Air Quality Assessment

Unit 4, Silverdale Industrial Estate, Hayes

Client: Marvell Developments LLC

Reference: 8167r2

Date: 10th October 2024

Redmore environmental

Report Issue

Report Title: Air Quality Assessment - Unit 4, Silverdale Industrial Estate, Hayes

Report Reference: 8167

Field	Report Version			
	1	2	3	4
Prepared by	Emily Pears-Ryding	Emily Pears-Ryding		
Position	Associate Director	Associate Director		
Reviewed by	Jethro Redmore	Jethro Redmore		
Position	Director	Director		
Date of Issue	17th September 2024	10th October 2024		
Comment	Draft for Comment	-		

Serendipity Labs, Building 7, Exchange Quay, Salford, M5 3EP

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

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Executive Summary

This Air Quality Assessment has been prepared by Redmore Environmental to accompany a full planning application for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The application is submitted on behalf of Marvell Developments LLC.

The development has the potential to cause air quality impacts as a result of:

- Fugitive dust emissions during construction;
- Road vehicle exhaust emissions during construction and operation; and,
- Combustion emissions from the emergency generator during operation.

An Air Quality Assessment was therefore undertaken to determine baseline conditions and assess potential impacts associated with the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts associated with construction phase road vehicle exhaust emissions were assessed. Due to the low number of movements predicted to be generated, potential impacts associated with road vehicle exhaust emissions are not predicted to be significant.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Due to the low number of movements predicted to be generated, potential impacts associated with road vehicle exhaust emissions are not predicted to be significant.

Potential impacts during the operational phase of the proposals may occur due to combustion emissions from the emergency generator at the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the relevant source. The results indicated that impacts were not predicted to be significant.

Potential emissions from the development were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The plant to be installed for provision of heating and hot water does not produce emissions to atmosphere. Additionally, the results indicated an acceptable level of transport emissions from the scheme. As such, the proposals are considered to be air quality neutral.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Air Quality Assessment has been prepared by Redmore Environmental to accompany a full planning application for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The application is submitted on behalf of Marvell Developments LLC.

1.1.2 The proposals have the potential to cause air quality impacts during construction and operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

1.2 Site Location and Context

1.2.1 The site is located at Unit 4, Silverdale Industrial Estate, Hayes, at approximate National Grid Reference (NGR): 510283, 179473. The site is located within an Air Quality Management Area (AQMA) which has been declared by The London Borough of Hillingdon (LB Hillingdon). This is discussed further in Section 4.2. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The planning application seeks full planning permission for demolition of the existing building and structures on site, and all other associated site clearance works. Construction of a data centre building (Class B8) with plant at roof level with an emergency generator (1no) and associated flue (provided with an external compound adjoining the data centre building), sprinkler tank and pumphouse, security guard house, and provision of one kiosk substation and MV Building. The development also comprises the construction of a new access and internal road and circulation areas, footpaths, provision of car and bicycle parking, hard and soft landscaping and other associated works and ancillary site infrastructure.

1.2.3 Reference should be made to Figure 2 for a site layout plan.

1.2.4 The development has the potential to cause air quality impacts as a result of:

- Fugitive dust emissions during construction;

- Road vehicle exhaust emissions during construction and operation; and,
- Combustion emissions from the emergency generator during operation.

1.2.5 An Air Quality Assessment was therefore undertaken to determine baseline conditions and assess potential impacts associated with the scheme. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide (SO_2);
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene (C_6H_6); and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023[2] was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

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1 AQS: Framework for Local Authority Delivery, DEFRA, 2023.

2 Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target

Pollutant	Air Quality Objective/Interim Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12[(a)]	Annual mean
SO_2	125	24-hour mean; not to be exceeded more than 3 times per annum
	350	1-hour mean; not to be exceeded more than 24 times per annum
	266	15-minute mean; not to be exceeded more than 35 times per annum

Note: (a) Interim Target to be achieved by end of January 2028.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance[3] on where the AQOs for pollutants considered within this report apply.

3 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access
15-minute mean	All locations where members of public might reasonably be exposed for a period of 15 minutes or longer	-

2.2 Local Air Quality Management

2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Industrial Pollution Control Legislation

2.3.1 Atmospheric emissions from industry are controlled in England through the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments. The operation of emergency generators are included within the Regulations and as such the facility is required to operate in accordance with an Environmental Permit issued by the Environment Agency (EA). Compliance with any conditions of the permit must be demonstrated through periodic monitoring requirements, which have been set in order to limit potential impacts in the surrounding area.

2.4 Environmental Assessment Levels

2.4.1 An Environmental Assessment Level (EAL) is the concentration of a substance, which, in a particular environmental medium, the regulators regard as an appropriate value to enable a comparison between the environmental effects of different substances in that medium and between environmental effects in different media, enabling the summation of those effects.

2.4.2 Ideally EALs to fulfil this objective would be defined for each pollutant:

- Based on the sensitivity of particular habitats or receptors (in particular three main types of receptor should be considered, protection of human health, protection of natural ecosystems and protection of specific sensitive receptors, e.g. materials, commercial activities requiring a particular environmental quality);
- Be produced according to a standardised protocol to ensure that they are consistent, reproducible and readily understood;
- Provide similar measure of protection for different receptors both within and between media; and,
- Take account of habitat specific environmental factors such as pH, nutrient status, bioaccumulation, transfer and transformation processes where necessary.

2.4.3 EALs used in this assessment were obtained from EA guidance[4] and are summarised in Table 3.

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

Table 3 Environmental Assessment Levels

Pollutant	Environmental Assessment Level	
	Concentration (µg/m³)	Averaging Period
Formaldehyde (CH_2O)	5	Annual mean
	100	1-hour mean

2.5 Dust

2.5.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> "any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.5.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.6 National Planning Policy

2.6.1 The revised National Planning Policy Framework[5] (NPPF) was published in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

2.6.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

5 NPPF, Ministry of Housing, Communities and Local Government, 2023.

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.6.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[…]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]."

2.6.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.6.5 The implications of the NPPF have been considered throughout this assessment.

2.7 National Planning Practice Guidance

2.7.1 The National Planning Practice Guidance[6] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

2.7.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.8 Local Planning Policy

London Plan

2.8.1 The London Plan 2021[7] is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for Good Growth. Review of this document indicated the following of relevance to this report:

> "Policy SI 1 - Improving Air Quality
>
> A. Development plans, through relevant strategic, site specific and area-based policies should seek opportunities to identify and deliver further improvements to

6 https://www.gov.uk/guidance/air-quality--3.

7 The London Plan March 2021, GLA, 2021.

air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B. To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed.
1. Development proposals should not:
a) lead to further deterioration of existing poor air quality
b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedence of legal limits
c) create unacceptable risk of high levels of exposure to poor air quality.
2. In order to meet the requirements of Part 1, as a minimum:
a) development proposals must be at least Air Quality Neutral
b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures.
c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1
d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people, should demonstrate that design measures have been used to minimise exposure.

C. Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:
a) How proposals have considered ways to maximise benefits to local air quality, and
b) What measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

D. In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E. Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development."

2.8.2 The requirements of these policies have been considered throughout this Air Quality Assessment.

Local Planning Policy

2.8.3 The LB Hillingdon Local Plan Part 1[8] was adopted in November 2012. It sets out the overall level and broad locations of growth up to 2026. Review of the document indicated the following policies of relevance to the assessment:

"Policy BE1: Built Environment

The Council will require all new development to improve and maintain the quality of the built environment in order to create successful and sustainable neighbourhoods, where people enjoy living and working and that serve the long-term needs of all residents. All new developments should:

[…]

10. Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants.

8 Local Plan Part 1, LB Hillingdon, 2012.

The Council will require all new development to achieve reductions in carbon dioxide emission in line with the London Plan targets through energy efficient design and effective use of low and zero carbon technologies. Where the required reduction from on-site renewable energy is not feasible within major developments, contributions off-site will be sought. The Council will seek to merge a suite of sustainable design goals, such as the use of SUDS, water efficiency, lifetime homes, and energy efficiency into a requirement measured against the Code for Sustainable Homes and BREEAM. These will be set out within the Hillingdon Local Plan: Part 2 - Development Management Policies Local Development Document (LDD). All developments should be designed to make the most efficient use of natural resources whist safeguarding historic assets, their settings and local amenity and include sustainable design and construction techniques to increase the re-use and recycling of construction, demolition and excavation waste and reduce the amount disposed to landfill;

[…]"

"Policy EM1: Climate Change Adaptation and Mitigation

The Council will ensure that climate change mitigation is addressed at every stage of the development process by:

[…]

5. Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.
6. Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.

[…]"

"Policy EM8: Land, Water, Air and Noise

[…]

Air Quality

All development should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

All major development within the Air Quality Management Area (AQMA) should demonstrate air quality neutrality (no worsening of impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum.

The Council seeks to reduce the levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy. London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Actions plans, in particular where Air Quality Management Areas have been designated.

The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements.

[…]"

2.8.4 The Local Plan Part 2 Development Management Policies and Site Allocations and Designations[9] was adopted by LB Hillingdon on 16th January 2020. Review of the document indicated the following of relevance to the assessment:

"Policy DMEI 14: Air Quality

[9] Local Plan Part 2 Development Management Policies and Site Allocations and Designations, LB Hillingdon, 2020.

A) Development proposals should demonstrate appropriate reductions in emissions to sustain compliance with and contribute towards meeting EU limit values and national air quality objectives for pollutants.
B) Development proposals should, as a minimum:
i. be at least 'air quality neutral';
ii. include sufficient mitigation to ensure there is no unacceptable risk from air pollution to sensitive receptors, both existing and new; and
iii) actively contribute towards the improvement of air quality, especially within the Air Quality Management Area."

"Policy DMT 1: Managing Transport Impacts

A) Development proposals will be required to meet the transport needs of the development and address its transport impacts in a sustainable manner. In order for developments to be acceptable they are required to:

[…]

v) have no significant adverse transport or associated air quality and noise impacts on the local and wider environment, particularly on the strategic road network.

[…]"

"Polic DMT 2: Highways Impacts

Development proposals must ensure that:

ii) they do not contribute to the deterioration of air quality, noise or local amenity or safety of all road users and residents;

[…]"

2.8.5 The above policies were considered as necessary throughout the undertaking of the assessment.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology, which was outlined to LB Hillingdon in August 2024.

3.2 Construction Phase Fugitive Dust Emissions

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Mayor of London's 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance'[10].

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

- Demolition;
- Earthworks;
- Construction; and,
- Trackout.

3.2.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.2.4 The assessment steps are detailed below.

10 The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Step 1

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 350m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.

3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 4.

Table 4 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 to 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total building volume less than 20,000m^3 • Construction material with low potential for dust release (e.g. metal, cladding or timber) • Demolition activities more than 10m above ground
	Earthworks	• Total site area less than 2,500m^2 • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 10,000 tonnes

Magnitude	Activity	Criteria
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.19 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The sensitivities of specific receptors are shown in Table 5.

Table 5 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.20 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.21 These factors were considered in the undertaking of this assessment.

3.2.22 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 6.

Table 6 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.23 Table 7 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 7 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m³	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m³	More than 10	Low	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low	Low
	Less than 24µg/m³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.24 Table 8 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 8 Construction Dust - Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	Medium	Medium
Medium	Medium	Low
Low	Low	Low

3.2.25 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.26 Table 9 outlines the risk category from demolition activities.

Table 9 Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Medium	Low	Negligible

3.2.27 Table 10 outlines the risk category from earthworks and construction activities.

Table 10 Construction Dust - Dust Risk Category from Earthworks and Construction

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.28 Table 11 outlines the risk category from trackout activities.

Table 11 Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

3.2.29 Step 3 requires the identification of site specific mitigation measures within the Mayor of London's guidance[11] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

3.2.30 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.31 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The Mayor of London's guidance[12] suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

11 The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

12 The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

3.3 Road Vehicle Exhaust Emissions

3.3.1 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the construction and operational phases. Screening assessments were therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[13] guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The following criteria are provided to help establish when an assessment of potential road traffic impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.3 Should these criteria not be met, then the IAQM guidance[14] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[15].

13 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

14 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

15 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

3.4 Combustion Emissions

3.4.1 Combustion emissions from the emergency standby generator have the potential to contribute to elevated pollutant concentrations in the vicinity of the site. These have been quantified through dispersion modelling in accordance with the methodology outlined in Appendix 2.

3.4.2 A number of different operating scenarios have been considered within Appendix 2 in accordance with EA requirements for data centre generators[16]. However, for the purpose of the planning submission, the assessment has focused on the testing scenario only as it represents the most likely air quality impacts associated with the proposals and is therefore considered appropriate for the determination of effect significance. This is defined as Scenario 1 within Appendix 2. It should be noted that impacts associated with emergency generator emissions during all operation will be controlled through an Environmental Permit issued by the EA. As such, there is an appropriate regulatory framework to limit potential effects throughout operation.

3.4.3 Predicted pollutant concentrations were compared with the relevant AQOs. This considered the most relevant averaging periods for the associated testing events as detailed in Appendix 2. The significance of predicted air quality impacts was then determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[17]. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration with the development in place (PEC) and the magnitude of change (PC), as outlined in Table 12.

Table 12 Significance of Impact - Annual Mean Concentrations

Concentration at Receptor in Assessment Year (PEC)	Predicted Concentration Change as Proportion of AQO/Interim Target (PC) (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/Interim Target	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/Interim Target	Negligible	Slight	Moderate	Moderate

16 Data Centre FAQ Headline Approach, EA, 2018.

17 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Concentration at Receptor in Assessment Year (PEC)	Predicted Concentration Change as Proportion of AQO/Interim Target (PC) (%)			
	1	2 - 5	6 - 10	> 10
95 - 102% of AQO/Interim Target	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/Interim Target	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/Interim Target	Moderate	Substantial	Substantial	Substantial

3.4.4 The matrix shown in Table 12 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.4.5 The significance of impacts on short-term pollutant concentrations at sensitive receptors was determined in accordance with the criteria outlined in the IAQM document[18], as summarised in Table 13.

Table 13 Significance of Impact - Short Term Concentrations

Predicted Concentration Change as Proportion of AQO (PC) (%)	Significance of Impact
Less than 10	Negligible
11 - 20	Slight
21 - 50	Moderate
Greater than 51	Substantial

3.4.6 Following the prediction of impacts at discrete receptor locations, the IAQM[19] provides guidance on determining the overall air quality impact significance of the operation of a development and states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

18 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

19 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

3.4.7 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), LB Hillingdon has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within their area of jurisdiction. As such, one AQMA has been declared. This is described as follows:

> "The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line"

4.2.2 The site is located within the AQMA. As such, there is the potential for any emissions from the development to cause air quality impacts within this sensitive area. This has been considered throughout the assessment.

4.2.3 LB Hillingdon has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Focus Areas

4.3.1 Air Quality Focus Areas (AQFAs) have been designated throughout London in locations where the annual mean AQO for NO_2 is exceeded and there is a high level of human exposure. They were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends.

4.3.2 The site is not located within an AQFA, with the closest AQFA located 120m to the west (ID: 82). There is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.4 Air Quality Monitoring

4.4.1 Monitoring of pollutant levels is undertaken by LB Hillingdon throughout their area of jurisdiction. Recent NO_2 concentrations recorded in the vicinity of the development are shown in Table 14. Exceedences of the relevant AQO are shown in **bold**.

Table 14 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration ($\mu g/m^3$)			
		2019	2020	2021	2022
HILL07	Harold Avenue, Hayes	36.9	28.1	28.8	30.5
HILL08	Phelps Way, Hayes	33.9	24.1	25.3	26.7
HILL17	Silverdale Gardens, Hayes	31.6	24.7	24.2	24.1
HILL18	Blyth Road, Hayes	37.4	29.9	27.6	28.3
HILL26	R/O Cleave Avenue, Hayes	**40.0**	28.2	26.8	29.2
HILL27	Botwell House Primary School	33.2	24.5	25.3	26.8
HILL28	Blyth Road, Hayes	31.7	23.0	23.5	27.1
HILL44	Hillingdon North Wood Focus Area (Outside AQMA)[(a)]	-	-	27.0	26.1

Note: (a) Monitor commissioned in 2021.

4.4.2 As shown in Table 14, NO_2 concentrations were above the annual mean AQO of 40$\mu g/m^3$ at the HILL26 monitor during 2019. Levels were below the AQO at the remaining sites in recent years. Reference should be made to Figure 3 for a map of the survey positions.

4.4.3 LB Hillingdon do not undertake monitoring of other pollutants in the vicinity of the site.

4.5 Background Pollutant Concentrations

4.5.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and

Assessment of air quality. The site is located in NGR: 510500, 179500. Data for this location was downloaded from the DEFRA website[20] for the purpose of the assessment and is summarised in Table 15.

Table 15 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (μg/m³)
NO_2	23.77
SO_2	6.12
C_6H_6[(a)]	0.603
PM_{10}	16.23
$PM_{2.5}$	10.66

Note: (a) Used to represent background CH_2O concentrations

4.5.2 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ are predicted for 2024, C_6H_6 for 2010 and SO_2 for 2001. These were the most recent predictions available at the time of assessment and are therefore considered to provide a reasonable representation of background concentrations in the vicinity of the site.

4.6 Sensitive Receptors

4.6.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and combustion emission impacts in the following Sections.

Construction Phase Sensitive Receptors

4.6.2 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 16.

20 https://uk-air.defra.gov.uk/data/laqm-background-home.

Table 16 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.6.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 17.

Table 17 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0

4.6.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 18.

Table 18 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline review indicated Tarmac Hayes Asphalt Plant is located approximately 85m east of the development. Construction works have also recently taken place approximately 70m south-east, 150m south-west and 160m north-west of the development. As such, it is possible that there has been a history of dust generating activities in the area
The likelihood of concurrent dust generating activity on nearby sites	Ongoing construction works are taking place approximately 70m south-east and 200m south-west of the site. Should these works continue to take place once the proposed development is constructed, it is possible there will be concurrent dust generation

Guidance	Comment
Pre-existing screening between the source and the receptors	There is no existing screening in the vicinity of the site
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 4, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the development are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is likely that it will extend over one year. The sensitivity of the surrounding area is unlikely to change during this period
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.6.5 Dust sensitive receptors within 250m of the development include places of work and residential dwellings. These are considered to be of **medium** and **high** sensitivity, respectively. It should be noted that only receptors of **medium** sensitivity are present within 100m of the boundary.

4.6.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 19.

Table 19 Sensitivity of the Surrounding Area to Potential Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

Operational Phase Sensitive Receptors

Human Receptors

4.6.7 Human receptors sensitive to potential operational phase combustion emission impacts were identified from a desk-top study and are summarised in Table 20. Receptor heights were included to represent sensitive locations at varying heights within existing developments.

Table 20 Operational Phase Combustion Emission Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Cranton Avenue	510119.2	179343.6	1.5
R2	Residential - Cranton Avenue	510119.2	179343.6	7.5
R3	Residential - Cranton Avenue	510119.2	179343.6	13.5
R4	Residential - Cranton Avenue	510119.2	179343.6	19.5
R5	Residential - Pump Lane	510337.3	179710.3	1.5
R6	Residential - Chalfont Road	510080.9	179636.8	1.5
R7	Residential - Chalfont Road	510080.9	179636.8	7.5
R8	Residential - Chalfont Road	510080.9	179636.8	13.5
R9	Residential - Chalfont Road	510080.9	179636.8	19.5
R10	Residential - Station Approach	509997.7	179440.2	1.5
R11	Residential - Station Approach	509997.7	179440.2	7.5
R12	Residential - Station Approach	509997.7	179440.2	13.5
R13	Residential - Station Approach	509997.7	179440.2	19.5
R14	Residential - Nestle's Avenue	509960.1	179097.5	1.5
R15	Residential - Nestle's Avenue	510279.9	178957.1	1.5
R16	Residential - Pump Lane	510188.8	179761.7	1.5
R17	Business - Cash and Carry	510310.0	179446.5	1.5
R18	Place of Worship - Hillingdon Borough Central Masjid	510244.1	179463.3	1.5

4.6.8 Reference should be made to Figure 5 for a map of the combustion emission sensitive receptor locations.

Ecological Receptors

4.6.9 Ecological receptors sensitive to potential operational phase combustion emission impacts were identified from a desk-top study, including an information request through the EA. These are outlined within Appendix 2, along with the relevant critical loads and levels for the habitats present at each designation and existing baseline pollution levels. The assessment of impacts at each relevant site is also included.

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

5.2 Construction Phase Fugitive Dust Emissions Assessment

Step 1

5.2.1 The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of the existing buildings on site. It is estimated that the building volume to be demolished is less than 20,000m^3. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from demolition is therefore **small**.

5.2.5 Table 19 indicates the sensitivity of the area to dust soiling effects on people and property is **medium.** In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of demolition.

5.2.6 Table 19 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of demolition.

Earthworks

5.2.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is between 2,500m^2 and 10,000m^2. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from earthworks is therefore **medium**.

5.2.8 Table 19 indicates the sensitivity of the area to dust soiling effects on people and property is **medium.** In accordance with the criteria outlined in Table 10, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks.

5.2.9 Table 19 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.10 The total building volume to be constructed is estimated to be less than 25,000m^3. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from construction is therefore **small.**

5.2.11 Table 19 indicates the sensitivity of the area to dust soiling effects on people and property is **medium.** In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.12 Table 19 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.13 Based on the site area, it is anticipated that the unpaved road will be less than 50m. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.14 Table 19 indicates the sensitivity of the area to dust soiling effects to people and property is **medium**. In accordance with the criteria outlined in Table 10, the development is considered to be a **medium** risk site for dust soiling as a result of trackout.

5.2.15 Table 19 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for human health impacts as a result of trackout.

Summary of the Risk of Dust Effects

5.2.16 A summary of the risk from each dust generating activity is provided in Table 21.

Table 21 Summary of Potential Unmitigated Dust Risks During Construction

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Medium	Low	Medium
Human Health	Negligible	Low	Negligible	Low

5.2.17 As indicated in Table 21, the potential risk of dust soiling is **medium** from earthworks and trackout and **low** from demolition and construction. The potential risk of human health impacts is **low** from earthworks and trackout and **negligible** from demolition and construction.

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

Step 3

5.2.19 The Mayor of London's guidance[21] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 22. These will be incorporated into the Outline Construction Management Plan prepared for the Application.

Table 22 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Develop a Dust Management Plan (DMP) • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Display the head or regional office contact information • Record and respond to all dust and air quality pollutant emissions complaints • Make a complaints log available to the LA when asked • Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions are being carried out, and during prolonged dry or windy conditions • Record any exceptional incidents that cause dust and air quality pollutant emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing and scaffolding clean using wet methods • Remove materials from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping

21 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Issue	Control Measure
Operating vehicle/machinery and sustainable travel	• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone • Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance • Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Produce a Construction Logistics Plan to manage the sustainable delivery of goods
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust/particulate matter mitigation • Use enclosed chutes, conveyors and covered skips • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Reuse and recycle waste to reduce dust from waste materials • Avoid bonfires or burning of waste materials
Demolition	• Soft strip inside buildings before demolition • Ensure effective water suppression is used during demolition activities • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport • Implement a wheel washing system, if required

Step 4

5.2.20 Assuming the relevant mitigation measures outlined in Table 22 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the Mayor of London's guidance[22].

5.3 Construction Phase Road Vehicle Exhaust Emissions

5.3.1 Any vehicle movements associated with the construction of the scheme will generate exhaust emissions on the local and regional road networks. Information outlined within the Outline Construction Management Plan[23] for the development indicates that the scheme is predicted to generate peak traffic flows of 20 HDVs and 10 LDVs per day during the construction phase.

5.3.2 Based on the above, the proposals will not generate LDV flows of more than 100 AADT or HDV flows of more than 25 AADT on any individual road link. Additionally, the proposals do not include significant highway realignment or the introduction of a junction. As such, potential air quality impacts associated with construction phase road vehicle exhaust emissions are predicted to be **not significant** in accordance with the IAQM[24] screening criteria shown in Section 3.3.

5.4 Operational Phase Road Vehicle Exhaust Emissions

5.4.1 Any vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. Information provided by SLR Consulting Limited, the Transport Consultants for the project, indicated that the development would generate 54 LDV movements per day.

5.4.2 Based on the above information the development is not anticipated to result in an increase in LDV flows of more than 100 AADT or HDV flows of more than 25 AADT on any individual road link. Additionally, the proposals do not include significant highway realignment or the introduction of a junction. As such, potential air quality impacts

22 The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

23 Outline Construction Management Plan, Clifton Scannell Emerson Associates, 2024.

24 Land Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

associated with the operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM[25] screening criteria shown in Section 3.3.

5.5 Operational Phase Combustion Emissions

5.5.1 The emergency generator will produce combustion emissions during routine testing and maintenance, as outlined in Appendix 2 of this report. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations.

5.5.2 The assessment considered the following scenarios:

- Baseline - Existing pollutant concentrations without the development in place;
- PEC - Existing pollutant concentrations in addition to the emission contribution from the emergency generator during routine maintenance and testing; and,
- PC - Process contribution from the emergency generator during routine maintenance and testing.

5.5.3 Reference should be made to Appendix 2 for full assessment input details.

Nitrogen Dioxide

5.5.4 Predicted annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m^3)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	24.10	24.11	0.01
R2	Residential - Cranton Avenue	24.10	24.11	0.01
R3	Residential - Cranton Avenue	24.10	24.11	0.01

25 Land Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Receptor		Predicted Annual Mean NO_2 Concentration (μg/m³)		
		Baseline	PEC	PC
R4	Residential - Cranton Avenue	24.10	24.12	0.02
R5	Residential - Pump Lane	24.10	24.12	0.02
R6	Residential - Chalfont Road	24.10	24.11	0.01
R7	Residential - Chalfont Road	24.10	24.11	0.01
R8	Residential - Chalfont Road	24.10	24.11	0.01
R9	Residential - Chalfont Road	24.10	24.11	0.01
R10	Residential - Station Approach	24.10	24.11	0.01
R11	Residential - Station Approach	24.10	24.11	0.01
R12	Residential - Station Approach	24.10	24.11	0.01
R13	Residential - Station Approach	24.10	24.11	0.01
R14	Residential - Nestle's Avenue	24.10	24.11	0.01
R15	Residential - Nestle's Avenue	24.10	24.10	0.00
R16	Residential - Pump Lane	24.10	24.11	0.01
R17	Business - Cash and Carry	24.10	24.17	0.07
R18	Place of Worship - Hillingdon Borough Central Masjid	24.10	24.10	0.00

5.5.5 As shown in Table 23, predicted annual mean NO_2 concentrations were below the relevant AQO at all sensitive receptors as a result of all meteorological years.

5.5.6 The significance of predicted impacts on annual mean NO_2 concentrations at the sensitive receptors are summarised in Table 24. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 24 Predicted Impacts on Annual Mean NO_2 Concentrations

Receptor		Predicted Concentration (PEC)	Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R2	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R3	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R4	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R5	Residential - Pump Lane	Below 75% of AQO	0	Negligible
R6	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R7	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R8	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R9	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R10	Residential - Station Approach	Below 75% of AQO	0	Negligible
R11	Residential - Station Approach	Below 75% of AQO	0	Negligible
R12	Residential - Station Approach	Below 75% of AQO	0	Negligible
R13	Residential - Station Approach	Below 75% of AQO	0	Negligible
R14	Residential - Nestle's Avenue	Below 75% of AQO	0	Negligible
R15	Residential - Nestle's Avenue	Below 75% of AQO	0	Negligible
R16	Residential - Pump Lane	Below 75% of AQO	0	Negligible
R17	Business - Cash and Carry	Below 75% of AQO	0	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Below 75% of AQO	0	Negligible

5.5.7 As shown in Table 24, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

5.5.8 Predicted 1-hour mean NO_2 PECs are summarised in Table 25.

Table 25 Predicted 1-hour Mean NO_2 Concentrations

Receptor		Predicted 1-hour Mean NO_2 Concentration (µg/m^3)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	48.20	48.20	0.00
R2	Residential - Cranton Avenue	48.20	48.20	0.00
R3	Residential - Cranton Avenue	48.20	48.20	0.00
R4	Residential - Cranton Avenue	48.20	48.20	0.00
R5	Residential - Pump Lane	48.20	48.20	0.00
R6	Residential - Chalfont Road	48.20	48.20	0.00
R7	Residential - Chalfont Road	48.20	48.20	0.00
R8	Residential - Chalfont Road	48.20	48.20	0.00
R9	Residential - Chalfont Road	48.20	48.20	0.00
R10	Residential - Station Approach	48.20	48.20	0.00
R11	Residential - Station Approach	48.20	48.20	0.00
R12	Residential - Station Approach	48.20	48.20	0.00
R13	Residential - Station Approach	48.20	48.20	0.00
R14	Residential - Nestle's Avenue	48.20	48.20	0.00
R15	Residential - Nestle's Avenue	48.20	48.20	0.00
R16	Residential - Pump Lane	48.20	48.20	0.00
R17	Business - Cash and Carry	48.20	48.20	0.00
R18	Place of Worship - Hillingdon Borough Central Masjid	48.20	48.20	0.00

5.5.9 As shown in Table 25, 1-hour mean NO_2 PECs were below the AQO of 200µg/m^3 at all sensitive receptors as a result of all meteorological years. It is noted that the PC was 0µg/m^3 at all sensitive receptor locations as routine maintenance and testing will only take place over a maximum of 19-hours per year.

5.5.10 The significance of predicted impacts on 1-hour mean NO_2 concentrations at the sensitive receptors are summarised in Table 26. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 26 Predicted Impacts on 1-hour Mean NO_2 Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Less than 10	Negligible
R2	Residential - Cranton Avenue	Less than 10	Negligible
R3	Residential - Cranton Avenue	Less than 10	Negligible
R4	Residential - Cranton Avenue	Less than 10	Negligible
R5	Residential - Pump Lane	Less than 10	Negligible
R6	Residential - Chalfont Road	Less than 10	Negligible
R7	Residential - Chalfont Road	Less than 10	Negligible
R8	Residential - Chalfont Road	Less than 10	Negligible
R9	Residential - Chalfont Road	Less than 10	Negligible
R10	Residential - Station Approach	Less than 10	Negligible
R11	Residential - Station Approach	Less than 10	Negligible
R12	Residential - Station Approach	Less than 10	Negligible
R13	Residential - Station Approach	Less than 10	Negligible
R14	Residential - Nestle's Avenue	Less than 10	Negligible
R15	Residential - Nestle's Avenue	Less than 10	Negligible
R16	Residential - Pump Lane	Less than 10	Negligible
R17	Business - Cash and Carry	Less than 10	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Less than 10	Negligible

5.5.11 As shown in Table 26, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptors. This is classified as **not significant**, in accordance with the stated guidance.

Particulate Matter

5.5.12 Annual mean PM_{10} PECs were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 27.

Table 27 Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	16.23	16.23	0.00
R2	Residential - Cranton Avenue	16.23	16.23	0.00
R3	Residential - Cranton Avenue	16.23	16.23	0.00
R4	Residential - Cranton Avenue	16.23	16.23	0.00
R5	Residential - Pump Lane	16.23	16.23	0.00
R6	Residential - Chalfont Road	16.23	16.23	0.00
R7	Residential - Chalfont Road	16.23	16.23	0.00
R8	Residential - Chalfont Road	16.23	16.23	0.00
R9	Residential - Chalfont Road	16.23	16.23	0.00
R10	Residential - Station Approach	16.23	16.23	0.00
R11	Residential - Station Approach	16.23	16.23	0.00
R12	Residential - Station Approach	16.23	16.23	0.00
R13	Residential - Station Approach	16.23	16.23	0.00
R14	Residential - Nestle's Avenue	16.23	16.23	0.00
R15	Residential - Nestle's Avenue	16.23	16.23	0.00
R16	Residential - Pump Lane	16.23	16.23	0.00
R17	Business - Cash and Carry	16.23	16.24	0.01
R18	Place of Worship - Hillingdon Borough Central Masjid	16.23	16.23	0.00

5.5.13 As shown in Table 27, PM_{10} PECs were below the AQO of $40\mu g/m^3$ at all sensitive receptor locations as a result of all meteorological years.

5.5.14 The significance of predicted impacts on annual mean PM_{10} concentrations at the sensitive receptors are summarised in Table 28. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 28 Predicted Impacts on Annual Mean PM_{10} Concentrations

Receptor		Predicted Concentration (PEC)	Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R2	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R3	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R4	Residential - Cranton Avenue	Below 75% of AQO	0	Negligible
R5	Residential - Pump Lane	Below 75% of AQO	0	Negligible
R6	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R7	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R8	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R9	Residential - Chalfont Road	Below 75% of AQO	0	Negligible
R10	Residential - Station Approach	Below 75% of AQO	0	Negligible
R11	Residential - Station Approach	Below 75% of AQO	0	Negligible
R12	Residential - Station Approach	Below 75% of AQO	0	Negligible
R13	Residential - Station Approach	Below 75% of AQO	0	Negligible
R14	Residential - Nestle's Avenue	Below 75% of AQO	0	Negligible
R15	Residential - Nestle's Avenue	Below 75% of AQO	0	Negligible
R16	Residential - Pump Lane	Below 75% of AQO	0	Negligible
R17	Business - Cash and Carry	Below 75% of AQO	0	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Below 75% of AQO	0	Negligible

5.5.15 As shown in Table 28, impacts on annual mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

5.5.16 Predicted 24-hour mean PM_{10} PECs, inclusive of background levels, are summarised in Table 29. It should be noted that the results assume constant operation of the generator throughout the year, rather than solely the routine maintenance and testing periods, in order to simplify the assessment scenarios presented in Appendix 2. As such, concentrations significantly overestimate impacts associated with the proposed operations.

Table 29 Predicted 24-hour Mean PM_{10} Concentrations

Receptor		Predicted 24-hour Mean PM_{10} Concentration (µg/m³)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	32.45	33.20	0.74
R2	Residential - Cranton Avenue	32.45	33.25	0.79
R3	Residential - Cranton Avenue	32.45	33.35	0.90
R4	Residential - Cranton Avenue	32.45	33.49	1.04
R5	Residential - Pump Lane	32.45	33.26	0.81
R6	Residential - Chalfont Road	32.45	32.79	0.34
R7	Residential - Chalfont Road	32.45	32.80	0.35
R8	Residential - Chalfont Road	32.45	32.80	0.35
R9	Residential - Chalfont Road	32.45	32.82	0.37
R10	Residential - Station Approach	32.45	32.89	0.43
R11	Residential - Station Approach	32.45	32.90	0.44
R12	Residential - Station Approach	32.45	32.92	0.46
R13	Residential - Station Approach	32.45	32.92	0.47
R14	Residential - Nestle's Avenue	32.45	32.74	0.28
R15	Residential - Nestle's Avenue	32.45	32.72	0.26
R16	Residential - Pump Lane	32.45	32.91	0.45
R17	Business - Cash and Carry	32.45	35.57	3.11
R18	Place of Worship - Hillingdon Borough Central Masjid	32.45	32.68	0.23

5.5.17 As shown in Table 29, 24-hour mean PM_{10} PECs were below the AQO of 50µg/m³ at all sensitive receptors as a result of all meteorological years.

5.5.18 The significance of predicted impacts on 24-hour mean PM_{10} concentrations at the sensitive receptors are summarised in Table 30. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 30 Predicted Impacts on 24-hour Mean PM_{10} Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Less than 10	Negligible
R2	Residential - Cranton Avenue	Less than 10	Negligible
R3	Residential - Cranton Avenue	Less than 10	Negligible
R4	Residential - Cranton Avenue	Less than 10	Negligible
R5	Residential - Pump Lane	Less than 10	Negligible
R6	Residential - Chalfont Road	Less than 10	Negligible
R7	Residential - Chalfont Road	Less than 10	Negligible
R8	Residential - Chalfont Road	Less than 10	Negligible
R9	Residential - Chalfont Road	Less than 10	Negligible
R10	Residential - Station Approach	Less than 10	Negligible
R11	Residential - Station Approach	Less than 10	Negligible
R12	Residential - Station Approach	Less than 10	Negligible
R13	Residential - Station Approach	Less than 10	Negligible
R14	Residential - Nestle's Avenue	Less than 10	Negligible
R15	Residential - Nestle's Avenue	Less than 10	Negligible
R16	Residential - Pump Lane	Less than 10	Negligible
R17	Business - Cash and Carry	Less than 10	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Less than 10	Negligible

5.5.19 As shown in Table 30, impacts on 24-hour mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

5.5.20 Predicted annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 31.

Table 31 Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	10.66	10.66	0.00
R2	Residential - Cranton Avenue	10.66	10.66	0.00
R3	Residential - Cranton Avenue	10.66	10.66	0.00
R4	Residential - Cranton Avenue	10.66	10.66	0.00
R5	Residential - Pump Lane	10.66	10.66	0.00
R6	Residential - Chalfont Road	10.66	10.66	0.00
R7	Residential - Chalfont Road	10.66	10.66	0.00
R8	Residential - Chalfont Road	10.66	10.66	0.00
R9	Residential - Chalfont Road	10.66	10.66	0.00
R10	Residential - Station Approach	10.66	10.66	0.00
R11	Residential - Station Approach	10.66	10.66	0.00
R12	Residential - Station Approach	10.66	10.66	0.00
R13	Residential - Station Approach	10.66	10.66	0.00
R14	Residential - Nestle's Avenue	10.66	10.66	0.00
R15	Residential - Nestle's Avenue	10.66	10.66	0.00
R16	Residential - Pump Lane	10.66	10.66	0.00
R17	Business - Cash and Carry	10.66	10.67	0.01
R18	Place of Worship - Hillingdon Borough Central Masjid	10.66	10.66	0.00

5.5.21 As shown in Table 31, $PM_{2.5}$ PECs were below the annual mean Interim Target of 12µg/m^3 at all sensitive receptor locations as a result of all meteorological years.

5.5.22 The significance of predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptors are summarised in Table 32. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 32 Predicted Impacts on Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Concentration (PEC)	Predicted Concentration Change as Proportion of Interim Target (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	76 - 94% of Interim Target	0	Negligible
R2	Residential - Cranton Avenue	76 - 94% of Interim Target	0	Negligible
R3	Residential - Cranton Avenue	76 - 94% of Interim Target	0	Negligible
R4	Residential - Cranton Avenue	76 - 94% of Interim Target	0	Negligible
R5	Residential - Pump Lane	76 - 94% of Interim Target	0	Negligible
R6	Residential - Chalfont Road	76 - 94% of Interim Target	0	Negligible
R7	Residential - Chalfont Road	76 - 94% of Interim Target	0	Negligible
R8	Residential - Chalfont Road	76 - 94% of Interim Target	0	Negligible
R9	Residential - Chalfont Road	76 - 94% of Interim Target	0	Negligible
R10	Residential - Station Approach	76 - 94% of Interim Target	0	Negligible
R11	Residential - Station Approach	76 - 94% of Interim Target	0	Negligible
R12	Residential - Station Approach	76 - 94% of Interim Target	0	Negligible
R13	Residential - Station Approach	76 - 94% of Interim Target	0	Negligible
R14	Residential - Nestle's Avenue	76 - 94% of Interim Target	0	Negligible
R15	Residential - Nestle's Avenue	76 - 94% of Interim Target	0	Negligible
R16	Residential - Pump Lane	76 - 94% of Interim Target	0	Negligible
R17	Business - Cash and Carry	76 - 94% of Interim Target	0	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	76 - 94% of Interim Target	0	Negligible

5.5.23 As shown in Table 32, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

Formaldehyde

5.5.24 Annual mean CH_2O concentrations at the sensitive receptors, inclusive of background levels, are summarised in Table 33.

Table 33 Predicted Annual Mean CH_2O Concentrations

Receptor		Predicted Annual Mean CH_2O Concentration (μg/m³)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	0.60	0.61	0.00
R2	Residential - Cranton Avenue	0.60	0.61	0.00
R3	Residential - Cranton Avenue	0.60	0.61	0.00
R4	Residential - Cranton Avenue	0.60	0.61	0.00
R5	Residential - Pump Lane	0.60	0.61	0.00
R6	Residential - Chalfont Road	0.60	0.60	0.00
R7	Residential - Chalfont Road	0.60	0.60	0.00
R8	Residential - Chalfont Road	0.60	0.60	0.00
R9	Residential - Chalfont Road	0.60	0.60	0.00
R10	Residential - Station Approach	0.60	0.60	0.00
R11	Residential - Station Approach	0.60	0.60	0.00
R12	Residential - Station Approach	0.60	0.60	0.00
R13	Residential - Station Approach	0.60	0.60	0.00
R14	Residential - Nestle's Avenue	0.60	0.60	0.00
R15	Residential - Nestle's Avenue	0.60	0.60	0.00
R16	Residential - Pump Lane	0.60	0.60	0.00
R17	Business - Cash and Carry	0.60	0.62	0.02

Receptor		Predicted Annual Mean CH_2O Concentration (µg/m^3)		
		Baseline	PEC	PC
R18	Place of Worship - Hillingdon Borough Central Masjid	0.60	0.60	0.00

5.5.25 As shown in Table 33, CH_2O PECs were below the EAL of 5µg/m^3 at all sensitive receptor locations as a result of all meteorological years.

5.5.26 The significance of predicted impacts on annual mean CH_2O concentrations at the sensitive receptors are summarised in Table 34. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 34 Predicted Impacts on Annual Mean CH_2O Concentrations

Receptor		Predicted Concentration (PEC)	Predicted Concentration Change as Proportion of EAL (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Below 75% of EAL	0	Negligible
R2	Residential - Cranton Avenue	Below 75% of EAL	0	Negligible
R3	Residential - Cranton Avenue	Below 75% of EAL	0	Negligible
R4	Residential - Cranton Avenue	Below 75% of EAL	0	Negligible
R5	Residential - Pump Lane	Below 75% of EAL	0	Negligible
R6	Residential - Chalfont Road	Below 75% of EAL	0	Negligible
R7	Residential - Chalfont Road	Below 75% of EAL	0	Negligible
R8	Residential - Chalfont Road	Below 75% of EAL	0	Negligible
R9	Residential - Chalfont Road	Below 75% of EAL	0	Negligible
R10	Residential - Station Approach	Below 75% of EAL	0	Negligible
R11	Residential - Station Approach	Below 75% of EAL	0	Negligible
R12	Residential - Station Approach	Below 75% of EAL	0	Negligible
R13	Residential - Station Approach	Below 75% of EAL	0	Negligible
R14	Residential - Nestle's Avenue	Below 75% of EAL	0	Negligible

Receptor		Predicted Concentration (PEC)	Predicted Concentration Change as Proportion of EAL (PC) (%)	Impact Significance
R15	Residential - Nestle's Avenue	Below 75% of EAL	0	Negligible
R16	Residential - Pump Lane	Below 75% of EAL	0	Negligible
R17	Business - Cash and Carry	Below 75% of EAL	0	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Below 75% of EAL	0	Negligible

5.5.27 As shown in Table 34, impacts on annual mean CH_2O concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

5.5.28 Predicted 1-hour mean CH_2O PECs, inclusive of background levels, are summarised in Table 35. Similarly to PM_{10}, these assume constant generator operation in order to simplify the assessment scenarios detailed in Appendix 2.

Table 35 Predicted 1-hour Mean CH_2O Concentrations

Receptor		Predicted 1-hour Mean CH_2O Concentration (μg/m^3)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	1.21	5.70	4.50
R2	Residential - Cranton Avenue	1.21	5.77	4.57
R3	Residential - Cranton Avenue	1.21	6.13	4.92
R4	Residential - Cranton Avenue	1.21	7.22	6.02
R5	Residential - Pump Lane	1.21	4.99	3.78
R6	Residential - Chalfont Road	1.21	4.65	3.44
R7	Residential - Chalfont Road	1.21	4.69	3.49
R8	Residential - Chalfont Road	1.21	4.78	3.58
R9	Residential - Chalfont Road	1.21	5.03	3.83
R10	Residential - Station Approach	1.21	4.37	3.16

Receptor		Predicted 1-hour Mean CH_2O Concentration (μg/m³)		
		Baseline	PEC	PC
R11	Residential - Station Approach	1.21	4.38	3.17
R12	Residential - Station Approach	1.21	4.53	3.32
R13	Residential - Station Approach	1.21	4.84	3.63
R14	Residential - Nestle's Avenue	1.21	3.15	1.94
R15	Residential - Nestle's Avenue	1.21	3.14	1.93
R16	Residential - Pump Lane	1.21	4.16	2.95
R17	Business - Cash and Carry	1.21	14.35	13.14
R18	Place of Worship - Hillingdon Borough Central Masjid	1.21	15.53	14.32

5.5.29 As shown in Table 35, 1-hour mean CH_2O PECs were below the EAL of 100μg/m³ at all sensitive receptors as a result of all meteorological years.

5.5.30 The significance of predicted impacts on 1-hour mean CH_2O concentrations at the sensitive receptors are summarised in Table 36. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 36 Predicted Impacts on 1-hour Mean CH_2O Concentrations

Receptor		Predicted Concentration Change as Proportion of EAL (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Less than 10	Negligible
R2	Residential - Cranton Avenue	Less than 10	Negligible
R3	Residential - Cranton Avenue	Less than 10	Negligible
R4	Residential - Cranton Avenue	Less than 10	Negligible
R5	Residential - Pump Lane	Less than 10	Negligible
R6	Residential - Chalfont Road	Less than 10	Negligible
R7	Residential - Chalfont Road	Less than 10	Negligible

Receptor		Predicted Concentration Change as Proportion of EAL (PC) (%)	Impact Significance
R8	Residential - Chalfont Road	Less than 10	Negligible
R9	Residential - Chalfont Road	Less than 10	Negligible
R10	Residential - Station Approach	Less than 10	Negligible
R11	Residential - Station Approach	Less than 10	Negligible
R12	Residential - Station Approach	Less than 10	Negligible
R13	Residential - Station Approach	Less than 10	Negligible
R14	Residential - Nestle's Avenue	Less than 10	Negligible
R15	Residential - Nestle's Avenue	Less than 10	Negligible
R16	Residential - Pump Lane	Less than 10	Negligible
R17	Business - Cash and Carry	11 - 20	Slight
R18	Place of Worship - Hillingdon Borough Central Masjid	11 - 20	Slight

5.5.31 As shown in Table 36, impacts on 1-hour mean CH_2O concentrations as a result of the proposed development were predicted to be **slight** at two locations and **negligible** at 16 receptors. This is classified as **not significant**, in accordance with the stated guidance.

Sulphur Dioxide

5.5.32 Predicted 1-hour mean SO_2 PECs, inclusive of background levels, are summarised in Table 37. Similarly to PM_{10} and CH_2O, these assume constant generator operation in order to simplify the assessment scenarios detailed in Appendix 2.

Table 37 Predicted 1-hour Mean SO_2 Concentrations

Receptor		Predicted 1-hour Mean SO_2 Concentration ($\mu g/m^3$)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	12.24	18.17	5.93
R2	Residential - Cranton Avenue	12.24	18.26	6.02

Receptor		Predicted 1-hour Mean SO_2 Concentration (µg/m³)		
		Baseline	PEC	PC
R3	Residential - Cranton Avenue	12.24	18.73	6.49
R4	Residential - Cranton Avenue	12.24	20.17	7.93
R5	Residential - Pump Lane	12.24	17.22	4.98
R6	Residential - Chalfont Road	12.24	16.78	4.54
R7	Residential - Chalfont Road	12.24	16.83	4.59
R8	Residential - Chalfont Road	12.24	16.96	4.72
R9	Residential - Chalfont Road	12.24	17.28	5.04
R10	Residential - Station Approach	12.24	16.41	4.17
R11	Residential - Station Approach	12.24	16.42	4.18
R12	Residential - Station Approach	12.24	16.62	4.38
R13	Residential - Station Approach	12.24	17.03	4.79
R14	Residential - Nestle's Avenue	12.24	14.80	2.56
R15	Residential - Nestle's Avenue	12.24	14.78	2.54
R16	Residential - Pump Lane	12.24	16.13	3.89
R17	Business - Cash and Carry	12.24	29.57	17.33
R18	Place of Worship - Hillingdon Borough Central Masjid	12.24	31.12	18.88

5.5.33 As shown in Table 37, 1-hour mean SO_2 PECs were below the AQO of 350µg/m³ at all sensitive receptors as a result of all meteorological years.

5.5.34 The significance of predicted impacts on 1-hour mean SO_2 concentrations at the sensitive receptors are summarised in Table 38. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 38 Predicted Impacts on 1-hour Mean SO_2 Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Less than 10	Negligible
R2	Residential - Cranton Avenue	Less than 10	Negligible
R3	Residential - Cranton Avenue	Less than 10	Negligible
R4	Residential - Cranton Avenue	Less than 10	Negligible
R5	Residential - Pump Lane	Less than 10	Negligible
R6	Residential - Chalfont Road	Less than 10	Negligible
R7	Residential - Chalfont Road	Less than 10	Negligible
R8	Residential - Chalfont Road	Less than 10	Negligible
R9	Residential - Chalfont Road	Less than 10	Negligible
R10	Residential - Station Approach	Less than 10	Negligible
R11	Residential - Station Approach	Less than 10	Negligible
R12	Residential - Station Approach	Less than 10	Negligible
R13	Residential - Station Approach	Less than 10	Negligible
R14	Residential - Nestle's Avenue	Less than 10	Negligible
R15	Residential - Nestle's Avenue	Less than 10	Negligible
R16	Residential - Pump Lane	Less than 10	Negligible
R17	Business - Cash and Carry	Less than 10	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Less than 10	Negligible

5.5.35 As shown in Table 38, impacts on 1-hour mean SO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

5.5.36 Predicted 15-minute mean SO_2 PECs, inclusive of background levels, are summarised in Table 39.

Table 39 Predicted 15-minute Mean SO_2 Concentrations

Receptor		Predicted 15-minute Mean SO_2 Concentration (µg/m^3)		
		Baseline	PEC	PC
R1	Residential - Cranton Avenue	12.24	18.66	6.42
R2	Residential - Cranton Avenue	12.24	18.86	6.62
R3	Residential - Cranton Avenue	12.24	19.68	7.44
R4	Residential - Cranton Avenue	12.24	21.90	9.66
R5	Residential - Pump Lane	12.24	17.93	5.69
R6	Residential - Chalfont Road	12.24	17.50	5.26
R7	Residential - Chalfont Road	12.24	17.57	5.33
R8	Residential - Chalfont Road	12.24	17.71	5.47
R9	Residential - Chalfont Road	12.24	18.48	6.24
R10	Residential - Station Approach	12.24	16.94	4.70
R11	Residential - Station Approach	12.24	17.07	4.83
R12	Residential - Station Approach	12.24	17.41	5.17
R13	Residential - Station Approach	12.24	18.17	5.93
R14	Residential - Nestle's Avenue	12.24	15.38	3.14
R15	Residential - Nestle's Avenue	12.24	15.37	3.13
R16	Residential - Pump Lane	12.24	16.75	4.51
R17	Business - Cash and Carry	12.24	30.21	17.97
R18	Place of Worship - Hillingdon Borough Central Masjid	12.24	31.58	19.34

5.5.37 As shown in Table 39, 15-minute mean SO_2 PECs were below the AQO of 266µg/m^3 at all sensitive receptors as a result of all meteorological years.

5.5.38 The significance of predicted impacts on 1-hour mean SO_2 concentrations at the sensitive receptors are summarised in Table 40. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 40 Predicted Impacts on 15-minute Mean SO_2 Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Cranton Avenue	Less than 10	Negligible
R2	Residential - Cranton Avenue	Less than 10	Negligible
R3	Residential - Cranton Avenue	Less than 10	Negligible
R4	Residential - Cranton Avenue	Less than 10	Negligible
R5	Residential - Pump Lane	Less than 10	Negligible
R6	Residential - Chalfont Road	Less than 10	Negligible
R7	Residential - Chalfont Road	Less than 10	Negligible
R8	Residential - Chalfont Road	Less than 10	Negligible
R9	Residential - Chalfont Road	Less than 10	Negligible
R10	Residential - Station Approach	Less than 10	Negligible
R11	Residential - Station Approach	Less than 10	Negligible
R12	Residential - Station Approach	Less than 10	Negligible
R13	Residential - Station Approach	Less than 10	Negligible
R14	Residential - Nestle's Avenue	Less than 10	Negligible
R15	Residential - Nestle's Avenue	Less than 10	Negligible
R16	Residential - Pump Lane	Less than 10	Negligible
R17	Business - Cash and Carry	Less than 10	Negligible
R18	Place of Worship - Hillingdon Borough Central Masjid	Less than 10	Negligible

5.5.39 As shown in Table 40, impacts on 15-minute mean SO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations. This is classified as **not significant**, in accordance with the stated guidance.

6.0 AIR QUALITY NEUTRAL ASSESSMENT

6.1 Introduction

6.1.1 The London Plan[26] requires that all developments are 'air quality neutral' to ensure proposals do not lead to further deterioration of existing poor air quality. In order to support the policy, guidance[27] has been produced by the GLA. The document provides a methodology for determining potential emissions from a development and benchmark values for comparison purposes. Where the benchmark is exceeded then action is required, either locally or by way of off-setting.

6.1.2 The Air Quality Neutral Assessment for the proposed development is outlined below.

6.2 Building Emissions

6.2.1 Heating and hot water for the development will be provided by electric heat pumps. These do not produce emissions to atmosphere. As such, the proposals are considered air quality neutral from a building emissions perspective.

6.2.2 It is noted that a diesel-fired standby generator will be included as part of the development in order to ensure availability of uninterrupted power supply at all times. As outlined in the guidance[28] backup plants installed for emergency power supply can be excluded from the calculation of predicting building emissions. As such, the proposed plant has not been considered further within the Air Quality Neutral Assessment.

6.3 Transport Emissions

6.3.1 The Transport Emission Benchmark (TEB) has been calculated based on the total floor area of the development. This is shown in Table 41.

26 The London Plan - The Spatial Development Strategy for Greater London, GLA, 2021.

27 London Plan Guidance: Air Quality Neutral, GLA, 2023.

28 London Plan Guidance: Air Quality Neutral, GLA, 2023.

Table 41 Benchmark Trip Rate

Land Use	Gross Internal Area (m^2)	Benchmark Trip Rate	Total Benchmark Trip Rate (trips/annum)
Industrial	1,734	16.3	28,264

6.3.2 As shown in Table 41, the TEB for the development is 28,264 trips/annum.

6.3.3 The anticipated annual trip rate from the development was calculated as 19,710. This is lower than the benchmark trip rate of 28,264 trips/annum. As such, the proposals are considered to be air quality neutral from a transport emissions perspective and no further mitigation is required.

6.4 Summary

6.4.1 Potential emissions from the development were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The building energy strategy includes the use of electric heat pumps, which do not produce emissions to atmosphere. Additionally, the results indicated an acceptable level of transport emissions from the development. As such, the proposals are considered air quality neutral in accordance with the London Plan Policy SI 1 and Local Plan Policy EM8.

7.0 CONCLUSION

7.1.1 This Air Quality Assessment has been prepared by Redmore Environmental to accompany a full planning application for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The application is submitted on behalf of Marvell Developments LLC.

7.1.2 The development has the potential to cause air quality impacts during construction and operation. An Air Quality Assessment was therefore undertaken to determine baseline conditions and assess potential impacts associated with the scheme.

7.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the Mayor of London's methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.

7.1.4 Potential construction phase air quality impacts from road vehicle exhaust emissions were assessed against the relevant screening criteria. Due to the low number of vehicle trips associated with the proposals, road traffic impacts were predicted to be **not significant**.

7.1.5 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Due to the low number of vehicle movements predicted to be generated by the site, potential impacts associated with road vehicle exhaust emissions are predicted to be **not significant**.

7.1.6 Potential impacts during the operational phase of the proposals may occur due to combustion emissions associated with the emergency standby generator. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the source. The results indicated that impacts were predicted to be **not significant**.

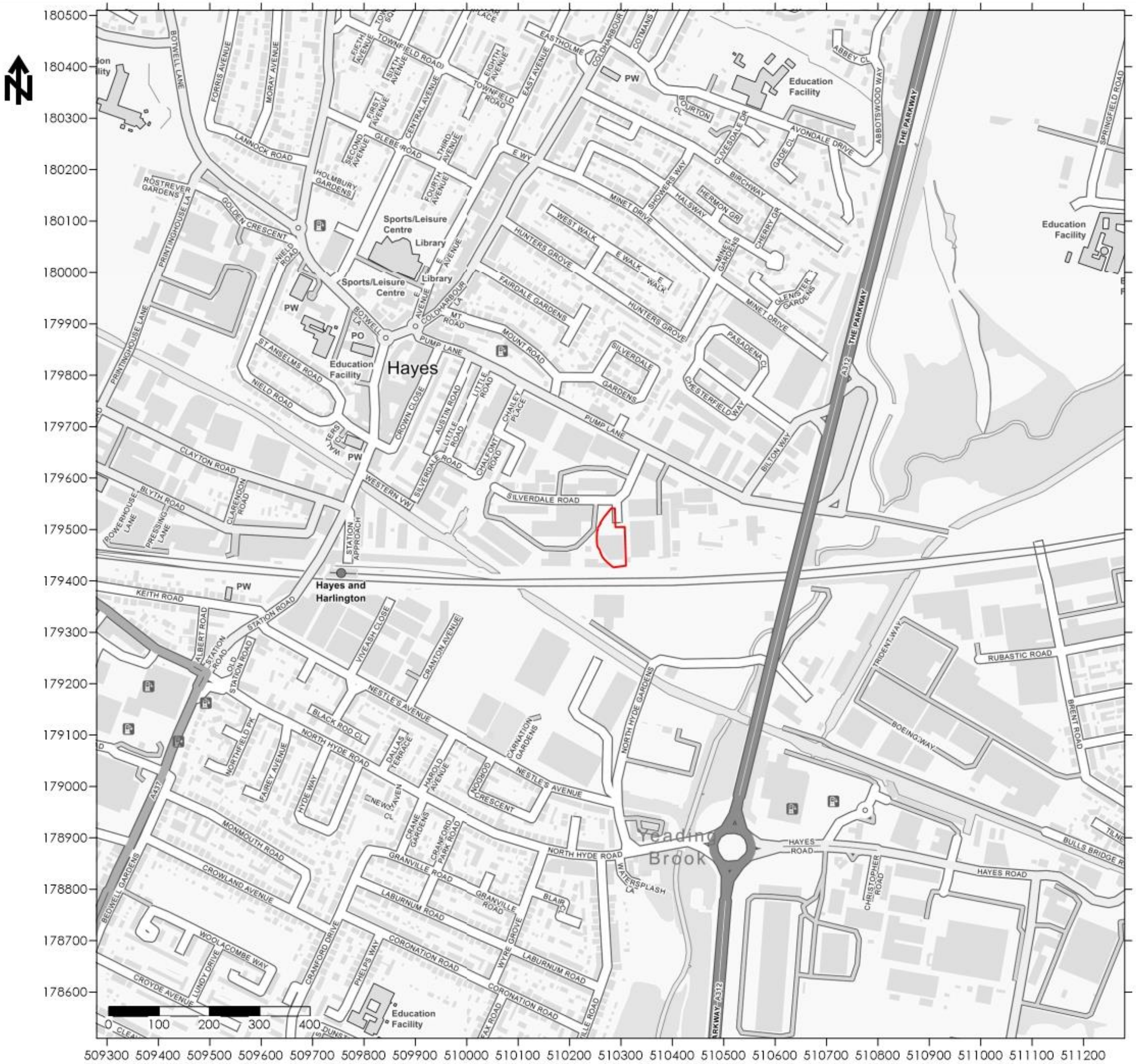
7.1.7 Potential emissions from the development were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The building energy strategy includes the use of electric heat pumps, which do not produce emissions to atmosphere. Additionally, the results indicated an acceptable level of transport emissions from the scheme. As such, the development was considered to be air quality neutral in accordance with the London Plan Policy SI 1 and Local Plan Policy EM8.

7.1.8 Based on the assessment results, air quality factors are not considered a constraint to the development.

8.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
C_6H_6	Benzene
CERC	Cambridge Environmental Research Consultants
CH_2O	Formaldehyde
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EA	Environment Agency
EAL	Environmental Assessment Level
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PC	Process Contribution
PEC	Predicted Environmental Concentration
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
SO_2	Sulphur dioxide
TEB	Transport Emissions Benchmark
z_0	Roughness length

Figures



Legend

Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference

8167

Client

Mulhaven Properties LLC

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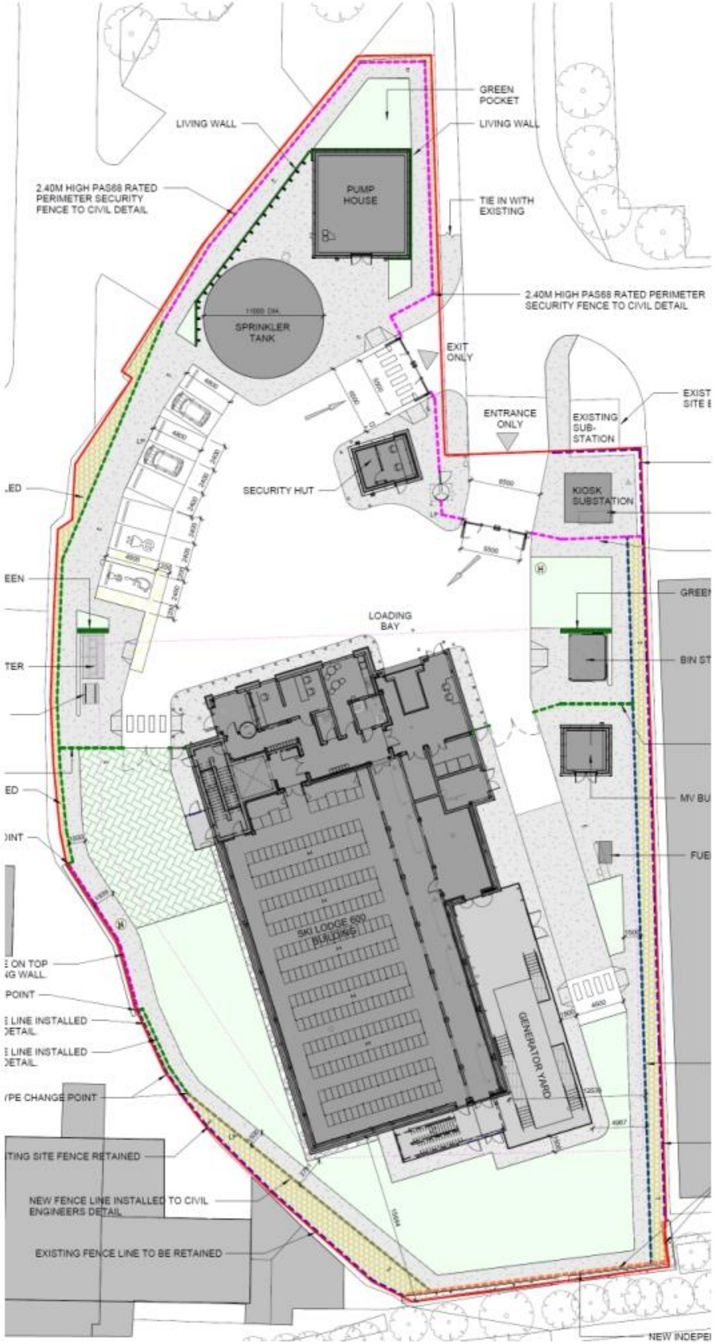

Legend

Title

Figure 2 - Site Layout Plan

Project

Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference

8167

Client

Mulhaven Properties LLC

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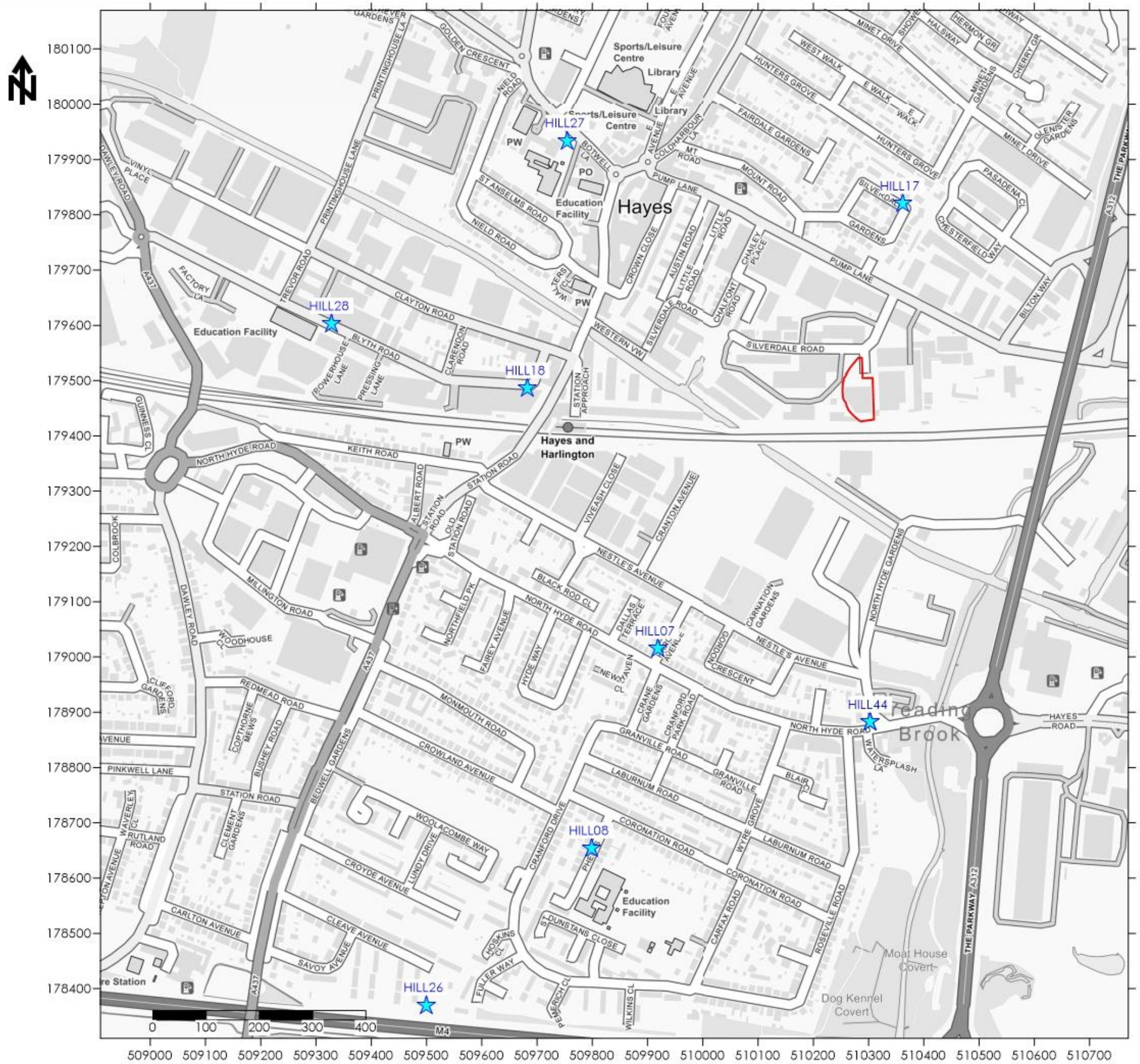

Legend

Site Boundary

Monitor

Title

Figure 3 - Monitoring Locations

Project

Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference

8167

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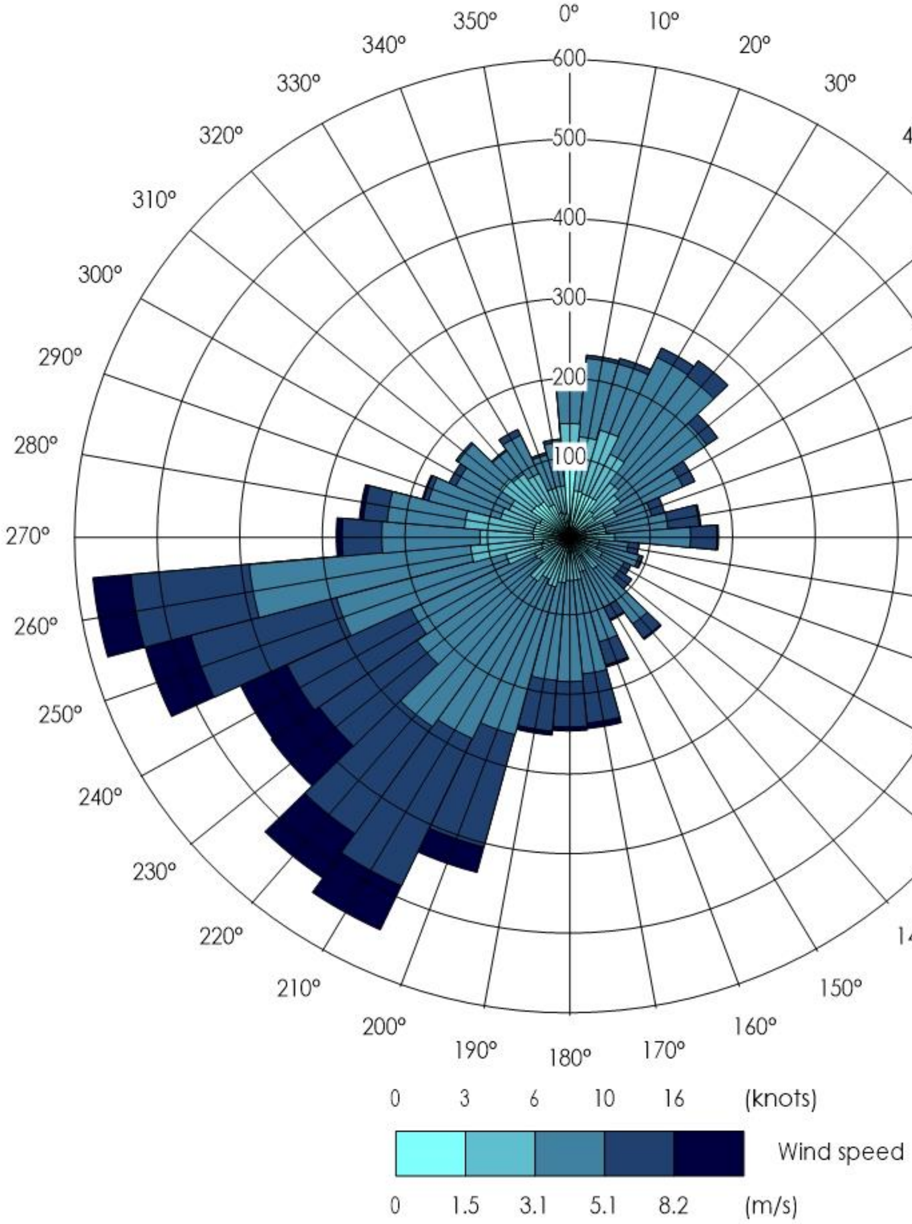

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Title
Figure 4 - Wind Rose of 2023 Heathrow Airport Meteorological Data

Project
Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference
8167

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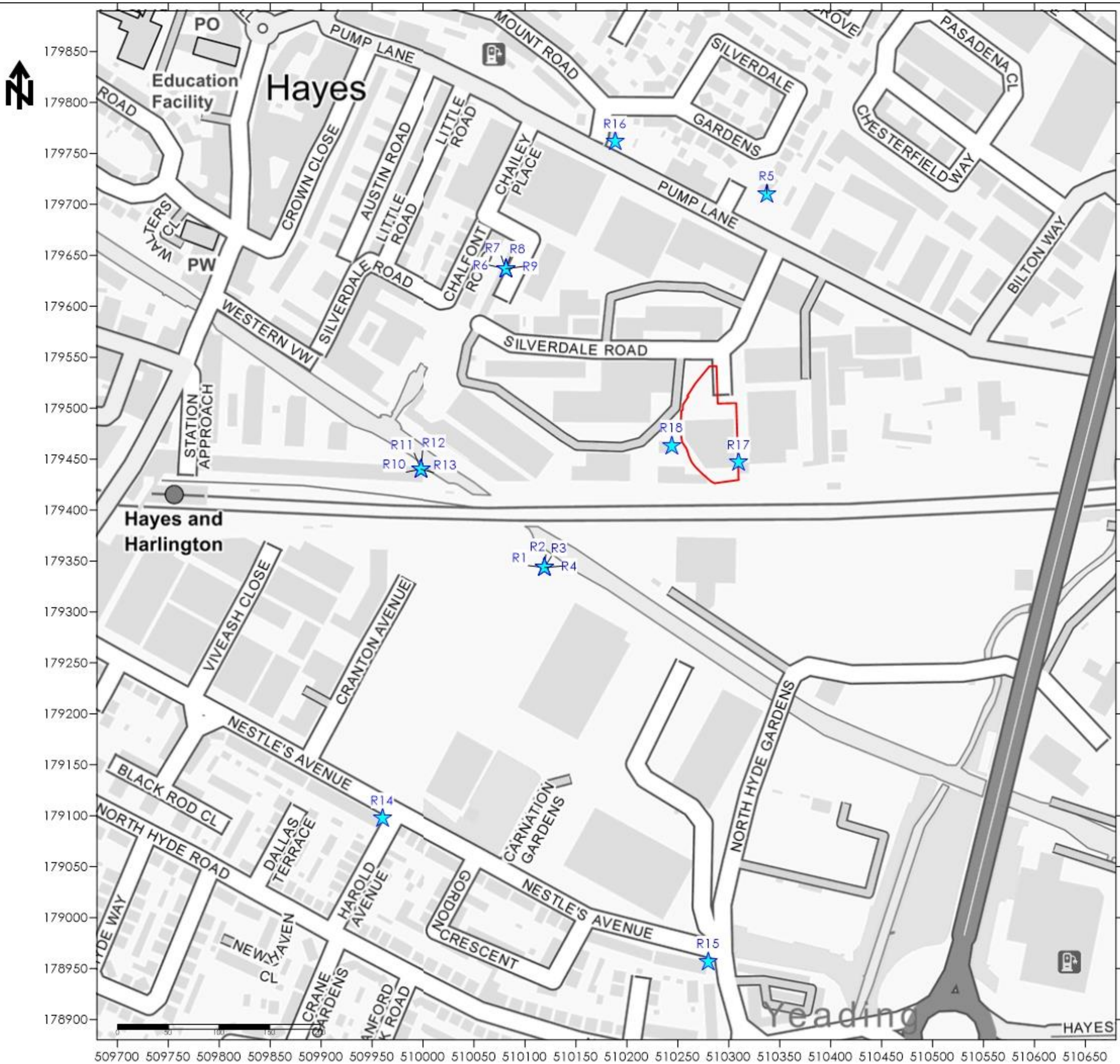

Legend

Site Boundary

Receptor

Title

Figure 5 - Operational Phase Sensitive Receptor Locations

Project

Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference

8167

Client

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Appendix 1 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

EMILY PEARS-RYDING

Associate Director

BSc (Hons), MIAQM, MIEnvSc

Tel: 0161 706 0075 | Email: emily.pears-ryding@red-env.co.uk

KEY EXPERIENCE:

Emily is an Associate Director with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-5. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Assessment of potential effects associated with network realignment schemes and highway developments.

SELECT PROJECTS SUMMARY:

Broad Street, Birmingham

Air Quality Assessment in support of a residential-led development on land at Broad Street, Birmingham. The proposals were located adjacent to a section of the Midland Metro Westside which runs along Broad Street. Consideration was made to the potential for re-alignment of the local road network as a result of the Metro to effect pollution levels at the development. The assessment indicated NO_2 concentrations exceeded air quality criteria from ground to third floor level as a result of road vehicle exhaust emissions. Mitigation was therefore specified for the affected units.

Home Farm, Forest Road, Warfield

Ecological Air Quality Assessment in support of a residential development. Natural England held concerns regarding potential impacts at sensitive ecological designations as a result of traffic exhaust emissions associated with the development. The predicted change in NO_x and ammonia concentrations and nitrogen and acid deposition was below the relevant criteria at all locations within the ecological designations. Impacts were therefore not considered to be significant.

Saltcoats Road, Stevenston

Air Quality Assessment in support of an educational campus and associated energy centre. Impacts associated with emissions from the proposed gas and biomass boilers were assessed through detailed dispersion modelling. This indicated impacts on annual mean NO_2 and PM_{10} concentrations were predicted to be not significant.

Blackthorn & Piddington

Environmental Impact Assessment in support of a railway embankment scheme on land at the Network Railway Embankment between Piddington and Blackthorn. Due to the extensive stabilisation works a Fugitive Dust Emissions Assessment was undertaken in addition to consideration of road vehicle exhaust emissions. Due to the location of the site in relation to nearby sensitive receptors, potential impacts associated with construction works were not considered to be significant.

Blackmoorfoot Road, Huddersfield

Air Quality in support of a residential-led development in close proximity to an operational minerals facility. Due to the presence of the Johnsons Wellfield Quarry to the south of the site a Fugitive Dust Emissions Assessment was undertaken to determine potential impacts. Dispersion modelling of road vehicle exhaust emissions was also undertaken in support of the scheme. Results indicated the overall significance of fugitive dust emissions from the quarry and air quality impacts associated with operation of the development itself were not significant.

Lockwood Bar, Huddersfield

Air Quality Assessment for the proposed highway realignment scheme along Lockwood Road, Huddersfield. Changes in pollution levels were considered at sensitive receptors as a result of variations to road geometry and associated redistribution of vehicle trips across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.

Appendix 2 - Environmental Permit Report

Air Quality Assessment

Unit 4, Silverdale Industrial Estate, Hayes

Client: Marvell Developments LLC

Reference: 8167-1r2

Date: 10th October 2024

Report Issue

Report Title: Air Quality Assessment - Unit 4, Silverdale Industrial Estate, Hayes

Report Reference: 8167-1

Field	Report Version			
	1	2	3	4
Prepared by	Emily Pears-Ryding	Emily Pears-Ryding		
Position	Associate Director	Associate Director		
Reviewed by	Jethro Redmore	Jethro Redmore		
Position	Director	Director		
Date of Issue	17th September 2024	10th October 2024		
Comments	Draft for Comment	-		

Serendipity Labs, Building 7, Exchange Quay, Salford, M5 3EP

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

This report has been prepared by Redmore Environmental Ltd in accordance with the agreed terms and conditions of appointment. Redmore Environmental Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Executive Summary

This Air Quality Assessment has been prepared by Redmore Environmental for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The report is commissioned on behalf of Marvell Developments LLC to support an Environmental Permit Application for the site.

Atmospheric emissions from the diesel-fired standby generator have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to quantify potential effects during the following Events:

- Event 1 - Biweekly service test;
- Event 2 - Biannual service test;
- Event 3 - Maintenance test; and,
- Event 4 - Emergency Blackout Event.

Dispersion modelling was undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the relevant sources. The results indicated that impacts were not predicted to be significant during any of the four Events.

Table of Contents

1.0 INTRODUCTION

1.1 Background

1.1.1 This Air Quality Assessment has been prepared by Redmore Environmental for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The report is commissioned on behalf of Marvell Developments LLC to support an Environmental Permit Application for the site.

1.1.2 Atmospheric emissions from the diesel-fired standby generator have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to quantify potential effects during different operating scenarios.

1.2 Site Location and Context

1.2.1 The site is located at Unit 4, Silverdale Industrial Estate, Hayes, at approximate National Grid Reference (NGR): 510283, 179473. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The scheme proposes demolition of the existing building and structures on site, and all other associated site clearance works. Construction of a data centre building (Class B8) with plant at roof level with an emergency generator (1no) and associated flue (provided with an external compound adjoining the data centre building), sprinkler tank and pumphouse, security guard house, and provision of one kiosk substation and MV Building. The development also comprises the construction of a new access and internal road and circulation areas, footpaths, provision of car and bicycle parking, hard and soft landscaping and other associated works and ancillary site infrastructure.

1.2.3 Due to the need to ensure availability of uninterrupted power supply at all times, the site will incorporate a diesel-fired standby generator. Reference should be made to Figure 2 for a site layout plan.

1.2.4 Operation of the generator has the potential to cause air quality impacts at existing sensitive receptor locations in the vicinity of the site. As such, an Air Quality Assessment has been undertaken. This is provided in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide (SO_2);
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene (C_6H_6); and,
- Carbon monoxide (CO).

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023[2] was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

1 The AQS: Framework for Local Authority Delivery, DEFRA, 2023.

2 Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/ Interim Target

Pollutant	Air Quality Objective/Interim Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12[a]	Annual mean
SO_2	125	24-hour mean; not to be exceeded more than 3 times per annum
	350	1-hour mean; not to be exceeded more than 24 times per annum
	266	15-minute mean; not to be exceeded more than 35 times per annum
CO	10,000	8-hour running mean

Note: (a) Interim Target to be achieved by end of January 2028.

2.2 Local Air Quality Management

2.2.1 Local Authorities are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure are likely to be exceeded, the Local Authority is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Industrial Pollution Control Legislation

2.3.1 Atmospheric emissions from industry are controlled in England through the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments. The operation of emergency generators are included within the Regulations and as such the facility is required to operate in accordance with an Environmental Permit issued by the Environment Agency (EA). Compliance with any conditions of the permit must be demonstrated through periodic monitoring requirements, which have been set in order to limit potential impacts in the surrounding area.

2.4 Environmental Assessment Levels

2.4.1 An Environmental Assessment Level (EAL) is the concentration of a substance, which, in a particular environmental medium, the regulators regard as an appropriate value to enable a comparison between the environmental effects of different substances in that medium and between environmental effects in different media, enabling the summation of those effects.

2.4.2 Ideally EALs to fulfil this objective would be defined for each pollutant:

- Based on the sensitivity of particular habitats or receptors (in particular three main types of receptor should be considered, protection of human health, protection of natural ecosystems and protection of specific sensitive receptors, e.g. materials, commercial activities requiring a particular environmental quality);
- Be produced according to a standardised protocol to ensure that they are consistent, reproducible and readily understood;
- Provide similar measure of protection for different receptors both within and between media; and,
- Take account of habitat specific environmental factors such as pH, nutrient status, bioaccumulation, transfer and transformation processes where necessary.

2.4.3 EALs used in this assessment were obtained from EA guidance[3] and are summarised in Table 2.

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

Table 2 Environmental Assessment Levels

Pollutant	Environmental Assessment Level	
	Concentration (µg/m³)	Averaging Period
Formaldehyde (CH_2O)	5	Annual mean
	100	1-hour mean

2.5 Acute Exposure Guideline Levels

2.5.1 The United States Environmental Protection Agency (US EPA) has developed Acute Exposure Guideline Levels (AEGLs) which are used by emergency planners and responders worldwide as guidance in dealing with rare, usually accidental, releases of chemicals into the air. AEGLs are expressed as specific concentrations of airborne pollutants at which health effects may occur. They are designed to protect the elderly and children, and other individuals who may be susceptible and are sensitive to atmospheric pollution.

2.5.2 AEGLs are calculated for five short exposure periods with 'levels' ranging from 1 to 3 based on the severity of the toxic effects caused by the exposure. These are described as follows:

- Level 1: Notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure;
- Level 2: Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape; and,
- Level 3: Life-threatening health effects or death.

2.5.3 The relevant AEGLs are summarised in Table 3.

Table 3 Acute Exposure Guideline Levels

Pollutant	Acute Exposure Guideline Level (ppm)					
	Level	Averaging Period				
		10-minutes	30-minutes	60-minutes	4-hours	8-hours
NO_2	1	0.5	0.5	0.5	0.5	0.5
	2	20.0	15.0	12.0	8.2	6.7
	3	34.0	25.0	20.0	14.0	11.0
SO_2	1	0.2	0.2	0.2	0.2	0.2
	2	0.75	0.75	0.75	0.75	0.75
	3	30.0	30.0	30.0	30.0	30.0
CO	1	N/A	N/A	N/A	N/A	N/A
	2	420	150	83	33	27
	3	1,700	600	330	150	130
CH_2O	1	0.9	0.9	0.9	0.9	0.9
	2	14.0	14.0	14.0	14.0	14.0
	3	100	70.0	56.0	35.0	35.0

2.6 Critical Loads and Levels

2.6.1 A critical load is defined by the UK Air Pollution Information System (APIS)[4] as:

> "A quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The exceedance of a critical load is defined as the atmospheric deposition of the pollutant above the critical load."

2.6.2 A critical level is defined as:

4 UK Air Pollution Information System, www.apis.ac.uk.

"Threshold for direct effects of pollutant concentrations according to current knowledge. Exceedance of a critical level is defined as the atmospheric concentration of the pollutant above the critical level."

2.6.3 A critical load refers to deposition of a pollutant, while a critical level refers to pollutant concentrations in the atmosphere (which usually have direct effects on vegetation or human health).

2.6.4 When pollutant loads (or concentrations) exceed the critical load or level it is considered that there is a risk of harmful effects. The excess over the critical load or level is termed the exceedence. A larger exceedence is often considered to represent a greater risk of damage.

2.6.5 Maps of critical loads and levels and their exceedences have been used to show the potential extent of pollution damage and aid in developing strategies for reducing pollution. Decreasing deposition below the critical load is seen as means for preventing the risk of damage. However, even a decrease in the exceedence may infer that less damage will occur.

2.6.6 Table 4 presents the critical levels for the protection of vegetation for pollutants considered within this assessment.

Table 4 Critical Levels for the Protection of Vegetation

Pollutant	Critical Level	
	Concentration ($\mu g/m^3$)	Averaging Period
Oxides of nitrogen (NO_x)	30	Annual mean
	75	24-hour mean
SO_2	10	Annual mean

2.6.7 Critical loads have been designated within the UK based on the sensitivity of the receiving habitat and have been identified for the relevant designations considered within the assessment in Section 3.6.

3.0 BASELINE

3.1 Introduction

3.1.1 Existing air quality conditions in the vicinity of the site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

3.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), the London Borough of Hillingdon (LB Hillingdon) has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within their area of jurisdiction. As such, one AQMA has been declared. This is described as follows:

> "The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line"

3.2.2 The facility is located within the AQMA. As such, there is the potential for air quality impacts within this sensitive area. This has been considered throughout the assessment.

3.2.3 LB Hillingdon has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

3.3 Air Quality Focus Areas

3.3.1 Air Quality Focus Areas (AQFAs) have been designated throughout London in locations where the annual mean AQO for NO_2 is exceeded and there is a high level of human exposure. They were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends.

3.3.2 The site is not located within an AQFA, with the closest AQFA located 120m to the west (ID: 82). There is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

3.4 Air Quality Monitoring

3.4.1 Monitoring of NO_2 concentrations is undertaken by LB Hillingdon throughout their area of jurisdiction. Recent NO_2 concentrations recorded in the vicinity of the site are shown in Table 5. Exceedences of the relevant AQO are shown in **bold**.

Table 5 Monitoring Results NO_2

Pollutant		Annual Mean NO_2 Concentration (µg/m^3)			
		2019	2020	2021	2022
HILL07	Harold Avenue, Hayes	36.9	28.1	28.8	30.5
HILL08	Phelps Way, Hayes	33.9	24.1	25.3	26.7
HILL17	Silverdale Gardens, Hayes	31.6	24.7	24.2	24.1
HILL18	Blyth Road, Hayes	37.4	29.9	27.6	28.3
HILL26	R/O Cleave Avenue, Hayes	**40.0**	28.2	26.8	29.2
HILL27	Botwell House Primary School	33.2	24.5	25.3	26.8
HILL28	Blyth Road, Hayes	31.7	23.0	23.5	27.1
HILL44	Hillingdon North Wood Focus Area (Outside AQMA)[a]	-	-	27.0	26.1

Note: (a) Monitor commissioned in 2021.

3.4.2 As shown in Table 5, NO_2 concentrations above the annual mean AQO of 40µg/m^3 at the HILL26 monitor during 2019. Levels were below the AQO at the remaining sites in recent years.

3.4.3 Reference should be made to Figure 3 for a map of the survey positions.

3.4.4 LB Hillingdon do not undertake monitoring of other pollutants in the vicinity of the site.

3.5 Background Pollutant Concentrations

3.5.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Authorities in their Review and Assessment of air quality. The site is located in grid square NGR: 510500, 179500. Data for this location was downloaded from the DEFRA website[5] for the purpose of the assessment and is summarised in Table 6.

Table 6 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (μg/m³)
NO_2	23.77
SO_2	6.12
CO	462
Benzene (C_6H_6)[(a)]	0.603
PM_{10}	16.23
$PM_{2.5}$	10.66

NOTE: (a) Used to represent background CH_2O concentrations.

3.5.2 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ are predicted for 2023, C_6H_6 for 2010 and SO_2 and CO for 2001. These were the most recent predictions available at the time of assessment and are therefore considered to provide a reasonable representation of background concentrations in the vicinity of the site.

3.6 Sensitive Receptors

3.6.1 A sensitive receptor is defined as any location which may be affected by changes in air quality. These have been defined for human and ecological receptors in the following Sections.

Sensitive Human Receptors

3.6.2 A desk-top study was undertaken in order to identify any sensitive human receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised in Table 7. Receptor heights were included to represent sensitive locations at varying heights within existing developments.

5 http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html.

Table 7 Sensitive Human Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Cranton Avenue	510119.2	179343.6	1.5
R2	Residential - Cranton Avenue	510119.2	179343.6	7.5
R3	Residential - Cranton Avenue	510119.2	179343.6	13.5
R4	Residential - Cranton Avenue	510119.2	179343.6	19.5
R5	Residential - Pump Lane	510337.3	179710.3	1.5
R6	Residential - Chalfont Road	510080.9	179636.8	1.5
R7	Residential - Chalfont Road	510080.9	179636.8	7.5
R8	Residential - Chalfont Road	510080.9	179636.8	13.5
R9	Residential - Chalfont Road	510080.9	179636.8	19.5
R10	Residential - Station Approach	509997.7	179440.2	1.5
R11	Residential - Station Approach	509997.7	179440.2	7.5
R12	Residential - Station Approach	509997.7	179440.2	13.5
R13	Residential - Station Approach	509997.7	179440.2	19.5
R14	Residential - Nestle's Avenue	509960.1	179097.5	1.5
R15	Residential - Nestle's Avenue	510279.9	178957.1	1.5
R16	Residential - Pump Lane	510188.8	179761.7	1.5
R17	Business - Cash and Carry	510310.0	179446.5	1.5
R18	Place of Worship - Hillingdon Borough Central Masjid	510244.1	179463.3	1.5

3.6.3 Reference should be made to Figure 4 for a map of the sensitive human receptor locations.

Ecological Receptors

3.6.4 Atmospheric emissions from the facility have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. A desk-top study, including an information request through the EA, indicated the following designations for inclusion in the assessment:

- South West London Waterbodies Special Protection Area (SPA) and Ramsar;
- Richmond Park Special Area of Conservation (SAC);
- Yeading Brook, Minet Country Park and Hitherbroom Park Local Wildlife Site (LWS);
- Crane Corridor LWS;
- Lake Farm Country Park LWS;
- Cranford Countryside Park and Open Space LWS;
- Cranford Lane Gravel Workings LWS;
- Hartlands Wood and Lower Park Farm LWS;
- Bolingbroke Way Sunken Pasture LWS;
- Stockley Business Park Lakes & Meadows LWS;
- Airlinks Ponds LWS: and,
- London's Canals LWS.

3.6.5 For the purpose of the modelling assessment discrete receptors were placed at the closest points of each designation to the facility to ensure the maximum potential impact was predicted. These are summarised in Table 8.

Table 8 Ecological Receptor Locations

Receptor		NGR (m)	
		X	Y
E1	South West London Waterbodies SPA and Ramsar	511866.3	170981.8
E2	South West London Waterbodies SPA and Ramsar	505375.5	174109.5
E3	South West London Waterbodies SPA and Ramsar	503172.7	175337.0
E4	Richmond Park SAC	518574.1	173781.3
E5	London's Canals LWS	510289.0	179268.0
E6	London's Canals LWS	510063.2	179416.8
E7	Crane Corridor LWS	510420.2	178880.8
E8	Hartlands Wood and Lower Park Farm LWS	510737.5	178129.4
E9	Airlinks Ponds LWS	511729.3	178064.5

Receptor		NGR (m)	
		X	Y
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	510654.8	179428.4
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	510717.7	180301.2
E12	Lake Farm Country Park LWS	509076.9	179997.1
E13	Lake Farm Country Park LWS	509464.8	180193.5
E14	Cranford Countryside Park and Open Space LWS	510007.3	178261.6
E15	Stockley Business Park Lakes & Meadows LWS	508528.5	179971.7
E16	Cranford Lane Gravel Workings LWS	509483.7	178275.8
E17	Bolingbroke Way Sunken Pasture LWS	508725.4	180238.1

3.6.6 Reference should be made to Figures 4 and 5 for maps of the ecological receptors.

3.6.7 Critical loads have been designated within the UK based on the sensitivity and relevant features of the receiving habitat. A review of the APIS[6] and MAGIC[7] websites, as well as the relevant site designations and publicly available information, was undertaken in order to identify the most suitable habitat description and associated critical load for the area of each designation considered within the assessment.

3.6.8 The relevant nitrogen deposition critical loads are presented in Table 9.

6 http://www.apis.ac.uk/.

7 Multi-Agency Geographic Information for the Countryside, www.magic.gov.uk.

Table 9 Critical Loads for Nitrogen Deposition

Receptor		Feature	APIS Habitat	Nitrogen Critical Load (kgN/ha/yr)	
				Low	High
E1	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	No comparable habitat with established critical load estimate available	-	-
E2	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	No comparable habitat with established critical load estimate available	-	-
E3	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	No comparable habitat with established critical load estimate available	-	-
E4	Richmond Park SAC	Lucanus cervus	Broadleaved deciduous woodland	10	15
E5	London's Canals LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E6	London's Canals LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E7	Crane Corridor LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E8	Hartlands Wood and Lower Park Farm LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E9	Airlinks Ponds LWS	Acid Grassland	Temperate acidophilous alpine grasslands	5	10
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	Improved Grassland	No comparable habitat with established critical load estimate available	-	-
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15

Receptor		Feature	APIS Habitat	Nitrogen Critical Load (kgN/ha/yr)	
				Low	High
E12	Lake Farm Country Park LWS	Calcareous grassland	Arctic-alpine calcareous grassland	5	10
E13	Lake Farm Country Park LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E14	Cranford Countryside Park and Open Space LWS	Acid grassland	Temperate acidophilous alpine grasslands	5	10
E15	Stockley Business Park Lakes & Meadows LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E16	Cranford Lane Gravel Workings LWS	Broadleaved, Mixed and Yew Woodland	Broadleaved deciduous woodland	10	15
E17	Bolingbroke Way Sunken Pasture LWS	Acid grassland	Temperate acidophilous alpine grasslands	5	10

3.6.9 The site features were also reviewed to identify the habitat types most sensitive to acid deposition. These are summarised in Table 10.

Table 10 Critical Loads for Acid Deposition

Receptor		Feature	APIS Habitat	Acid Critical Load (keq/ha/yr)		
				CLMinN	CLMaxS	CLMaxN
E1	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	-	-	-	-
E2	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	-	-	-	-

Receptor		Feature	APIS Habitat	Acid Critical Load (keq/ha/yr)		
				CLMinN	CLMaxS	CLMaxN
E3	South West London Waterbodies	Anas clypeata (North-western/Central Europe) (Bird, not sensitive)	-	-	-	-
E4	Richmond Park SAC	Lucanus cervus	Unmanaged Broadleafed/ Coniferous Woodland	0.142	0.724	1.009
E5	London's Canals LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.673	2.03
E6	London's Canals LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.673	2.03
E7	Crane Corridor LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.673	2.03
E8	Hartlands Wood and Lower Park Farm LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.671	2.028
E9	Airlinks Ponds LWS	Acid Grassland	Acid Grassland	0.438	0.87	1.308
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	Improved Grassland	-	-	-	-
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.673	2.03
E12	Lake Farm Country Park LWS	Calcareous grassland	Calcareous grassland	1.071	4.00	5.071
E13	Lake Farm Country Park LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.142	1.58	1.722

Receptor		Feature	APIS Habitat	Acid Critical Load (keq/ha/yr)		
				CLMinN	CLMaxS	CLMaxN
E14	Cranford Countryside Park and Open Space LWS	Acid Grassland	Acid Grassland	0.223	0.87	1.093
E15	Stockley Business Park Lakes & Meadows LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.357	1.671	2.028
E16	Cranford Lane Gravel Workings LWS	Broadleaved, Mixed and Yew Woodland	Broadleafed/ Coniferous unmanaged woodland	0.142	1.581	1.723
E17	Bolingbroke Way Sunken Pasture LWS	Acid Grassland	Acid Grassland	0.438	0.88	1.318

3.6.10 Baseline pollutant concentrations and deposition rates at each ecological receptor were obtained from the APIS[8] website and are summarised in Table 11.

Table 11 Baseline Pollution Levels at Ecological Receptors

Receptor		Annual Mean Conc. (µg/m³)		Baseline Deposition Rate	
		NO_x	SO_2	Nitrogen (kgN/ha/yr)	Acid (keq/ha/yr)
E1	South West London Waterbodies	22.48	1.91	11.88	0.93
E2	South West London Waterbodies	36.14	2.96	12.73	1.03
E3	South West London Waterbodies	40.18	2.18	12.78	1.02
E4	Richmond Park SAC	24.87	1.53	23.49	1.79
E5	London's Canals LWS	32.75	2.19	25.09	1.94
E6	London's Canals LWS	32.75	2.19	25.09	1.94
E7	Crane Corridor LWS	34.19	2.14	23.15	1.95
E8	Hartlands Wood and Lower Park Farm LWS	34.19	2.14	13.48	1.08

8 http://www.apis.ac.uk/.

Receptor		Annual Mean Conc. (µg/m³)		Baseline Deposition Rate	
		NO_x	SO_2	Nitrogen (kgN/ha/yr)	Acid (keq/ha/yr)
E9	Airlinks Ponds LWS	28.27	1.81	13.36	1.06
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	32.75	2.19	25.09	1.94
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	28.83	1.93	13.43	1.06
E12	Lake Farm Country Park LWS	30.81	2.03	25.21	1.95
E13	Lake Farm Country Park LWS	26.89	1.85	13.48	1.07
E14	Cranford Countryside Park and Open Space LWS	34.19	2.14	25.13	1.95
E15	Stockley Business Park Lakes & Meadows LWS	29.39	1.96	25.33	1.97
E16	Cranford Lane Gravel Workings LWS	32.11	2.04	13.6	1.09
E17	Bolingbroke Way Sunken Pasture LWS	26.81	1.94	13.52	1.07

4.0 METHODOLOGY

4.1 Introduction

4.1.1 Emissions from the site have the potential to contribute to elevated pollutant concentrations at sensitive locations. These have been quantified through dispersion modelling in accordance with the methodology outlined in the following Sections.

4.2 Dispersion Model

4.2.1 Dispersion modelling was undertaken using ADMS-6.0 (v6.0.2.0), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

4.2.2 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

4.3 Modelling Scenarios

4.3.1 The proposed generator will operate in accordance with a regular testing schedule. This will include the following Events:

- Event 1: Biweekly - The generator will be tested (daytime only) for half an hour every fortnight. Generator will be tested at 25% load;
- Event 2: Biannual - The generator will be tested (daytime only) for an hour and a half twice annually. Generator will be tested at 100% load; and,
- Event 3: Maintenance - The generator will be tested (daytime only) for three cumulative hours over a year. Generator will be tested at 100% load.

4.3.2 There is also the potential for the generator to operate at 100% load during Event 4, an Emergency Blackout Event lasting 72-hours.

4.3.3 The Events described above were reviewed to develop suitable scenarios for consideration in the modelling assessment. These are summarised in Table 12.

Table 12 Modelling Scenarios

Scenario	Operating Profile	Description	Representative Event
Scenario 1	Continuous	The generator will be operated at 100% load, 24-hours a day, 365-days a year. This predicted maximum potential short-term impacts associated with the various testing Events	Event 1, 2 and 3
Scenario 2	A single worst-case event of 72-hours of generator operation	A single event where the generator will operate at 100% load. This predicted potential impacts during an Emergency Blackout Event	Event 4

4.3.4 The scenarios have been represented within the model as summarised in the following Sections. Predicted pollutant concentrations were summarised in the following formats:

- Process contribution (PC) - Predicted pollutant level as a result of emissions from the facility only; and,
- Predicted environmental concentration (PEC) - Total predicted pollutant level as a result of emissions from the facility and existing baseline conditions.

4.3.5 Predicted ground level pollutant concentrations and deposition rates were compared with the relevant AQOs, AEGLs, critical levels and critical loads. These criteria are collectively referred to as Environmental Quality Standards (EQSs).

Scenario 1

4.3.6 For Scenario 1, emissions from the generator were modelled constantly with 100% load. The maximum predicted concentration for each averaging period was then identified and compared to the relevant EQS. This significantly overestimates impacts as constant operation has been assumed to ensure a full range of meteorological conditions were included in the results. Additional analysis of any EQS exceedence was provided as necessary.

4.3.7 During Events 1, 2 and 3 the generator is run for periods between 30-minutes and 1.5-hours. Model outputs were therefore selected to represent these averaging periods. These are summarised in Table 13.

Table 13 Event 1 Model Outputs

Pollutant	Modelled As	EQS ($\mu g/m^3$)[(a)]
NO_2	Maximum 10-minute mean	941
	Maximum 30-minute mean	941
	Maximum 1-hour mean	941[(b)]
CH_2O	Maximum 10-minute mean	1,105
	Maximum 30-minute mean	941
	Maximum 1-hour mean	100
CO	Maximum 10-minute mean	481,156
	Maximum 30-minute mean	171,841
	Maximum 1-hour mean	95,086
SO_2	Maximum 10-minute mean	524[(c)]
	Maximum 30-minute mean	524
	Maximum 1-hour mean	524[(d)]

NOTE: (a) Converted from ppm.
(b) Results also considered in the context of the AQO of $200\mu g/m^3$.
(c) Results also considered in the context of the 15-minute AQO of $266\mu g/m^3$.
(d) Results also considered in the context of the AQO of $350\mu g/m^3$.

Scenario 2

4.3.8 For Scenario 2, emissions from the generator were modelled constantly at 100% load to ensure a full range of meteorological conditions were included in the outputs.

4.3.9 The approach to analysis of the results is summarised in the following Sections.

Human Receptors

4.3.10 The EA has issued guidance[9] on dispersion modelling of emissions from back-up generating plant. This includes a method for statistical analysis using the hypergeometric probability distribution in order to identify the potential for an exceedence of the 1-hour AQO for NO_2 for facilities that operate periodically on an undefined schedule.

4.3.11 For Scenario 2, an operating period of 72-hours per annum was assumed. Using the hypergeometric probability distribution method, it was determined that should the results indicate 1,430 or more instances of NO_2 concentrations over 200µg/m^3 within a year, then the probability of producing 19 instances of NO_2 concentrations over 200µg/m^3, and therefore an exceedence of the AQO, within 72 operational hours would be 2.0%. As the plant can operate for periods in excess of 4-hours, this value was multiplied by 2.5 in accordance with the guidance[10]. This provided a probability of 4.9%. The EA indicate that:

> "A probability of less than 5% indicates exceedances are unlikely, provided the generator plant operational lifetime is no more than 20 years."

4.3.12 Although the generator plant operational lifetime may exceed 20-years, grid outages of 72-hour duration are extremely unlikely. As such, this level of probability is considered to be acceptable and therefore an appropriate criterion for use in the assessment.

4.3.13 Based on the number of instances determined previously, the 83.68th percentile (%ile) was calculated for use in the modelling assessment. As such, should predicted 83.68th %ile 1-hour mean NO_2 concentrations be under 200µg/m^3 then there is less than 5% probability of an AQO exceedence and impacts are not considered significant in accordance with the utilised guidance[11].

4.3.14 The maximum predicted concentrations of CH_2O, CO and SO_2 for each averaging period were identified and compared to the relevant EQS. This significantly overestimates impacts of these pollutants as constant operation has been assumed to ensure a full

9 Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, EA, 2018.

10 Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, EA, 2018.

11 Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, EA, 2018.

range of meteorological conditions were included in the results. If exceedences of the EQSs were identified, then the input parameters would have been amended to more accurately represent actual emissions.

4.3.15 The duration of Scenario 2 was assumed as 72-hours. As such, emissions are unlikely to significantly affect concentrations for averaging periods greater than 24-hours, or the 24-hour mean AQO for PM_{10} as 35 exceedences are permitted per annum. The model outputs for human receptors are therefore summarised in Table 14.

Table 14 Scenario 2 Model Outputs: Human Receptors

Pollutant	Modelled As	EQS (µg/m³)[a]
NO_2	83.68th %ile 1-hour mean	200
	Maximum 1-hour mean	941
CH_2O	Maximum 1-hour mean	100
CO	Maximum 8-hour rolling mean	10,000
SO_2	Maximum 1-hour mean	350
	Maximum 1-hour mean	524

NOTE: (a) Converted from ppm where relevant.

Ecological Receptors

4.3.16 Scenario 2 has the potential to affect 24-hour mean NO_x concentrations at sensitive ecological receptors. An assessment was therefore undertaken assuming constant operation of the generator. The results were subsequently compared with the relevant EQS. If this indicated an exceedence, then further analysis to represent a more realistic operational profile would be undertaken.

Long Term Averaging Periods

4.3.17 The EA outline a requirement to consider long term pollutant averaging periods. As such, modelling was also undertaken for the parameters outlined in Table 15.

Table 15 Long Term Pollutant Averaging Periods

Pollutant	Receptor Type	Modelled As	EQS (µg/m^3)[a]
NO_2	Human	Annual mean	40
PM_{10}	Human	Annual mean	40
		90.4th %ile 24-hour mean	50
$PM_{2.5}$	Human	Annual mean	12
NO_x	Ecological	Annual mean	30
SO_2	Ecological	Annual mean	10
Nitrogen deposition	Ecological	Annual	As outlined in Table 9
Acid deposition	Ecological	Annual	As outlined in Table 10

4.3.18 To predict annual mean concentrations, constant operation of the generator using the input parameters for Scenario 2 was undertaken as a worst-case, prior to factoring the results to represent a total operational period of 91-hours per annum. This consisted of:

- Event 1: 13-hours;
- Event 2: 3-hours;
- Event 3: 3-hours; and,
- Event 4: Emergency Blackout Event lasting 72-hours.

4.3.19 Daily PM_{10} concentrations were predicted based on constant operation of all generators using the input parameters for Scenario 2 as a worst-case.

4.4 Source Parameters

4.4.1 A summary of the source parameters used in the assessment is provided in Table 16. These were provided by the Applicant or calculated from the relevant technical data sheet for the generator.

Table 16 Source Parameters

Parameter	Unit	Input
Stack height	m	16

Parameter	Unit	Input
Stack diameter	m	0.4
Efflux Velocity	m/s	33.16
Exhaust gas temperature	˚C	518
Stack location (NGR)	m	510295.9, 179446.9
NO_x Emission Rate	g/s	5.4143
CO Emission Rate	g/s	1.4452
PM Emission Rate	g/s	0.1165
CH_2O Emission Rate	g/s	0.1769
SO_2 Emission Rate	g/s	0.2332

4.4.2 The emission rate for PM is stated as total dust. However, for the purposes of dispersion modelling it was considered that the entire PM emission consisted of only PM_{10} or $PM_{2.5}$. This allowed the maximum ground level impacts, with respect to the relevant EQSs, to be assessed. Actual plant emissions of PM are unlikely to only consist of only these size fractions, resulting in a worst-case assessment.

4.4.3 Reference should be made to Figure 6 for a map of the source location.

4.5 NO_x to NO_2 Conversion

4.5.1 Ambient NO_x concentrations were predicted through dispersion modelling. Concentrations of NO_2 shown in the results section assume 15% conversion from NO_x to NO_2 in accordance with previous EA consultation responses for similar sites.

4.6 Building Effects

4.6.1 The dispersion of substances released from elevated sources can be influenced by the presence of buildings close to the emission point. Structures can interrupt the wind flows and cause significantly higher ground-level concentrations close to the source than would arise in the absence of the buildings.

4.6.2 Analysis of the site layout indicated that a number of buildings should be included within the model in order to take account of effects on pollutant dispersion. Input geometries are shown in Table 17.

Table 17 Building Geometries

Building	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (°)
	X	Y				
Ski Lodge	510279.6	179463.2	13.13	18.8	42.7	253.3
Ski Lodge East	510292.9	179463.5	5.4	6.9	45.9	253.3
Cash and Carry	510342.8	179480.5	6.5	47.2	71.2	268.5
Cash and Carry Extension	510315.0	179464.5	6.5	10.3	56.9	268.5

4.7 Meteorological Data

4.7.1 Meteorological data used in the assessment was taken from Heathrow Airport meteorological station over the period 1st January 2019 to 31st December 2023 (inclusive). This observation station is located at NGR: 506947, 176515, which is approximately 4.4km south-west of the facility. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

4.7.2 All meteorological files used in the assessment were provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 7 for wind roses of the utilised meteorological records.

4.8 Roughness Length

4.8.1 A roughness length (z_0) of 1m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'cities, woodlands'.

4.8.2 A z_0 of 0.3m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'agricultural areas (max)'.

4.9 Monin-Obukhov Length

4.9.1 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 100m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-6 as being suitable for 'large conurbations >1 million'.

4.10 Background Concentrations

4.10.1 Review of the data summarised in Section 3.0 was undertaken in order to identify suitable baseline values for use in the assessment. The NO_2 concentration recorded at the HILL17 monitoring site in 2022 was utilised to represent existing levels at human receptors. The value is higher than the value predicted by DEFRA and therefore ensured a robust assessment.

4.10.2 LB Hillingdon do not undertake monitoring of SO_2, CO, C_6H_6, PM_{10} or $PM_{2.5}$ within the vicinity of the site. As such, background concentrations predicted by DEFRA, as shown in Table 6, were utilised to represent baseline levels throughout the assessment extents.

4.10.3 Background levels at the ecological receptors were obtained from the APIS website, as summarised in Section 3.5.

4.10.4 It is not possible to add short-term peak baseline and process concentrations. This is because the conditions which give rise to peak ground-level concentrations of substances emitted from an elevated source at a particular location and time are likely to be different to the conditions which give rise to peak concentrations due to emissions from other sources. This point is addressed in in EA guidance 'Air emissions risk assessment for your environmental permit'[12], which advises that an estimate of the maximum combined pollutant concentration can be obtained by adding the maximum predicted short-term concentration due to emissions from the source to twice the annual mean baseline concentration. This approach was adopted throughout the assessment.

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

4.11 Modelling Uncertainty

4.11.1 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;
- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

4.11.2 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual meteorological data sets from an observation station local to the site to account for inter-year variability. The assessment was based on the worst-case year to ensure maximum concentrations were considered;
- Surface characteristics - The z_0 and Monin-Obukhov length were determined for both the dispersion and meteorological sites based on the surrounding land uses and guidance provided by CERC;
- Plant operating conditions - Operational parameters were provided by the Applicant or were obtained from the relevant technical data sheets for the generator. As such, input parameters are considered to be representative of the relevant operating conditions;
- Background concentrations - Background pollutant levels were obtained from LB Hillingdon monitoring data, the DEFRA mapping study and APIS website;
- Receptor locations - Sensitive human and ecological locations were identified through review of mapping resources; and,
- Variability - All model inputs were as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

4.11.3 Results were considered in the context of the relevant EQSs. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

5.0 RESULTS

5.1 Introduction

5.1.1 Dispersion modelling was undertaken with the inputs described in Section 4.0. For ease of reference, Scenario 1 and 2 represent the following events:

- Scenario 1: Events 1, 2 and 3; and,
- Scenario 2: Emergency Blackout Event lasting 72-hours.

5.1.2 The results are outlined in the following Sections.

5.2 Scenario 1

5.2.1 The maximum PEC for any meteorological data set at each receptor during Scenario 1 is summarised in Table 18.

Table 18 Scenario 1: Predicted Pollutant Concentrations

Receptor	Maximum Predicted 1-hour Mean PEC (µg/m³)											
	NO_2			CH_2O			CO			SO_2		
	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr
R1	70.56	69.80	48.37	6.08	5.91	5.70	964	962	961	18.66	18.44	18.17
R2	71.27	70.28	48.44	6.23	6.01	5.77	965	963	961	18.86	18.58	18.26
R3	74.10	72.62	48.56	6.85	6.52	6.13	970	967	964	19.68	19.25	18.73
R4	81.83	78.91	48.74	8.53	7.90	7.22	984	979	973	21.90	21.06	20.17
R5	68.03	66.92	52.38	5.53	5.28	4.99	959	957	955	17.93	17.61	17.22
R6	66.51	65.37	48.21	5.19	4.95	4.65	957	955	952	17.50	17.17	16.78
R7	66.75	65.59	48.21	5.25	4.99	4.69	957	955	952	17.57	17.23	16.83
R8	67.24	66.05	48.21	5.35	5.09	4.78	958	956	953	17.71	17.37	16.96
R9	69.93	67.86	48.21	5.94	5.49	5.03	963	959	955	18.48	17.88	17.28
R10	64.55	63.69	48.20	4.77	4.58	4.37	953	951	950	16.94	16.69	16.41

Receptor	Maximum Predicted 1-hour Mean PEC (µg/m³)											
	NO_2			CH_2O			CO			SO_2		
	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr	10-Min	30-Min	1-hr
R11	65.01	63.89	48.20	4.87	4.62	4.38	954	952	950	17.07	16.75	16.42
R12	66.19	64.93	48.20	5.12	4.85	4.53	956	954	951	17.41	17.04	16.62
R13	68.86	66.87	48.20	5.71	5.27	4.84	961	957	954	18.17	17.60	17.03
R14	59.14	58.18	48.56	3.59	3.38	3.15	943	942	940	15.38	15.11	14.80
R15	59.11	58.13	48.32	3.58	3.37	3.14	943	942	940	15.37	15.09	14.78
R16	63.91	62.93	48.67	4.63	4.42	4.16	952	950	948	16.75	16.47	16.13
R17	110.79	109.86	67.62	14.84	14.64	14.35	1,035	1,033	1,031	30.21	29.95	29.57
R18	115.55	114.90	48.20	15.88	15.73	15.53	1,044	1,015	1,041	31.58	31.39	31.12

5.2.2 As shown in Table 18, there were no predicted exceedences of any EQS at any receptor location for any pollutant or averaging period of interest.

5.2.3 As outlined previously, the results shown in Table 18 assume constant operation of the generator throughout the year. This has therefore presented an extreme worst-case scenario of the standby test coinciding with the worst-case meteorological conditions. Given the tests are only undertaken over a cumulative period of 19-hours per year, this is very unlikely to occur. As such, impacts during Scenario 1 are not considered to be significant.

5.3 Scenario 2

Human Receptors

5.3.1 The maximum PEC for any meteorological data set at each human receptor during Scenario 2 is summarised in Table 19.

Table 19 Scenario 2: Predicted Pollutant Concentrations at Human Receptors

Receptor	PEC (µg/m³)				
	NO_2		Maximum 1-hour Mean CH_2O	Maximum 8-hour Rolling Mean CO	Maximum 1-hour Mean SO_2
	83.68th %ile 1-hour Mean	Maximum 1-hour Mean			
R1	48.37	68.85	5.70	954.84	18.17
R2	48.44	69.17	5.77	956.12	18.26
R3	48.56	70.80	6.13	959.46	18.73
R4	48.74	75.82	7.22	964.89	20.17
R5	52.38	65.55	4.99	949.34	17.22
R6	48.21	63.99	4.65	946.97	16.78
R7	48.21	64.20	4.69	947.28	16.83
R8	48.21	64.63	4.78	947.90	16.96
R9	48.21	65.77	5.03	948.78	17.28
R10	48.20	62.72	4.37	947.13	16.41
R11	48.20	62.75	4.38	947.80	16.42
R12	48.20	63.46	4.53	949.18	16.62
R13	48.20	64.87	4.84	950.92	17.03
R14	48.56	57.12	3.15	937.34	14.80
R15	48.32	57.06	3.14	937.14	14.78
R16	48.67	61.76	4.16	943.22	16.13
R17	67.62	108.54	14.35	1003.21	29.57
R18	48.20	113.96	15.53	972.72	31.12

5.3.2 The results shown in Table 19 can be summarised as follows:

- The 83.68th %ile 1-hour mean NO_2 concentration is not predicted to exceed the AQO at any receptor;
- The maximum 1-hour mean NO_2 concentration is not predicted to exceed the AEGL at any receptor;

- The maximum 1-hour mean CH_2O concentration is not predicted to exceed the EAL at any receptor;
- The maximum 8-hour rolling mean CO concentration is not predicted to exceed the AQO at any receptor; and,
- The maximum 1-hour mean SO_2 concentration is not predicted to exceed the AQO or AEGL at any receptor.

5.3.3 As EQS exceedences were not predicted, impacts associated with emissions during Scenario 2 are not considered to be significant.

Ecological Receptors

5.3.4 The potential for exceedences of the 24-hour mean EQS at ecological receptors during Scenario 2 was assessed using the methodology outlined in Section 4.3. Maximum predicted 24-hour mean NO_x concentrations at the ecological receptor locations are summarised in Table 20.

Table 20 Predicted 24-hour Mean NO_x Concentrations - Ecological Receptors

Receptor		Maximum Predicted Annual Mean NO_x Concentration (µg/m^3)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E1	South West London Waterbodies SPA and Ramsar	0.92	45.88	1.2	61.2
E2	South West London Waterbodies SPA and Ramsar	1.14	73.42	1.5	97.9
E3	South West London Waterbodies SPA and Ramsar	0.75	81.11	1.0	108.1
E4	Richmond Park SAC	0.89	50.63	1.2	67.5
E5	London's Canals LWS	92.64	158.14	123.5	210.9
E6	London's Canals LWS	89.11	154.61	118.8	206.1
E7	Crane Corridor LWS	25.57	93.95	34.1	125.3
E8	Hartlands Wood and Lower Park Farm LWS	9.23	77.61	12.3	103.5
E9	Airlinks Ponds LWS	7.07	63.61	9.4	84.8

Receptor		Maximum Predicted Annual Mean NO_x Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	46.10	111.60	61.5	148.8
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	14.31	71.97	19.1	96.0
E12	Lake Farm Country Park LWS	7.91	69.53	10.5	92.7
E13	Lake Farm Country Park LWS	9.83	63.61	13.1	84.8
E14	Cranford Countryside Park and Open Space LWS	13.92	82.30	18.6	109.7
E15	Stockley Business Park Lakes & Meadows LWS	4.85	63.63	6.5	84.8
E16	Cranford Lane Gravel Workings LWS	9.67	73.89	12.9	98.5
E17	Bolingbroke Way Sunken Pasture LWS	5.62	59.24	7.5	79.0

5.3.5 EA guidance 'Air emissions risk assessment for your environmental permit'[13] states that PCs at SPAs, SACs and Ramsars can be screened as insignificant if they meet the following criteria:

- The long-term PC is less than 1% of the long-term environmental standard for protected conservation areas.

5.3.6 EA guidance 'Air emissions risk assessment for your environmental permit'[14] states that PCs at LWSs can be screened as insignificant if they meet the following criteria:

- The short-term PC is less than 100% of the short-term environmental standard for protected conservation areas.

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

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

5.3.7 As shown in Table 20, PCs was below the relevant criteria at all receptors, with the exception of E5 and E6. As such, impacts at the majority of positions were not predicted to be significant.

5.3.8 The PC was greater than 100% of the short-term EQS at E5 and E6. However, this is based on constant operation of the generator. As such, additional analysis was undertaken to determine the number of exceedences based on operation of the generator for a maximum of 72-hours during Event 4, an Emergency Blackout Event.

5.3.9 The number of threshold exceedences, representing the number of days within a year where the 24-hour NO_x EQS would be exceeded based on 24-hour operation, 365-days per year, was initially modelled. These are summarised in Table 21.

5.3.10 It is noted that the threshold value was calculated by deducting the short-term baseline concentration of 65.50µg/m^3, defined as twice the annual mean baseline NO_x concentration, from the 24-hour mean NO_x EQS. This resulted in a threshold concentration of 9.50µg/m^3.

Table 21 24-hour Mean NO_x Threshold Exceedences

Receptor		Number of Threshold Exceedences (Days)				
		2019	2020	2021	2022	2023
E5	London's Canals LWS	47	47	75	62	62
E6	London's Canals LWS	61	54	53	62	52

5.3.11 As shown in Table 21, the 24-hour NO_x EQS is exceeded on a maximum of 75 days at either receptor location. This result was predicted at receptor E5.

5.3.12 The next step in the analysis involved determining the 'probability of exceedence' occurring by dividing the maximum number of exceedence days by the numbers of days in a year.

Table 22 Probability of 24-hour EQS Exceedence

Receptor		Maximum Number of Exceedence Days	Probability of Exceedence (%)
E5	London's Canals LWS	75	20.5
E6	London's Canals LWS	62	17.0

5.3.13 As shown in Table 22, the highest probability of an exceedence of the EQS was 20.5% at receptor E5.

5.3.14 The 'probability of exceedence' shown in Table 22 assumes that the plant is operational 24-hours a day, 365-days a year. However, the duration of Scenario 2 is 72-hours. As such, the 'probability of operation' was calculated as 0.8% i.e 3-days in every 365.

5.3.15 The final step in the analysis involved combining the 'probability of operation' with the 'probability of exceedence' to give the 'probability of operational exceedence'. This value represented the probability that an EQS exceedence occurs within a given year should a 72-hour grid outage arise. The results are shown in Table 23.

Table 23 Probability of Operational Exceedence

Receptor		Probability of Exceedence (%)	Probability of Operation (%)	Probability of Operational Exceedence (%)
E5	London's Canals LWS	20.5	0.8	0.17
E6	London's Canals LWS	17.0	0.8	0.14

5.3.16 As shown in Table 23, the maximum probability that the EQS will be exceeded should Event 4, a 72-hour grid outage, arise is 0.17% at receptor E5. The EA guidance 'dispersion modelling for oxides of nitrogen assessment for specified generators'[15] states that probabilities of less than 1% indicate exceedences are highly unlikely. As such, impacts at ecological receptors are not considered to be significant based on the maximum Scenario 2 duration.

15 Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, EA, 2018.

5.4 Long Term Averaging Periods

Human Receptors

5.4.1 Maximum predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations based on a total operational period of 91-hours per annum are summarised in Table 24.

Table 24 Predicted Long Term Pollutant Concentrations - Human Receptors

Receptor		Annual Mean PEC (μg/m³)		
		NO_2	PM_{10}	$PM_{2.5}$
R1	Residential - Cranton Avenue	24.11	16.23	10.66
R2	Residential - Cranton Avenue	24.11	16.23	10.66
R3	Residential - Cranton Avenue	24.11	16.23	10.66
R4	Residential - Cranton Avenue	24.12	16.23	10.66
R5	Residential - Pump Lane	24.12	16.23	10.66
R6	Residential - Chalfont Road	24.11	16.23	10.66
R7	Residential - Chalfont Road	24.11	16.23	10.66
R8	Residential - Chalfont Road	24.11	16.23	10.66
R9	Residential - Chalfont Road	24.11	16.23	10.66
R10	Residential - Station Approach	24.11	16.23	10.66
R11	Residential - Station Approach	24.11	16.23	10.66
R12	Residential - Station Approach	24.11	16.23	10.66
R13	Residential - Station Approach	24.11	16.23	10.66
R14	Residential - Nestle's Avenue	24.11	16.23	10.66
R15	Residential - Nestle's Avenue	24.10	16.23	10.66
R16	Residential - Pump Lane	24.11	16.23	10.66
R17	Business - Cash and Carry	24.17	16.24	10.67
R18	Place of Worship - Hillingdon Borough Central Masjid	24.10	16.23	10.66

5.4.2 As shown in Table 24, there were no predicted exceedences of any EQS at any receptor location for any pollutant or averaging period of interest.

5.4.3 As the predicted concentrations shown in Table 24 are based on the total theoretical operational period, impacts associated with Scenario 1 in isolation would therefore be lower. As such, impacts on long term pollutant concentrations at human receptors are not considered to be significant.

5.4.4 Maximum predicted 90.4th %ile 24-hour mean PM_{10} concentrations based on continuous operation are summarised in Table 25.

Table 25 Predicted 24-hour PM_{10} Concentrations - Human Receptors

Receptor		90.4th %ile 24-hour Mean PM_{10} PEC ($\mu g/m^3$)
R1	Residential - Cranton Avenue	33.20
R2	Residential - Cranton Avenue	33.25
R3	Residential - Cranton Avenue	33.35
R4	Residential - Cranton Avenue	33.49
R5	Residential - Pump Lane	33.26
R6	Residential - Chalfont Road	32.79
R7	Residential - Chalfont Road	32.80
R8	Residential - Chalfont Road	32.80
R9	Residential - Chalfont Road	32.82
R10	Residential - Station Approach	32.89
R11	Residential - Station Approach	32.89
R12	Residential - Station Approach	32.92
R13	Residential - Station Approach	32.92
R14	Residential - Nestle's Avenue	32.74
R15	Residential - Nestle's Avenue	32.72
R16	Residential - Pump Lane	32.91
R17	Business - Cash and Carry	35.57

Receptor		90.4th %ile 24-hour Mean PM_{10} PEC (µg/m³)
R18	Place of Worship - Hillingdon Borough Central Masjid	32.68

5.4.5 As shown in Table 25, there were no predicted exceedences of the 24-hour mean EQS for PM_{10} at any receptor location.

5.4.6 As the predicted concentrations shown in Table 25 are based on constant operation of the facility, impacts associated with Scenario 1 in isolation would therefore be lower. As such, impacts on 24-hour mean PM_{10} concentrations at human receptors are not considered to be significant.

Ecological Receptors

Oxides of Nitrogen

5.4.7 Maximum predicted annual mean NO_x concentrations at the ecological receptor locations based on a total operational period of 91-hours per annum are summarised in Table 26.

Table 26 Predicted Annual Mean NO_x Concentrations - Ecological Receptors

Receptor		Maximum Predicted Annual Mean NO_x Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E1	South West London Waterbodies SPA and Ramsar	0.00	22.48	0.0	74.9
E2	South West London Waterbodies SPA and Ramsar	0.00	36.14	0.0	120.5
E3	South West London Waterbodies SPA and Ramsar	0.00	40.18	0.0	133.9
E4	Richmond Park SAC	0.00	24.87	0.0	82.9
E5	London's Canals LWS	0.08	32.83	0.3	109.4
E6	London's Canals LWS	0.06	32.81	0.2	109.4

Receptor		Maximum Predicted Annual Mean NO_x Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E7	Crane Corridor LWS	0.02	34.21	0.1	114.0
E8	Hartlands Wood and Lower Park Farm LWS	0.01	34.20	0.0	114.0
E9	Airlinks Ponds LWS	0.01	28.28	0.0	94.3
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.07	32.82	0.2	109.4
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.03	28.86	0.1	96.2
E12	Lake Farm Country Park LWS	0.00	30.81	0.0	102.7
E13	Lake Farm Country Park LWS	0.01	26.90	0.0	89.7
E14	Cranford Countryside Park and Open Space LWS	0.01	34.20	0.0	114.0
E15	Stockley Business Park Lakes & Meadows LWS	0.00	29.39	0.0	98.0
E16	Cranford Lane Gravel Workings LWS	0.01	32.12	0.0	107.1
E17	Bolingbroke Way Sunken Pasture LWS	0.00	26.81	0.0	89.4

5.4.8 EA guidance 'Air emissions risk assessment for your environmental permit'[16] states that PCs at SPAs and SACs can be screened as insignificant if they meet the following criteria:

- The long-term PC is greater than 1% and the long term PEC is less than 70% of the long term environmental standard.

5.4.9 PCs at LWSs can be screened as insignificant if they meet the following criteria:

- The long-term PC is less than 100% of the long-term environmental standard for protected conservation areas.

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

5.4.10 As shown in Table 26, PCs were below the relevant criteria at all ecological designations. As such, predicted effects on annual mean NO_x concentrations are not considered to be significant.

Sulphur Dioxide

5.4.11 Maximum predicted annual mean SO_2 concentrations at the ecological receptor locations based on a total operational period of 91-hours per annum are summarised in Table 27.

Table 27 Predicted Annual Mean SO_2 Concentrations - Ecological Receptors

Receptor		Maximum Predicted Annual Mean SO_2 Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E1	South West London Waterbodies SPA and Ramsar	0.000	1.910	0.0	19.1
E2	South West London Waterbodies SPA and Ramsar	0.000	2.960	0.0	29.6
E3	South West London Waterbodies SPA and Ramsar	0.000	2.180	0.0	21.8
E4	Richmond Park SAC	0.000	1.530	0.0	15.3
E5	London's Canals LWS	0.003	2.193	0.0	21.9
E6	London's Canals LWS	0.003	2.193	0.0	21.9
E7	Crane Corridor LWS	0.001	2.141	0.0	21.4
E8	Hartlands Wood and Lower Park Farm LWS	0.000	2.140	0.0	21.4
E9	Airlinks Ponds LWS	0.000	1.810	0.0	18.1
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.003	2.193	0.0	21.9
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.001	1.931	0.0	19.3
E12	Lake Farm Country Park LWS	0.000	2.030	0.0	20.3
E13	Lake Farm Country Park LWS	0.000	1.850	0.0	18.5

Receptor		Maximum Predicted Annual Mean SO_2 Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E14	Cranford Countryside Park and Open Space LWS	0.001	2.141	0.0	21.4
E15	Stockley Business Park Lakes & Meadows LWS	0.000	1.960	0.0	19.6
E16	Cranford Lane Gravel Workings LWS	0.001	2.041	0.0	20.4
E17	Bolingbroke Way Sunken Pasture LWS	0.000	1.940	0.0	19.4

5.4.12 As shown in Table 27, PCs were below the relevant criteria at all ecological designations. As such, predicted effects on annual mean SO_2 concentrations are not considered to be significant.

Nitrogen Deposition

5.4.13 Maximum predicted annual nitrogen deposition rates at the ecological receptor locations based on a total operational period of 91-hours per annum are summarised in Table 28.

Table 28 Predicted Annual Nitrogen Deposition Rates - Ecological Receptors

Receptor		Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
		PC	PEC	Low EQS		High EQS	
				PC	PEC	PC	PEC
E1	South West London Waterbodies SPA and Ramsar	0.000	11.880	-	-	-	-
E2	South West London Waterbodies SPA and Ramsar	0.000	12.730	-	-	-	-
E3	South West London Waterbodies SPA and Ramsar	0.000	12.780	-	-	-	-

Receptor		Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
		PC	PEC	Low EQS		High EQS	
				PC	PEC	PC	PEC
E4	Richmond Park SAC	0.000	23.490	0.0	234.9	0.0	156.6
E5	London's Canals LWS	0.003	25.093	-	-	-	-
E6	London's Canals LWS	0.003	25.093	0.0	250.9	0.0	167.3
E7	Crane Corridor LWS	0.001	23.151	0.0	231.5	0.0	154.3
E8	Hartlands Wood and Lower Park Farm LWS	0.000	13.480	0.0	134.8	0.0	89.9
E9	Airlinks Ponds LWS	0.000	13.360	0.0	267.2	0.0	133.6
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.003	25.093	-	-	-	-
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.001	13.431	0.0	134.3	0.0	89.5
E12	Lake Farm Country Park LWS	0.000	25.210	0.0	504.2	0.0	252.1
E13	Lake Farm Country Park LWS	0.000	13.480	0.0	134.8	0.0	89.9
E14	Cranford Countryside Park and Open Space LWS	0.000	25.130	0.0	502.6	0.0	251.3
E15	Stockley Business Park Lakes & Meadows LWS	0.000	25.330	0.0	253.3	0.0	168.9
E16	Cranford Lane Gravel Workings LWS	0.001	13.601	0.0	136.0	0.0	90.7
E17	Bolingbroke Way Sunken Pasture LWS	0.000	13.520	0.0	270.4	0.0	135.2

5.4.14 As shown in Table 28, PCs were below the relevant criteria at all ecological designations. As such, predicted effects on nitrogen deposition are not considered to be significant.

Acid Deposition

5.4.15 Maximum predicted annual acid deposition rates at the ecological receptor locations based on a total operational period of 91-hours per annum are summarised in Table 29.

Table 29 Predicted Annual Acid Deposition Rates - Ecological Receptors

Receptor		Maximum Predicted Annual Acid PC Deposition Rate (keq/ha/yr)		Proportion of EQS (%)
		N	S	
E1	South West London Waterbodies SPA and Ramsar	0.00000	0.00000	-
E2	South West London Waterbodies SPA and Ramsar	0.00000	0.00001	-
E3	South West London Waterbodies SPA and Ramsar	0.00000	0.00000	-
E4	Richmond Park SAC	0.00000	0.00000	-
E5	London's Canals LWS	0.00025	0.00081	-
E6	London's Canals LWS	0.00019	0.00064	0.0
E7	Crane Corridor LWS	0.00005	0.00018	-
E8	Hartlands Wood and Lower Park Farm LWS	0.00002	0.00006	-
E9	Airlinks Ponds LWS	0.00001	0.00003	0.0
E10	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.00023	0.00075	-
E11	Yeading Brook, Minet Country Park and Hitherbroom Park LWS	0.00008	0.00027	-
E12	Lake Farm Country Park LWS	0.00001	0.00002	0.0
E13	Lake Farm Country Park LWS	0.00002	0.00008	-
E14	Cranford Countryside Park and Open Space LWS	0.00002	0.00007	-
E15	Stockley Business Park Lakes & Meadows LWS	0.00001	0.00003	0.0
E16	Cranford Lane Gravel Workings LWS	0.00004	0.00012	-

Receptor		Maximum Predicted Annual Acid PC Deposition Rate (keq/ha/yr)		Proportion of EQS (%)
		N	S	
E17	Bolingbroke Way Sunken Pasture LWS	0.00001	0.00002	-

5.4.16 As shown in Table 29, PCs were below the relevant criteria at all ecological designations. As such, predicted effects on acid deposition are not considered to be significant.

6.0 CONCLUSION

6.1.1 This Air Quality Assessment has been prepared by Redmore Environmental for the redevelopment of Unit 4, Silverdale Industrial Estate, Hayes, to provide a data centre development. The report is commissioned on behalf of Marvell Developments LLC to support an Environmental Permit Application for the site.

6.1.2 Atmospheric emissions from the diesel-fired standby generator at the site have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to quantify potential effects during the following four operating scenarios:

- Event 1 - Biweekly service test;
- Event 2 - Biannual service test;
- Event 3 - Maintenance test; and,
- Event 4 - Emergency Blackout Event lasting 72 hours.

6.1.3 Dispersion modelling of NO_x, CH_2O, CO, PM_{10}, $PM_{2.5}$ and SO_2 emissions was undertaken using ADMS-6. Impacts at sensitive receptors were quantified for two separate Scenarios and the results compared with the relevant EQSs.

6.1.4 Predicted pollutant concentrations for Scenario 1, representing regular standby generator testing, were below the relevant EQSs at all receptor locations. As such, impacts are not considered to be significant.

6.1.5 Predicted pollutant concentrations for Scenario 2, representing a 72-hour grid outage, were below the relevant EQSs at all human receptor locations. As such, impacts are not considered to be significant.

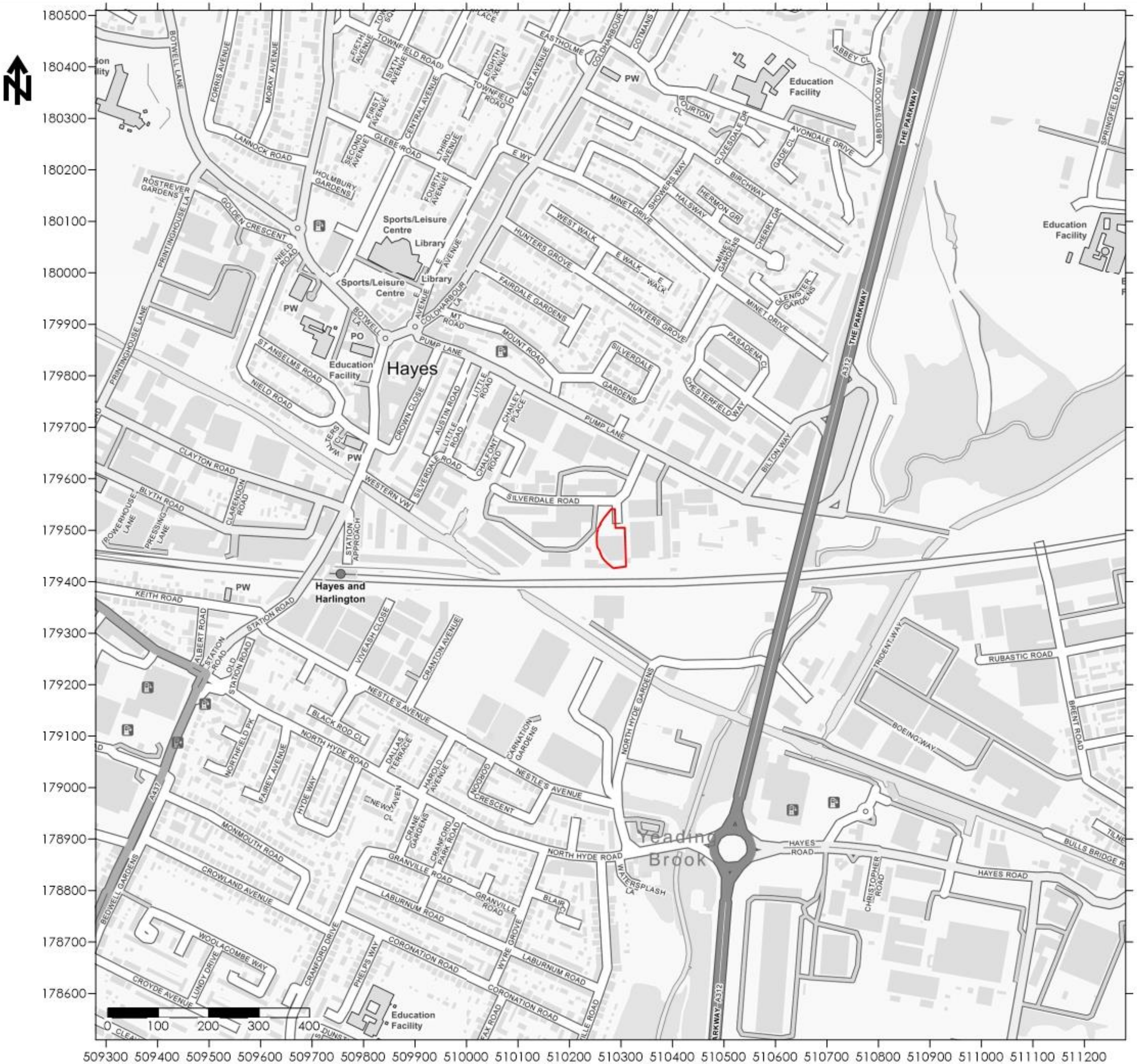
6.1.6 Impacts at sensitive ecological receptors during Scenario 2 were also not predicted to be significant.

6.1.7 Impacts on long-term pollutant concentrations were not predicted to be significant at any human or ecological receptor.

7.0 ABBREVIATIONS

AEGL	Acute Exposure Guideline Level
APIS	Air Pollution Information System
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
AW	Ancient Woodland
CERC	Cambridge Environmental Research Consultants
C_6H_6	Benzene
CH_2O	Formaldehyde
CO	Carbon monoxide
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EAL	Environmental Assessment Level
EQS	Environmental Quality Standard
LAQM	Local Air Quality Management
LWS	Local Wildlife Sites
MAGIC	Multi-Agency Geographic Information for the Countryside
NGR	National Grid Reference
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PC	Process Contribution
PEC	Predicted Environmental Concentration
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 10µm
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
SAC	Special Area of Conservation
SO_2	Sulphur dioxide
SPA	Special Protection Area
US EPA	United States Environmental Protection Agency
z_0	Roughness length
%ile	Percentile

Figures



Legend

Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
Unit 4, Silverdale Industrial Estate, Hayes

Project Reference

8167-1

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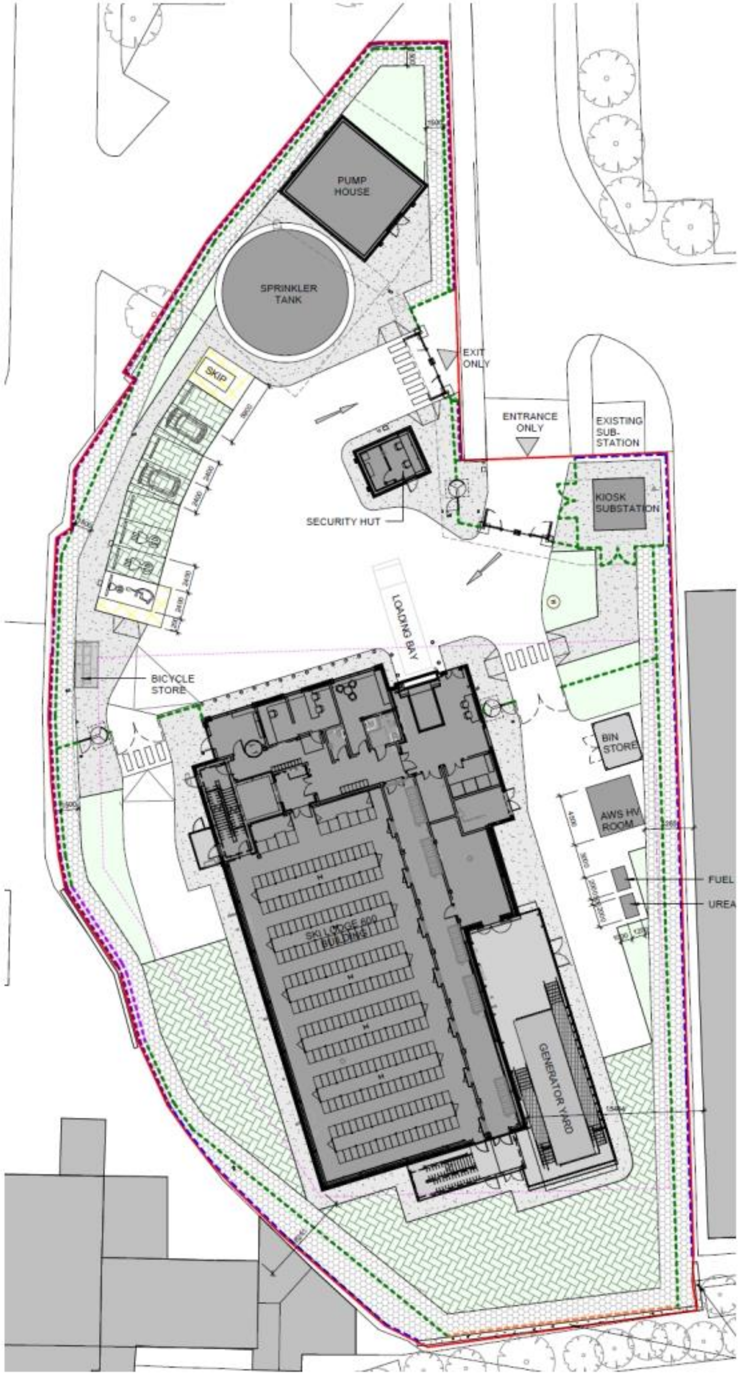

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Figure 2 - Site Layout Plan

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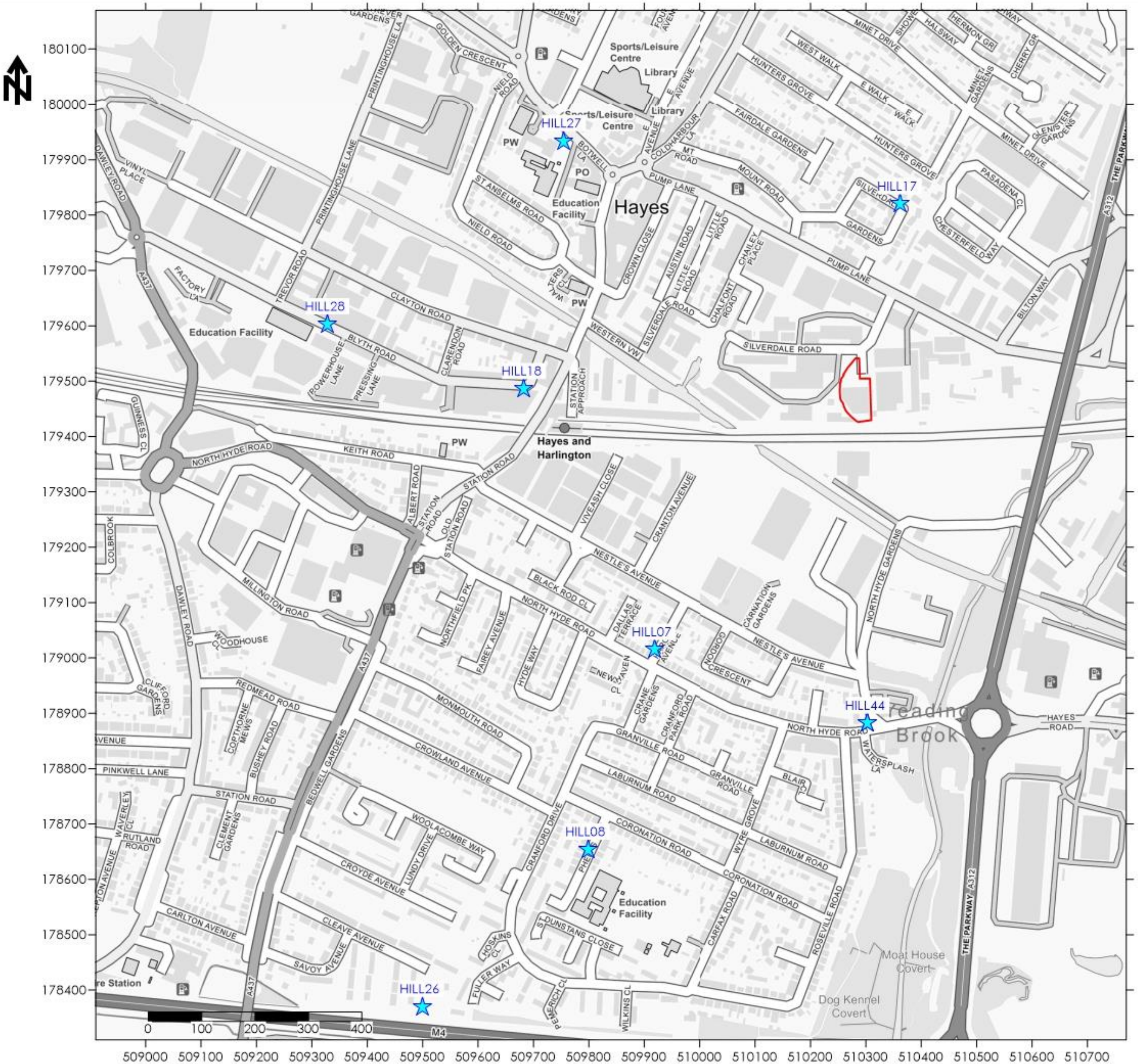

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Site Boundary

Monitor

Title

Figure 3 - Monitoring Locations

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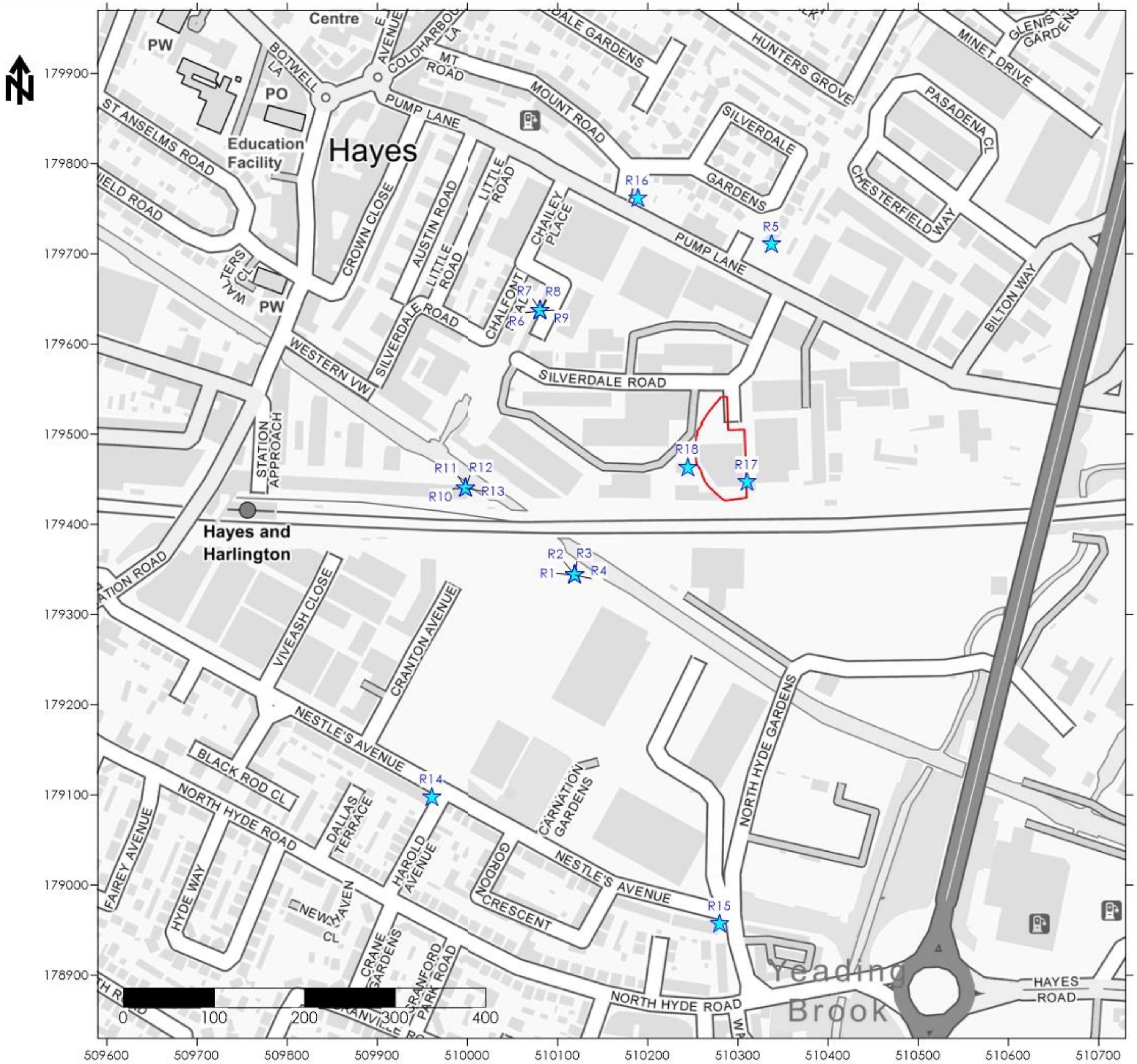

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Site Boundary

Human Receptor

Title

Figure 5 - Human Sensitive Receptor Locations

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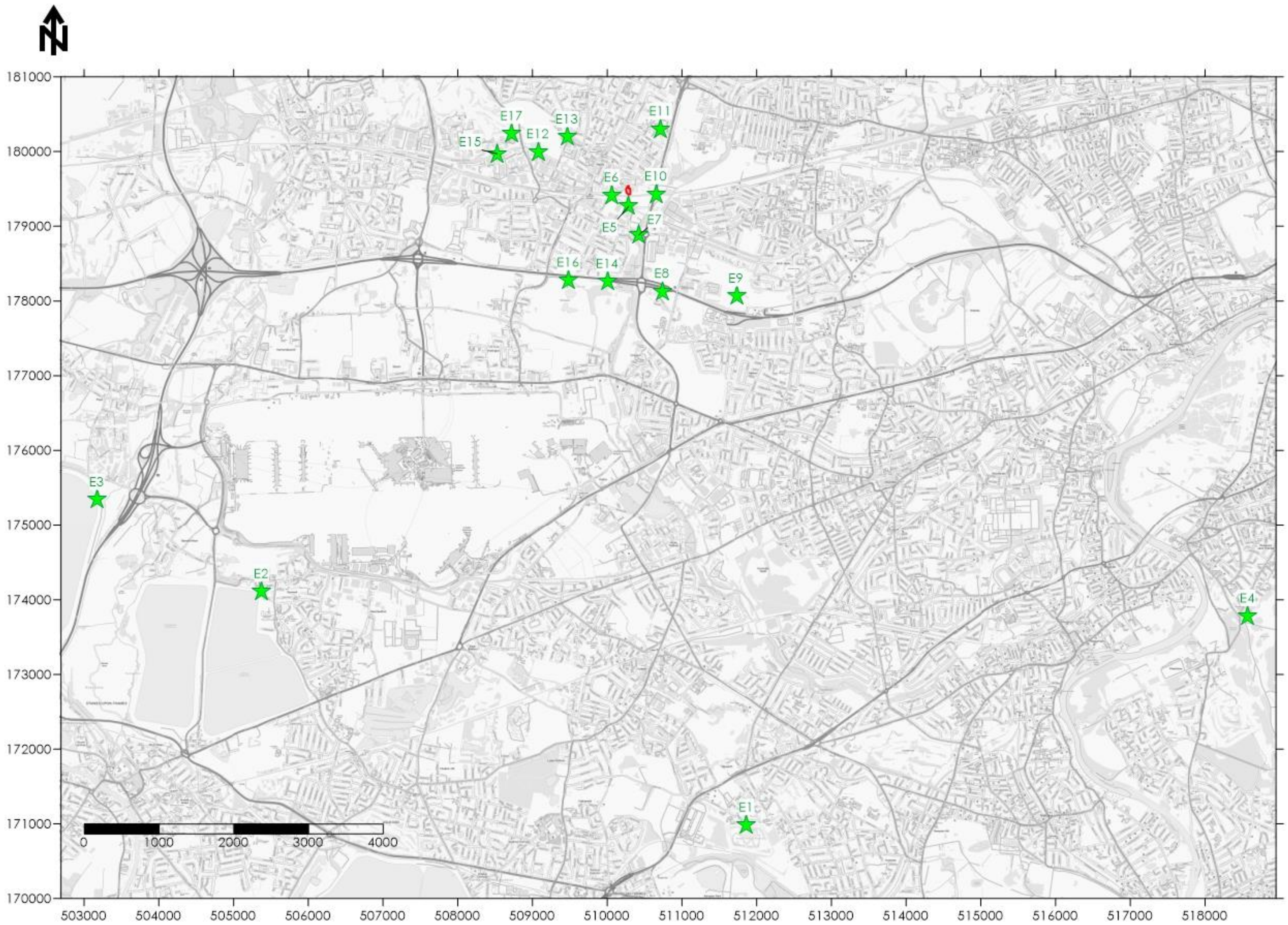

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Site Boundary

Ecological Receptor

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Figure 5 - Ecological Sensitive Receptor Locations

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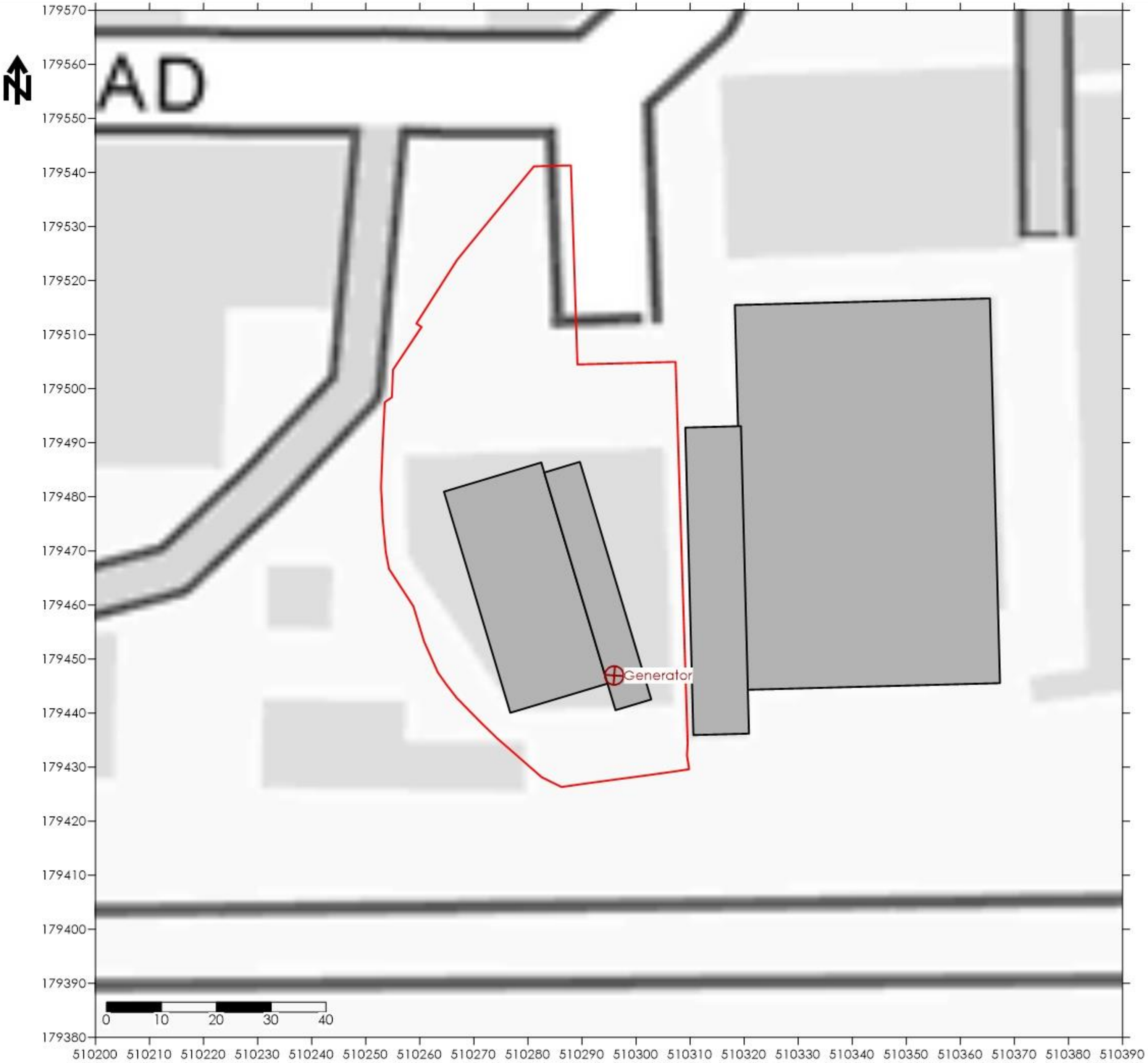

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Site Boundary

Emission Point

Building

Title
Figure 6 - ADMS-6 Inputs

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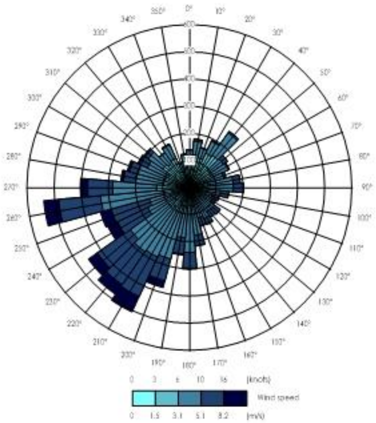
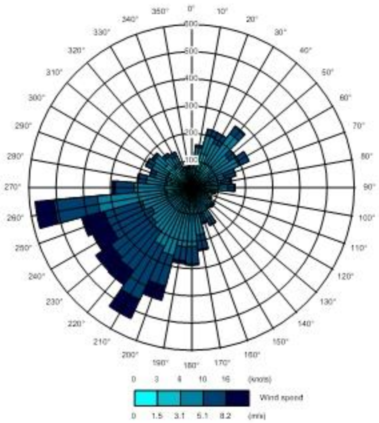
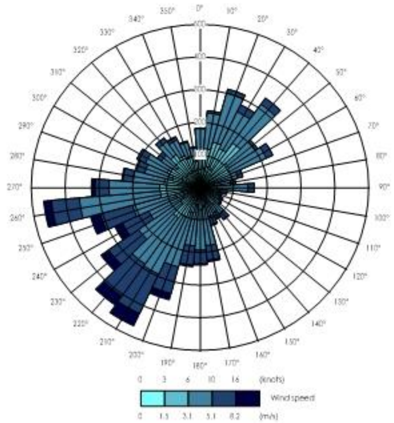


2019



2020



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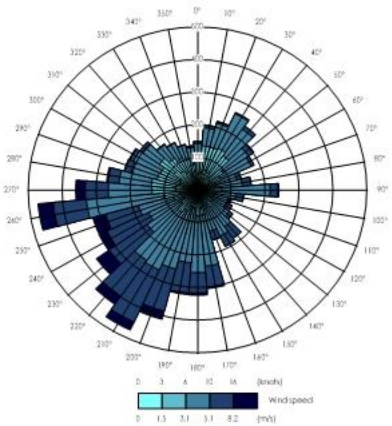
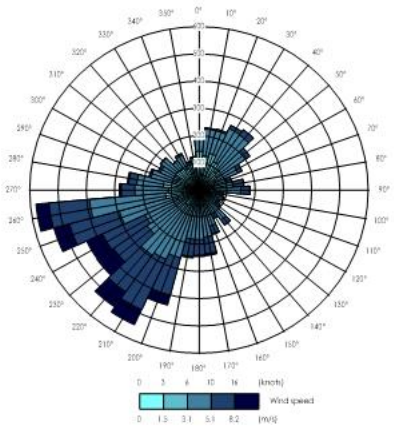


2022



2023

Title
Figure 7 - Wind Roses of 2019 to 2023 Heathrow Airport Meteorological Data

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