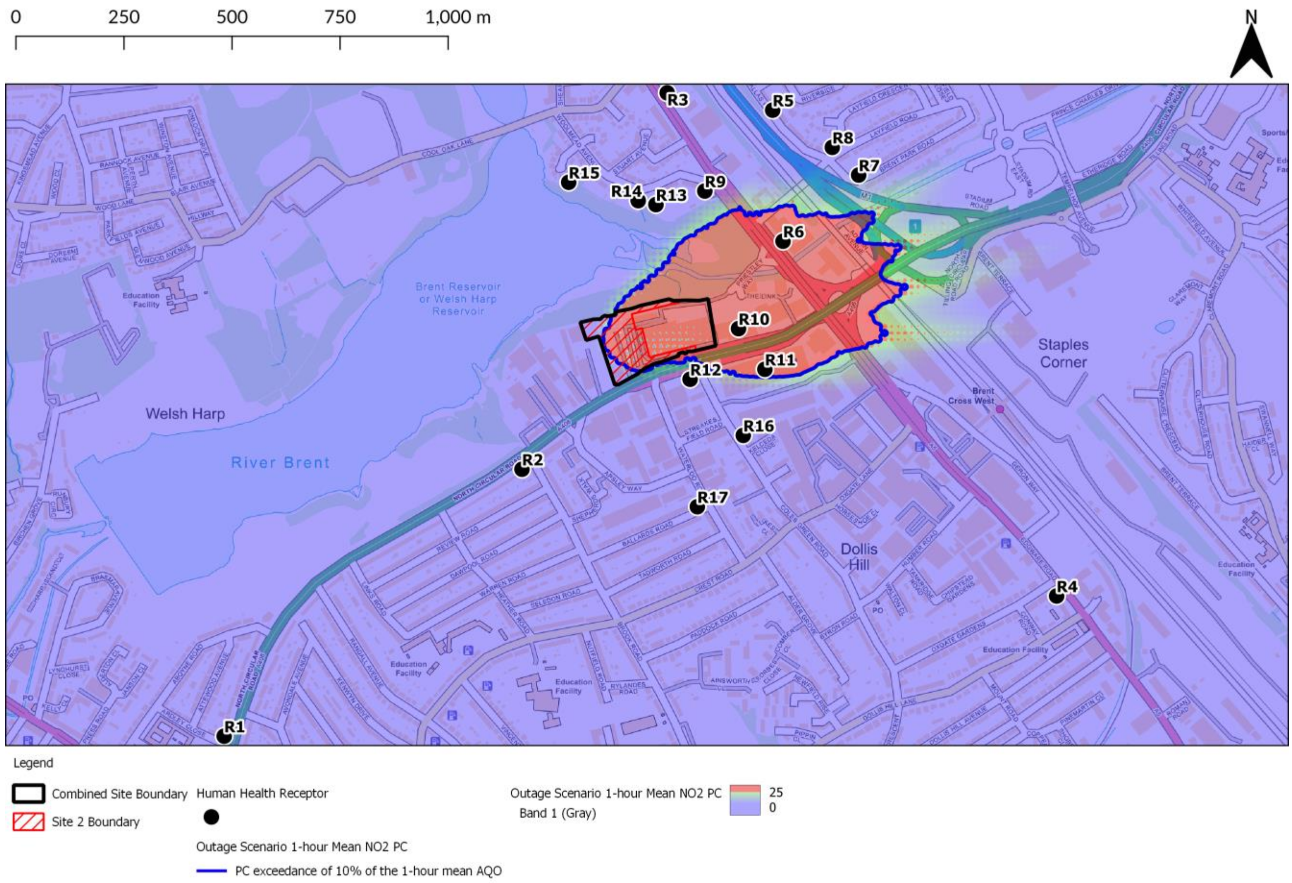

Figure 10: Extent of the 5% risk of PC Exceedance of the 1-hour Mean NO_2 AQO within the Outage Scenario. Contains OS Data © Crown Copyright and Database rights 2024.

Step 2 of the screening process for this receptor is displayed in Table 45. The impacts at the remaining receptors are likely to be insignificant.

Table 45: Step 2 of Screening for 5% Risk of there being an Exceedance of the NO_2 1-hour Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	1-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 1-hour mean AQO minus twice the long-term background	Significance
R6	39.0	142.2	27.4%	Potentially Significant
R10	116.6	142.2	82.0%	Potentially Significant
R11	38.6	142.2	27.1%	Potentially Significant

The PC as a percentage of the 1-hour mean NO_2 AQO minus twice the long-term background exceeds 20% and is therefore potentially significant. However, the 48-hour long outage scenario is very unlikely to occur, as over the past 10 years the longest outage at Elstree Substation lasted no longer than 3 minutes Additionally, the 1-hour mean NO_2 PEC at R10 is 174.4 µg/m^3, which gives a headroom of approximately 13% to the 1-hour mean NO_2 AQO, even though the modelled scenario assumes no improvement from the Site 1 assessment, and other worst case assumptions such as diesel fuel and worst case meteorological conditions have been considered. Therefore, it is not likely that the installation will contribute towards an exceedance of the AQO. Subsequently, the 1-hour mean NO_2 impacts at all receptors are likely to be not significant in line with the EA guidance.

6.3.2 Particulate Matter

Annual mean concentrations of PM_{10} have been predicted at existing receptor locations in the vicinity of the Site and have been assessed against the annual mean objective of 40 µg/m^3 at 13 existing receptors. The results are presented below in Table 46.

Table 46: PM_{10} Annual Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	<0.1%	Insignificant
R3	<0.1	<0.1%	Insignificant
R4	<0.1	<0.1%	Insignificant
R5	<0.1	<0.1%	Insignificant
R6	<0.1	<0.1%	Insignificant
R7	<0.1	<0.1%	Insignificant
R8	<0.1	<0.1%	Insignificant
R9	<0.1	<0.1%	Insignificant
R10	<0.1	<0.1%	Insignificant
R11	<0.1	<0.1%	Insignificant
R12	<0.1	<0.1%	Insignificant
R13	<0.1	<0.1%	Insignificant
R14	<0.1	<0.1%	Insignificant
R15	<0.1	<0.1%	Insignificant
R16	<0.1	<0.1%	Insignificant
R17	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the AQO are below 1% for all receptors and impacts associated with the PM_{10} annual mean are therefore likely to be insignificant.

As a worst case, it is assumed that the emission rate used within this assessment for particulate matter could represent 100% $PM_{2.5}$ and would therefore be the same as PM_{10}. As all annual mean PM_{10} impacts are insignificant, it is likely that the $PM_{2.5}$ impacts would also be insignificant as the PC of <0.1 is less than 1% of the $PM_{2.5}$ annual mean AQO of 25 µg/m^3.

The 24-hour mean AQO for PM_{10} allows 50 µg/m^3 to be exceeded no more than 35 days per year. As the outage scenario only spans for 48 hours, it is highly unlikely that the 24-hour mean PM_{10} AQO will be exceeded. As such, the change in concentrations at these existing receptors for the 24-hour mean PM_{10} impacts are considered to be insignificant and do not need to be assessed further.

6.3.3 SO_2

1-hour mean and 15-minute mean concentrations of SO_2 have been assessed against the 1-hour mean objective of 350 µg/m^3 and the 15-minute mean objective of 266 µg/m^3 at 17 existing receptor locations. The results are presented below in Table 47. The 24-hour mean has not been included within this table as the outage scenario will not run for enough days to cause an exceedance and therefore no further assessment of the 24-hour mean is required.

Table 47: Step 1 of Screening for SO_2 1-hour Mean and 15-minute Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	1-hour mean			15-minute mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant	0.5	0.2%	Insignificant
R2	<0.1	<0.1%	Insignificant	1.5	0.6%	Insignificant
R3	<0.1	<0.1%	Insignificant	1.1	0.4%	Insignificant
R4	<0.1	<0.1%	Insignificant	0.6	0.2%	Insignificant
R5	<0.1	<0.1%	Insignificant	1.1	0.4%	Insignificant
R6	<0.1	<0.1%	Insignificant	1.9	0.7%	Insignificant
R7	<0.1	<0.1%	Insignificant	1.1	0.4%	Insignificant
R8	<0.1	<0.1%	Insignificant	1.1	0.4%	Insignificant
R9	<0.1	<0.1%	Insignificant	1.9	0.7%	Insignificant
R10	<0.1	<0.1%	Insignificant	2.2	0.8%	Insignificant
R11	<0.1	<0.1%	Insignificant	2.2	0.8%	Insignificant
R12	<0.1	<0.1%	Insignificant	2.0	0.7%	Insignificant
R13	<0.1	<0.1%	Insignificant	1.9	0.7%	Insignificant
R14	<0.1	<0.1%	Insignificant	1.6	0.6%	Insignificant
R15	<0.1	<0.1%	Insignificant	1.3	0.5%	Insignificant
R16	<0.1	<0.1%	Insignificant	1.9	0.7%	Insignificant
R17	<0.1	<0.1%	Insignificant	1.1	0.4%	Insignificant

The predicted 1-hour and 15-minute mean PC are all below 10% of their respective AQO. Subsequently SO_2 emissions from the installation are likely to be insignificant at all existing receptors in line with the EA guidance.

6.3.4 CO

8-hour mean, and 1-hour mean concentrations of CO have been assessed against the 8-hour mean objective of 10,000 µg/m^3 and the 1-hour mean objective of 30,000 µg/m^3 at 17 existing receptor locations. The results are presented below in Table 48.

Table 48: CO 8-hour Mean and 1-hour Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	8-hour Mean			1-hour mean		
	PC (µg/m^3)	PC % of AQO	Significance	PC (µg/m^3)	PC % of AQO	Significance
R1	48.9	0.5%	Insignificant	78.5	0.3%	Insignificant
R2	133.4	1.3%	Insignificant	152.7	0.5%	Insignificant
R3	78.3	0.8%	Insignificant	107.5	0.4%	Insignificant
R4	51.1	0.5%	Insignificant	99.5	0.3%	Insignificant
R5	73.6	0.7%	Insignificant	122.6	0.4%	Insignificant
R6	155.0	1.6%	Insignificant	198.4	0.7%	Insignificant
R7	76.7	0.8%	Insignificant	122.7	0.4%	Insignificant
R8	80.2	0.8%	Insignificant	123.4	0.4%	Insignificant
R9	134.2	1.3%	Insignificant	178.1	0.6%	Insignificant
R10	196.5	2.0%	Insignificant	307.7	1.0%	Insignificant
R11	164.8	1.6%	Insignificant	208.0	0.7%	Insignificant
R12	136.3	1.4%	Insignificant	242.7	0.8%	Insignificant
R13	124.9	1.2%	Insignificant	169.1	0.6%	Insignificant
R14	121.0	1.2%	Insignificant	152.3	0.5%	Insignificant
R15	80.5	0.8%	Insignificant	124.6	0.4%	Insignificant
R16	160.3	1.6%	Insignificant	172.5	0.6%	Insignificant
R17	100.3	1.0%	Insignificant	115.1	0.4%	Insignificant

The predicted short-term CO concentrations are all below 10% of the relevant AQO at all existing receptors, subsequently CO emissions from the installation can be considered insignificant in line with the EA guidance.

6.3.5 Benzene

Annual mean and 1-hour mean concentrations of benzene have been assessed against the annual mean objective of 5 µg/m^3 and the 1-hour mean objective of 195 µg/m^3 at 13 and 17 existing receptors respectively.

6.3.5.1 Annual Mean

The annual mean results are presented below in Table 49.

Table 49: Step 1 Screening of Benzene Annual Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	<0.1	<0.1%	Insignificant
R2	<0.1	0.1%	Insignificant
R3	<0.1	0.1%	Insignificant

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R4	<0.1	0.1%	Insignificant
R5	<0.1	0.2%	Insignificant
R7	<0.1	0.2%	Insignificant
R8	<0.1	0.2%	Insignificant
R9	<0.1	0.3%	Insignificant
R13	<0.1	0.3%	Insignificant
R14	<0.1	0.2%	Insignificant
R15	<0.1	0.1%	Insignificant
R16	<0.1	0.2%	Insignificant
R17	<0.1	0.1%	Insignificant

The predicted annual mean Benzene concentrations are all below 1% of the relevant AQO and therefore are likely to be insignificant in line with the EA guidance.

6.3.5.2 1-hour Mean

The 1-hour mean results are presented below in Table 50.

Table 50: Step 1 Screening of Benzene 1-hour Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	PC % of AQO	Significance
R1	13.4	6.9%	Insignificant
R2	26.2	13.4%	Potentially Significant
R3	18.4	9.4%	Insignificant
R4	17.0	8.7%	Insignificant
R5	21.0	10.8%	Potentially Significant
R6	34.0	17.4%	Potentially Significant
R7	21.0	10.8%	Potentially Significant
R8	21.1	10.8%	Potentially Significant
R9	30.5	15.6%	Potentially Significant
R10	52.7	27.0%	Potentially Significant
R11	35.6	18.3%	Potentially Significant
R12	41.6	21.3%	Potentially Significant
R13	29.0	14.9%	Potentially Significant
R14	26.1	13.4%	Potentially Significant
R15	21.3	10.9%	Potentially Significant
R16	29.5	15.1%	Potentially Significant
R17	19.7	10.1%	Potentially Significant

There are eight receptors where the 1-hour mean PC exceeds 10% of the short term AQO and therefore cannot be screened out under step 1. The extent of the exceedance is outlined in Figure 11.

Figure 11: Extent of the PC Exceedance of the 1-hour Mean Benzene AQO within the Outage Scenario. Contains OS Data © Crown Copyright and Database rights 2024.

Step 2 of the screening process is therefore required at these receptors and has been displayed in Table 51. The impacts at remaining receptors are likely to be insignificant.

Table 51: Step 2 Screening of Benzene 1-hour Mean Concentrations from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	1-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 1-hour mean AQO minus twice the long-term background	Significance
R2	26.2	190.4	13.7%	Insignificant
R5	21.0	190.6	11.0%	Insignificant
R6	34.0	190.6	17.8%	Insignificant
R7	21.0	190.6	11.0%	Insignificant
R8	21.1	190.6	11.1%	Insignificant
R9	30.5	190.6	16.0%	Insignificant
R10	52.7	190.6	27.7%	Potentially Significant
R11	35.6	190.6	18.7%	Insignificant

Receptor ID	PC ($\mu g/m^3$)	1-hour mean AQO minus twice the long-term background ($\mu g/m^3$)	PC as a % of the 1-hour mean AQO minus twice the long-term background	Significance
R12	41.6	190.6	21.8%	Potentially Significant
R13	29.0	190.6	15.2%	Insignificant
R14	26.1	190.6	13.7%	Insignificant
R15	21.3	190.6	11.2%	Insignificant
R16	29.5	190.2	15.5%	Insignificant
R17	19.7	190.2	10.4%	Insignificant

In line with step 2 of the screening process, two receptors are greater than 20% of the 1-hour mean AQO minus twice the long-term background. However, the 48-hour long outage scenario is very unlikely to occur, as over the past 10 years the longest outage at Elstree Substation lasted no longer than 3 minutes Additionally, the highest 1-hour mean Benzene PEC of 53.8 $\mu g/m^3$, occurring at R10, giving a headroom of approximately 72% to the 1-hour mean Benzene AQO, even though the modelled scenario assumes no improvement from the Site 1 assessment, and other worst case assumptions such as diesel fuel and worst case meteorological conditions have been considered. ,The model has assumed that benzene represents 100% of TOCs as a worst case, whereas in reality it would be a fraction of this, which would reduce the PC and PEC. Therefore, it is not likely that the installation will contribute towards an exceedance of the AQO. Subsequently, the 1-hour mean Benzene impacts at all receptors are likely to be not significant in line with the EA guidance.

6.4 Summary of Human Health Assessment

The impacts of the installation during both the testing scenarios were found to be insignificant following the EA screening steps except for the 1-hour mean NO_2 AQO in the six-monthly testing scenario where there are potentially significant impacts around R10 and R11. However, the NO_2 1-hour mean PEC for both are below 50% of the 200 $\mu g/m^3$ AQO, therefore it is considered unlikely to exceed the AQO and the impact is considered to be not significant. For the outage scenario, the impacts from PM_{10}, SO_2, and CO were all screened out as insignificant. Only the NO_2 annual mean, NO_2 1-hour mean and the Benzene 1-hour mean were found to have potentially significant impacts in step 2 of the EA screening but both PECs were still below their respective AQOs. In addition, the 48-hour long outage scenario is highly unlikely to occur as the longest outage from Elstree Substation in the last ten years was less than 3 minutes, therefore impacts can be considered to be not significant. Subsequently, annual mean and short term impacts at all receptors in all scenarios are either screened out and insignificant in line with the EA screening steps, or determined to be not significant through professional judgement where they can't be screened out.

7. Ecological Assessment

The potential for air quality impacts on ecological sites from the operation of the Plant are assessed in this section.

7.1 Testing Scenario – Six Monthly

The following outlines the results of the dispersion modelling for the six-monthly tests within the testing scenario. As outlined in section 3.2, the generators will be tested individually every six months. To represent this in the model, a single generator has been run at 100% load for a total of 448 hours, to represent the worst meteorological hours for 56 generators being run individually for four hours every six months.

7.1.1 NO_X

The PC predicted in the testing scenario have been compared to the relevant critical levels for NO_X. For all local wildlife sites, a single point has been selected in line with the points assessed for Site 1. For Brent Reservoir SSSI, the predicted concentration is the maximum concentration predicted across the grid modelled to represent the SSSI. Predicted concentrations for the SSSI and LWSs are presented in Table 52.

Table 52: Step 1 Screening for NO_X Annual Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	0.6	2.2%	Potentially Significant
E2	<0.1	0.1%	Insignificant
E3	<0.1	0.1%	Insignificant
E4	<0.1	0.1%	Insignificant
E5	<0.1	0.1%	Insignificant
E6	0.1	0.2%	Insignificant
E7	<0.1	0.1%	Insignificant
E8	<0.1	0.1%	Insignificant
E9	0.1	0.3%	Insignificant
E10	0.1	0.4%	Insignificant
E11	<0.1	0.1%	Insignificant
E12	<0.1	0.2%	Insignificant
E13	<0.1	0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC at E1 exceeds 1% of the critical level and therefore impacts cannot be screened out under step 1. The PC at all other ecological sites (E2 – E15), which are LWS, are less than 100% of the critical level and therefore impacts are likely to be insignificant.

Step 2 of the screening process for E1 is displayed in Table 53.

Table 53: Step 2 Screening for NO_X Annual Mean from the Testing Scenario on Ecological Receptors

Receptor ID	PEC (µg/m^3)	PEC % of Critical Level	Significance
E1	36.0	117.9%	Potentially Significant

In line with step 2 of the screening process, the maximum PEC at E1 is 36.0 µg/m^3, or 117.9% of the critical level. The PEC exceeds the critical level due to the background concentrations already exceeding the critical level at E1. However, it should be noted that the background concentration considered here is from 2020 which is a conservative approach, as the background concentration within the opening year is likely to be lower. Furthermore, as displayed in the contour plot in Figure 12, the area of Brent Reservoir that is predicted to experience a PC greater that 1% of the critical level is a small section of the SSSI.

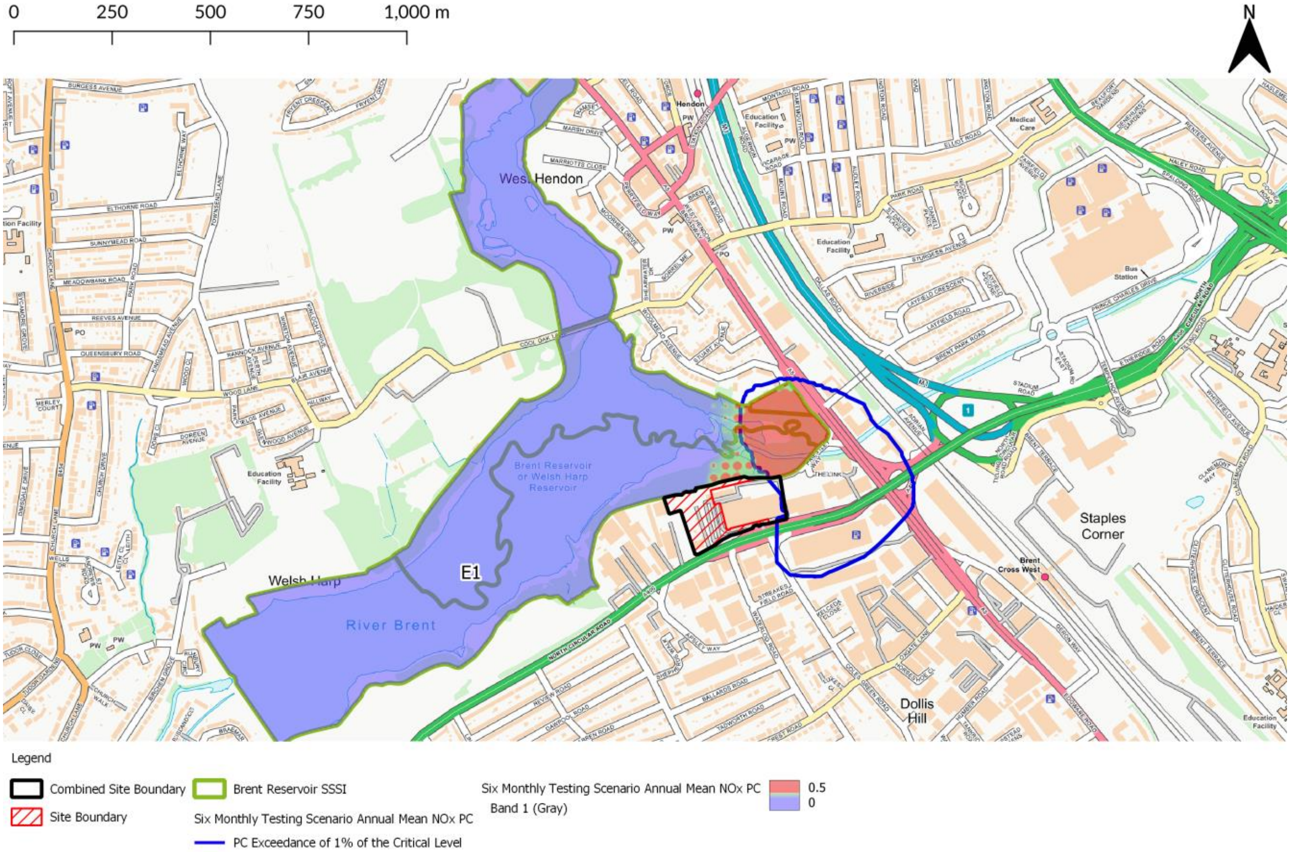

Figure 12: Test Scenario Annual Mean NO_X PC Contour. Contains OS Data © Crown Copyright and Database rights 2024.

As outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to long term NO_X concentrations exceeding the critical level. The NOx background concentrations already exceeding the critical level is likely a result of the nearby busy roads, such as the A406 North Circular, the A5 and the M1. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI. As such the impacts on annual mean NO_X at E1 within the testing scenario are likely to be not significant.

The 24-hour mean NO_X PC have been compared against 200 µg/m^3 and are displayed in Table 54.

Table 54: Step 1 Screening for NO_X 24-hour Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	88.2	44.1%	Potentially Significant
E2	4.5	2.3%	Insignificant
E3	3.6	1.8%	Insignificant
E4	6.6	3.3%	Insignificant

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E5	5.2	2.6%	Insignificant
E6	4.3	2.1%	Insignificant
E7	7.0	3.5%	Insignificant
E8	2.0	1.0%	Insignificant
E9	6.9	3.4%	Insignificant
E10	7.7	3.9%	Insignificant
E11	3.9	2.0%	Insignificant
E12	4.7	2.4%	Insignificant
E13	4.7	2.4%	Insignificant
E14	2.2	1.1%	Insignificant
E15	2.2	1.1%	Insignificant

In line with step 1 of the screening process, the 24-hour mean PC exceeds 10% of the critical level of 200 µg/m^3 at E1, therefore impacts cannot be screened out under step 1, and step 2 of the screening process is required. All other ecological sites (E2 – E15), which are LWS, do not exceed 100% of the critical level and impacts can therefore be considered insignificant.

Step 2 of the screening process for E1 is displayed in Table 55.

Table 55: Step 2 Screening for NO_X 24-hour Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PEC (µg/m^3)	24-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 24-hour mean AQO minus twice the long-term background	Significance
E1	88.2	158.4	55.7	Potentially Significant

As outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to NO_X concentrations exceeding the critical level. The NOx background concentrations already exceeding the critical level is likely a result of the nearby busy roads, such as the A406 North Circular, the A5 and the M1. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI. As such the impacts on 24 hour mean NO_X at E1 within the testing scenario are likely to be not significant.

7.1.2 SO_2

Predicted annual mean SO_2 concentrations as a result of the testing of generators have been displayed in Table 56.

Table 56: Step 1 Screening for Annual Mean SO_2 Impacts from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	<0.1	<0.1%	Insignificant
E2	<0.1	<0.1%	Insignificant
E3	<0.1	<0.1%	Insignificant
E4	<0.1	<0.1%	Insignificant
E5	<0.1	<0.1%	Insignificant
E6	<0.1	<0.1%	Insignificant
E7	<0.1	<0.1%	Insignificant
E8	<0.1	<0.1%	Insignificant
E9	<0.1	<0.1%	Insignificant
E10	<0.1	<0.1%	Insignificant
E11	<0.1	<0.1%	Insignificant
E12	<0.1	<0.1%	Insignificant
E13	<0.1	<0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the annual mean PC is less than 0.1 µg/m^3 and less than 0.1% of the most stringent critical level of 10 µg/m^3 at all ecological sites. Therefore, the impact of SO_2 emissions on local habitats from the six monthly testing of generators is likely to be insignificant.

7.1.3 Acidification

The deposition of nitrogen and sulphur compounds has been assessed against the relevant critical loads outlined in Section 2.4.3. Step 1 and 2 of the screening process for Acidification of nitrogen and step 1 of the screening process for the acidification of sulphur are displayed in Table 57, Table 58 and Table 59 respectively.

Table 57: Step 1 Screening for Acidification of Nitrogen as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC N (keq/ha/a)	PC N as a % of the Critical Load	Significance
E1	0.013	3.7%	Potentially Significant
E2	<0.001	0.1%	Insignificant
E3	<0.001	0.1%	Insignificant
E4	0.001	0.2%	Insignificant
E5	<0.001	0.1%	Insignificant
E6	0.001	0.3%	Insignificant

Receptor ID	PC N (keq/ha/a)	PC N as a % of the Critical Load	Significance
E7	<0.001	0.1%	Insignificant
E8	<0.001	0.1%	Insignificant
E9	0.002	0.6%	Insignificant
E10	0.002	0.7%	Insignificant
E11	0.001	0.2%	Insignificant
E12	0.001	0.3%	Insignificant
E13	0.001	0.1%	Insignificant
E14	<0.001	0.1%	Insignificant
E15	<0.001	0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of nitrogen exceeds 1% at E1, therefore impacts cannot be screened out under step 1. For all other ecological sites, the impacts are likely to be insignificant.

Table 58: Step 2 Screening for Acidification of Nitrogen as a Result of the testing Scenario on Ecological Receptors.

Receptor ID	PEC N (keq/ha/a)	PEC N as a % of the Critical Load	Significance
E1	0.84	31.1%	Insignificant

In line with step 2 of the screening process, the PEC for the acidification of nitrogen is less than 70% of the critical load and therefore impacts are likely to be insignificant.

Table 59: Step 1 Screening for Acidification of Sulphur as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E1	<0.001	<0.1%	Insignificant
E2	<0.001	<0.1%	Insignificant
E3	<0.001	<0.1%	Insignificant
E4	<0.001	<0.1%	Insignificant
E5	<0.001	<0.1%	Insignificant
E6	<0.001	<0.1%	Insignificant
E7	<0.001	<0.1%	Insignificant
E8	<0.001	<0.1%	Insignificant
E9	<0.001	<0.1%	Insignificant
E10	<0.001	<0.1%	Insignificant

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E11	<0.001	<0.1%	Insignificant
E12	<0.001	<0.1%	Insignificant
E13	<0.001	<0.1%	Insignificant
E14	<0.001	<0.1%	Insignificant
E15	<0.001	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of sulphur does not exceed 1% at any ecological receptors, therefore the impacts are likely to be insignificant.

Furthermore, both nitrogen and sulphur PC have been plotted against the minimum and maximum critical loads for nitrogen and the maximum critical load for sulphur using the APIS Acidity Plot Tool. The graph comparing the PC against the nitrogen and sulphur critical load function is displayed in Figure 13, the PC is below the minimum CL function line.

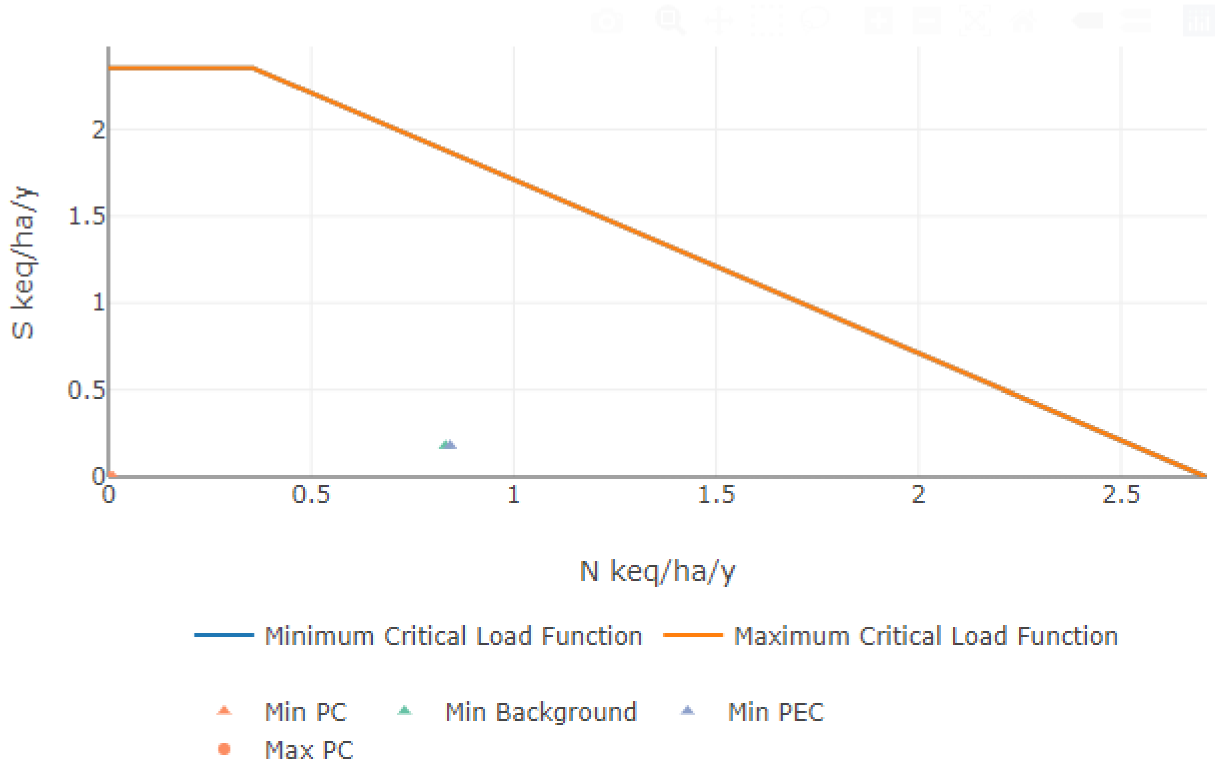

Figure 13: Acid Deposition in the Testing Scenario as a Proportion of the Minimum Critical Load Function.

7.1.4 Nutrient Nitrogen Deposition

The PC for nutrient nitrogen deposition is displayed for ecological sites in Table 60.

Table 60: Step 1 Screening for Nutrient Nitrogen Deposition as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC (kq N/ha/a)	PC as a % of the Critical Load	Significance
E1	0.187	1.87%	Potentially Significant
E2	0.007	0.07%	Insignificant
E3	0.006	0.06%	Insignificant
E4	0.009	0.09%	Insignificant
E5	0.006	0.06%	Insignificant
E6	0.015	0.15%	Insignificant
E7	0.005	0.05%	Insignificant
E8	0.004	0.04%	Insignificant
E9	0.028	0.28%	Insignificant
E10	0.033	0.33%	Insignificant
E11	0.012	0.12%	Insignificant
E12	0.014	0.14%	Insignificant
E13	0.007	0.07%	Insignificant
E14	0.004	0.04%	Insignificant
E15	0.004	0.04%	Insignificant

In line with step 1 of the screening process, the PC for nutrient nitrogen deposition exceeds 1% of the critical load at E1, therefore impacts cannot be screened out under step 1. For the remaining eco sites, the PC as a percentage of the critical load is less than 1%, indicating that impacts are likely to be insignificant.

Table 61: Step 2 Screening for Nutrient Nitrogen Deposition as a Result of the Testing Scenario on Ecological Receptors

Receptor ID	PEC (kq N/ha/a)	PEC as a % of the Critical Load	Significance
E1	11.8	117.9%	Potentially Significant

In line with step 2 of the screening process, the PEC at E1 exceeds 70% of the critical load, indicating potentially significant impacts. However, as outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to long term NO_X concentrations exceeding the critical level. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI and it is therefore fair to assume that airborne pollution is likely to have little impact on the SSSI. As further backed up by APIS, which states nitrogen from the atmosphere is unlikely to be the largest source of NO_X to eutrophicated standing waters and therefore nitrogen deposition from air is unlikely to be harmful to eutrophicated standing waters. As such the impacts on nutrient nitrogen deposition at E1 within the month testing scenario are likely to be not significant.

7.2 Testing Scenario - Monthly

The following outlines the results of the dispersion modelling for the monthly tests within the testing scenario. As outlined in section 3.2, the generators will be tested in groups of up to eight for 30 minutes every month, excluding the months where the six-monthly test occurs. To represent this in the model, a group of eight generators has been run at 50% load for a total of 70 hours, equating to 7 hours per day for a total of 10 days per year, to represent the worst meteorological hours of the year.

7.2.1 NO_X

The PC predicted in the testing scenario have been compared to the relevant critical levels for NO_X. For all local wildlife sites, a single point has been selected in line with the points assessed for Site 1. For Brent Reservoir SSSI, the predicted concentration is the maximum concentration predicted across the grid modelled to represent the SSSI. Predicted concentrations for the SSSI and LWSs are presented in Table 62.

Table 62: Step 1 Screening for NO_X Annual Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	0.3	1.0%	Potentially Significant
E2	<0.1	<0.1%	Insignificant
E3	<0.1	<0.1%	Insignificant
E4	<0.1	<0.1%	Insignificant
E5	<0.1	<0.1%	Insignificant
E6	<0.1	0.1%	Insignificant
E7	<0.1	<0.1%	Insignificant
E8	<0.1	<0.1%	Insignificant
E9	<0.1	0.2%	Insignificant
E10	0.1	0.2%	Insignificant
E11	<0.1	0.1%	Insignificant
E12	<0.1	0.1%	Insignificant
E13	<0.1	<0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the annual mean PC for NOx exceeds 1% of the critical level of 30 µg/m^3 at E1, therefore impacts cannot be screened out under step 1, and step 2 of the screening process is required. All other ecological sites, which are LWS, do not exceed 1% of the critical level and impacts can therefore be considered insignificant. Step 2 of the screening process for E1 is displayed Table 63. Table 63: Step 2 Screening for NO_X Annual Mean from the Testing Scenario on Ecological Receptors

Receptor ID	PEC (µg/m^3)	PEC % of Critical Level	Significance
E1	35.6	118.7%	Potentially Significant

In line with step 2 of the screening process, the maximum PEC at E1 is 35.6 µg/m^3, or 117.9% of the critical level. The PEC exceeds the critical level due to the background concentrations already exceeding the critical level at E1. However, it should be noted that the background concentration considered here is from 2020 which is a conservative approach, as the background concentration within the opening year is likely to be lower.

As outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to long term NO_X concentrations exceeding the critical level. The NOx background concentrations already exceeding the critical level is likely a result of the nearby busy roads, such as the A406 North Circular, the A5 and the M1. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI. As such the impacts on annual mean NO_X at E1 within the testing scenario are likely to be not significant.

The 24-hour mean NO_X PC have been compared against 200 µg/m^3 and are displayed in Table 64.

Table 64: Step 1 Screening for NO_X 24-hour Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	192.0	96.0%	Potentially Significant
E2	14.6	7.3%	Insignificant
E3	12.2	6.1%	Insignificant
E4	16.5	8.2%	Insignificant
E5	10.6	5.3%	Insignificant
E6	20.9	10.5%	Insignificant
E7	10.2	5.1%	Insignificant
E8	6.3	3.1%	Insignificant
E9	22.3	11.1%	Insignificant
E10	25.6	12.8%	Insignificant
E11	10.4	5.2%	Insignificant
E12	11.9	5.9%	Insignificant
E13	12.6	6.3%	Insignificant
E14	7.2	3.6%	Insignificant
E15	7.2	3.6%	Insignificant

In line with step 1 of the screening process, the 24-hour mean PC exceeds 10% of the critical level of 200 µg/m^3 at E1, therefore impacts cannot be screened out under step 1, and step 2 of the screening process is required. All other ecological sites, which are LWS, do not exceed 100% of the critical level and impacts can therefore be considered insignificant. Step 2 of the screening process for E1 is displayed in Table 65.

Table 65: Step 2 Screening for NO_X 24-hour Mean from the Testing Scenario on Ecological Receptors

Receptor ID	PC (µg/m^3)	24-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 24-hour mean AQO minus twice the long-term background	Significance
E1	192.0	129.4	148.4%	Potentially Significant

As outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to NO_X concentrations exceeding the critical level. The NOx background concentrations already exceeding the critical level is likely a result of the nearby busy roads, such as the A406 North Circular, the A5 and the M1. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI. As such the impacts on 24 hour mean NO_X at E1 within the testing scenario are likely to be not significant.

7.2.2 SO_2

Predicted annual mean SO_2 concentrations as a result of the testing of generators have been displayed in Table 66.

Table 66: Step 1 Screening for Annual Mean SO_2 Impacts from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	<0.1	<0.1%	Insignificant
E2	<0.1	<0.1%	Insignificant
E3	<0.1	<0.1%	Insignificant
E4	<0.1	<0.1%	Insignificant
E5	<0.1	<0.1%	Insignificant
E6	<0.1	<0.1%	Insignificant
E7	<0.1	<0.1%	Insignificant
E8	<0.1	<0.1%	Insignificant
E9	<0.1	<0.1%	Insignificant
E10	<0.1	<0.1%	Insignificant
E11	<0.1	<0.1%	Insignificant
E12	<0.1	<0.1%	Insignificant
E13	<0.1	<0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the annual mean PC is less than 0.1 µg/m^3 and less than 0.1% of the most stringent critical level of 10 µg/m^3 at all ecological sites. Therefore, the impact of SO_2 emissions on local habitats from the monthly testing of generators is likely to be insignificant.

7.2.3 Acidification

The deposition of nitrogen and sulphur compounds has been assessed against the relevant critical loads outlined in Section 2.4.3. Step 1 of the screening process for Acidification of nitrogen and step 1 of the screening process for the acidification of sulphur are displayed in Table 67 and Table 69 respectively.

Table 67: Step 1 Screening for Acidification of Nitrogen as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC N (keq/ha/a)	PC N as a % of the Critical Load	Significance
E1	0.006	1.7%	Potentially Significant
E2	<0.001	0.1%	Insignificant
E3	<0.001	0.1%	Insignificant
E4	<0.001	0.1%	Insignificant
E5	<0.001	0.1%	Insignificant

Receptor ID	PC N (keq/ha/a)	PC N as a % of the Critical Load	Significance
E6	0.001	0.2%	Insignificant
E7	<0.001	<0.1%	Insignificant
E8	<0.001	<0.1%	Insignificant
E9	0.001	0.3%	Insignificant
E10	0.001	0.3%	Insignificant
E11	<0.001	0.1%	Insignificant
E12	<0.001	0.1%	Insignificant
E13	<0.001	0.1%	Insignificant
E14	<0.001	<0.1%	Insignificant
E15	<0.001	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of nitrogen exceeds 1% at E1, therefore impacts cannot be screened out under step 1. For all other ecological sites, the impacts are likely to be insignificant.

Table 68: Step 2 Screening for Acidification of Nitrogen as a Result of the testing Scenario on Ecological Receptors.

Receptor ID	PEC N (keq/ha/a)	PEC N as a % of the Critical Load	Significance
E1	0.84	30.8%	Insignificant

In line with step 2 of the screening process, the PEC for the acidification of nitrogen is less than 70% of the critical load and therefore impacts are likely to be insignificant.

Table 69: Step 1 Screening for Acidification of Sulphur as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E1	<0.001	<0.1%	Insignificant
E2	<0.001	<0.1%	Insignificant
E3	<0.001	<0.1%	Insignificant
E4	<0.001	<0.1%	Insignificant
E5	<0.001	<0.1%	Insignificant
E6	<0.001	<0.1%	Insignificant
E7	<0.001	<0.1%	Insignificant
E8	<0.001	<0.1%	Insignificant
E9	<0.001	<0.1%	Insignificant
E10	<0.001	<0.1%	Insignificant
E11	<0.001	<0.1%	Insignificant
E12	<0.001	<0.1%	Insignificant

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E13	<0.001	<0.1%	Insignificant
E14	<0.001	<0.1%	Insignificant
E15	<0.001	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of sulphur does not exceed 1% at any ecological receptors, therefore the impacts are likely to be insignificant.

Furthermore, both nitrogen and sulphur PC have been plotted against the minimum and maximum critical loads for nitrogen and the maximum critical load for sulphur using the APIS Acidity Plot Tool. The graph comparing the PC against the nitrogen and sulphur critical load function is displayed in Figure 14, the PC is below the minimum CL function line.

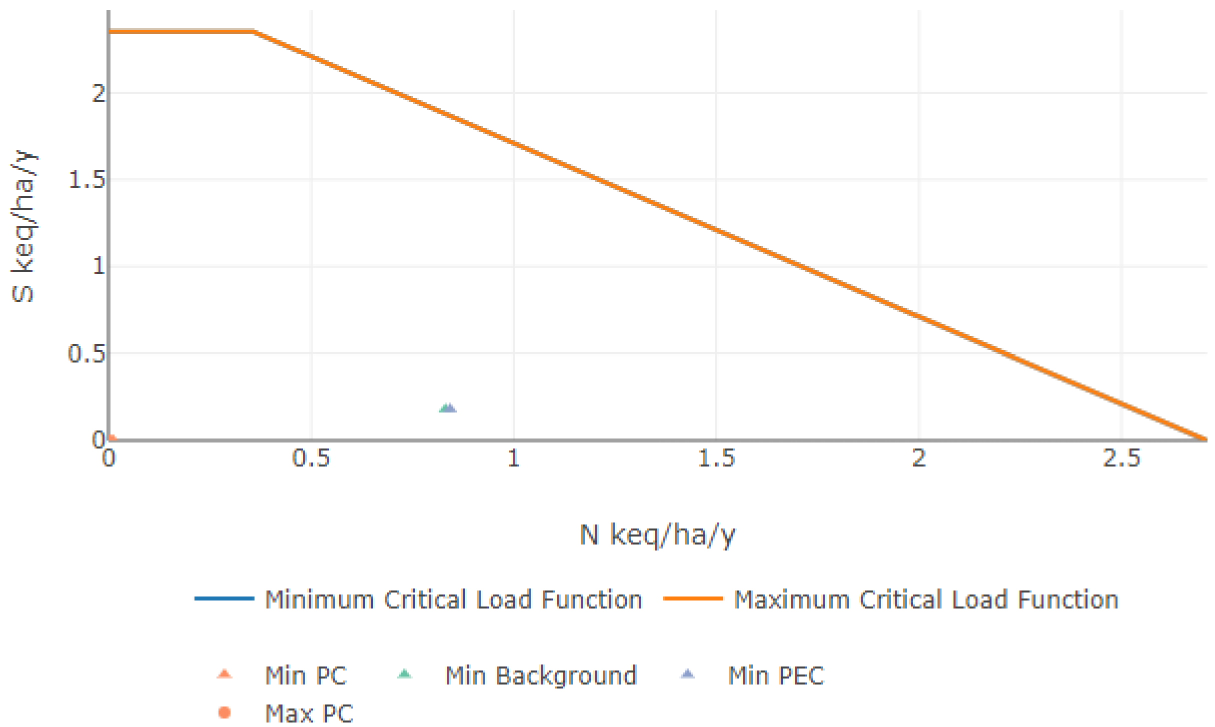

Figure 14: Acid Deposition in the Testing Scenario as a Proportion of the Minimum Critical Load Function.

7.2.4 Nutrient Nitrogen Deposition

The PC for nutrient nitrogen deposition is displayed for ecological sites in Table 70.

Table 70: Step 1 Screening for Nutrient Nitrogen Deposition as a Result of the Testing Scenario on Ecological Receptors.

Receptor ID	PC (kq N/ha/a)	PC as a % of the Critical Load	Significance
E1	0.087	0.87%	Insignificant
E2	0.003	0.03%	Insignificant
E3	0.003	0.03%	Insignificant
E4	0.004	0.04%	Insignificant

Receptor ID	PC (kq N/ha/a)	PC as a % of the Critical Load	Significance
E5	0.003	0.03%	Insignificant
E6	0.008	0.08%	Insignificant
E7	0.002	0.02%	Insignificant
E8	0.002	0.02%	Insignificant
E9	0.013	0.13%	Insignificant
E10	0.015	0.15%	Insignificant
E11	0.006	0.06%	Insignificant
E12	0.007	0.07%	Insignificant
E13	0.003	0.03%	Insignificant
E14	0.002	0.02%	Insignificant
E15	0.002	0.02%	Insignificant

In line with step 1 of the screening process, the PC for nutrient nitrogen deposition is below 1% of the critical load at all eco sites, impacts can therefore be screened out as insignificant.

7.3 Outage Scenario

7.3.1 NO_X

The PC predicted in the 48-hour outage scenario have been compared to the relevant critical levels for NO_X. The same method as outlined in section 7.1.1 has been used when assessing this scenario. PC for NO_X in the outage scenario for all ecological receptors are presented in Table 71.

Table 71: Step 1 Screening for NO_X Annual Mean from the Outage Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	4.1	10.3%	Potentially Significant
E2	0.1	0.4%	Insignificant
E3	0.1	0.3%	Insignificant
E4	0.2	0.5%	Insignificant
E5	0.1	0.4%	Insignificant
E6	0.3	0.9%	Insignificant
E7	0.1	0.3%	Insignificant
E8	0.1	0.3%	Insignificant
E9	0.5	1.6%	Insignificant
E10	0.6	1.9%	Insignificant
E11	0.2	0.7%	Insignificant
E12	0.3	0.8%	Insignificant
E13	0.1	0.4%	Insignificant
E14	0.1	0.2%	Insignificant
E15	0.1	0.2%	Insignificant

In line with step 1 of the screening process, the PC at E1 exceeds 1% of the critical level and impacts are therefore impacts cannot be screening out under step 1. The PC at all other ecological sites, which are LWS are less than 100% of the critical level and therefore impacts are likely to be insignificant.

Step 2 of the screening process for E1 is displayed in Table 72.

Table 72: Step 2 Screening for NO_X Annual Mean from the Testing Scenario on Ecological Receptors

Receptor ID	PEC (µg/m^3)	PEC % of Critical Level	Significance
E1	39.4	131.4%	Potentially Significant

In line with step 2 of the screening process, the maximum PEC at E1 is 39.4 µg/m^3, or 131.4% of the critical level. The PEC exceeds the critical level due to the background concentrations already exceeding the critical level at E1. However, it should be noted that the background concentration considered here is from 2020 which is a conservative approach, as the background concentration within the opening year is likely to be lower. Furthermore, as displayed in the contour plot in Figure 15, the area of Brent Reservoir that is predicted to experience a PC greater that 1% of the critical level covers approximately one third of the SSSI.

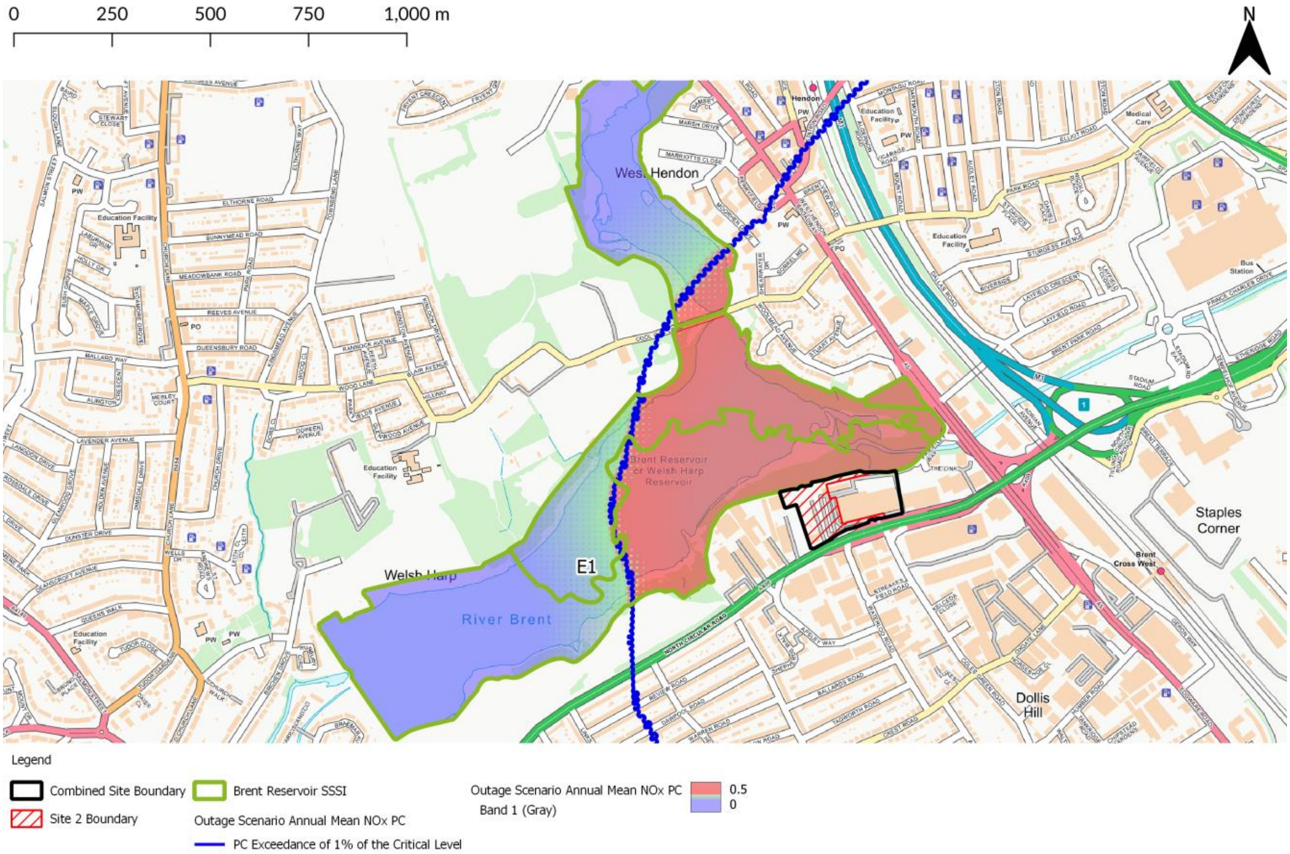

Figure 15: Outage Scenario Annual Mean NO_X PC Contour. Contains OS Data © Crown Copyright and Database rights 2024.

The 48-hour long outage scenario is highly unlikely to actually occur as over the past 10 years the longest outage from Elstree Substation was no longer than 3 minutes. Additionally, as outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to long term NO_X concentrations exceeding the critical level. Furthermore, the ecology statement (August 2023) stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI. As such the impacts on annual mean NO_X at E1 within the testing scenario are likely to be not significant.

The 24-hour mean NO_X PC have been compared against 200 µg/m^3 and are displayed in Table 73.

Table 73: Step 1 Screening for NO_X 24-hour Mean from the Outage Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	3070.0	1570.3%	Potentially Significant
E2	290.2	145.1%	Potentially Significant
E3	290.9	145.4%	Potentially Significant
E4	606.7	303.4%	Potentially Significant
E5	420.4	210.2%	Potentially Significant
E6	405.3	202.7%	Potentially Significant
E7	317.6	158.8%	Potentially Significant
E8	151.6	75.8%	Insignificant

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E9	545.9	272.9%	Potentially Significant
E10	482.5	241.2%	Potentially Significant
E11	235.9	117.9%	Potentially Significant
E12	268.4	134.2%	Potentially Significant
E13	266.7	133.3%	Potentially Significant
E14	211.3	105.6%	Potentially Significant
E15	176.3	88.2%	Insignificant

In line with step 1 of the screening process, the 24-hour mean PC exceeds 10% of the critical level of 200 µg/m^3, at E1 and exceeds 100% of the critical level at E6, E9 and E10, which are LWS. Therefore, impacts cannot be screened out under step 1 and step 2 of the screening process is required for these receptors. For the remaining ecological sites, which are LWS, the PC does not exceed 100% of the critical level and therefore impacts are likely to be insignificant.

Step 2 of the screening process for E1 is displayed in Table 74.

Table 74: Step 2 Screening for NO_X 24-hour Mean from the Testing Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	24-hour mean AQO minus twice the long-term background (µg/m^3)	PC as a % of the 24-hour mean AQO minus twice the long-term background	Significance
E1	3800.0	129.4	2991.2%	Potentially Significant
E2	290.2	121.8	302.4%	Potentially Significant
E3	290.9	118.0	316.0%	Potentially Significant
E4	606.7	130.8	516.8%	Potentially Significant
E5	420.4	130.8	374.3%	Potentially Significant
E6	405.3	132.0	358.6%	Potentially Significant
E7	317.6	118.0	338.6%	Potentially Significant
E9	545.9	111.6	568.4%	Potentially Significant
E10	482.5	111.6	511.5%	Potentially Significant
E11	235.9	123.0	254.4%	Potentially Significant
E12	268.4	123.0	280.8%	Potentially Significant
E13	266.7	137.4	239.7%	Potentially Significant
E14	211.3	143.2	187.2%	Potentially Significant

In line with step 2 of the screening process, the 24-hour mean PC exceeds 20% of the 24-hour mean AQO minus twice the long term background and subsequently there are potentially significant impacts at all eco receptors except for R8 and E15. A contour plot has not been displayed for the 24-hour mean scenario as the entire area of the SSSI exceeds 10% of the critical level.

However, the outage scenario is highly unlikely to occur, as in the past ten years the longest outage from the Elstree substation lasted no longer than 3 minutes. A number of worst case assumptions have also been made within this assessment, the modelled scenario has assumed no improvement from the Site 1 assessment, diesel fuel emissions have been modelled instead of the HVO 100 fuel emissions, and the worst case meteorological conditions have been assumed. Furthermore, regarding the SSSI, airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI and NO_X is unlikely to be harmful to this habitat. As such the impacts on 24-hour mean NO_X at all eco receptors as a result of the outage scenario are likely to be not significant as the 48-hour outage scenario is highly unlikely to occur.

7.3.2 SO_2

Predicted annual mean SO_2 concentrations as a result of the outage scenario have been displayed in Table 75.

Table 75: Step 1 Screening for Annual Mean SO_2 Impacts from the Outage Scenario on Ecological Receptors.

Receptor ID	PC (µg/m^3)	PC % of Critical Level	Significance
E1	<0.1	<0.1%	Insignificant
E2	<0.1	<0.1%	Insignificant
E3	<0.1	<0.1%	Insignificant
E4	<0.1	<0.1%	Insignificant
E5	<0.1	<0.1%	Insignificant
E6	<0.1	<0.1%	Insignificant
E7	<0.1	<0.1%	Insignificant
E8	<0.1	<0.1%	Insignificant
E9	<0.1	<0.1%	Insignificant
E10	<0.1	<0.1%	Insignificant
E11	<0.1	<0.1%	Insignificant
E12	<0.1	<0.1%	Insignificant
E13	<0.1	<0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the annual mean PC is 0.001 µg/m^3 or less and less than 0.01% of the most stringent critical level of 10 µg/m^3 at all ecological sites. Therefore, the impact of SO_2 emissions on local habitats from the outage scenario is likely to be insignificant.

7.3.3 Acidification

The deposition of nitrogen and sulphur compounds has been assessed against the relevant critical loads outlined in Section 2.4.3. Step 1 and 2 of the screening process for Acidification of nitrogen and step 1 of the screening process for the acidification of sulphur are displayed in Table 76, Table 77 and Table 78 respectively.

Table 76: Step 1 Screening of Acidification of Nitrogen and Sulphur as a Result of the Outage Scenario on Ecological Receptors.

Receptor ID	PC N (keq/ha/a)	PC as a % of the Critical Load	Significance
E1	0.084	23.7%	Potentially Significant

Receptor ID	PC N (keq/ha/a)	PC as a % of the Critical Load	Significance
E2	0.002	0.6%	Insignificant
E3	0.002	0.6%	Insignificant
E4	0.003	0.9%	Insignificant
E5	0.002	0.6%	Insignificant
E6	0.005	1.5%	Insignificant
E7	0.002	0.4%	Insignificant
E8	0.002	0.4%	Insignificant
E9	0.010	2.8%	Insignificant
E10	0.012	3.3%	Insignificant
E11	0.004	1.2%	Insignificant
E12	0.005	1.4%	Insignificant
E13	0.003	0.7%	Insignificant
E14	0.001	0.4%	Insignificant
E15	0.001	0.4%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of nitrogen exceeds 1% at E1, therefore impacts cannot be screened out under step 1. For all other ecological sites, the impacts are likely to be insignificant.

Table 77: Step 2 Screening for Acidification of Nitrogen as a Result of the Outage Scenario on Ecological Receptors.

Receptor ID	PEC N (keq/ha/a)	PEC N as a % of the Critical Load	Significance
E1	0.91	33.7%	Insignificant

In line with step 2 of the screening process, the PEC for the acidification of nitrogen is less than 70% of the critical load and therefore impacts are likely to be insignificant.

Table 78: Step 1 Screening for Acidification of Sulphur as a Result of the Outage Scenario on Ecological Receptors.

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E1	<0.1	<0.1%	Insignificant
E2	<0.1	<0.1%	Insignificant
E3	<0.1	<0.1%	Insignificant
E4	<0.1	<0.1%	Insignificant
E5	<0.1	<0.1%	Insignificant
E6	<0.1	<0.1%	Insignificant
E7	<0.1	<0.1%	Insignificant

Receptor ID	PC S (keq/ha/a)	PC S as a % of the Critical Load	Significance
E8	<0.1	<0.1%	Insignificant
E9	<0.1	<0.1%	Insignificant
E10	<0.1	<0.1%	Insignificant
E11	<0.1	<0.1%	Insignificant
E12	<0.1	<0.1%	Insignificant
E13	<0.1	<0.1%	Insignificant
E14	<0.1	<0.1%	Insignificant
E15	<0.1	<0.1%	Insignificant

In line with step 1 of the screening process, the PC as a percentage of the critical load for acidification of sulphur does not exceed 1% at any ecological receptors, therefore the impacts are likely to be insignificant.

Furthermore, both nitrogen and sulphur PC have been plotted against the minimum and maximum critical loads for nitrogen and the maximum critical load for sulphur using the APIS Acidity Plot Tool. The graph comparing the PC against the nitrogen and sulphur critical load function is displayed in Figure 16, the PC is below the minimum CL function line.

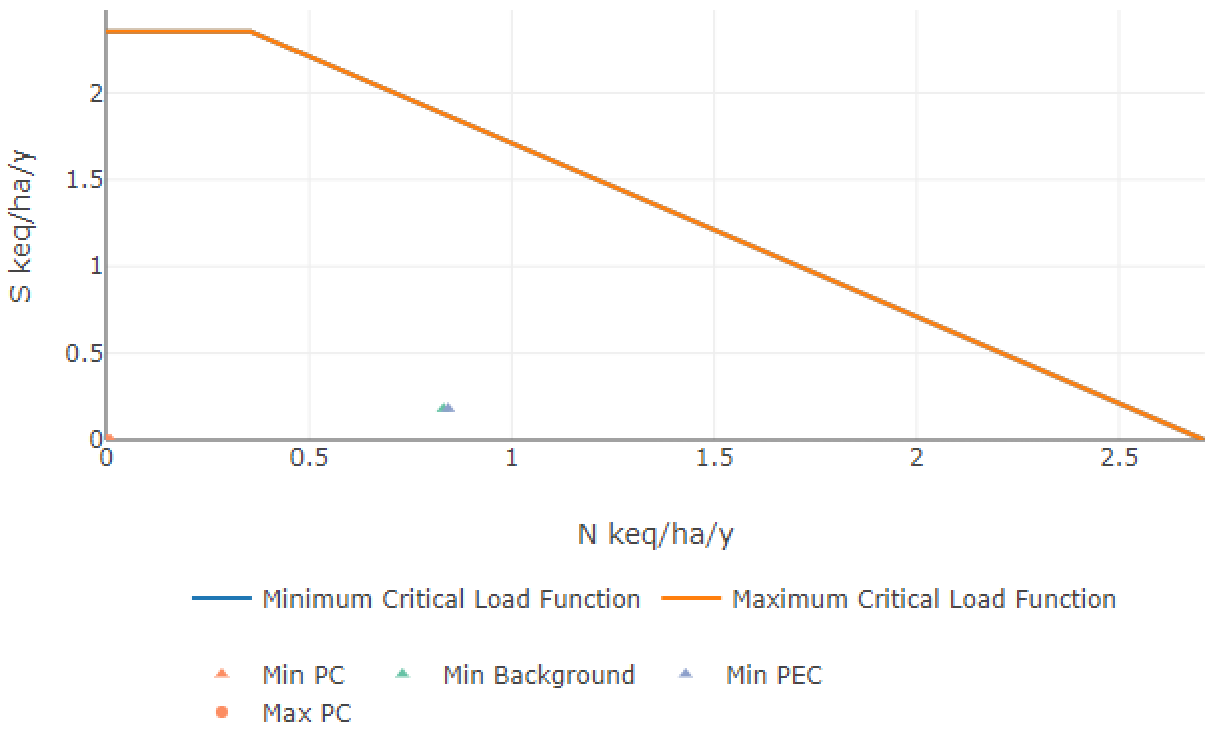

Figure 16: Acid Deposition in the Outage Scenario as a Proportion of the Minimum Critical Load Function.

7.3.4 Nutrient Nitrogen Deposition

The outage scenario PC for nutrient nitrogen deposition is displayed for ecological receptors in Table 79.

Table 79: Nutrient Nitrogen Deposition as a Result of the Outage Scenario on Ecological Receptors.

Receptor ID	PC (kq N/ha/a)	PC as a % of the Critical Load	Significance
E1	1.185	11.85%	Potentially Significant
E2	0.031	0.31%	Insignificant
E3	0.029	0.29%	Insignificant
E4	0.044	0.44%	Insignificant
E5	0.032	0.32%	Insignificant
E6	0.075	0.75%	Insignificant
E7	0.023	0.23%	Insignificant
E8	0.022	0.22%	Insignificant
E9	0.138	1.38%	Insignificant
E10	0.165	1.65%	Insignificant
E11	0.063	0.63%	Insignificant
E12	0.072	0.72%	Insignificant
E13	0.037	0.37%	Insignificant
E14	0.020	0.20%	Insignificant
E15	0.020	0.20%	Insignificant

In line with step 1 of the screening process, the PC for nutrient nitrogen deposition exceeds 1% of the critical load at E1, therefore impacts cannot be screened out under step 1. For the remaining ecological sites (E2 – E15), which are LWS, the PC as a percentage of the critical load is less than 100%, indicating that impacts are likely to be insignificant. Step 2 of the screening process for nutrient nitrogen deposition at E1 is displayed in Table 80.

Table 80: Step 2 Screening for Nutrient Nitrogen Deposition as a Result of the Outage Scenario on Ecological Receptors

Receptor ID	PEC (kq N/ha/a)	PEC as a % of the Critical Load	Significance
E1	12.8	127.9%	Potentially Significant

In line with step 2 of the screening process, the PEC at E1 exceeds 70% of the critical load, indicating potentially significant impacts. However, as outlined within the ecology statement (August 2023), the SSSI is primarily a wet woodland located in an urban setting, and therefore it is likely to be more resilient to nitrogen input as it is already subject to long term NO_X concentrations exceeding the critical level. Furthermore, the ecology statement (August 2023) report stated that airborne NO_X is not on the list of pollutants that are potentially damaging to the SSSI and it is therefore fair to assume that airborne pollution is likely to have little impact on the SSSI. As further backed up by APIS, which states nitrogen from the atmosphere is unlikely to be the largest source of NO_X to eutrophicated standing waters and therefore nitrogen deposition from air is unlikely to be harmful to eutrophicated standing waters. As such the impacts on nutrient nitrogen deposition at E1 within the testing scenario are likely to be not significant.

7.4 Summary of Ecological Assessment

In line with the criteria within step 1 and 2 of the screening process the impacts from both the testing scenarios were screened to be insignificant except for the annual mean NO_X concentrations and nutrient nitrogen deposition at E1 within the six-monthly testing scenario. The background concentrations from 2020 were used to provide a conservative assessment and therefore concentrations within the opening year are likely to be lower than predicted. Furthermore, E1 is likely to be more resilient to nitrogen input as it is already subject to long term NOx concentration exceeding the critical level as influenced by nearby major roads. It has also been noted in the ecology statement (August 2023) that supports this assessment, that NOx airborne pollutants are likely to have little impact on E1. Therefore, annual mean impacts from NOx and nutrient nitrogen deposition impacts as a result of the six-monthly testing scenario can be considered not significant.

For the outage scenario, impacts were not able to be screened out as insignificant within steps 1 and 2 at E1 for annual mean NOx and nutrient nitrogen deposition as well as all but E8 and E15 for 24-hour mean NOx. However, it is highly unlikely that the outage scenario will occur for a 48-hour long period due to the longest outage at Elstree substation lasting no longer than 3 minutes in the past ten years. Furthermore, airborne NO_X is not on the list of potentially damaging pollutants to the SSSI and NO_X being unlikely to be harmful. APIS also states that nitrogen from the atmosphere is unlikely to be the largest source of NO_X to eutrophic standing waters and therefore nitrogen deposition from the atmosphere is unlikely to be harmful to these habitat types. Subsequently, it is considered likely that the impacts to ecological sites from both testing scenarios and the outage scenario as a result of the installation will be not significant.

8. Mitigation

As the impacts on human and ecological sites have been screened out as insignificant or determined to be not significant where screening out is not possible, mitigation measures are not considered necessary.

Though not required to mitigate against impacts as a result of the operation of the backup generators, mitigation measures have been designed into the scheme, such as a testing schedules aimed at minimising the operation of generators as well as a green wall. Furthermore, generators will be using HVO fuel instead of fossil fuel diesel. On site emissions testing for Site 1 has shown that when using HVO fuel, the emissions rates are lower than the emission rates provided by the generator manufacturer.

9. Summary and Recommendations.

This report details the requirements to vary the existing permit (EPR/QP3706LH) covering Site 1, consisting of 16 generators to incorporate the new installation comprising of 40 generators.

The emissions from the generators have been modelled using ADMS-5 to assess their impact on human health and ecological sites within the vicinity of the installation from operation as part of the six-monthly and monthly testing schedule and in the case of an emergency power outage. Modelling has been undertaken over five meteorological years and the worst case year (2017) has been written up in this assessment. The assessment considers the impacts from modelled emissions of NO_2, PM_{10}, SO_2, CO and benzene at 17 existing human receptors and 15 ecological receptors in the vicinity of the Site.

The impacts at all human health receptors during both the six-monthly and monthly testing scenario were screened to be insignificant at all receptors for all pollutants except for the 1-hour mean NO_2 AQO within the six-monthly testing scenario. However, the 1-hour mean NO_2 PEC were below 50% of the 200 $\mu g/m^3$ AQO and therefore the impacts is considered to be not significant. For the outage scenario, the impacts from PM_{10}, SO_2 and CO were all screened to be insignificant. The annual mean and 1-hour mean NO_2 and the 1-hour mean Benzene were found to have potentially significant impacts, however both PECs were below their respective AQOs and the 48 hour outage scenario is highly unlikely to occur as the longest outage from Elstree Substation in the last ten years was less than 3 minutes, therefore impacts can be considered to be not significant. Subsequently, annual mean and short term impacts at all human health receptors are either screened out and insignificant, or considered to be not significant where they aren't screened out for all scenarios.

Impacts as a result of the six monthly and monthly testing scenarios on ecological receptors were screened to be insignificant and all but the annual mean NOx, 24-hour mean NOx and nutrient nitrogen deposition at E1 within the six monthly testing scenario and the annual mean NOx and 24-hour mean NOx at E1 within the monthly testing scenario. To ensure a conservative approach, the background concentration from 2020 has been used therefore concentrations in the opening year likely to be lower than predicted. In addition, the majority of the impact is due to the background concentration already exceeding the AQO. Furthermore, NOx airborne pollutants are likely to have little impact on E1, as stated by APIS. Subsequently, NOx concentrations are not considered to be an issue for the habitat types within E1. As such, the annual mean NOx impacts, and nutrient nitrogen deposition impacts are considered to be not significant.

During the outage scenario, impacts were screened to be insignificant for all receptors except at E1 for annual mean NOx and nutrient nitrogen deposition as well as all but E8 and E15 for 24-hour mean NOx. However, theses impacts were all determined to be not significant as it is highly unlikely that an outage will occur for a length of 48 hours, as the longest outage at Elstree substation was less than 3 minutes in the past ten years. As such the impact at ecological sites, where not able to be screened as insignificant, have been determined to be not significant in the outage scenario due to the unlikelihood of the outage scenario occurring.

Subsequently no additional mitigation is recommended for the installation. However, some measures have been included within the design to reduce emissions.

10. Glossary of Terms.

AQMA	Air Quality Management Area
BAT	Best Available Technique
CO	Carbon Monoxide
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
IED	Industrial Emissions Directive
LAEI	London Air Emissions Inventory
LBB	London Borough of Brent
LAQM	Local Air Quality Management
LNR	Local Nature Reserve
MCPD	Medium Combustion Plant Directive
$\mu g/m^3$	Micrograms per cubic metre
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides (taken to be NO_2 + NO)
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PC	Process Contribution
PEC	Predicted Environmental Concentration
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 micrometres
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 micrometres
SAC	Special Area of Conservation
SO_2	Sulphur Dioxide
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TOC	Total Organic Carbon

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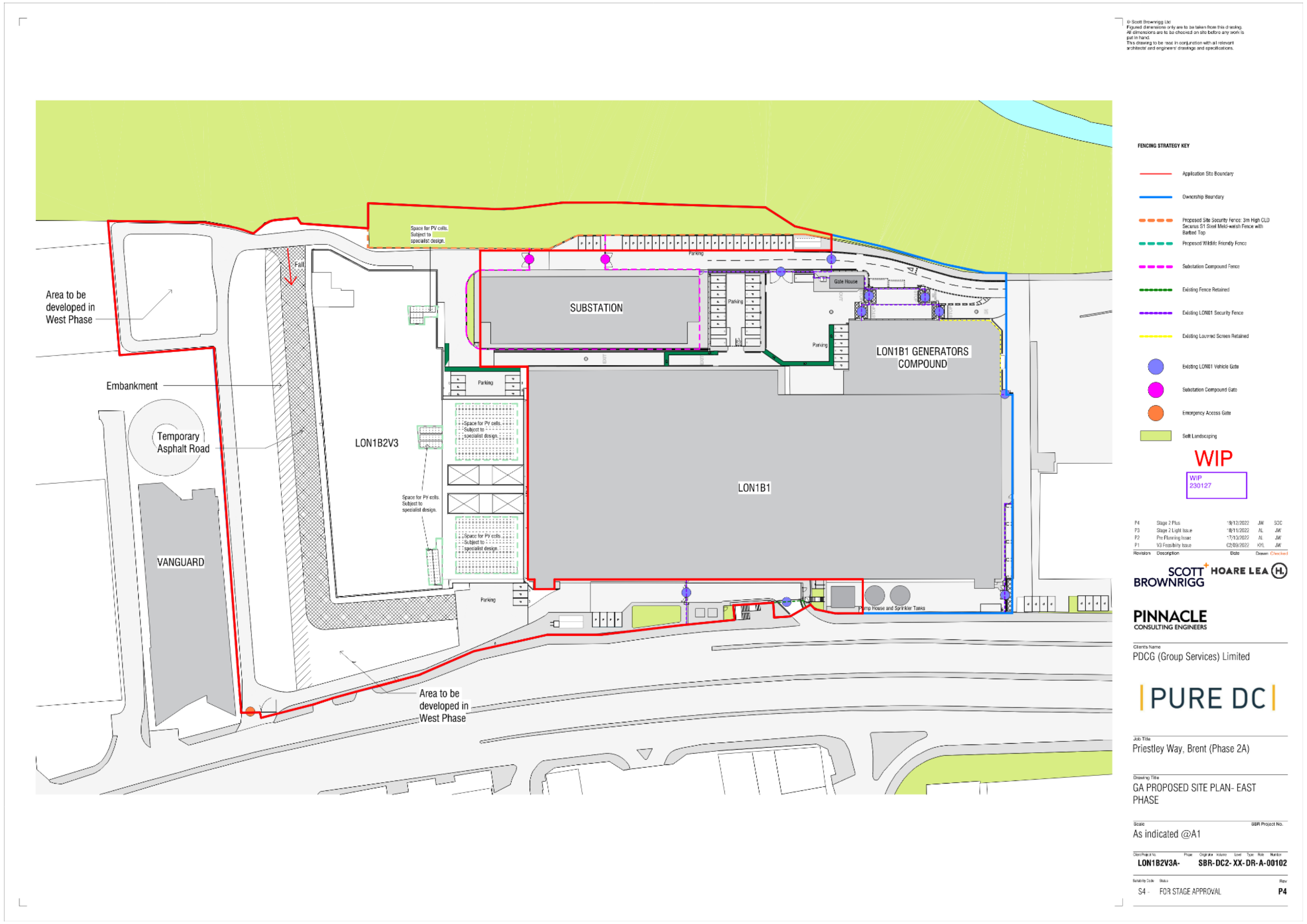
Appendix 1 – Site Plan.



Appendix 2 – Energy Combustion System Model Input Data.

Energy Centre.

The ADMS-5 model has been run to predict the process contribution (PC) of the emissions from the 56 x 3.3 MW_e generators. Emissions of NO_2, PM_{10}, SO_2, CO and benzene for all relevant AQOs have been modelled. The generators will only be used for testing and in the event of an outage to the power supply for the installation.

NO_X to NO_2 Conversion

Annual mean nitrogen oxides and the 99.79 percentile of 1-hour mean nitrogen oxides (NO_X) concentrations have been modelled in ADMS-5. The approach recommended by Environment Agency online guidance has been used to estimate annual mean NO_2 concentrations and 99.79 percentiles of 1-hour mean NO_2 concentrations from the modelled NO_X output assuming:

- Annual mean NO_2 concentrations = annual mean NO_X concentrations x 0.7; and
- 99.79 percentiles of 1-hour mean NO_2 concentrations = 99.79 percentiles of 1-hour mean NO_X multiplied by 0.35.

Conversion of 1-hour Mean Concentrations

The 8 hour and 24-hour means have been calculated using their respective output averages in ADMS with the relevant percentiles applied. For the 15 minute mean, the 99.99th percentile, which is provided in a 1-hour mean format, has been multiplied by a factor of 1.34, in line with the EA guidance[2], to represent a 15-minute mean.

Model Input Parameters.

The proposals include 56 x 3.3 MW_e generators that will only be operational for testing and standby power in the case of an emergency power outage from the grid.

The change in pollutant concentrations has been modelled using ADMS-5 dispersion model. Entrainment of the plume into the wake of the building (the building downwash effect) has been simulated within the model. Buildings surrounding the proposed stack have also been included in the model.

The testing scenario has been represented in the model using the following inputs:

- Six Monthly Testing Scenario:
  - 40 generators modelled individually for four hours twice per year at 100% load.
  - 16 generators modelled individually for four hours twice per year at 100% load.
- Monthly Testing Scenario:
  - 40 generators modelled in groups of eight for one hour for the remaining ten months at 50% load. As the model is run in hourly periods the emission rates are reduced by 50% to account for the 30 minute test.
  - 16 generators modelled in groups of eight for one hour for the remaining 10 months at 10% load. As the model is run in hourly periods, the emissions rates are reduced by 50% to account for the 30 minute test.
- Outage Scenario:
  - 36 generators modelled at 100% load for a 48-hour emergency outage period (four generators dedicated as swing generators).
  - 16 generators modelled at 75% load for a 48-hour emergency outage period. These generators have been run at 75% load to represent four generators dedicated as swing generators).

The generators have been modelled based on the manufacturer's technical specification which assumes the use of diesel fuel, however in reality it is anticipated that HVO 100 fuel will be used during operation. HVO 100 fuel is expected to reduce the emissions of NO_X, but the effectiveness of this improvement is not documented by the manufacturer and has therefore not been accounted for within the model.

Table 81: Model Input Parameters for Site 2 generators used in ADMS-5

Parameter		Generators 100% Load	Generators 50% Load
Number of Units		40	40
Make and Model		Rolls Royce MTU 20V4000G94LF	Rolls Royce MTU 20V4000G94LF
Fuel		Diesel *	Diesel *
Power (kW)		3307	1653
Exhaust gas temperature (°C)		472	432
Normalised exhaust gas volume flow rate (Nm^3/s)		2.985	1.631
Actual exhaust gas volume flow rate (Am^3/s)		11.9	6.5
Stack height above ground (m)		43.1	43.1
Stack diameter (mm)		750	750
Oxygen content (%)		9.9	11.9
NO_X emission rate	g/s	7.0509	2.6725
PM emission rate	g/s	0.021	0.054
CO emission rate	g/s	0.333	0.553
SO_2 emission rate	g/s	0.003	0.0016
HC (as benzene) emission rate	g/s	0.057	0.047

* The model has been run based on emissions from the use of diesel fuel however it is anticipated that HVO 100 fuel will be used in reality.

Table 82: Model Input Parameters for Site 1 generators used in ADMS-5

Parameter	Monthly tests (10% Load)	Six Monthly Tests (100% Load)	Outage Scenario (75% Load)
Number of Units	16	16	16
Fuel	Diesel *	Diesel *	Diesel *
Exhaust gas temperature (°C)	482	482	482

Parameter		Monthly tests (10% Load)	Six Monthly Tests (100% Load)	Outage Scenario (75% Load)
Normalised exhaust gas volume flow rate (Nm^3/s)		2362	2632	2362
Stack height above ground (m)		17.5	17.5	17.5
Stack diameter (mm)		600	600	600
Oxygen content (%)		10.6	10.6	10.6
NO_X emission rate	g/s	0.84	6.08	4.06
PM emission rate	g/s	0.0046	0.0184	0.0207
CO emission rate	g/s	0.26	0.28	0.28
SO_2 emission rate	g/s	0.00037	0.00276	0.00207
HC (as benzene) emission rate	g/s	0.066	0.046	0.0048

The above have been taken from the AERA submitted for the existing environmental permit. It has been assumed that the above are correct.

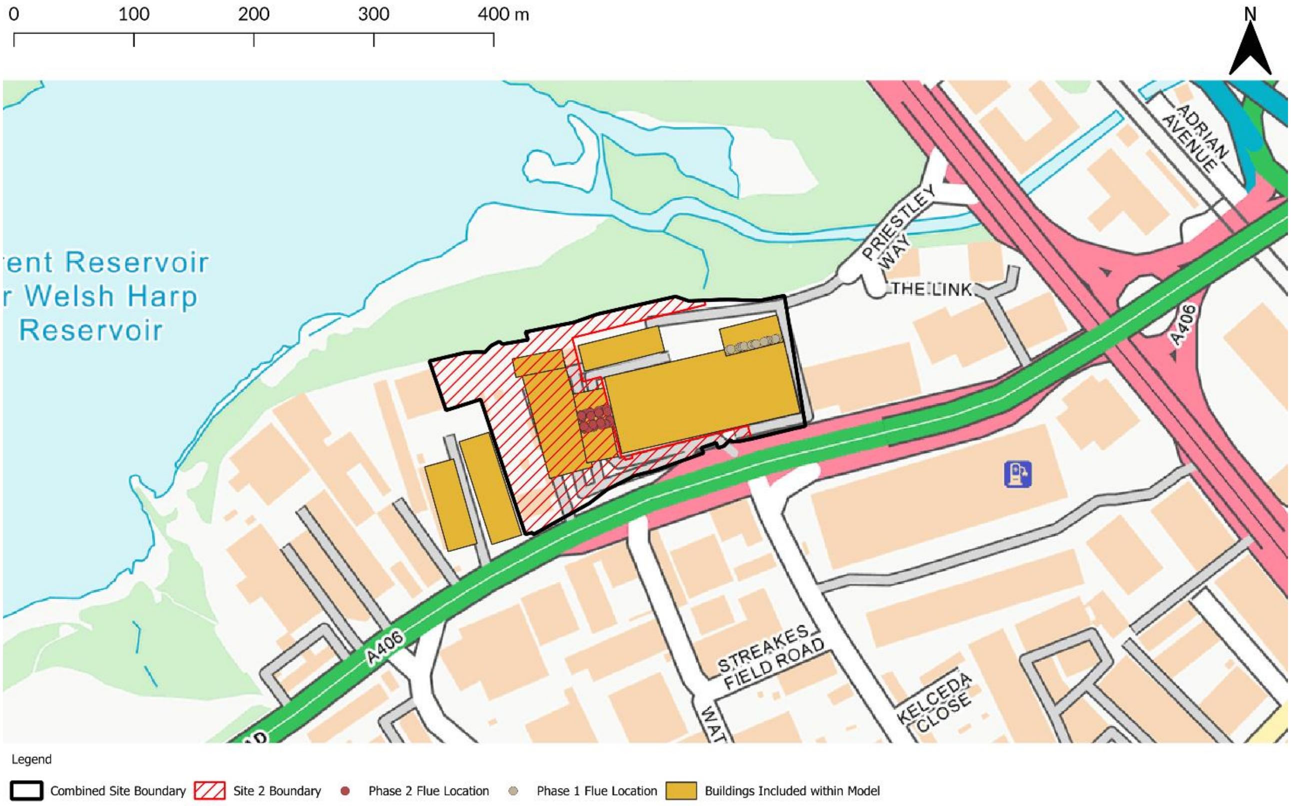


Figure 17: Stack Locations and Buildings Included in the Model. Contains Ordnance Survey Data © Crown Copyright and Database rights 2024.

Meteorological Data.
The meteorological site at Heathrow Airport is considered representative of the Site and the prevailing wind direction is dominated by westerly and south westerly directions as shown in Figure 18. This is likely to disperse emissions from the installation to the north and east of Site. The nearest existing receptors in these directions are the ecologically sensitive Brent Reservoir SSSI and further away the existing receptors at Woolmead Avenue and surrounding residential areas. Table 83 shows the values for surface roughness and the Monin-Obukhov length inputs used in the model.

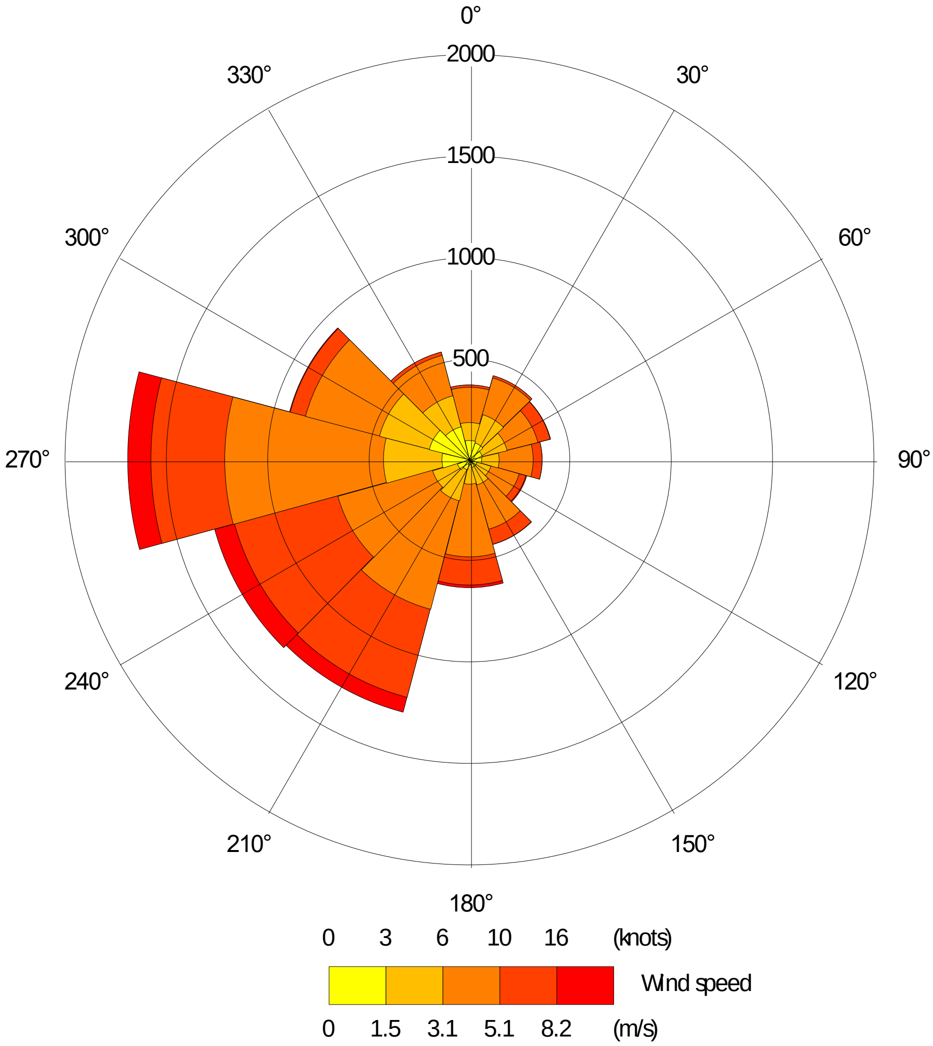


Figure 18: Wind Rose for Heathrow Airport in 2017.

Table 83: Grid and Meteorological Data Settings used in ADMS 5

Meteorology		Value		
Monin-Obukhov Length (m)	Dispersion Site	30		
	Meteorological Measurement Site	30		
Surface Roughness (m)	Dispersion Site	0.5		
	Meteorological Measurement Site	0.3		
Grid		Start	Finish	Number of Points
x		520684	523684	100
y		185691	188691	100
z		1.5	1.5	1

Meteorological analysis has been based on the observed concentrations across the model grid as well as at existing receptors. Table 84 and Table 85 shows a summary of the meteorological analysis results (for NO_X, CO, SO_2 and Benzene) as if the generators were running at 100% load all year round in order to capture the worst case met conditions during the year. The highest concentration for each parameter are shown in bold, the worst case met year is shown to be 2017.

Table 84: Meteorological Analysis to Determine Worst Case Conditions for Gridded Concentrations.

Meteorological Data Year	NO_X Annual Mean (µg/m^3)	NO_X 1-hour Mean (µg/m^3)	PM_{10} Annual Mean (µg/m^3)	PM_{10} 24-hour Mean (µg/m^3)	CO 1-hour Mean (µg/m^3)	SO_2 15-minute Mean (µg/m^3)	SO_2 1-hour Mean (µg/m^3)	SO_2 24-hour Mean (µg/m^3)	Benzene 1-hour Mean (µg/m^3)
2017	**533.1**	**5174.9**	**1.6**	**7.8**	249.2	**2.2**	**2.2**	**1.9**	42.7
2018	365.3	5056.9	1.1	6.3	247.7	2.2	2.1	1.8	42.4
2019	450.8	5079.7	1.3	6.8	248.2	2.2	2.1	1.8	42.5
2020	482.9	5094.4	1.4	6.9	263.5	2.2	2.1	1.8	45.1
2021	406.1	5060.3	1.2	6.4	**270.2**	2.2	2.1	1.8	**46.3**

Table 85: Meteorological Analysis to Determine Worst Case Conditions at Existing Receptors.

Meteorological Data Year	NO_X Annual Mean (µg/m^3)	NO_X 1-hour Mean (µg/m^3)	PM_{10} Annual Mean (µg/m^3)	PM_{10} 24-hour Mean (µg/m^3)	CO 1-hour Mean (µg/m^3)	SO_2 15-minute Mean (µg/m^3)	SO_2 1-hour Mean (µg/m^3)	SO_2 24-hour Mean (µg/m^3)	Benzene 1-hour Mean (µg/m^3)
2017	**526.5**	**3576.9**	**1.6**	**7.3**	**205.1**	1.6	**1.5**	**1.5**	**35.1**
2018	352.1	3541.2	1.0	6.1	187.3	1.5	1.5	1.4	32.1
2019	362.6	3524.8	1.1	6.1	185.6	1.5	1.5	1.4	31.8
2020	370.6	3524.4	1.1	6.2	192.6	1.5	1.5	1.4	33.0
2021	320.9	3576.0	1.0	5.4	191.6	**1.6**	1.5	1.4	32.8

Appendix 3 Modelled Results with a 1% Risk of Exceedance of Relevant AQO

Six Monthly Testing Scenario

The following PC were calculated during the six monthly testing scenario using percentiles that represent a 1% risk of exceedance of the relevant AQO. These percentiles were only used for short term PC within the six monthly testing scenario.

NO_2 1-hour Mean

Table 86: Percentile Representing 1% Risk of there being an Exceedance of the NO_2 1-hour Mean from the six monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)
	1-hour Mean
R1	9.7
R2	41.6
R3	33.0
R4	14.5
R5	32.9
R6	63.1
R7	29.5
R8	31.4
R9	64.4
R10	96.3
R11	85.2
R12	71.5
R13	68.9
R14	62.6
R15	36.0
R16	69.0
R17	37.3

PM_{10} 24-hour Mean

Receptor ID	PC (µg/m^3)
	24-hour Mean
R1	<0.1
R2	<0.1
R3	<0.1
R4	<0.1
R5	<0.1
R6	<0.1
R7	<0.1
R8	<0.1
R9	<0.1
R10	<0.1
R11	<0.1
R12	<0.1
R13	<0.1
R14	<0.1
R15	<0.1
R16	<0.1
R17	<0.1

SO_2

Table 87: Percentile Representing 1% Risk of there being an Exceedance of the SO_2 24-hour, 1-hour and 15-minute Mean from the six monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)		
	24-hour Mean	1-hour Mean	15-minute Mean
R1	<0.1	<0.1	<0.1
R2	<0.1	<0.1	<0.1
R3	<0.1	<0.1	<0.1
R4	<0.1	<0.1	<0.1
R5	<0.1	<0.1	<0.1
R6	<0.1	<0.1	<0.1
R7	<0.1	<0.1	<0.1
R8	<0.1	<0.1	<0.1
R9	<0.1	<0.1	<0.1
R10	<0.1	<0.1	0.1

Receptor ID	PC (µg/m^3)		
	24-hour Mean	1-hour Mean	15-minute Mean
R11	<0.1	<0.1	0.1
R12	<0.1	<0.1	<0.1
R13	<0.1	<0.1	<0.1
R14	<0.1	<0.1	<0.1
R15	<0.1	<0.1	<0.1
R16	<0.1	<0.1	<0.1
R17	<0.1	<0.1	<0.1

CO

Table 88: Percentile Representing 1% Risk of there being an Exceedance of the CO 8-hour and 1-hour Mean from the six monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)	
	8-hour Mean	1-hour Mean
R1	1.0	1.9
R2	2.9	3.6
R3	1.6	2.6
R4	1.1	2.5
R5	1.5	2.4
R6	3.1	3.3
R7	1.4	2.5
R8	1.4	2.4
R9	2.9	3.7
R10	4.5	4.8
R11	4.0	4.9
R12	3.7	5.9
R13	3.2	4.3
R14	2.7	3.7
R15	1.7	2.8
R16	4.2	4.5
R17	2.5	3.0

Benzene

Table 89: Percentile Representing 1% Risk of there being an Exceedance of the Benzene 1-hour Mean from the six monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m3)
	1-hour Mean
R1	0.3
R2	0.6
R3	0.5
R4	0.4
R5	0.4
R6	0.5
R7	0.4
R8	0.4
R9	0.6
R10	0.8
R11	0.8
R12	1.0
R13	0.7
R14	0.6
R15	0.5
R16	0.8
R17	0.5

Monthly Testing Scenario

The following PC were calculated during the monthly testing scenario using percentiles that represent a 1% risk of exceedance of the relevant AQO. These percentiles were only used for short term PC within the monthly testing scenario.

NO_2 1-hour Mean

Table 90: Percentile Representing 1% Risk of there being an Exceedance of the NO_2 1-hour Mean from the monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m3)
	1-hour Mean
R1	<0.1
R2	<0.1
R3	<0.1
R4	<0.1

Receptor ID	PC (µg/m³)
	1-hour Mean
R5	<0.1
R6	0.1
R7	<0.1
R8	<0.1
R9	<0.1
R10	0.1
R11	<0.1
R12	<0.1
R13	<0.1
R14	<0.1
R15	<0.1
R16	<0.1
R17	<0.1

Particulate Matter

During the monthly testing scenario there are not enough operational days for the 24-hour mean AQO to be exceeded, which allows for 35-days exceeding 50 µg/m³.

SO_2

Table 91: Percentile Representing 1% Risk of there being an Exceedance of the SO_2 24-hour, 1-hour and 15-minute Mean from the monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m³)		
	24-hour Mean	1-hour Mean	15-minute Mean
R1	<0.1	<0.1	<0.1
R2	<0.1	<0.1	<0.1
R3	<0.1	<0.1	<0.1
R4	<0.1	<0.1	<0.1
R5	<0.1	<0.1	0.1
R6	<0.1	<0.1	0.1
R7	<0.1	<0.1	<0.1
R8	<0.1	<0.1	0.1
R9	<0.1	<0.1	0.1
R10	<0.1	<0.1	0.2

Receptor ID	PC (µg/m³)		
	24-hour Mean	1-hour Mean	15-minute Mean
R11	<0.1	<0.1	0.2
R12	<0.1	<0.1	<0.1
R13	<0.1	<0.1	0.1
R14	<0.1	<0.1	<0.1
R15	<0.1	<0.1	<0.1
R16	<0.1	<0.1	<0.1
R17	<0.1	<0.1	<0.1

CO

Table 92: Percentile Representing 1% Risk of there being an Exceedance of the CO 8-hour and 1-hour Mean from the monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m³)	
	8-hour Mean	1-hour Mean
R1	13.2	24.6
R2	37.9	46.0
R3	20.8	33.3
R4	13.8	33.2
R5	19.7	30.8
R6	29.8	39.8
R7	16.6	26.8
R8	17.7	26.3
R9	37.4	47.5
R10	55.5	59.9
R11	51.1	62.7
R12	49.6	77.8
R13	42.1	55.4
R14	37.7	50.5
R15	22.6	35.5
R16	57.0	61.9
R17	33.2	37.7

Benzene

Table 93: Percentile Representing 1% Risk of there being an Exceedance of the Benzene 1-hour Mean from the monthly testing Scenario on Human Health.

Receptor ID	PC (µg/m^3)
	1-hour Mean
R1	2.2
R2	4.1
R3	2.9
R4	2.9
R5	3.3
R6	6.3
R7	3.4
R8	3.5
R9	5.2
R10	7.2
R11	7.6
R12	9.9
R13	5.4
R14	4.9
R15	3.4
R16	5.5
R17	3.6

Outage Scenario

The following PC were calculated during the outage scenario using percentiles that represent a 1% risk of exceedance of the relevant AQO. These percentiles were only used for short term PC within the outage scenario.

NO_2 1-hour Mean

Table 94: Percentile Representing 1% Risk of there being an Exceedance of the NO_2 1-hour Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)
	1-hour Mean
R1	<0.1
R2	<0.1
R3	0.2
R4	<0.1

Receptor ID	PC (µg/m^3)
	1-hour Mean
R5	13.0
R6	104.9
R7	28.9
R8	20.8
R9	21.9
R10	365.2
R11	66.9
R12	0.8
R13	2.3
R14	0.3
R15	<0.1
R16	0.1
R17	<0.1

Particulate Matter
During the outage scenario there are not enough operational hours for the 24-hour mean AQO to be exceeded, which allows for 35-days exceeding 50 µg/m^3.

SO_2
During the monthly testing scenario there are not enough operational hours for the 24-hour mean AQO to be exceeded, which allows for 3-days exceeding 50 µg/m^3.

Table 95: Percentile Representing 1% Risk of there being an Exceedance of the SO_2 1-hour and 15-minute Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)	
	1-hour Mean	15-minute Mean
R1	<0.1	0.5
R2	<0.1	1.5
R3	<0.1	1.1
R4	<0.1	0.6
R5	<0.1	1.1
R6	<0.1	1.9
R7	<0.1	1.1
R8	<0.1	1.1
R9	<0.1	1.9
R10	<0.1	2.2

Receptor ID	PC (µg/m³)	
	1-hour Mean	15-minute Mean
R11	<0.1	2.2
R12	<0.1	2.0
R13	<0.1	1.9
R14	<0.1	1.6
R15	<0.1	1.3
R16	<0.1	1.9
R17	<0.1	1.1

CO

Table 96: Percentile Representing 1% Risk of there being an Exceedance of the CO 8-hour and 1-hour Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m³)	
	8-hour Mean	1-hour Mean
R1	48.9	78.5
R2	133.4	152.7
R3	78.3	107.5
R4	51.1	99.5
R5	73.6	122.6
R6	155.0	198.4
R7	76.7	122.7
R8	80.2	123.4
R9	134.2	178.1
R10	196.5	307.7
R11	164.8	208.0
R12	136.3	242.7
R13	124.9	169.1
R14	121.0	152.3
R15	80.5	124.6
R16	160.3	172.5
R17	100.3	115.1

Benzene

Table 97: Percentile Representing 1% Risk of there being an Exceedance of the Benzene 1-hour Mean from the Outage Scenario on Human Health.

Receptor ID	PC (µg/m^3)
	1-hour Mean
R1	13.4
R2	26.2
R3	18.4
R4	17.0
R5	21.0
R6	34.0
R7	21.0
R8	21.1
R9	30.5
R10	52.7
R11	35.6
R12	41.6
R13	29.0
R14	26.1
R15	21.3
R16	29.5
R17	19.7

Appendix 4 Professional Experience.

Christelle Escoffier (Hoare Lea) MsEng. Msc. PhD MIES MIAQM

Christelle Escoffier is a Senior Associate and Technical Lead for air quality group with Hoare Lea. She is a Full Member of the Institution of Environmental Sciences and the Institute of Air Quality Management. She graduated with a Master in Science Diploma from Paris VI University, France and holds a Doctor of Philosophy degree in Physical Oceanography, Meteorology and Environment, from the same University.

In her twenty-two years of professional experience, she has managed and delivered air quality services for a wide range of industries in the United Kingdom (UK), the United States of America (USA) and the Middle East. Her portfolio of experience comprehends projects for diverse sectors from road transport, planning and development, wastewater and waste, oil and gas to power (energy centres, landfill gas plant, power reserve facilities, gas-fired and oil-fired combustion turbine stations). Christelle has in-depth knowledge of atmospheric dispersion models. She has delivered dispersion modelling training courses to government agencies, academic, industrial and commercial professionals worldwide since 2005.

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

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

Andy has worked on a range of projects of varying size across a number of different sectors. His experience focusses on work up to and through planning for air quality assessments and environmental impact assessments. Andy also has experience in detailed dispersion modelling of energy combustion plant such as Aintree Hospital (New hospital backup generator), Leconfield House (Energy combustion plant for mixed use development) and Quayside Quarter (Energy combustion plant for mixed use development).

Andy has a particular interest in reducing emissions for the benefit of human health and the environment through the life cycle of a building.

Oliver Parsons (Hoare Lea), BSc (Hons), MSc, AMIEnvSc, MIAQM

Oliver is a Senior Air Quality Consultant with Hoare Lea. He is an Associate Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management. He has worked on projects across multiple sectors including residential, commercial and industrial sectors.

He has completed two EIA within the past year at Hoare Lea, SSEN (film studio) and SBQ (mixed use residential). He has experience across different aspects of the air quality assessment processes including monitoring, detailed dispersion modelling of energy combustion plant such as Aintree Hospital (New hospital backup generator). He has also had experience with detailed dispersion modelling of roads, standalone air quality assessments and environmental impact assessments.

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