ARUP

Global Infrastructure UK Ltd

Data Center and Electricity Substation at Maxwells Farm West, Cheshunt

Air Quality Assessment

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Executive Summary

Arup has undertaken detailed air quality dispersion modelling of standby back-up diesel generators to accompany the permit application of a Data Center located in Cheshunt, in the Borough of Broxbourne, Hertfordshire (the Proposed Development). This report reviews the existing baseline and considers and assesses the potential air quality impacts that could arise due to the use of the standby back-up generators through the regular testing and maintenance routines.

The assessment considers the potential effects on sensitive human and ecological receptors, as well as considering the nearby Air Quality Management Area (AQMA) known as Great Cambridge Road (A10) AQMA, which is located approximately 100m to the east.

This assessment has also considered the potential impact from an 'emergency' scenario, in the event of complete grid failure.

A summary of the assessment scenarios is provided below.

- Scenario 1 – the annual test. Monthly tests of one hour with all generators to be tested one at a time at 100% load.
- Scenario 2 – all generators run for 12 hours (annual test) plus 30 generators run for an additional 12 hours, with up to 9 of these running simultaneously. The generators are run at 100% load. This test would occur once every 3 years.
- Scenario 3 – all generators run for 12 hours (annual test) plus 30 generators run for an additional 24 hours, with up to 9 of these running simultaneously. The generators are run at 100% load. This test would occur once every 6 years.
- Scenario 4 – emergency situation with all generators running together at 100% load for 30 hours.

Extensive work was undertaken reviewing Best Available Techniques (BAT) to reduce the potential air quality impacts as far as reasonably practical. The generator solution chosen included Selective Catalytic Reduction (SCR) emissions abatement, together with differing generator flue exhaust (stack) heights to reduce potential air quality impacts.

Following the assessment of each of the testing scenarios, it is considered that there would be **no significant effects as a result of the testing** of the backup generators, with the exception of the Scenario 3 test. A statistical analysis using the hypergeometric distribution was used to assess the probability of exceeding the NO_2 hourly mean Environmental Assessment Level (EAL) and the resulting probability indicated that **exceedance would be unlikely**. There are predicted exceedances of the critical level for daily mean NO_x for Scenario 3, however this test is only expected to occur once every 6 years.

The backup generators were also assessed for an emergency scenario, where it was found that the probability of an exceedance for hourly mean NO_2 was found to be less than 1%, indicating the probability of **exceedance would be highly unlikely** according to Environment Agency guidance. The emergency scenario was also compared against the US Acute Exposure Guideline Levels (AEGLs) for NO_x. Exceedances of the lower AEGL 1 limit were predicted under the emergency scenario (four exceedances for the 10-minute limit, and five for the 30-minute and 1-hour limits). The AEGLs guidance states that effects of exposure to AEGL 1 are "*not disabling and are transient and reversible upon cessation of exposure"*. Additionally, the risk of this scenario occurring is very unlikely based on electrical grid reliability for the area and inbuilt design resilience.

1. Introduction

1.1 Background

1.1.1 This Air Quality Assessment has been produced by Arup on behalf of Global Infrastructure UK Ltd (GIUK) for the development of Phase 3 Data Center in relation to Land at Maxwells Farm West, Great Cambridge Road, Cheshunt, Broxbourne (hereafter referred to as 'the Proposed Development').

1.1.2 The Air Quality Assessment has been prepared to accompany a bespoke application for an Environmental Permit (EP) for the development.

1.1.3 The Proposed Development would provide a state-of-the-art Data Center and high-tech industry to Broxbourne comprising:

- 62,000m^2 Data Center (employment space) across four buildings;
- 2,400m^2 for substation

1.1.4 The Proposed Development includes the construction of a building for use as a Data Center with emergency back-up diesel generators with three kept as back-up (redundancy), in case other generators fail. All back-up generators will be run individually for maintenance tests throughout the year and will exhaust through individual exhaust flues.

1.2 Site Location

1.2.1 The Proposed Development is located at Maxwells Farm West, Cheshunt, Waltham Cross, Broxbourne, BN8 8XH and falls within the administrative boundary of Broxbourne Borough Council (BBC). The Proposed Development comprises agricultural land and measures approximately 19 hectares (ha).

1.2.2 The Proposed Development is located between the villages of Cheshunt which is approximately 2km north-east of the Proposed Development and Goff's Oak which is approximately 5km north-west. The primary access to the Proposed Development is gained via the northbound carriageway of the Great Cambridge Road, A10. A secondary access has now been provided as part of the Phase 1 infrastructure works from the south of the Proposed Development via Lieutenant Ellis Way and runs through the centre of the Proposed Development connecting to the A10 to the east.

1.2.3 The Proposed Development is screened by mature trees and hedgerows along its northern boundary which abuts the Maxwells West industrial estate / business park to the immediate north-east. Beyond this, the area is predominantly residential in nature with playing fields which form part of the Goffs Churchgate secondary school.

1.2.4 The western boundary of the Proposed Development is delineated by timber fencing parallel to the New River. St Mary's School and Sixth Form is located further west of this. The eastern boundary of the Proposed Development contains minimal screening and is delineated by the A10 Great Cambridge Road carriageway which provides travel northwards towards Cheshunt and Broxbourne and southwards towards the M25 motorway. The southern portion of the Proposed Development is bisected by a public right of way and connects to a flyover known as the 'Paul Cully Bridge,' which provides a

pedestrian / cycle route eastward over the A10 towards Cheshunt Football Club and Cedars Park. The south of the Proposed Development is bound by Theobalds Lane and the B198 / Lieutenant Ellis Way.

1.2.5 There is also an Air Quality Management Area (AQMA) known as Great Cambridge Road (A10) AQMA, which is located approximately 100m to the east. The AQMA was declared in 2017 due to exceedances of the 1-hour and annual mean air quality standards for nitrogen dioxide (NO_2).

1.3 Description

1.4 Purpose and Structure

1.4.1 This report considers and assesses the likely significant effects of the site on the environment in respect to air quality. Air quality studies are concerned with the presence of airborne pollutants in the atmosphere.

1.4.2 The EP application is for a Data Center, principally the back-up generation only and not for the whole site. As such, the main pollutants of concern related to diesel generators for local air quality are oxides of nitrogen (NO_x) including NO_2, carbon monoxide (CO), sulphur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$).

1.4.3 With regards to emissions from the back-up generators, the potential effects of SO_2 and CO emissions are not considered to be of primary concern but have been assessed for completeness with reference to the national Air Quality Standards (AQS).

Figure 1 Site location

2. Air Quality Standards and Guidelines

2.1.1 A brief summary of the most relevant standards and guidelines relating to this assessment are set out below. Further details of air quality standards, legislation, planning and permitting policy and guidance are provided in Appendix A.

2.2 Air Quality Standards

2.2.1 In this assessment, the term 'Air Quality Standard' (AQS)[1] has been used to refer to the national limit values. Table 1 below sets out the national air quality standards for NO_2, PM_{10} and $PM_{2.5}$, the main pollutants of concern in the UK and the local area, together with additional key pollutants emitted from the back-up generators (SO_2 and CO).

Table 1 Air quality standards

Pollutant	Averaging Period	Limit value / objective
Nitrogen dioxide (NO_2)	Annual mean	40µg/m^3
	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year (99.79th percentile)
Particulate matter (PM_{10})	Annual mean	40µg/m^3
	24-hour mean	50µg/m^3 not to be exceeded more than 35 times a year (90.41st percentile)
Fine particulate matter ($PM_{2.5}$)	Annual mean	20µg/m^3
		12µg/m^3 to be achieved by 2028*
		10µg/m^3 to be achieved by 2040*
Sulphur dioxide (SO_2)	15-minute mean	266µg/m^3 Not to be exceeded more than 35 times a year
	1-hour mean	350µg/m^3 Not to be exceeded more than 24 times a year
	24-hour mean	125µg/m^3 Not to be exceeded more than 3 times a year
Carbon monoxide (CO)	8-hour mean	10 mg/m^3
Note: * The Environmental Targets (Fine Particular Matter) (England) Regulations 2023 updated in 2023, to state that the "the annual mean level of $PM_{2.5}$ in ambient air must be equal to or less than 10 µg/m³ ("the target level")" by 31st December 2040[2]. The Environmental Improvement Plan (2023) sets an interim target of 12 µg/m³, to be achieved by 31 January 2028.		

[1] The Air Quality Standards (Amendment) Regulations 2016, SI 2016/1184

[2] Defra, 2023. Chief Planners Newsletter. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1140170/03_Chief_Planners_Newsletter_March_2023.pdf [Accessed July 2023]

2.3 Ecological legislation

2.3.1 The Conservation of Habitats and Species Regulations 2010[3] transposed the European Council Directive 92/43/EEC[4] (Habitats Directive) into law in England and Wales. These required the introduction of a range of measures for the protection of habitats and species.

2.3.2 The Habitats Regulations requires the competent authority first to evaluate whether operation of the Proposed Development is likely to give rise to a significant effect on the European site (such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites.) (Habitats Regulation Assessment screening). Where this is the case, it has to carry out an 'appropriate assessment' in order to determine whether the Proposed Development would adversely affect the integrity of the European site.

Critical levels

2.3.3 There are specific objective pollutant concentrations for vegetation called 'critical levels', which are shown in Table 2. These are concentrations below which harmful effects are unlikely to occur. The critical levels apply to locations more than 20km from towns with more than 250,000 inhabitants or more than 5km from other built-up areas, industrial installations or motorways.

2.3.4 The objectives in the legislation are used to assess the potential impacts upon any sensitive ecosystems. They will be referred to as critical levels in the remainder of this report.

Table 2 Critical levels for the protection of ecosystems

Pollutant	Averaging period	Standard
Oxides of nitrogen (NO_x)	Annual mean	30µg/m^3
	Daily mean	75µg/m^3
SO_2 (for ecosystems where lichens and bryophytes are present)	Annual mean	10µg/m^3
SO_2 (for all other ecosystems)	Annual mean	20µg/m^3

[3] UK The Conservation of Habitats and Species Regulations (2010) No. 490

[4] European Council Directive (92/43/EEC) of 21 May 1992, on the conservation of natural habitats and of wild fauna and flora

3. Methodology

3.1 Assessment Approach

3.1.1 The overall approach to the air quality assessment comprised the following:

- a review of the existing air quality conditions at, and in the vicinity of, the Proposed Development;
- an assessment of the potential changes in air quality arising from the operation of the Proposed Development; and
- formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

3.2 Consultation

3.2.1 Consultation was undertaken with BBC in January 2023 to confirm the proposed approach. It was agreed during the discussion that demonstration of the Best Available Techniques (BAT) assessment would be included as part of the Air Quality Assessment (AQA) in Section 5 for permitting, as well as in the planning report, to show the design steps taken to minimise the impacts from emissions to air from the back-up generators.

3.3 Methodology of Baseline Assessment

3.3.1 Existing or baseline ambient air quality refers to the concentrations of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

3.3.2 A desk-based review of the following data sources has been undertaken to determine baseline conditions of air quality around the Proposed Development:

- *BBC Air Quality Annual Status Report* (ASR)[5];
- the Department for Environment, Food & Rural Affairs (Defra) Local Air Quality Management website[6];
- the UK Air Information Resource website[7]; and
- the Environment Agency (EA) register on industrial installations[8] and pollution inventory[9].

[5] Broxbourne Borough Council (2021) Air Quality Annual Status Report for 2021. Available at: https://www.broxbourne.gov.uk/downloads/file/2240/9483-9612-broxbourne-asr-england-2021-final-v3-0 [Accessed: March 2023].

[6] Defra, Local Air Quality Management website. Available at: http://laqm.defra.gov.u k/ [Accessed: March 2023]

[7] Defra, http://uk-air.defra.gov.uk [Accessed: March 2023]

[8] Environment Agency, https://environment.data.gov.uk/public-register/view/search-industrial-installations [Accessed: March 2023]

[9] Environment Agency, Pollution Inventory, https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory [Accessed: March 2023]

3.4 Operational Phase

Back-up Generators

3.4.1 The Proposed Development comprises containerised diesel generators, for back-up emergency purposes in the event of a power grid failure. Each generator has an individual flue terminating at 15m above ground for generators A-a to A-h and 13m above ground for all other generators; the locations of which are provided in Figure 2. The generator details are provided in Appendix B.

3.4.2 Generator flue exhaust heights were determined by undertaking a stack height assessment, detailed in Section 5.5, to understand the impact of differing heights on ground level concentrations and to identify the individual design solutions that would be acceptable in terms of potential air quality impacts.

3.4.3 The assessment has examined the changes in pollutant concentrations in the surrounding area that would result from the operation of the Proposed Development. The industry standard dispersion model ADMS 5 (version 5.2) [10] has been used to calculate concentrations of NO_2, PM_{10} and $PM_{2.5}$, SO_2 and CO at sensitive receptors.

[10] Cambridge Environmental Research Consultants (CERC), ADMS 5, http://www.cerc.co.uk/environmental-software/ADMS-model.html

Figure 2 Stack locations

Assessment Scenarios

3.4.4 The scenarios detailed in Table 3 have been assessed, following the information provided by GIUK.

Table 3 Assessment scenarios

Scenarios	Operating profile	Description
Scenario 1: annual test	One hour run per month = 12 hours per year per generator	Each of the generators to be tested, one at a time each month (daytime only). Generators will be tested at 100% load.
Scenario 2: 3 yearly test (occurs every other 3 years)	The annual test plus 30 generators running in sets of 6 or 9 for an additional 12 hours. Summary: All generators run for 12 hours (annual test) plus 30 generators run for 12 hours.	Generators will be tested at 100% load. The annual test plus the following: • 9 generators run for 12 hours at 100% load • 9 generators run for 12 hours at 100% load • 6 generators run for 12 hours at 100% load • 6 generators run for 12 hours at 100% load
Scenario 3: 6 yearly test (occurs once every 6 years)	The annual test plus 30 generators running in sets of 6 or 9 for an additional 24 hours. Summary: All generators run for 12 hours (annual test) plus 30 generators run for 24 hours.	Generators will be tested at 100% load. The annual test plus the following: • 9 generators run for 24 hours at 100% load • 9 generators run for 24 hours at 100% load • 6 generators run for 24 hours at 100% load • 6 generators run for 24 hours at 100% load
Scenario 4: Emergency scenario	A single unlikely event of 30 hours continuous operation due to grid failure	A single unlikely event where all generators will operate at 100% load for up to 30 hours. Although 3 generators are kept as back-up (redundancy) in case other generators fail, generators have been modelled as a worst-case scenario.
Note: * the 9 worst case generators have been modelled in this scenario (A-a to A-i in **Figure 2** above) as these are the generators closest to sensitive receptors, giving a more conservative assessment.		

Modelling long-term concentrations for testing scenarios (Scenario 1-3)

3.4.5 The long-term air quality standards are only relevant to planned operations (testing and maintenance). The resulting predicted annual mean concentrations were adjusted to the actual operating hours. For Scenario 1, the following factor was used to adjust the annual mean concentrations, since each generator is run for 12 hours per year (12 ÷ 8,760 = 0.0014) following EA guidance[11].

3.4.6 The same principle applies for Scenario 2 for the 3 yearly test, where generators are tested for 12 hours, with 9 generators being run at one time, and 30 generators running over the course of the test, for an additional 12 hours (12 ÷ 8760) × (30 ÷ 9).

3.4.7 For Scenario 3 for the 6 yearly test, generators are tested for 24 hours, with 9 generators being run at one time, and 30 generators running over the course of the test, for an additional 24 hours (24 ÷ 8760) × (30 ÷ 9).

3.4.8 It has been assumed that the 3 yearly test only occurs every other 3 years, with the 6 yearly test occurring in between, meaning the 3 yearly and 6 yearly tests would not take place in the same year.

Modelling short-term concentrations for testing scenarios (Scenario 1-3)

3.4.9 There are short-term air quality standards for NO_2 and PM_{10}. The standards are given as a permitted annual number of exceedances of a threshold concentration which can be expressed as an equivalent percentile. The NO_2 hourly mean standard (200µg/m^3), not to be exceeded more than 18 times a year, can be expressed at the 99.79th percentile of the hourly mean Predicted Environmental Concentration (PEC). PEC is the sum of the contribution from the process, Process Contribution (PC), and the background concentration. The PM_{10} daily mean (50µg/m^3), not to be exceeded more than 35 times a year, can be expressed as the 90.41st percentile daily mean PEC.

Modelling short-term concentrations for Scenario 4 (emergency scenario)

3.4.10 Modelling the generators for predicting hourly mean NO_2 and daily mean PM_{10} concentrations for the emergency scenario is complex as the timing of an emergency scenario cannot be predetermined. In order to estimate the absolute worst-case concentrations resulting from generators operating in an emergency, the modelling has assumed that all generators operate continuously throughout the year. This allows for the emissions to coincide with all meteorological conditions that occur throughout the year and then the short-term impacts are extracted from these predictions. This approach is very pessimistic as it is highly improbable that, in the case of the NO_2 hourly mean for instance, the generators will be operating during meteorological conditions that represent the 19 hours of the year that give rise to the highest concentrations for each receptor. Therefore, a further statistical analysis was carried out using the hypergeometric distribution to determine the probability of exceeding the NO_2 hourly mean standard.

[11] Environment Agency (2019) Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment [Accessed March 2023]

Statistical analysis of the NO_2 hourly mean standard for Scenario 4 (emergency scenario)

3.4.11 The hypergeometric distribution has been used to assess the likelihood of NO_2 hourly mean exceedance hours coinciding with the estimated hours of emergency operation. This makes it possible to calculate the probability of exceeding the NO_2 hourly mean standard (not to be exceeded more than 18 times a year), taking into account the number of operating hours.

3.4.12 The probability of randomly selecting 19 or more exceedance hours (failures) from the operating hours (N) is the same as selecting a non-exceedance hour within the operating hours (successes, N – 19 hours). Based on this relationship, the hypergeometric analysis calculates the probability (P) of exceedance in a year (more than 18 exceedances of the 200µg/m^3 NO_2 hourly mean standard). The probability (P) is then multiplied by a safety factor of 2.5 following the *EA guidance*11. The calculation is:

$$P = \sum_{i=0}^{N-19} \frac{\binom{K}{i}\binom{M-K}{N-i}}{\binom{M}{N}}$$

Where:

N= operating hours per year (i.e., 30 hours of assumed emergency operation);

M= the operating envelope (i.e., the number of hours per year, 8,760 hours);

i= the number of sample successes required (i.e., the number of non-exceedance hours considering the total operating hours, i.e. 30 – 19 = 11 hours); and

K= The total number of non-exceedance hours in the operating envelope (i.e., 8,760 hours minus the number of hours that the limit in the model is expected to be exceeded).

Sensitive Receptors

Human receptors

3.4.13 Pollutant concentrations have been predicted at existing sensitive receptors. The assessment has been undertaken to consider the predicted concentrations in areas where the air quality standards set out in Table 1 apply. The long-term annual mean objective applies at locations where sensitive receptors are located, these would include residential properties, hospitals and schools.

3.4.14 The short-term hourly mean objective applies at locations where members of the public may be expected to be present for at least an hour. Although some receptors included in the assessment, for example the Travelodge Cheshunt and the school playing fields are not considered to be representative of relevant exposure against the long-term objectives, they have been included primarily for consideration against the short-term objectives, whilst also providing a conservative assessment against the long-term mean objectives.

3.4.15 The closest identified receptor is on Tudor Close (receptor HR21) 40m north-west of the Proposed Development. Due to the close proximity of AQMA 6 Great Cambridge Road (A10), receptors have been included along the AQMA. Receptors have been modelled at the façades of nearby existing buildings as these are closest to the pollutant sources, and have been included at 1.5m above ground level (corresponding to the average height of human exposure).

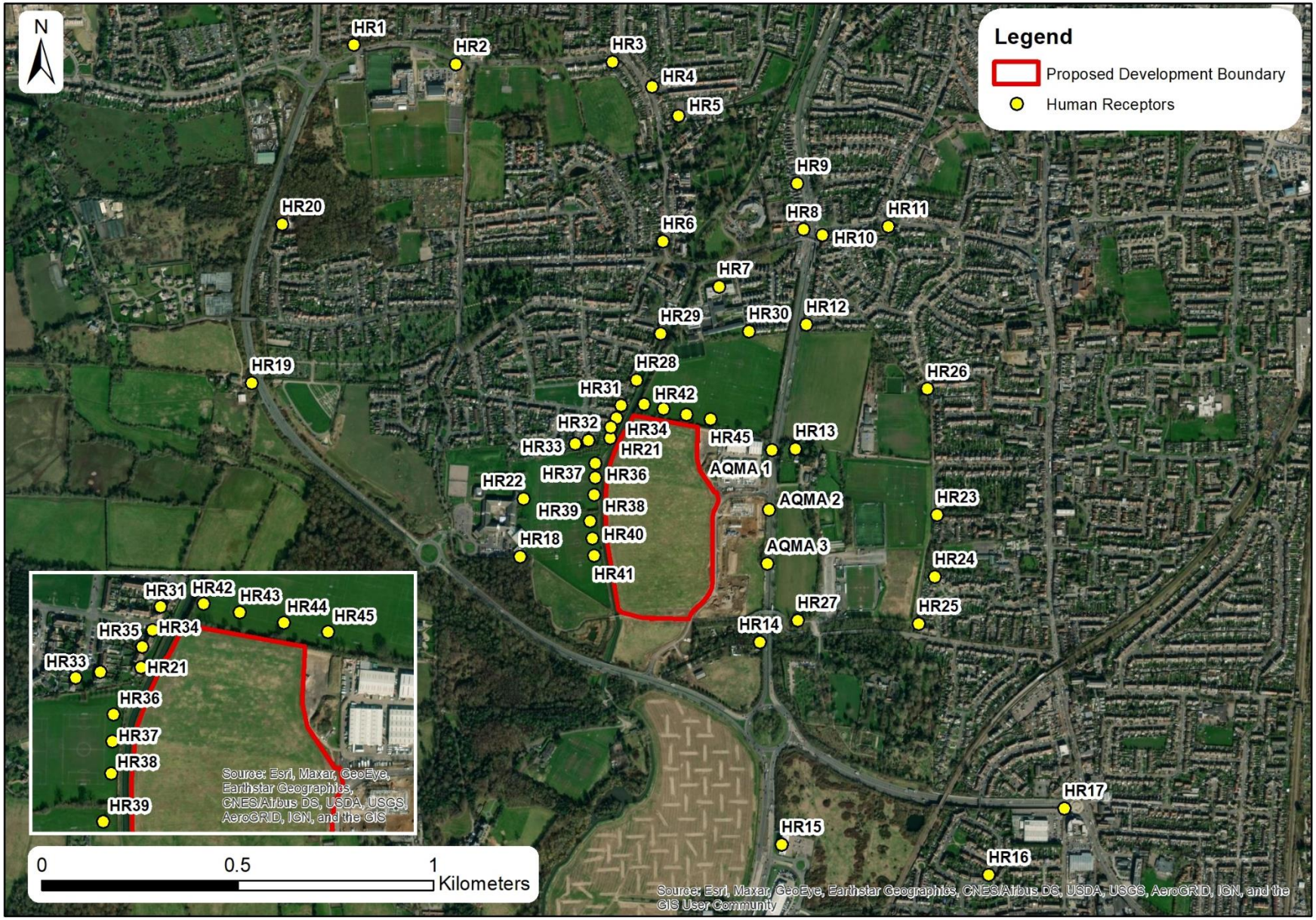
3.4.16 Details of the assessed human receptors are given in Table 4 and their locations are shown in Figure 3.

Table 4 Assessed human receptors

ID	Receptor	National Grid Reference		Type
		X	Y	
HR1	29 Bushbarns	534162	202720	Residential
HR2	Goffs Academy	534422	202671	School
HR3	3 Goffs Lane	534821	202677	Residential
HR4	152 Churchgate	534922	202614	Residential
HR5	Dewhurst St Mary CE Primary School	534989	202539	School
HR6	5A Churchgate	534950	202219	Residential
HR7	Goffs Churchgate Academy	535094	202104	School
HR8	Bright Stars Nursery	535308	202249	School
HR9	106 Great Cambridge Road	535292	202367	Residential
HR10	61 Great Cambridge Road	535357	202235	Residential
HR11	119 College Road	535525	202257	Residential
HR12	15 Farm Close	535316	202007	Residential
HR13	Albury Farm	535287	201681	Residential
HR14	Theobalds Lane 1	535196	201187	Residential
HR15	Travelodge Cheshunt	535246	200678	Residential
HR16	58 Leven Drive	535775	200601	Residential
HR17	Winston Churchill Way	535967	200770	Residential
HR18	St Mary's High School & Sixth Form 1	534473	201464	School
HR19	Broadfield Farm	533885	201869	Residential
HR20	51 Grovedale Close	533962	202274	Residential
HR21	Tudor Close 1	534814	201708	Residential
HR22	St Mary's High School & Sixth Form 2	534593	201553	School
HR23	68 Friends Avenue	535641	201515	Residential
HR24	58 Montayne Road	535635	201357	Residential
HR25	73 Theobalds Lane	535594	201237	Residential
HR26	72 Hillside Crescent	535615	201836	Residential
HR27	Theobalds Lane 2	535292	201243	Residential
HR28	Hawthorne Close	534882	201856	Residential
HR29	New River Court	534944	201984	Residential
HR30	24 Beadman Road	535169	201989	Residential
HR31	8 Tudor Close	534841	201791	Residential
HR32	12 Ermine Close	534759	201702	Residential
HR33	10 Ermine Close	534725	201693	Residential
HR34	17 Tudor Close	534830	201759	Residential
HR35	Tudor Close 2	534816	201736	Residential
HR36	School playing field receptor 1	534777	201643	School
HR37	School playing field receptor 2	534776	201607	School

ID	Receptor	National Grid Reference		Type
		X	Y	
HR38	School playing field receptor 3	534773	201563	School
HR39	School playing field receptor 4	534763	201496	School
HR40	School playing field receptor 5	534768	201451	School
HR41	School playing field receptor 6	534773	201408	School
HR42	School playing field receptor 7	534900	201794	School
HR43	School playing field receptor 8	534950	201783	School
HR44	School playing field receptor 9	535009	201768	School
HR45	School playing field receptor 10	535070	201756	School
AQMA 1	AQMA 6 Great Cambridge Road (A10) 1	535226	201678	AQMA
AQMA 2	AQMA 6 Great Cambridge Road (A10) 2	535220	201525	AQMA
AQMA 3	AQMA 6 Great Cambridge Road (A10) 3	535215	201387	AQMA

Figure 3 Modelled human receptors



Ecological Receptors

3.4.17 Ecological receptors have been reviewed within 10km of the Proposed Development, in accordance with *EA guidance*[11]. This review has identified a number of designated sites for ecological assessment. The nearest ecological sites to the Proposed Development have been identified as Lee Valley Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) and Cheshunt Park Local Nature Reserve (LNR), within 2km of the Proposed Development.

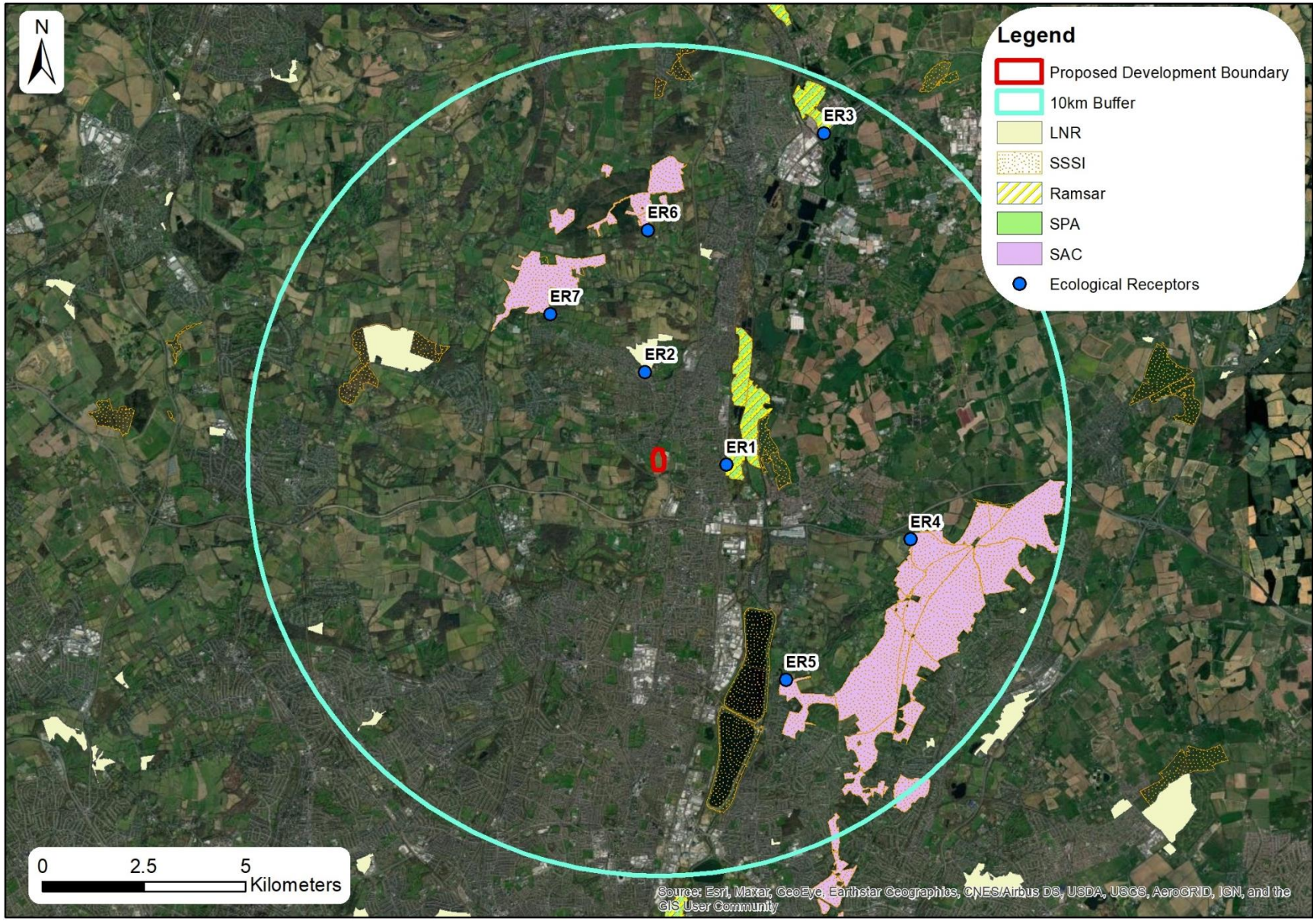
3.4.18 There are also a number of other SPAs and Special Areas of Conservation (SACs) within 10km of the Proposed Development. The location of the ecological receptors is shown in Table 5 and presented in Figure 4. Receptor points have been placed at the closest point of the ecological site to the proposed stacks.

3.4.19 Ecological receptors have been modelled at a height of 0m, representative of ground level.

Table 5 Assessed ecological receptors

ID	Receptor	National Grid Reference		Type
		X	Y	
ER1	Lee Valley SPA, SSSI	536612	201393	SPA, SSSI
ER2	Cheshunt Park LNR	534607	203679	LNR
ER3	Lee Valley SPA, SSSI	539016	209557	SPA, SSSI
ER4	Epping Forest SAC, SSSI	541137	199555	SAC, SSSI
ER5	Epping Forest SAC	538079	196106	SAC
ER6	Wormley-Hoddesdonpark Woods SAC, SSSI	534667	207161	SAC, SSSI
ER7	Wormley-Hoddesdonpark Woods SAC	532269	205102	SAC

Figure 4 Modelled ecological receptors



3.5 Dispersion Model Setup

3.5.1 The dispersion model ADMS 5 (version 5.2) was used for this assessment. The model has been widely validated for point sources and is accepted by the industry and the EA as 'fit for purpose' for air quality assessments of combustion plant and stack releases. The model incorporates the latest understanding of boundary layer meteorology and dispersion.

Meteorological Data

3.5.2 Meteorological data used in this assessment were measured at London Stansted Airport meteorological station over the period 1st January 2017 to 31st December 2021 (inclusive). London Stansted Airport is located approximately 30km north-east of the Proposed Development and was chosen due to its proximity to the Proposed Development.

3.5.3 In order for the modelling exercise to be representative of local conditions and to predict long-term averages, the dispersion model requires representative meteorological data. Most dispersion models cannot make predictions during calm wind conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. The default option within ADMS for treating calm conditions has been implemented, by setting the minimum wind speed to 0.75m/s. Local *Air Quality Management (LAQM).Technical Guidance (TG22)*[12] recommends that the meteorological data file is tested within a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours than cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%.

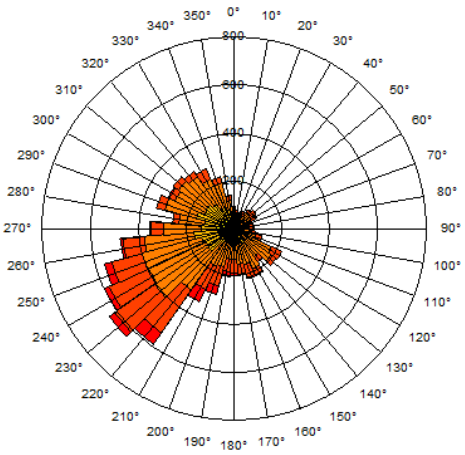
3.5.4 The datasets for 2017-2021 all had usable hours greater than 90% (2017: 98%; 2018: 96%; 2019: 97%; 2020: 98%; and 2021: 96%). The data therefore meets the requirements of the *Defra guidance* and is considered to be adequate for use in dispersion modelling.

3.5.5 Figure 5 shows the wind roses for each year of data (2017 to 2021); the predominant wind direction is south-westerly. Five years of meteorological data have been used in the dispersion modelling to determine the year giving the maximum pollutant concentrations at ground level.

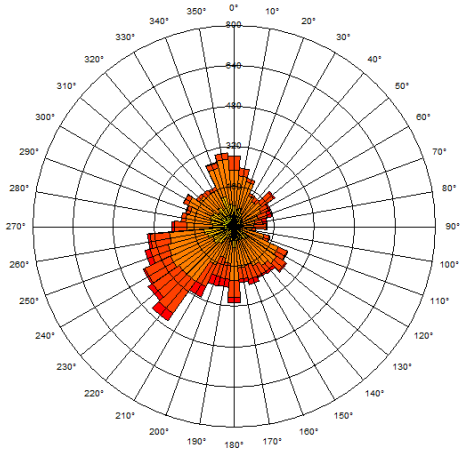
[12] Defra (2022) Local Air Quality Management Technical Guidance TG (22)

Figure 5 Wind roses for Stansted Airport from 2017 to 2021

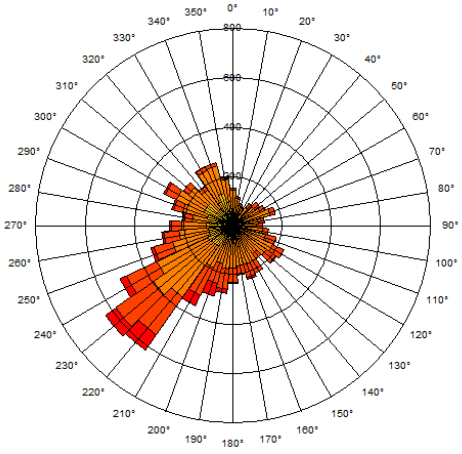
2017



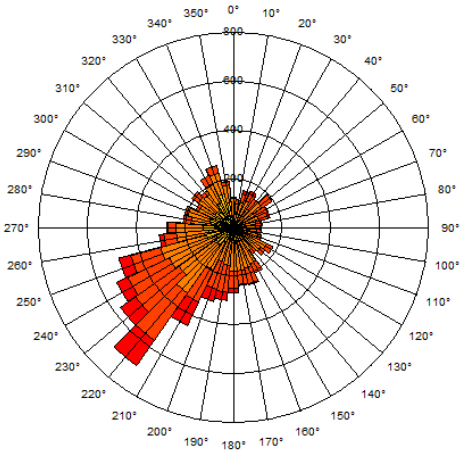
2018



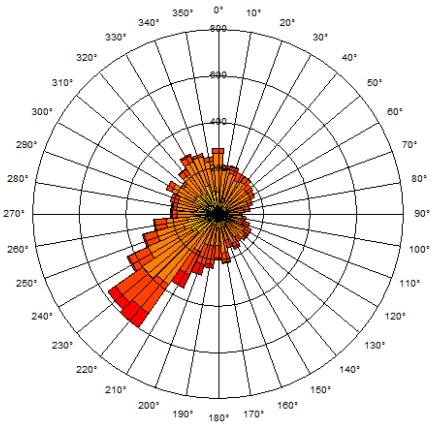
2019

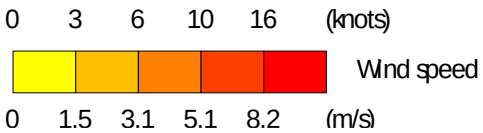


2020



2021





Buildings

3.5.6 Buildings can have an important effect on the spread of pollutants. If tall buildings are close to a chimney this can affect the spread of pollutants in the atmosphere and can lead to higher concentrations near the chimney than one would expect in the absence of buildings.

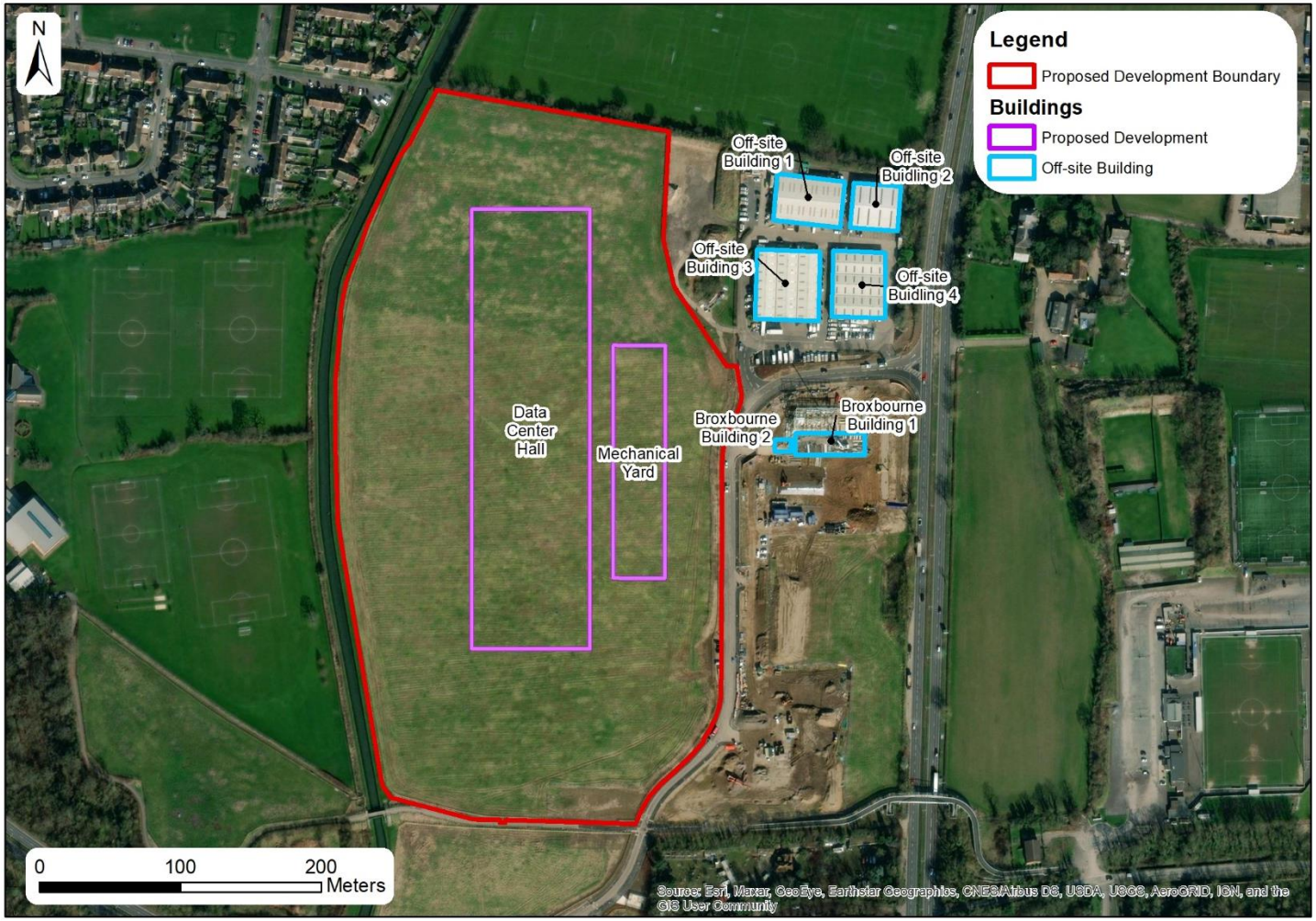
3.5.7 The proposed Data Center Hall building on site will likely have the most significant impact on dispersion, as it is the closest building to the flues. It has been modelled as the main building for all flues.

3.5.8 The details of the building geometries included in the model are shown in Table 6 and the locations of modelled buildings are shown in Figure 6. The Data Center Hall has been modelled with a height of 10.9m above ground level, as specified in detailed design drawings. Buildings can only be added to the ADMS model as rectangular or circular shapes, therefore some simplifications of the building geometries have been made.

Table 6 Modelled building parameters

Name	Building centre		Height* (m)	Length (m)	Width (m)	Angle of building length to north (degrees)
	X centroid	Y centroid				
Data Center Hall (Proposed Development)	534943	201537	10.9	83.3	321.2	89.1
Mechanical Yard (Proposed Development)	535017	201513	7.6	36.7	164.7	90.6
Broxbourne Building 1	535153	201526	16.3	49.2	15.5	89.9
Broxbourne Building 2	535119	201525	2.4	11.3	9.0	90.0
Off-site Building 1	535137	201699	12.0	47.8	32.8	96.0
Off-site Building 2	535185	201694	12.0	33.4	31.9	94.3
Off-site Building 3	535122	201639	12.0	44.2	49.1	92.0
Off-site Building 4	535172	201639	12.0	36.7	46.9	92.4
*Heights noted above ground level						

Figure 6 Modelled buildings



Surface roughness

3.5.9 Surface roughness is a parameter that describes the local land use and determines how turbulence resulting from the air flow over the ground is treated in the model. In relatively flat (smooth surface) areas the surface roughness is low and turbulence from this source is lower than a built-up urban area. Typical surface roughness values range from 0.0001m (for water or sandy deserts) to 1.5m (for cities, forests and industrial areas).

3.5.10 In this assessment, a value of 0.5m has been selected for the dispersion site, this value is described in ADMS as representing a surface roughness of "parkland, open suburbia".

3.5.11 A value of 0.2m has been selected for the meteorological measurement site as representing a surface roughness of "agricultural areas (min)". This was chosen to represent the airport and surrounding area.

Monin-Obukhov Length

3.5.12 The Monin-Obukhov length provides a measure of the extent to which stable atmospheric conditions are limited by the heat island effect. A minimum Monin-Obukhov length of 10m has been used in this dispersion modelling study, which is described as representative of a "Small towns <50,000".

NO_x to NO_2 conversion

3.5.13 The model predicts nitrogen oxides (NO_x) concentrations, which comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NO_x is emitted from combustion processes, primarily as NO with a small percentage of NO_2. The emitted NO reacts with oxidants in the air (mainly ozone) to form NO_2.

3.5.14 This assessment has followed the methodology set out by the EA, which states it should be assumed as a worst-case scenario that 70% of long-term and 35% of short-term NO_x concentrations will convert to NO_2[13].

Total Concentrations

3.5.15 To calculate the total concentration, the background concentrations are added to the predicted concentrations of the generators at the receptors. For long-term concentrations, the annual average background concentration has been used. For the short-term concentrations, twice the annual mean background concentrations has been added to the model predictions, following *EA guidance*[14].

3.5.16 The total concentrations at each receptor are calculated as follows:

- Long-term total concentration or Predicted Environmental Concentration (PEC): long-term process contribution (PC) from the generators + annual mean background concentration.
- Short-term PEC: short-term PC + 2 x annual mean background concentration.

3.6 Assessment of Significance

Human receptors

3.6.1 Whilst more focused from an Environmental Permitting perspective, the *EA guidance*[14] describes how insignificant process contributions can be screened out of further analysis.

3.6.2 Step 1: The PC can be considered insignificant and requires no further investigation if:

- the long-term PC is <1% of the long-term environmental standard; and
- the short-term process contribution is <10% of the short-term environmental standard.

3.6.3 Step 2: For those contributions not screened out in step 1, the PEC, must be tested. Concentrations are considered potentially significant if:

- the long-term PEC is greater than 70% of the long-term standard; or
- the short-term PC is greater than 20% of the short-term standard minus twice the annual mean background concentration.

Ecological receptors

3.6.4 Similarly, to the above process, the following criteria have been adopted in this assessment in respect to potential impacts at ecological sites.

3.6.5 For SPAs, SACs, Ramsar sites or SSSIs:

- the long-term PC is less than 1% of the long-term environmental standard for protected conservation area but the PEC is less than 70% of the long-term environmental standards; and
- the short-term PC is greater than 10%.

3.6.6 Predicted PC or PEC that meet the above criteria are deemed to be insignificant. When impacts cannot be screened out as being insignificant using the thresholds above, the evaluation of the significance of results requires further consideration. The screening criteria has been used to assess the impact on relevant SPAs, SACs and Ramsar sites within 10km of the Proposed Development. For SSSIs, sites within 2km of the Proposed Development have been assessed.

3.6.7 For local nature sites and ancient woodlands, the EA uses less stringent criteria in its permitting decisions. EA local policy[14] for its permitting process is that if either the short-term or long-term PC is less than 100% of the criteria level or load, they do not require further assessment. This screening criteria has been used to assess the impact on the relevant ancient woodland within 2km of the Proposed Development.

[13] Environment Agency; *Air Quality Modelling and Assessment Unit, Conversion ratios for NO_x and NO_2*

[14] EA (2021) Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Hypergeometric distribution

3.6.8 A statistical analysis has been undertaken to assess the likelihood of the NO_2 hourly mean objective being exceeded in the modelled emergency scenario. With regards to the probability from the hypergeometric distribution, the following criteria has been used following the *EA guidance*11. Where the probability is:

- 1% or less – exceedances are highly unlikely;
- less than 5% – exceedances are unlikely as long as the generator plant operational lifetime is no more than 20 years; and
- more than or equal to 5% – there is potential for exceedances and the regulator will consider if acceptable on a case-by-case basis.

3.7 Nutrient Nitrogen Deposition and Acid Deposition

3.7.1 With regard to nitrogen and acid deposition, site and habitat specific critical loads and existing deposition rates have been taken from the APIS website[15] Predicted deposition at ecological receptors has been compared against the lowest critical loads to provide a conservative assessment.

3.7.2 The assessment has looked at the Critical Load Functions (CLFs) for acidity using the relevant graphs on the APIS website. Where impacts were not been screened out as less than 1%, the CLF graphs for the most sensitive species in each designated area have been used to estimate the worst-case impact.

3.7.3 The information on the critical loads for each designated for vegetation of nutrient nitrogen and acidity (nitrogen and sulphur) are given in Appendix C.

3.7.4 Acid deposition has been assessed in terms of the CLFs for acidity, which are a function of nitrogen (N) and sulphur (S) deposition. The critical load functions are site and feature/habitat specific. Total N deposition has been derived from the addition of ammonia and NO_2 deposition results. While Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF) give rise to acid deposition, they are not assessed as part of the CLFs as the emissions of these pollutants from the stacks are not significant in comparison to N and S[16].

3.7.5 The CLFs graphs comprise two lines that represent two envelopes of safety (reflecting the present uncertainty in the scientific knowledge and evidence-base on the effects of acidic air pollution on sensitive species). If the total acid deposition rate is above the higher 'maximum CL' line, it is likely that there are harmful effects on the relevant habitat/features arising from the current level of acid (due to both nitrogen and sulphur) deposition. If the total acid deposition level falls below the lower 'minimum CL' line, it is unlikely that the feature/habitat is being harmed. If the current total acid (due to both nitrogen and sulphur) deposition level lies between the lower and upper CLFs, it is not possible to be certain that harm is occurring[15].

3.7.6 The dry deposition flux for each receptor location has been calculated based on recommended deposition velocities[16] as shown in Table 7.

Table 7 Recommended dry deposition velocities

Chemical species	Recommended deposition velocity, m/s	
NO_2	Grassland	0.0015
	Forest	0.003
SO_2	Grassland	0.012
	Forest	0.024

[15] Air Pollution Information System (APIS), available at: Site Relevant Critical Loads and Source Attribution | Air Pollution Information System (apis.ac.uk) [Accessed March 2023]

[16] A guide to the assessment of air quality impacts on designated nature conservation sites, IAQM. May 2020. Available at: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf

3.7.7 Conversion factors are used to convert dry deposition flux from units of µg/m^2/s to kg/ha/yr are shown in Table 8.

Table 8 Conversion factors to change units from µg/m^2/s of chemical species X to kg of X/ha/yr

Chemical species	Conversion factor µg m^2/s of species X to kg/ha/year	
NO_2	of N:	96
SO_2	of S:	157.7

3.7.8 The unit of 'equivalents' is also used for acidification purposes, rather than a unit of mass. Essentially this means 'moles of charge' i.e., it is a measure of how acidifying the chemical species can be. It is denoted by the units 'keq'.

3.7.9 To convert kg/ha/yr to keq/ha/yr, the conversion factors shown in Table 9 have been used.

Table 9 Conversion factors to alter units from kg of N or S ha/yr to keq of N or S ha/yr

Species	Conversion factor kg/ha/year to keq/ha/year
N	0.071428
S	0.0625

4. Baseline Assessment

4.1 Air Pollution Sources

Industrial Pollution

4.1.1 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met, and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A(1), A(2), Part B or Medium Combustion Plant (MCP) processes and are regulated through the Pollution Prevention and Control (PPC) system[17,18]. The larger more polluting processes are regulated by the EA, and the smaller less polluting ones by the local authorities. Local authorities focus on regulation for emissions to air, whereas the EA regulates emissions to air, water and land.

4.1.2 There are no regulated Part A(1) industrial installations or MCP processes listed on the EA website[19] within 2km of the Proposed Development.

Road traffic

4.1.3 In recent decades, atmospheric emissions from transport on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. The local air quality around the Proposed Development is mainly influenced by vehicle emissions from major roads, notably the A10 (43,748 AADT in 2019)[20].

Rail traffic

4.1.4 Theobalds Grove railway station is located approximately 700m to the south-east of the Proposed Development. The railway line is not highlighted as a line with heavy traffic of diesel passenger trains in the *LAQM guidance*[12] and therefore is not considered to be a significant source of local air pollutant concentrations. Emissions from the railway line and station have not been considered further in this assessment.

4.2 Local Air Quality

4.2.1 The Environment Act 2021 requires local authorities to review and assess air quality with respect to the objectives for the pollutants specified in the National Air Quality Strategy. Where objectives are not predicted to be met, local authorities must declare the area (or a

[17] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

[18] The Environmental Permitting (England and Wales) Regulations 2016, SI 2016/1154.

[19] Environment Agency, Environmental Permitting Regulations – Installations. Available at: https://environment.data.gov.uk/public-register/view/search-industrial-installations [Accessed March 2023]

[20] Department for Transport, Road Traffic Statistics. Available at: https://roadtraffic.dft.gov.uk/manualcountpoints/36184 [Accessed March 2023].

wider area where action is required to ensure compliance) as an AQMA and then produce an Air Quality Action Plan (AQAP) which includes measures to improve air quality in the AQMA. Local authorities are also required to prepare an ASR to state the measures implemented to improve local air quality and report any progress achieved. Most AQMAs across the UK have been declared due to road traffic emissions.

4.2.2 There are four AQMAs within 2km of the Proposed Development. The closest AQMA is AQMA 6 Great Cambridge Road (A10), in BBC, which is located approximately 100m to the east. This AQMA was declared in 2017 due to exceedances of the 1-hour and annual means for NO_2. As this AQMA is adjacent to the Proposed Development, it is considered further in this assessment.

4.2.3 AQMA No.4 Eleanor Cross Road / Monarchs Way is located approximately 1.4km to the south-east in BBC and was declared in 2016 due to exceedances of the annual mean for NO_2.

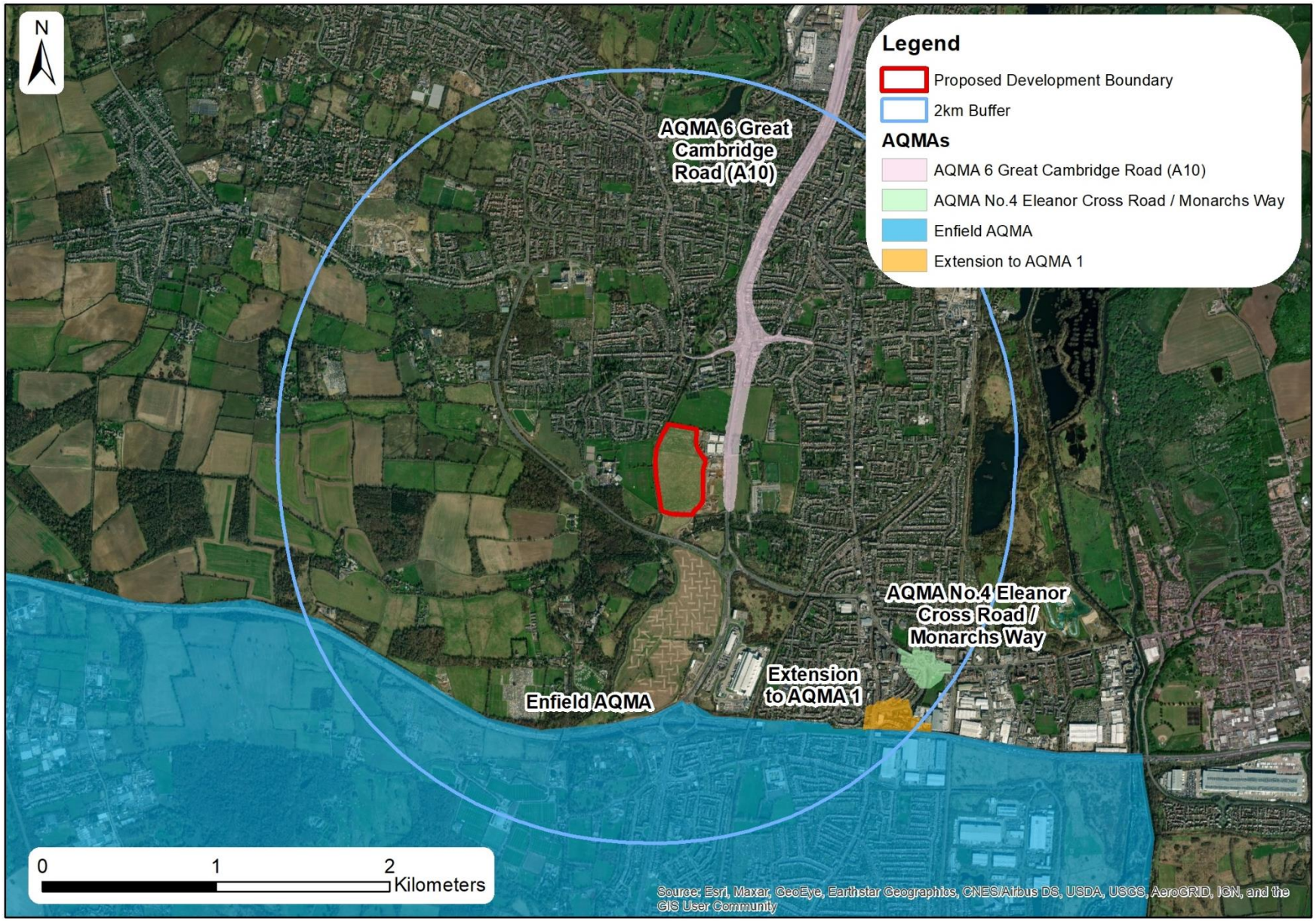
4.2.4 The BBC AQMA 1 (extension) is located approximately 1.5km south-east of the Proposed Development and was designated in 2001 for exceedances of the annual mean NO_2 objective and the 24-hour PM_{10} objective.

4.2.5 The London Borough of Enfield (LBE) declared a borough wide AQMA in 2001 due to exceedances in the annual mean for NO_2 and 24-hour mean for PM_{10} in 2001, and it is located 1km south of the Proposed Development.

4.2.6 The Eleanor Cross Road, AQMA 1 extension and LBE AQMA are unlikely to be affected by the Proposed Development due to the back-up emergency nature of the proposed generators and are not considered further in this assessment.

4.2.7 The location of these AQMAs are shown in Figure 7.

Figure 7 AQMAs within 2km of the Proposed Development



4.3 Local Monitoring

4.3.1 A review of existing air quality conditions in the area surrounding the Proposed Development has been undertaken using the *2021 BBC ASR*[5]. Data from 2019 and older has been used for the baseline assessment, as data from 2020 and 2021 was affected by COVID-19 national lockdowns and therefore isn't considered to be representative of typical baseline conditions.

Automatic Monitoring

4.3.2 Automatic or continuous monitoring involves drawing air through an analyser continuously to obtain near real-time pollutant concentration data. A review of the most recent *ASR* from BBC[5] shows that there are no automatic monitoring stations within 2km of the Proposed Development.

4.3.3 There is no PM_{10} or $PM_{2.5}$ monitoring within 2km of the Proposed Development.

Diffusion Tube Monitoring

4.3.4 There are 17 diffusion tube monitoring sites located within 2km of the Proposed Development that measure NO_2 concentrations. The monitoring data collected by BBC between 2016 and 2020 is listed in Table 10 and the locations of the monitoring sites are shown in Figure 8. Although not considered representative of typical conditions, data from 2020 is included here for completeness.

4.3.5 There were exceedances of the annual mean objective for NO_2 at seven of the sites in 2016-2020 in BBC. The highest concentration was recorded at monitoring site BB28 (214 Cambridge Road, Cheshunt). In 2019, the concentration recorded was 61.8µg/m^3, above the air quality standard of 40µg/m^3.

4.3.6 BB34 (Farm Close, Cheshunt) is the closest roadside monitoring site to the Proposed Development and is considered representative of the air quality conditions at the residential area to the north, along the A10. In 2019, the concentration recorded at monitoring site BB34 was 30.6µg/m^3, below the air quality standard of 40µg/m^3.

4.3.7 Diffusion tube location BB10 is the nearest urban background site to the Proposed Development and recorded a concentration of 28.5µg/m^3 in 2019, which is below the annual mean NO_2 air quality objective.

4.3.8 Although BBC does not monitor NO_2 hourly mean, the NO_2 annual mean exceeded 60µg/m^3 at two monitoring sites, which indicates a potential exceedance of the NO_2 hourly mean objective[12]. These sites are BB05 (Arlington Crescent, Waltham Cross) and BB28 (214 Cambridge Road, Cheshunt). However, these two sites are not considered to be representative of air quality conditions at the Proposed Development. Monitoring site BB05 is considered likely to be influenced by local emission sources as it is adjacent to the M25 and site BB28 is considered too far from the Proposed Development to be representative. Monitoring sites BB09 (100 Great Cambridge Road), BB34 (Farm Close, Cheshunt) and BB40 (A10/College Rd Junction, Cheshunt) are in close proximity to the Proposed Development and do not exceed 60µg/m^3.

Table 10 Annual mean concentrations of NO_2 at diffusion tube monitoring sites

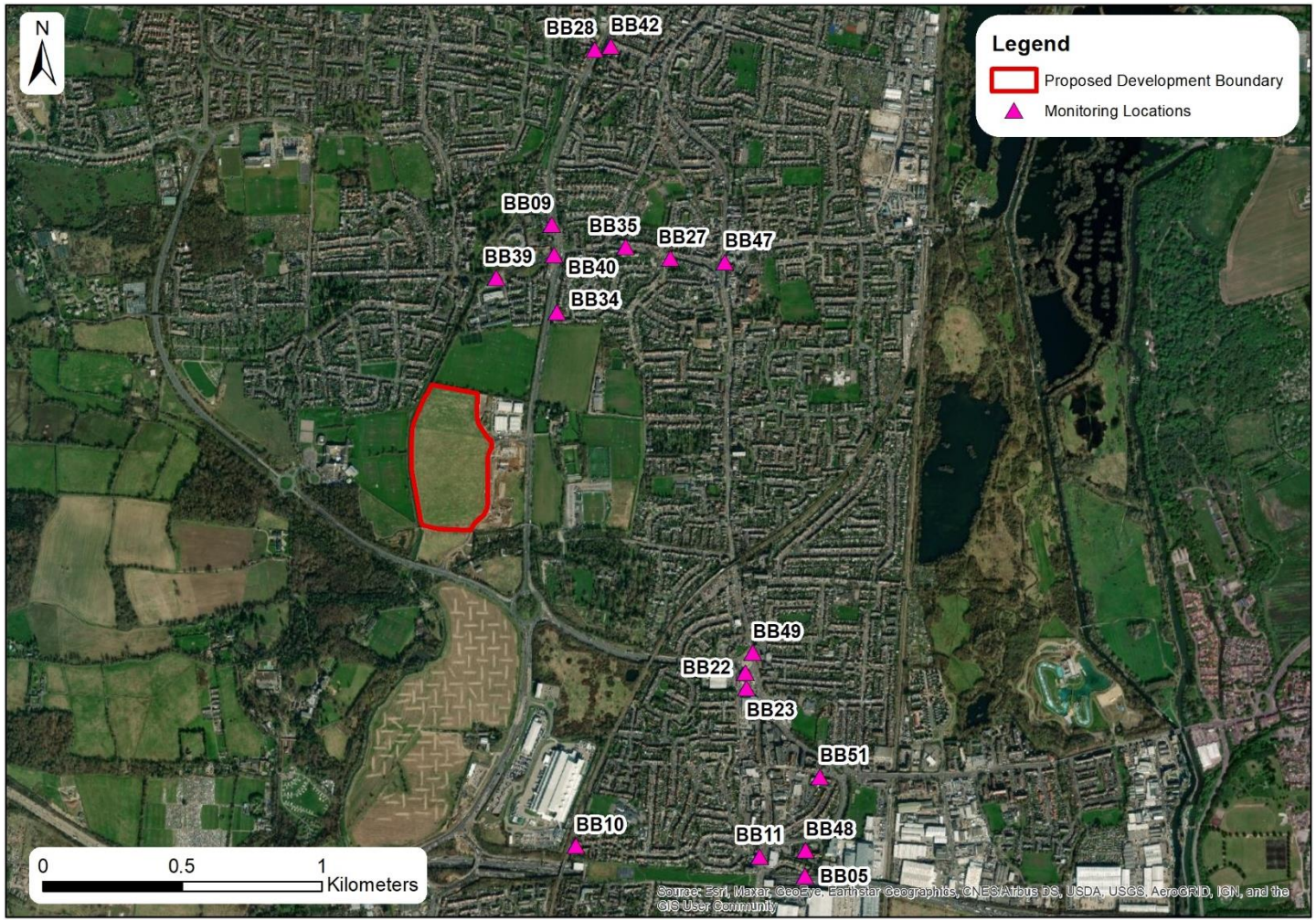
Site name	Site ID	X	Y	Site type	NO_2 concentration ($\mu g/m^3$)				
					2016	2017	2018	2019	2020
Arlington Crescent, Waltham Cross	BB05	536213	200020	Roadside	**60.7**	**65.6**	**58.9**	**57.0**	**45.4**
100 Great Cambridge Rd	BB09	535306	202351	Roadside	**54.3**	**50.7**	**47.4**	**43.8**	34.5
Teresa Gardens, Waltham Cross	BB10	535392	200128	Urban Background	34.1	33.7	30.1	28.5	22.3
35 High Street, Waltham Cross	BB11	536051	200090	Roadside	**43.6**	**42.4**	**41.3**	**39.2**	30.3
Sturlas Way, Waltham Cross	BB22	535999	200747	Roadside	**41.2**	**42.6**	38.6	33.1	27.9
Wickes Car Park	BB23	536002	200692	Other	29.5	34.8	31.8	31.9	22.4
59 College Road, Cheshunt	BB27	535730	202230	Roadside	37.4	38.6	37.0	33.6	24.8
214 Cambridge Road, Cheshunt	BB28	535459	202978	Roadside	**73.3**	**71.2**	**63.3**	**61.8**	**43.2**
Farm Close, Cheshunt	BB34	535332	202039	Roadside	36.6	37.7	34.5	30.6	25.0
86 College Road, Cheshunt	BB35	535571	202271	Roadside	33.2	36.1	33.4	31.9	23.5
College Rd/Goffs Churchgate Academy, Cheshunt	BB39	535107	202160	Roadside	N/A	25.1	31.2	27.2	20.8
A10/College Rd Junction, Cheshunt	BB40	535314	202244	Roadside	N/A	**42.0**	**48.6**	**42.5**	33.7
48 Hobbs Close, Cheshunt	BB42	535516	202989	Suburban	N/A	32.7	33.8	30.4	23.9
Turners Hill 2, Cheshunt	BB47	535924	202217	Kerbside	N/A	N/A	38.3	32.7	26.7
Parkside, outside Greenwich Court (Flats 13-24), Waltham Cross	BB48	536214	200111	Urban Background	N/A	N/A	39.0	34.1	25.5
Winston Churchill Way/High Street	BB49	536026	200819	Kerbside	N/A	N/A	**46.9**	37.3	32.6
28 Eleanor Cross Road, Waltham Cross	BB51	536265	200375	Kerbside	N/A	N/A	N/A	N/A	39.4

Notes: N/A = no monitoring data available for this year

Exceedances of the air quality objectives are highlighted in **bold**. NO_2 annual means exceeding $60\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

Data from 2020 was affected by COVID-19 national lockdowns and therefore isn't considered to be representative of typical baseline conditions but is included here for completeness.

Figure 8 Diffusion tube monitoring sites within 2km of the Proposed Development



4.4 Background Concentrations

4.4.1 Defra publishes background pollutant mapping[21] for every 1km x 1km Ordinance Survey (OS) grid square across the UK for NO_x, NO_2 and PM_{10}, $PM_{2.5}$, SO_2 and CO.

4.4.2 Table 11 shows the estimated Defra background concentrations for the OS grid squares containing the Proposed Development (534500, 201500 and 535500, 201500) and the OS grid squares containing the closest urban background monitors to the Proposed Development in 2019 for comparison.

4.4.3 The 2018 Defra backgrounds were compared to 2019 Defra backgrounds; 2018 provided higher concentrations and have therefore been used in this assessment.

Table 11 2018 background pollutant concentrations

Description	X, Y	Average annual mean concentrations (µg/m^3)					
		NO_2	NO_x	PM_{10}	$PM_{2.5}$	SO_2*	CO**
Proposed Development	534500, 201500	15.8	21.8	16.4	10.8	3.9	0.2
	535500, 201500	18.2	25.5	17.2	11.3	4.9	0.2
BB10	534500, 200500	19.8	28.1	17.5	11.4	4.0	0.2
BB48	536500, 200500	20.8	29.9	17.9	11.8	11.5	0.2

Note:

* Year adjustment factors for SO_2 are no longer provided by Defra as background levels near industrial sits would change very little, i.e., the factor would be close to 1. Defra's 2001 reference year background concentrations have therefore been used for SO_2 backgrounds.

**An adjustment factor of 0.435 has been used to project 2001 reference year background concentrations of CO to 2018, using Defra data[22].

4.4.4 The closest urban background monitoring sites to the Proposed Development are BB10, which is 1.2km to the south-west, and BB48, which is 1.6km to the south-west.

4.4.5 Table 12 shows the comparison between the measured concentrations at the urban background monitoring sites (BB10 and BB48) and the estimated Defra background concentrations for the same OS grid square for NO_2 in 2018.

Table 12 Comparison between monitored NO_2 and Defra background concentrations

Monitoring site	Estimated Defra background concentration (µg/m^3)	Measured concentration (µg/m^3)	Difference (µg/m^3)	Difference (%)
BB10	19.9	30.1	10.2	41%
BB48	20.8	39.0	18.2	61%

[21] Defra, Background Pollutant Mapping, Available at: http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html; [Accessed: March 2023].

[22] Defra. Year Adjustment Factors. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/year-adjustment-factors/ [Accessed: March 2023].

4.4.6 The NO_2 concentrations measured at the urban background monitoring sites are higher than the estimated Defra background concentration for the same grid squares. The highest percentage difference between the estimated Defra background concentration and the measured concentration is 61% at BB48 for NO_2. However, BB48 is located in a car park and approximately 30m from a dual carriageway. Therefore, this site is not considered to be representative of background conditions. Additionally, monitoring site BB10 is located approximately 60m north of the M25, which is likely to heavily influence the background concentrations here too. Therefore, Defra background concentrations have been used in this assessment.

4.4.7 Table 13 shows the NO_2, PM_{10} and $PM_{2.5}$, SO_2 and CO background concentrations at each receptor that have been used in this assessment, from the appropriate grid square.

Table 13 2018 NO_2, PM_{10}, $PM_{2.5}$, SO_2 and CO background concentrations used at each receptor

Receptor	NO_2	PM_{10}	$PM_{2.5}$	SO_2	CO
HR1	15.2	16.0	10.8	4.2	0.2
HR2	15.2	16.0	10.8	4.2	0.2
HR3	15.2	16.0	10.8	4.2	0.2
HR4	15.2	16.0	10.8	4.2	0.2
HR5	15.2	16.0	10.8	4.2	0.2
HR6	15.2	16.0	10.8	4.2	0.2
HR7	17.8	16.9	11.3	5.8	0.2
HR8	17.8	16.9	11.3	5.8	0.2
HR9	17.8	16.9	11.3	5.8	0.2
HR10	17.8	16.9	11.3	5.8	0.2
HR11	17.8	16.9	11.3	5.8	0.2
HR12	17.8	16.9	11.3	5.8	0.2
HR13	18.2	17.2	11.3	4.9	0.2
HR14	18.2	17.2	11.3	4.9	0.2
HR15	25.2	18.2	12.0	4.4	0.2
HR16	25.2	18.2	12.0	4.4	0.2
HR17	25.2	18.2	12.0	4.4	0.2
HR18	15.8	16.4	10.8	3.9	0.2
HR19	14.5	16.8	10.8	3.7	0.2
HR20	13.8	15.6	10.5	3.8	0.2
HR21	15.8	16.4	10.8	3.9	0.2
HR22	15.8	16.4	10.8	3.9	0.2
HR23	18.2	17.2	11.3	4.9	0.2
HR24	18.2	17.2	11.3	4.9	0.2
HR25	18.2	17.2	11.3	4.9	0.2
HR23	18.2	17.2	11.3	4.9	0.2
HR24	18.2	17.2	11.3	4.9	0.2
HR25	15.8	16.4	10.8	3.9	0.2

Receptor	NO_2	PM_{10}	$PM_{2.5}$	SO_2	CO
HR26	15.8	16.4	10.8	3.9	0.2
HR27	18.2	17.2	11.3	4.9	0.2
HR28	15.8	16.4	10.8	3.9	0.2
HR29	16.6	16.0	10.8	4.2	0.2
HR30	14.5	16.0	10.8	4.2	0.2
HR31	12.7	16.0	10.8	4.2	0.2
HR32	15.8	16.4	10.8	3.9	0.2
HR33	15.8	16.4	10.8	3.9	0.2
HR34	15.8	16.4	10.8	3.9	0.2
HR35	15.8	16.4	10.8	3.9	0.2
HR36	15.8	16.4	10.8	3.9	0.2
HR37	15.8	16.4	10.8	3.9	0.2
HR38	15.8	16.4	10.8	3.9	0.2
HR39	15.8	16.4	10.8	3.9	0.2
HR40	15.8	16.4	10.8	3.9	0.2
HR41	15.8	16.4	10.8	3.9	0.2
HR42	15.8	16.4	10.8	3.9	0.2
HR43	15.8	16.4	10.8	3.9	0.2
HR44	18.2	17.2	11.3	4.9	0.2
HR45	18.2	17.2	11.3	4.9	0.2
AQMA 1	18.2	17.2	11.3	4.9	0.2
AQMA 2	18.2	17.2	11.3	4.9	0.2
AQMA 3	18.2	17.2	11.3	4.9	0.2
ER1	16.6	16.4	11.1	4.9	0.2
ER2	14.5	15.6	10.6	4.1	0.2
ER3	12.7	15.0	9.9	5.0	0.1
ER4	18.6	17.9	11.4	4.1	0.2
ER5	17.7	16.4	10.9	4.2	0.2
ER6	11.4	14.4	9.7	3.6	0.1
ER7	10.9	14.8	9.9	3.6	0.1

4.5 Baseline summary

4.5.1 There are 17 diffusion tube monitoring sites located within 2km of the Proposed Development that measure NO_2 concentrations. There were exceedances of the annual mean objective for NO_2 recorded at seven of the sites in 2016-2020 in BBC. The highest concentration was recorded at monitoring site BB28. In 2019, the concentration recorded was 61.8µg/m^3, above the air quality standard of 40µg/m^3.

4.5.2 BB34 is the closest roadside monitoring site to the Proposed Development and in 2019 the concentration recorded was 30.6µg/m^3, below the air quality standard of 40µg/m^3.

4.5.3 BBC also undertakes background monitoring within the vicinity of the Proposed Development. The nearest background monitoring location to the Proposed Development is BB10, which recorded an NO_2 annual mean concentration of 30.1µg/m^3 in 2018, which is below the air quality objective.

4.5.4 Defra NO_2 annual mean backgrounds at the Proposed Development site are 15.8µg/m^3 and 18.2µg/m^3, which are well below the air quality objective. Defra background concentrations were used as the background data in this assessment, as they are considered to be more representative of the background conditions at the nearby residential sites, compared to existing monitoring locations.

5. Best Available Techniques (BAT)

5.1 Overview

5.1.1 This section contains the findings and background of the appraisal of BAT and reports the findings of various alternations that have been made to the system of generators to minimise air quality impacts. BAT is explained in detail in the *EA Guidance 'Best Available Techniques: environmental permits'*[23]. The term 'technique' encompasses the technology used and the way the system is designed, built and operated.

5.1.2 The following section outlines the initial model setup prior to understanding the alterations that would be required to achieve BAT, and subsequently outlines the various scenarios that have been assessed to improve air quality concentrations.

5.1.3 In order to determine the BAT for the Proposed Development, the following steps were taken:

- the model inputs were refined through discussions with the generator provider, to ensure accurate data to input to the models;
- the project team compared initial air quality predicted concentration results from the array of generators available, to identify the most acceptable generators that could be taken forward;
- the model inputs were then further refined by comparing parameters with the Computational Fluid Dynamics (CFD) and noise teams to ensure consistency across the project and agree a generator specification suitable for air quality, CFD and noise;
- the air quality team discussed the potential use of Hydrogenated Vegetable Oil (HVO) fuel with the generator provider, and found this was not considered to be a viable option for the project (further details are provided below);
- the air quality team then liaised with the generator provider about possible mitigation through the use of Selective Catalytic Reduction (SCR), and compared results for alternative generators using SCR;
- once the specific generator had been selected, to improve predicted concentrations from operation, a stack height assessment was undertaken.

[23] Environment Agency, 2016. Best Available Techniques: environmental permits. Available at: https://www.gov.uk/guidance/best-available-techniques-environmental-permits [Accessed March 2023].

5.2 Review of alternative generator specifications

Generator 1

5.2.1 This generator was considered to be a good alternative to some of the standard generators, however it was found that the low NO_x generators are not able to provide sufficient power for the Proposed Development, and therefore could not be taken forward for operational reasons.

Generator 2

5.2.2 Generator 2 was then considered, however it was found that the NO_x emission rate was too high (>2000 mg/m^3) and therefore this specification was not suitable for the Proposed Development. Other generators were then considered at this point.

Generator 3

5.2.3 Generator 3 generator had lower emission rates than Generator 2, however it was considered that other generators or options may still be able to improve upon this.

Generator 4

5.2.4 Generator 4 was suggested to be used with SCR and it had the lowest emission rate. However, for the annual test, the SCR would only be in operation for the latter half hour due to the lead time in the SCR taking effect. When weighting the original Generator 4 emission rate with the Generator 4 SCR emission rate, the final emission rate was higher than the standard Generator 2 emission rate (further details on calculating SCR emission rates are provided below).

Generator 2 with open loop SCR generator

5.2.5 Due to the outcomes of the Generator 4 with SCR, Generator 2 was tested with SCR using the same methodology and it was found that this generator specification provided the best possible outcome of all generators tested, particularly as it was also suitable for the CFD and noise teams.

5.3 Consideration of SCR mitigation

5.3.1 Due to the consideration that the predicted concentrations of the original generators could be improved upon, SCR was investigated. The generator provider confirmed that SCR would require 20 to 30 minutes to warm up before being effective. For a 1-hour test, this would mean that for the first half hour, the SCR would not be effective, and the original generator emission rate would be in effect. The second half hour would then emit pollutants at the lower SCR emission rate. In order to take this into account for the modelling, a weighted emission rate was calculated, using the standard emission rate for the initial half hour and the SCR emission rate for the second half hour.

5.4 Consideration of HVO

5.4.1 The possibility of HVO fuel as an alternative fuel source to diesel was discussed with the generator provider. The generator provider indicated that there was a lack of empirical evidence supporting the use of HVO fuel to achieve a sufficient reduction in NOx and PM_{10} and $PM_{2.5}$ emissions. The use of HVO fuel was therefore discounted for the purposes of this application.

5.5 Stack Height Assessment

5.5.1 A stack height assessment was undertaken to determine a suitable height for the proposed Generator 2 with open loop SCR generator. Emissions of short-term NO_2 for Scenario 3 (6 yearly test) were identified early in the design development as likely to be the worst case and therefore this stack height assessment focusses on the predicted short term NO_2 concentrations for Scenario 3 only.

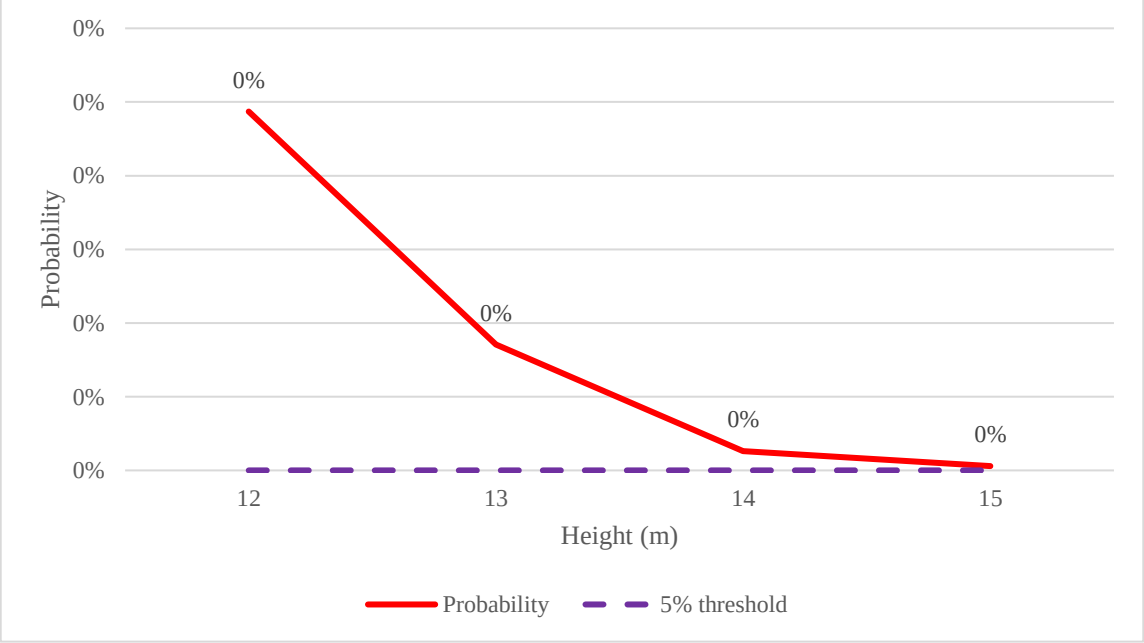
5.5.2 An operating window of 96 hours must be achieved to allow for Scenario 3 (based on four sets of 24 continuous tests). Stack heights were tested in 1m increments between 12m and 15m, based on known design parameters.

Stack heights for a 96-hour operating window

5.5.3 When considering stack heights from 12m-14m using the EA's hypergeometric distribution analysis, it was found there would be a high likelihood (greater than or equal to 5%) of exceeding the NO_2 hourly mean standard.

5.5.4 For a stack height of 15m however, this falls below 5% (see Figure 9), which indicates an unlikely probability of exceeding the NO_2 hourly mean standard.

Figure 9 Probability of exceeding hourly mean NO_2 standard



5.5.5 A stack height assessment was undertaken with generators A-a to A-h (see Figure 2) using a stack height of 15m and all other generators at 13m. Generators A-a to A-h are the closest to the sensitive residential receptors in the north-west and were therefore modelled at a greater stack height to improve dispersion.

5.5.6 It was found that the probability of exceeding the hourly NO_2 mean standard was 4.8%, which indicates an exceedance is unlikely.

5.5.7 Therefore, the final assessment and design has considered stack heights of 15m for generators A-a to A-h and a stack height of 13m for all other generators. Results are outlined in detail in Section 6.

6. Assessment of Generator Emissions

6.1 Assessment of Back-up Generator Emissions

6.1.1 The concentrations of pollutants as a result of generator emissions have been predicted for five meteorological years (2017, 2018, 2019, 2020 and 2021) at each of the identified nearby sensitive receptors. The following section provides a summary of the highest modelling results predicted from the five years of meteorological data used.

6.1.2 Table 14 outlines a summary of the significance of Scenarios 1-4 for the assessment of back-up generator emissions on human receptors. Table 15 outlines a summary of the significance of Scenarios 1-4 for the assessment on ecological receptors. Detailed descriptions of the results on human receptors are provided in Table 16-Table 19 below for each Scenario, and full results are provided in Appendix C for testing and emergency scenarios (see Table 3 for information on scenarios).

6.1.3 Table 20 provides the outcomes of the assessment of the Scenario 4 emergency impacts against the AEGLs in keeping with EA requirements. There are a number of exceedances of AEGL 1 for each of the three periods assessed. The AEGLs guidance states that effects of exposure to AEGL 1 are “not disabling and are transient and reversible upon cessation of exposure”. Additionally, the risk of this emergency scenario occurring is very unlikely based on electrical grid reliability for the area and inbuilt design resilience. The exceedances are detailed below:

- For the 10-minute limit for AEGL 1, there are four exceedances, two of which are at residential receptors on Tudor Close and two of which are at a playing field where receptors could leave the area immediately indoors if needed in the event of an emergency.
- For the 30-minute and 1-hour limits for AEGL, 1 there are five exceedances, three of which are at residential receptors on Tudor Close and two of which are at a playing field. As above, receptors at the playing field are able to vacate the area indoors in the event of an emergency.

Table 14 Human receptor assessment summary of significance for testing and emergency scenarios

Scenario	NO_2 annual mean	PM_{10} annual mean	NO_2 hourly mean	PM_{10} daily mean	SO_2 15-minute mean	SO_2 hourly mean	SO_2 daily mean	CO 8-hour rolling mean
Scenario 1 (annual test)	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Scenario 2 (3 yearly test)	-	-	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Scenario 3 (6 yearly test)	-	-	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Scenario 4 emergency	-	-	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
"-"denotes that as this scenario would only run for a limited period and is not a regularly scheduled test, no annual averages have been calculated.								

Table 15 Ecological assessment summary of significant for testing and emergency scenarios

Scenario	SO_2 annual mean	NO_x annual mean	NO_x daily mean
Scenario 1 (annual test)	Insignificant	Insignificant	Insignificant
Scenario 2 (3 yearly test)	-	-	Insignificant
Scenario 3 (6 yearly test)	-	-	Potentially significant
Scenario 4 Emergency	-	-	Potentially significant
"-"denotes that as this scenario would only run for a limited period and is not a regularly scheduled test, no annual averages have been calculated.			

Scenario 1 – annual test

Table 16 Assessment of generator emissions on human receptors - Scenario 1 (annual test) results

Pollutant & period	Air quality standard	Largest PC	Location of largest PC (receptor)	PC as % of air quality standard	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_2 annual mean concentration	40µg/m^3	0.32µg/m^3	HR44 (Playing Field 9)	Less than 1%	25.2µg/m^3	HR15 (Travelodge Cheshunt)[1]	Well below the air quality standard	**Insignificant**
PM_{10} annual mean concentration	40µg/m^3	<0.01µg/m^3	HR7 (Goffs Churchgate Academy)	Less than 1%	18.2µg/m^3	HR15 (Travelodge Cheshunt)	Well below the air quality standard	**Insignificant**
NO_2 hourly mean concentration	200µg/m^3	80.6µg/m^3	HR38 (Playing Field 3)	More than 10% More than 20% of the short-term minus twice the annual mean background concentration (step 2 of the H1 criteria)11	112µg/m^3	HR38 (Playing Field 3)	Well below the air quality standard	**Insignificant** [2]
PM_{10} daily mean concentration (90.41st percentile)	50µg/m^3	0.01µg/m^3	HR7 (Goffs Churchgate Academy)	Less than 10%	36.5µg/m^3	HR15 (Travelodge Cheshunt) [1]	Well below the air quality standard	**Insignificant**
SO_2 15-minute mean concentration (99.9th percentile)	266µg/m^3	0.26µg/m^3	HR7 (Goffs Churchgate Academy)	Less than 10%	11.5µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 hourly mean concentration (99.73rd percentile)	350µg/m^3	0.24µg/m^3	HR37 (Playing Field 2)	Less than 10%	11.5µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 daily mean concentration (99.18th percentile)	125ug/m^3	0.03µg/m^3	HR38 (Playing Field 3)	Less than 10%	11.5µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**

Pollutant & period	Air quality standard	Largest PC	Location of largest PC (receptor)	PC as % of air quality standard	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
CO 8-hour rolling mean concentration	10mg/m^3	0.41µg/m^3	HR36 (Playing Field 1)	Less than 10%	0.7µg/m^3	HR36 (Playing Field 1)	Well below the air quality standard	**Insignificant**

Notes

[1]Although Playing Fields and the Travelodge Cheshunt are not classified as sensitive receptors, they have been assessed against objectives as a worst-case location.

[2] Although impacts cannot be screened out using the EA criteria, Scenario 1 would include 480 hours of generator run time over the course of a year, which equates to 5% of the year (480/8760); overall the potential impacts are considered to be insignificant

Scenario 2 – 3 yearly test

Table 17 Assessment of generator emissions on human receptors - Scenario 2 (3 yearly test) results

Pollutant & period	Air quality standard	Largest PC	Location of largest PC (receptor)	PC as % of air quality standard	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_2 hourly mean concentration	200µg/m^3	411µg/m^3	HR38 (Playing Field 3)[2]	More than 10% More than 20% of the short-term minus twice the annual mean background concentration (step 2 of the H1 criteria)11	443µg/m^3	HR38 (Playing Field 3)[2]	Exceeds the air quality standard	**Insignificant** [1]
PM_{10} daily mean concentration (90.41st percentile)	50µg/m^3	0.98µg/m^3	HR32 (12 Ermine Close)	Less than 10%	36.6µg/m^3	HR15 (Travelodge Cheshunt)[2]	Well below the air quality standard	**Insignificant**
SO_2 15-minute mean concentration (99.9th percentile)	266µg/m^3	1.68µg/m^3	HR38 (Playing Field 3)[2]	Less than 10%	11.9µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 hourly mean concentration (99.73rd percentile)	350µg/m^3	1.22µg/m^3	HR38 (Playing Field 3)[2]	Less than 10%	11.8µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 daily mean concentration (99.18th percentile)	125ug/m^3	0.42µg/m^3	HR32 (12 Ermine Close)	Less than 10%	11.6µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
CO 8-hour rolling mean concentration	10mg/m^3	5.89µg/m^3	HR44 (Playing Field 9)[2]	Less than 10%	6.2µg/m^3	HR44 (Playing Field 9)[2]	Well below the air quality standard	**Insignificant**

Notes

[1] As there is an exceedance of the air quality standard of 200µg/m^3, the next step required is the statistical analysis using the hypergeometric distribution. The analysis found that the maximum probability of exceeding the standard, assuming 48 hours of generators running (based on four 12-hour continuous tests, see Table 3 for further information), was <0.01% at receptor HR43 (Playing Field 8), which suggests an exceedance is highly unlikely.

[2]Although the Playing Fields and the Travelodge Cheshunt are not classified as sensitive receptors, they have been assessed against objectives as a worst-case location.

Scenario 3 – 6 yearly test

Table 18 Assessment of Generator Emissions Scenario 3 (6 yearly test) results

Pollutant & period	Air quality standard	Largest PC	Location of largest PC (receptor)	PC as % of air quality standard	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_2 hourly mean concentration	200µg/m^3	411µg/m^3	HR38 (Playing Field 3)[2]	More than 10% More than 20% of the short-term minus twice the annual mean background concentration (step 2 of the H1 criteria)11	443µg/m^3	HR38 (Playing Field 3)[2]	Exceeds air quality standards	**Insignificant**[1]
PM_{10} daily mean concentration (90.41st percentile)	50µg/m^3	1.96µg/m^3	HR32 (12 Ermine Close)	Less than 10%	36.6µg/m^3	HR15 (Travelodge Cheshunt)[2]	Well below the air quality standard	**Insignificant**
SO_2 15-minute mean concentration (99.9th percentile)	266µg/m^3	1.68µg/m^3	HR38 (Playing Field 3)[2]	Less than 10%	11.9µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 hourly mean concentration (99.73rd percentile)	350µg/m^3	1.22µg/m^3	HR38 (Playing Field 3)[2]	Less than 10%	11.8µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
SO_2 daily mean concentration (99.18th percentile)	125ug/m^3	0.84µg/m^3	HR32 (12 Ermine Close)	Less than 10%	11.7µg/m^3	HR7 (Goffs Churchgate Academy)	Well below the air quality standard	**Insignificant**
CO 8-hour rolling mean concentration	10mg/m^3	5.89µg/m^3	HR44 (Playing Field 9)[2]	Less than 10%	6.2µg/m^3	HR44 (Playing Field 9)[2]	Well below the air quality standard	**Insignificant**

Notes

[1] As there is an exceedance of the air quality standard of 200µg/m^3, the next step required is the statistical analysis using the hypergeometric distribution. The analysis found that the maximum probability of exceeding the standard, assuming 96 hours of generators running (based on four 24-hour continuous tests, see Table 3 for further information), was <0.01% at receptor HR43 (Playing Field 8), which suggests an exceedance is unlikely.

[2]Although the Playing Fields and the Travelodge Cheshunt are not classified as sensitive receptors, they have been assessed against objectives as a worst-case location.

Scenario 4 – Emergency Scenario

Table 19 Assessment of generator emissions Scenario 4 (emergency scenario) results

Pollutant & period	Air quality standard	Largest PC	Location of largest PC (receptor)	PC as % of air quality standard	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_2 hourly mean concentration	200µg/m^3	1022µg/m^3	HR21 (Tudor Close 1)	More than 10% More than 20% of the short-term minus twice the annual mean background concentration (step 2 of the H1 criteria)11	1052µg/m^3	HR21 (Tudor Close 1)	Exceeds the air quality standard	**Insignificant**[1]
PM_{10} daily mean concentration (90.41st percentile)	50µg/m^3	6.23µg/m^3	HR32 (12 Ermine Close)	More than 10% of More than 20% of the short-term standard minus twice the annual mean background concentration (step 2 of the H1 criteria)[11]	39.7µg/m^3	HR45 (Playing Field 10)[3]	Below the air quality standard	**Insignificant**[2]
SO_2 15-minute mean concentration (99.9th percentile)	266µg/m^3	3.46µg/m^3	HR20 (51 Grovedale Close)	Less than 10%	12.8µg/m^3	HR12 (15 Farm Close)	Well below the air quality standard	**Insignificant**
SO_2 hourly mean concentration (99.73rd percentile)	350µg/m^3	3.04µg/m^3	HR20 (51 Grovedale Close)	Less than 10%	12.8µg/m^3	HR12 (15 Farm Close)	Well below the air quality standard	**Insignificant**
SO_2 daily mean concentration (99.18th percentile)	125ug/m^3	2.16µg/m^3	HR40 (Playing Field 5)[3]	Less than 10%	12.5µg/m^3	HR12 (15 Farm Close)	Well below the air quality standard	**Insignificant**
CO 8-hour rolling mean concentration	10mg/m^3	19.6µg/m^3	HR43 (Playing Field 8)[3]	Less than 10%	19.0µg/m^3	HR43 (Playing Field 8)[3]	Well below the air quality standard	**Insignificant**

Notes

[1] As there is an exceedance of the air quality standard of 200µg/m^3, the next step required is the statistical analysis using the hypergeometric distribution. The analysis found that the maximum probability of exceeding the standard, assuming 30 hours of emergency generators running was <0.01% at receptor HR45 (Playing Field 10), which suggests an exceedance is highly unlikely.

[2]As there are no exceedances of the air quality standard, and as this scenario would only occur in the unlikely event of a grid power outage, this is considered to be insignificant.

[3]Although the Playing Fields are not classified as sensitive receptors, they have been assessed against objectives as a worst-case location.

Table 20 Assessment of generator emissions Scenario 4 (emergency scenario) AEGL results

Pollutant & period	AEGL Limit Values (µg/m^3)			Largest PC (µg/m^3)	Location of largest PC (receptor)	Largest PEC (µg/m^3)	Location of largest PEC (receptor)	PC as % of air quality standard	% of AEGL Limit Value	Impact
	AEGL 1	AEGL 2	AEGL 3							
NO_x hourly mean concentration	956.3	22,950.0	38,250.0	1401.3	HR 21 (Tudor Close 1)	1433.0	HR21 (Tudor Close 1)	146% of AEGL 1	Exceeds AEGL 1[1]	**Insignificant** [2]
NO_x 30-minute mean concentration	956.3	28,867.5	47,812.5	1420.5	HR 21 (Tudor Close 1)	1452.1	HR 21 (Tudor Close 1)	149% of AEGL 1	Exceeds AEGL 1[1]	**Insignificant** [2]
NO_x 10-minute mean concentration	956.3	38,250.0	65,025.0	1433.7	HR 21 (Tudor Close 1)	1465.4	HR 21 (Tudor Close 1)	149% of AEGL 1	Exceeds AEGL 1[1]	**Insignificant** [2]

Notes

[1]There are no exceedances of AEGLs 2 and 3 therefore these have not been assessed further.

[2]Although there is an exceedance of AEGL 1, as this scenario would only occur in the unlikely event of a grid power outage, this is considered to be insignificant.

6.2 Ecological assessment

6.2.1 The impact of the Proposed Development on ecological receptors has been assessed against the relevant air quality standards for each scenario. Detailed descriptions of the results at ecological receptors are provided in Table 21-Table 24 below for each Scenario, and results are provided in Appendix C for testing and emergency scenarios (see Table 3 for information on scenarios).

6.2.2 A contour plot of NO_x daily concentrations in Scenario 4, using the worst case meteorological data is also provided in Figure 10, Appendix D.

6.2.3 APIS acidity plots are also provided in Appendix E

Scenario 1 – annual test

Table 21 Assessment of generator emissions on ecological receptors - Scenario 1 (annual test) results

Pollutant & period	Critical level	Largest PC	Location of largest PC (receptor)	PC as % of critical level	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_x annual mean concentration	30µg/m^3	0.02µg/m^3	ER1 (Lee Valley)	Less than 1%	26.2µg/m^3	ER4 (Epping Forest)	Below the critical level	**Insignificant**
NO_x daily mean	75µg/m^3	0.9µg/m^3	ER1 (Lee Valley)	Less than 10%	52.6µg/m^3	ER4 (Epping Forest)	Below the critical level	**Insignificant**

Scenario 2 – 3 yearly test

Table 22 Assessment of generator emissions on ecological receptors - Scenario 2 (3 yearly test) results

Pollutant & period	Critical level	Largest PC	Location of largest PC (receptor)	PC as % of critical level	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_x daily mean	75µg/m^3	17.3µg/m^3	ER1 (Lee Valley)	More than 10%	63.5µg/m^3	ER4 (Epping Forest)	Below the critical level	**Insignificant**

Scenario 3 – 6 yearly test

Table 23 Assessment of generator emissions on ecological receptors - Scenario 3 (6 yearly test) results

Pollutant & period	Critical level	Largest PC	Location of largest PC (receptor)	PC as % of critical level	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_x daily mean	75µg/m^3	34.7µg/m^3	ER1 (Lee Valley)	More than 10%	80.8µg/m^3	ER4 (Epping Forest)	Above the critical level	**Potentially significant**[1]

Note:

[1]Whilst this scenario would only occur once every 6 years, this cannot be considered insignificant as there is an exceedance.

Scenario 4 – emergency scenario

Table 24 Assessment of generator emissions on ecological receptors - Scenario 4 (emergency scenario) results

Pollutant & period	Critical level	Largest PC	Location of largest PC (receptor)	PC as % of critical level	Largest PEC	Location of largest PEC (receptor)	PEC compared to air quality standard	Impact
NO_x daily mean	75µg/m^3	191µg/m^3	ER1 (Lee Valley)	More than 10%	237µg/m^3	ER1 (Lee Valley)	Above the critical level	**Potentially significant**[1]

Note:

[1]Whilst the impacts on the NO_x daily mean from the back-up generators during the emergency scenario are potentially significant, it should be noted that the chances of this scenario occurring are considered to be unlikely, based on the reliability of the electrical distribution network and the inbuilt design resilience.

6.2.4 In addition to reviewing the results against the relevant critical levels, nitrogen deposition and acid deposition have also been considered for Scenarios 1-3.

Scenario 1

Nitrogen deposition

6.2.5 For nitrogen deposition, the impact of the PC at all sensitive ecological receptors is predicted to be less than 1% of the relevant lower critical loads. The impacts during Scenario 1 are therefore considered to be **insignificant.**

Acid deposition

6.2.6 For acid deposition, the PC for each ecological receptor was less than the critical load and no exceedances of the critical load function were recorded using the Air Pollution Information System (APIS) critical load function tool. As such, the impacts of acid deposition during Scenario 1 can be considered **insignificant.**

6.2.7 Acidity plots recorded using the APIS critical load tool are provided in Appendix E.

Scenario 2

Nitrogen deposition

6.2.8 For nitrogen deposition, the impact of the PC at all sensitive ecological receptors are predicted to be less than 1% of the relevant lower critical loads. The impacts during Scenario 2 are therefore considered to be **insignificant.**

Acid deposition

6.2.9 For acid deposition, the PC for each ecological receptor was less than the critical load and no exceedances of the critical load function were recorded using the APIS critical load function tool. As such, the impacts of acid deposition during Scenario 2 can be considered **insignificant.**

6.2.10 Acidity plots recorded using the APIS critical load tool are provided in Appendix E

Scenario 3

Nitrogen deposition

6.2.11 For nitrogen deposition, the impact of the PC at all sensitive ecological receptors are predicted to be less than 1% of the relevant lower critical loads. The impacts during Scenario 3 are therefore considered to be **insignificant.**

Acid deposition

6.2.12 For acid deposition, the PC for each ecological receptor was less than the critical load and no exceedances of the critical load function were recorded using the APIS critical load function tool. As such, the impacts of acid deposition during Scenario 3 can be considered **insignificant.**

6.2.13 Acidity plots recorded using the APIS critical load tool are provided in Appendix E.

7. Mitigation

7.1 Operational Phase

Embedded Mitigation

7.1.1 In order to mitigate potential exceedances of pollutants from the testing and potential use of the back-up emergency generators, SCR has been incorporated into the generator design. This has been included in all modelling scenarios.

7.1.2 As part of this AQA, consideration has also been given to the design of the plant, equipment and infrastructure, particularly in how to demonstrate that the relevant BAT will be used. This includes consideration of the Medium Combustion Plant Directive (MCPD).

7.1.3 A comprehensive BAT assessment has been completed and will also form part of the subsequent Environmental Permit Application for the Proposed Development, to be submitted to the EA.

7.1.4 The *EA guidance* sets out BAT requirements for the engines and emissions to air, as follows, with responses on how this will be met for the Proposed Development. This is for emergency standby diesel generators with a net rated thermal input above 1 MW, which are exempt from MCPD emission limits because they operate for less than 500 hours per year.

- Statement: *"Emissions optimised engines specified to TA-Luft 2g, or US EPA Tier 2 standard or equivalent NO_x emission levels in the range of 2000 mg/m^3 of NO_x at 5% oxygen and reference conditions."*

  Response – the assessment has been based on back-up emergency generators with NO_x emission concentrations of 190mg/m^3 at 5% oxygen and reference conditions (100% load standby mode).

- Statement: *"Dispersion of flue gases optimised through vertical stacks, no caps and cowls impediments".*

  Response – Vertical stacks, clear of impediments 15 and 13 meters above ground level, are proposed to be installed at the Proposed Development.

- Statement: *"Provision of flue gases sampling ports to allow for monitoring of NO_x and Carbon Monoxide in line with web guidance 'Monitoring stack emissions: low risk MCPs and specified generators'".*

Response – Sampling ports will be included for flue gas monitoring.

Further Mitigation

7.1.5 For Scenarios 1 and 2, the effect is considered to be insignificant for all pollutants and therefore no additional mitigation measures are considered necessary.

7.1.6 In Scenario 3, although predicted impacts against the NO_x daily mean critical level are potentially significant, this testing scenario is only likely to occur once every 6 years and therefore no additional mitigation measures are considered necessary.

7.1.7 The likelihood of a complete grid failure for a continuous 24-hour period is considered to be highly unlikely, based on in-built electrical design resilience measures at the Proposed Development, together with published grid reliability data for the National Grid network, therefore no further mitigation is recommended for Scenario 4.

8. Conclusions

8.1.1 The operational effects from the back-up generator emissions were assessed for planned testing scenarios, which would be the normal operation of the Proposed Development.

8.1.2 Further work was undertaken to review Best Available Techniques to reduce the impacts on air quality concentrations. Using Generator 2 with open loop SCR and stack heights of 15m for generators A-a to A-h and 13m for all other generators was determined to be the most appropriate solution to reduce potential air quality impacts of short term NO_2.

8.1.3 No significant effects are predicted for all pollutants for testing Scenarios 1 and 2 (annual test and 3 yearly test), and for PM, CO and SO_2 for Scenarios 3 and 4. No significant effects are predicted for human receptors.

8.1.4 For testing scenarios 2 and 3 (the 3 yearly and 6 yearly tests), potential impacts on the NO_2 hourly mean were assessed further using statistical analysis (hypergeometric distribution). This assumes 48 hours (3 yearly test) and 96 hours (6 yearly test) of operation, to assess the probability of exceeding the NO_2 hourly mean objective. This showed that an exceedance would be highly unlikely (<1% probability) for the 3 yearly test and unlikely (<5% probability) for the 6 yearly test. These impacts are therefore considered as insignificant.

8.1.5 For testing scenario 3, potential exceedances of the NO_x daily mean critical level are predicted and this is considered to be potentially significant. However, this scenario would only occur once every 6 years.

8.1.6 An emergency scenario (scenario 4), assuming all generators would be operating continuously for 30 hours was also assessed, with predicted exceedances of the NO_2 hourly mean objective, and NO_x daily mean critical level. These are considered to be potentially significant. Statistical analysis using the hypergeometric distribution was used to assess the probability of exceeding the NO_2 hourly mean objective and this indicated that an exceedance would be highly unlikely (<1% probability). Exceedances of the AEGL 1 limit are predicted under the emergency scenario. The effects of exposure to AEGL 1 are not disabling and are reversible upon cessation of exposure. Additionally, the likelihood of this scenario occurring is very unlikely based on electrical grid reliability for the area and inbuilt design resilience.

Appendix A Air quality standards and legislation

A.1.1 Environment Act 2021

A.1.1.1 The Environment Bill became an Act[24] (law) in November 2021. The Environment Act 2021 amends the Environment Act 1995[25]. It also amends the Clean Air Act 1993[26] to give local authorities more power at reducing local pollution, particularly that from domestic burning. It also amends the Environmental Protection Act 1990[27] to reduce smoke from residential chimneys by extending the system of statutory nuisance to private dwellings.

A.1.1.2 The following sections of the Environment Act 1995 have been transposed into the Environment Act 2021:

- For the Secretary of State to develop, implement and maintain an Air Quality Strategy. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare an Air Quality Management Area (AQMA) where pollutant concentrations exceed the national air quality objectives. Where an AQMA is declared, the local authority needs to produce an Air Quality Action Plan (AQAP) which outlines the strategy for improving air quality in these areas.

A.1.1.3 The Act will implement key parts of the government's Clean Air Strategy and include targets for tackling air pollution in the UK;

- for the Secretary of State for Defra to set long-term legally binding targets on air quality.; these targets must be of at least 15 years in duration, and be proposed by late 2022;
- for the Secretary of State to publish a report reviewing the Air Quality Strategy every five years;
- for the government to set two targets by October 2022: the first on the amount of $PM_{2.5}$ pollutant in the ambient air (the figure and deadline for compliance remain unspecified) and a second long-term target set at least 15 years ahead to encourage stakeholder investment;
- for the Office for Environmental Protection to be established to substitute the watchdog function previously exercised by the European Commission;
- for local authorities' powers to be extended under the current Local Air Quality Management framework, including responsibilities to improve local air quality and to reduce public exposure to excessive levels of air pollution;
- for "air quality partners" to have a duty to share responsibility for dealing with local air pollution among public bodies; and

[24] Environment Act 2021. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted. Accessed [Accessed December 2022].

[25] Environment Act 1995, Chapter 25, Part IV Air Quality

[26] Clean Air Act 1993. Available at: https://www.legislation.gov.uk/ukpga/1993/11/contents. [Accessed December 2022]

[27] Environmental Protection Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents. [Accessed December 2022]

- the introduction of a new power for the government to compel vehicle manufacturers to recall vehicles and non-road mobile machinery if they are found not to comply with the environmental standards that they are legally required to meet.

A.1.2 Air Quality Standards Regulations 2010 (amended in 2016)

A.1.2.1 The Air Quality Standards Regulations 2010 (amended in 2016)[1] defines the policy framework for 12 air pollutants known to have harmful effects on human health or the natural environment. The Secretary of State for the Environment has the duty of ensuring compliance with the air quality limit values.

A.1.2.2 Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment, i.e., effects occur after a prolonged period of exposure to elevated concentrations. Other pollutants have standards expressed as 24-hour or 1-hour average concentrations due to the acute way in which they affect health or the natural environment, i.e., after a relatively short period of exposure. Some pollutants have standards expressed in terms of both long and short-term concentrations. Air quality limit values and objectives are quality standards for clean air. The regulation sets out the national air quality standards for NO_2, PM_{10} and $PM_{2.5}$.

A.1.3 Medium Combustion Plant Directive (MCPD)

A.1.3.1 In November 2015, the European Commission published the Medium Combustion Plant (MCP) Directive 2015/2193[28] on the limitation of emissions of certain pollutants into the air from MCPs.

A.1.3.2 The MCP Directive regulates pollutant emissions from the combustion of fuels in plants with a rated thermal input equal to, or greater than, 1 megawatt (MWth) and less than 50 MWth.

A.1.3.3 The MCP Directive regulates emissions of sulphur dioxide (SO_2), NO_x and dust to the air only, with the aim of reducing those emissions and the risks to human health and the environment they may cause. It also lays down rules to monitor emissions of carbon monoxide (CO) but does not set an emission limit value (ELV) for CO.

A.1.3.4 The ELVs set out in the MCP Directive will have to be applied from 20 December 2018 for new plants depending on their size.

A.1.3.5 For those MCPs which are emergency use and operate less than 500 hours per year as a rolling average over a period of five years, the emission limit values set out in the MCPD can be exempt, however an MCP permit will still be required.

[28] Directive (EU) 2015/2193 of the European Parliament and the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants

A.1.4 Industrial Emissions Directive (IED)

A.1.4.1 The Industrial Emissions Directive (IED) (2010/75/EU)[29] was transposed into UK law[30] through the Pollution Prevention and Control (PPC) system defined in the Environmental Permitting Regulations[31]. It is the regulatory regime being followed by the EA.

A.1.4.2 The IED regulates pollutant emissions of NO_x, dust, SO_2 and CO to the air from combustion of fuel in plants with an aggregated rated thermal input equal or greater than 50MWth.

A.1.4.3 IED ELVs for liquid fuel combustion plants (e.g., diesel generators) are provided in Annex V, Part 1 of the IED. However, for each of those turbines and engines which are emergency use and operate due to testing or emergency for less than 500 hours per year, the emission limit values defined in the IED under 1.1A combustion Chapter III Annex V do not apply.

A.1.5 US Acute Exposure Guideline Levels (AEGLs)

A.1.5.1 In the United States, the Superfund Amendments and Reauthorization Act[32] (SARA) of 1986 required the US Environmental Protection Agency (EPA) to identify Extremely Hazardous Substances (EHSs) and, to provide guidance for conducting health hazard assessments for the development of emergency response plans for sites where EHSs are produced, stored, transported, or used. The Agency for Toxic Substances and Disease Registry (ATSDR) were also required to determine whether chemical substances identified either at hazardous waste sites or in the environment could present a public health concern.

A.1.5.2 Subsequently, Standard Operating Procedures for Developing Acute Exposure Guideline Levels for Hazardous Substances[33] was published in 2001, providing updated procedures, methodologies, and other guidelines used by the National Advisory Committee (NAC) on Acute Exposure Guideline Levels for Hazardous Substances and the Committee on Acute Exposure Guideline Levels (AEGLs) in developing the AEGL values. There are now AEGLs for more than 270 extremely hazardous substances, which were developed using the 2001 report and input from members of EPA, various governmental organisations and sectors, the chemical industry, academia and the private sector.

A.1.5.3 AEGLs represent threshold exposure limits (exposure levels below which adverse health effects are not likely to occur) for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours.

A.1.5.4 There are three levels of AEGL, which are defined as follows:

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[29] Directive (EU) 2010/75/EU of the European Parliament and the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

[30] UK Government. (2016). The Air Quality Standards Regulations 2016, SI 2010/1001; http://www.legislation.gov.uk/uksi/2016/1184/made [Accessed December 2022]

[31] Environmental Permitting (England and Wales) (Amendment) Regulations 2018

[32] USEPA (1986) The Superfund Amendments and Reauthorization Act

[33] National Academies (2001) Standing Operating Procedures for Developing Acute Exposure Guideline Levels for Hazardous Chemicals

- *"AEGL-1 is the airborne concentration (expressed as ppm [parts per million] or mg/m^3 [milligrams per cubic meter]) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.*

- *AEGL-2 is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.*

- *AEGL-3 is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening adverse health effects or death."*

A.1.5.5 The EA makes reference in the Data Centre Draft Industry Guidance (detailed in section A.3.2) to including a comparison of NO_2 with the AEGLs, for consideration of the potential impact from any emergency operation scenarios. Therefore, these AEGLs have been considered in the assessment. The AEGLs for NO_2 are provided in Table 25 below for hourly mean NO_2, 30-minute mean NO_2 and 10-minute mean NO_2.

Table 25 AEGLs 1-3 for NO_2

AEGL	10-minute mean	30-minute mean	Hourly mean
ppm			
AEGL 1	0.5	0.5	0.5
AEGL 2	20	15	12
AEGL 3	34	25	20
µg/m^3			
AEGL 1	956.3	956.3	956.3
AEGL 2	38,250	28,687.5	22,950
AEGL 3	65,025	47,812.5	38,250
Note: the AEGLs were converted from ppm to µg/m^3 using the Defra conversion factor for NO_x			

A.2 Planning policy and guidance

A.2.1 National Planning Policy Framework

A.2.1.1 The National Planning Policy Framework (NPPF)[34] was updated in July 2021 with the purpose of planning to achieve sustainable development. Paragraph 186 of the NPPF on air quality 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."

A.2.1.2 In addition, paragraph 105 states that:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."

A.2.1.3 Paragraph 174 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. In relation to air quality, NPPF notes that this can be achieved 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, taking into account relevant information such as river basin management plans."

[34] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework

A.2.2 Planning Practice Guidance (2019)

A.2.2.1 Planning Practice Guidance (PPG)[35] on various topics, including air quality was developed in order to support the NPPF. The guidance provides a concise outline as to how air quality should be considered in order to comply with the NPPF and states when air quality is considered relevant to a planning application. This includes factors such as changes in traffic volumes, vehicle speeds, congestion or traffic composition, the introduction of new point sources of air pollution, exposure of people to existing sources of air pollutants, and the potential to give rise to air quality impacts at nearby sensitive receptors.

A.2.3 Clean Air Strategy

A.2.3.1 The Department for Environment, Food and Rural Affairs (Defra) Clean Air Strategy[36] was published in 2019 and sets targets for improving air quality across the country. It includes actions for reducing emissions from various sources, such as transport, domestic activities, farming and industry. There is also a long-term target for reducing population exposure to $PM_{2.5}$ concentrations to meet the World Health Organisation's (WHO) target of 10µg/m^3 as an annual mean. In particular, the Clean Air Strategy states:

"New legislation will create a stronger and a more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanism."

A.2.4 Local Air Quality Management Policy and Technical Guidance

A.2.4.1 The 2022 policy guidance note from Defra, LAQM.PG(22)[12], provides additional guidance on the links between transport and air quality and guidance on the links between air quality and the land-use planning system. It summarises the main ways in which the land-use planning system can help deliver compliance with the air quality objectives. This guidance is relevant to any external organisations who may wish to engage with the local authority to assist in the delivery of their statutory duties on managing air quality.

A.2.4.2 The LAQM Technical Guidance, TG(22)[12] is designed to support local authorities in carrying out their duties to review and assess air quality in their area. It provides detailed guidance on how to assess the impact of measures using existing air quality tools.

[35] Department for Communities and Local Government (2019): 'Planning Practice Guidance: Air Quality'

[36] Defra (2019) Clean Air Strategy 2019.

A.3 Permitting Guidance

A.3.1 Integrated Pollution Prevention and Control (IPPC) Horizonal Guidance Note H1

A.3.1.1 The IPPC H1 guidance[37] was produced by the EA for England and Wales in collaboration with the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment and Heritage Service (EHS). The IPPC is a regulatory system that employs an integrated approach to control the environmental impacts of certain industrial activities. The purpose of the H1 guidance note is to provide supplementary information relevant to all sectors, for the appraisal of Best Available Techniques (BAT) and to carry out an appropriate environmental assessment of the overall impact of the emissions resulting from a proposed installation.

A.3.1.2 More recently the EA has revised the guidance and has developed a web-based version[38], with the latest revision date being May 2021. The EA guidance has been followed in the assessment and, where applicable, reference is also made to the EA air emissions risk assessment guidance. For convenience, the reference to 'H1' is retained.

A.3.2 Data Center Draft Guidance

A.3.2.1 The Environment Agency have published a working draft guide[39] on the approach to the permitting and regulatory aspects for Data Center within the context of the IED and Environmental Permitting Regulations for 1.1A Combustion Activities 'Chapter II' sites aggregated to >50MWth input.

A.3.2.2 The Frequently Asked Questions (FAQs) also have relevance for Data Centers which come under the MCPD specified generators. i.e., plant which is less than aggregated 50MWth but which falls under the Tranche A or Tranche B criteria for generating power (unless it is an 'excluded generator' due to <50hours testing per year).

A.3.2.3 The document is not presently an official release but forms the basis for discussion of a common methodology and liaison with individual operators and their industry association. The document states that it must be recognised that the document is not a legal document intending to create or modify the law as stated in statute; so ultimately Data Center permitting and day to day regulation must necessarily be on a site-specific basis.

[37] IPPC H1 (2003) Environmental Assessment and Appraisal of BAT

[38] EA (2021) Air emissions risk assessment for your environmental permit Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

[39] Environment Agency (2018) Data Center FAQ Headline Approach. Available at: https://consult.environment-agency.gov.uk/psc/cr0-4td-digital-realty-uk-limited/supporting_documents/Data%20Center%20FAQ.pdf

A.3.3 Guidance on Land-use Planning & Development Control

A.3.3.1 The 2017 Land-Use Planning & Development Control guidance document[40] produced by Environmental Protection UK (EPUK) and the IAQM provides a framework for professionals operating in the planning system to provide a means of reaching sound decisions, with regard to the air quality implications of development proposals.

A.3.3.2 The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition, energy facilities or combustion processes used.

[40] EPUK and IAQM (2017) Land-use Planning & Development Control: Planning for Air Quality, (v1.2).

A.4 Local Policy and Guidance

A.4.1 The Broxbourne Local Plan 2018-2033

A.4.1.1 The Broxbourne Local Plan[41] was adopted by BBC in June 2020. The Local Plan sets out the overall special strategy and planning policies for Broxbourne until the year 2033.

A.4.1.2 Policy EQ2: Air Quality states:

Applicants should consider the impact of their proposals on air quality. Where it is likely that a decline in air quality will occur, applicants should provide details of how the adverse effects will be mitigated in order to comply with national air quality objectives. Where adequate mitigation cannot be provided, development will not normally be permitted.

Developments proposing housing, schools, and other uses vulnerable to the effects of poor air quality within AQMAs will be required to provide an air quality assessment which will detail options for the mitigation of poor air quality on users, particularly through development design. Where air quality exposure is not reduced to acceptable levels, development will not normally be permitted.

[41] The Broxbourne Local Plan, June 2020. Available at: https://www.broxbourne.gov.uk/downloads/file/1813/local-plan-2018-2033 [Accessed December 2022]

Appendix B Model Inputs

B.1.1 Generator parameters

B.1.1.1 The Proposed Development will install generators with parameters detailed in Table 26.

Table 26 Generator stack parameters

Description	Units	Parameter modelled
Make and model	-	Generator 2 with SCR
NO_x emission rate	g/s	1.141 – SCR Generator 2 (effective SCR treatment)
		6.242 – Generator 2 (warm-up, pre-SCR benefits)
		3.691 – time weighted average*
PM_{10} emission rate	g/s	0.022
SO_2 emission rate	g/s	0.004
CO emission rate	g/s	0.219
Exit diameter	m	0.6
Exit temperature	°C	406
Efflux velocity	m/s	32.36
Volumetric flow rate (at reference conditions)	Nm^3/s	9.15
Emission Data		
Emission concentration data (at 5% O_2 at reference conditions†)		
NO_x	mg/Nm^3	2,773 – Generator 2 (warm-up, pre-SCR benefits)
		<190 – SCR Generator 2 (effective SCR treatment)
PM_{10}	mg/Nm^3	11
SO_2	mg/Nm^3	72
CO	mg/Nm^3	29
Manufacturer emission factors used in emission calculations		
NO_x	g/BHP-hr	1.04
PM_{10}	g/BHP-hr	0.02
SO_2	g/BHP-hr	0.004
CO	g/BHP-hr	0.2

Notes:

†Actual conditions data (oxygen and moisture) is not available for the Site and therefore emission data based on emissions per power rating data were provided by the manufacturer. These data are for reference only and were not used in the assessment.

Emission rates assumed at 100% load to be conservative.

* The emission rate is time weighted to account for the SCR generator requiring approximately 30 minutes to warm up and become effective. The first half hour is assumed to be the standard Generator 2 emissions and the second half hour is assumed to be the Generator 2 SCR generator emissions. This is calculated to be 3.691 as worst case. This is considered to be a conservative assumption as the EA guidance suggests SCR may only require 10 minutes to warm up.

B.1.1.2 The generators are proposed to have individual stack exhausts. The coordinates of the stacks for the generators are detailed in Table 27.

Table 27 Stack locations

Source ID	X (m)	Y (m)	Height above ground (m)
Stack A-a	534877	201695	15
Stack A-b	534876	201689	15
Stack A-c	534857	201663	15
Stack A-d	534863	201666	15
Stack A-e	534849	201644	15
Stack A-f	534849	201638	15
Stack A-g	534849	201632	15
Stack A-h	534849	201626	15
Stack A-i	534849	201617	13
Stack A-j	534849	201611	13
Stack A-k	534849	201605	13
Stack A-l	534849	201599	13
Stack A-m	534849	201593	13
Stack A-n	534849	201570	13
Stack A-o	534849	201564	13
Stack A-p	534849	201558	13
Stack A-q	534849	201552	13
Stack A-r	534849	201533	13
Stack A-s	534849	201527	13
Stack A-t	534849	201521	13
Stack A-u	534849	201515	13
Stack A-v	534849	201496	13
Stack A-w	534849	201490	13
Stack A-x	534849	201484	13
Stack A-y	534849	201478	13
Stack A-z	534849	201464	13
Stack B-a	534849	201458	13
Stack B-b	534849	201452	13
Stack B-c	534849	201446	13
Stack B-d	534849	201440	13
Stack B-e	534848	201412	13
Stack B-f	534848	201406	13
Stack B-g	535039	201471	13
Stack B-h	535039	201489	13
Stack B-i	535039	201507	13

Source ID	X (m)	Y (m)	Height above ground (m)
Stack B-j	535039	201525	13
Stack B-k	535039	201543	13
Stack B-l	535039	201560	13
Stack B-m	535039	201578	13
Stack B-n	535039	201594	13

Appendix C Modelling Results

C.1 Scenario 1

C.1.1 NO_2 results for scenario 1

Table 28 NO_2 annual mean results (µg/m^3)

Receptor	X	Y	Long term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	15.2	2018	0.07	0.18%	15.2	38%	Insignificant
HR2	534422	202671	15.2	2020	0.08	0.21%	15.2	38%	Insignificant
HR3	534821	202677	15.2	2020	0.11	0.27%	15.3	38%	Insignificant
HR4	534922	202614	15.2	2020	0.12	0.30%	15.3	38%	Insignificant
HR5	534989	202539	15.2	2020	0.14	0.35%	15.3	38%	Insignificant
HR6	534950	202219	15.2	2020	0.24	0.61%	15.4	38%	Insignificant
HR7	535094	202104	17.8	2020	0.40	0.99%	18.2	45%	Insignificant
HR8	535308	202249	17.8	2020	0.31	0.78%	18.1	45%	Insignificant
HR9	535292	202367	17.8	2020	0.23	0.59%	18.0	45%	Insignificant
HR10	535357	202235	17.8	2020	0.32	0.81%	18.1	45%	Insignificant
HR11	535525	202257	17.8	2018	0.29	0.74%	18.1	45%	Insignificant
HR12	535316	202007	17.8	2020	0.53	1.31%	18.3	46%	Insignificant
HR13	535287	201681	18.2	2017	0.85	2.13%	19.0	48%	Insignificant
HR14	535196	201187	18.2	2017	0.33	0.82%	18.5	46%	Insignificant
HR15	535246	200678	25.2	2021	0.12	0.31%	25.3	63%	Insignificant
HR16	535775	200601	25.2	2017	0.09	0.23%	25.3	63%	Insignificant
HR17	535967	200770	25.2	2017	0.09	0.24%	25.3	63%	Insignificant
HR18	534473	201464	15.8	2018	0.25	0.63%	16.1	40%	Insignificant
HR19	533885	201869	14.5	2018	0.09	0.23%	14.6	36%	Insignificant
HR20	533962	202274	13.8	2018	0.09	0.22%	13.9	35%	Insignificant
HR21	534814	201708	15.8	2020	0.97	2.42%	16.8	42%	Insignificant
HR22	534593	201553	15.8	2018	0.47	1.17%	16.3	41%	Insignificant
HR23	535641	201515	18.2	2017	0.21	0.54%	18.4	46%	Insignificant
HR24	535635	201357	18.2	2017	0.18	0.46%	18.4	46%	Insignificant
HR25	535594	201237	18.2	2017	0.18	0.45%	18.4	46%	Insignificant
HR26	535615	201836	18.2	2017	0.35	0.88%	18.5	46%	Insignificant
HR27	535292	201243	18.2	2017	0.32	0.80%	18.5	46%	Insignificant
HR28	534882	201856	15.8	2020	0.69	1.73%	16.5	41%	Insignificant
HR29	534944	201984	15.8	2020	0.48	1.19%	16.3	41%	Insignificant
HR30	535169	201989	18.2	2020	0.61	1.53%	18.8	47%	Insignificant

Receptor	X	Y	Long term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR31	534841	201791	15.8	2020	0.81	2.03%	16.6	42%	Insignificant
HR32	534759	201702	15.8	2018	0.96	2.40%	16.8	42%	Insignificant
HR33	534725	201693	15.8	2018	0.87	2.17%	16.7	42%	Insignificant
HR34	534830	201759	15.8	2020	0.89	2.22%	16.7	42%	Insignificant
HR35	534816	201736	15.8	2020	0.93	2.33%	16.7	42%	Insignificant
HR36	534777	201643	15.8	2018	1.10	2.76%	16.9	42%	Insignificant
HR37	534776	201607	15.8	2018	1.06	2.64%	16.9	42%	Insignificant
HR38	534773	201563	15.8	2018	1.01	2.53%	16.8	42%	Insignificant
HR39	534763	201496	15.8	2020	0.96	2.39%	16.8	42%	Insignificant
HR40	534768	201451	15.8	2021	0.96	2.39%	16.8	42%	Insignificant
HR41	534773	201408	15.8	2021	0.96	2.40%	16.8	42%	Insignificant
HR42	534900	201794	15.8	2020	0.91	2.29%	16.7	42%	Insignificant
HR43	534950	201783	15.8	2020	1.27	3.18%	17.1	43%	Insignificant
HR44	535009	201768	18.2	2020	1.44	3.60%	19.6	49%	Insignificant
HR45	535070	201756	18.2	2020	1.33	3.33%	19.5	49%	Insignificant
AQMA 1	535226	201678	18.2	2017	1.07	2.67%	19.2	48%	Insignificant
AQMA 2	535220	201525	18.2	2017	0.79	1.98%	19.0	47%	Insignificant
AQMA 3	535215	201387	18.2	2017	0.52	1.29%	18.7	47%	Insignificant
ER1	536612	201393	16.6	2017	0.06	0.16%	16.7	42%	Insignificant
ER2	534607	203679	14.5	2020	0.04	0.11%	14.5	36%	Insignificant
ER3	539016	209557	12.7	2020	<0.01	0.02%	12.7	32%	Insignificant
ER4	541137	199555	18.6	2017	0.01	0.03%	18.6	47%	Insignificant
ER5	538079	196106	17.7	2018	0.01	0.03%	17.7	44%	Insignificant
ER6	534667	207161	11.4	2020	0.01	0.03%	11.4	29%	Insignificant
ER7	532269	205102	10.9	2017	0.02	0.04%	10.9	27%	Insignificant

AQS: 40µg/m^3
*Results are to 2d.p.

Table 29 NO_2 99.79th percentile hourly mean results (µg/m^3)

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	30.3	2017	53.8	27%	84.1	42%	Insignificant
HR2	534422	202671	30.3	2018	53.7	27%	84.0	42%	Insignificant
HR3	534821	202677	30.3	2018	50.4	25%	80.7	40%	Insignificant
HR4	534922	202614	30.3	2020	50.0	25%	80.3	40%	Insignificant
HR5	534989	202539	30.3	2018	54.1	27%	84.4	42%	Insignificant
HR6	534950	202219	30.3	2018	82.5	41%	112.8	56%	Insignificant
HR7	535094	202104	35.5	2018	99.1	50%	134.7	67%	Insignificant
HR8	535308	202249	35.5	2018	69.2	35%	104.8	52%	Insignificant
HR9	535292	202367	35.5	2018	59.9	30%	95.4	48%	Insignificant
HR10	535357	202235	35.5	2021	68.7	34%	104.2	52%	Insignificant
HR11	535525	202257	35.5	2018	59.2	30%	94.7	47%	Insignificant
HR12	535316	202007	35.5	2018	86.9	43%	122.4	61%	Insignificant
HR13	535287	201681	36.3	2020	129.7	65%	166.0	83%	Insignificant
HR14	535196	201187	36.3	2021	81.4	41%	117.8	59%	Insignificant
HR15	535246	200678	50.4	2021	48.1	24%	98.4	49%	Insignificant
HR16	535775	200601	50.4	2021	40.1	20%	90.5	45%	Insignificant
HR17	535967	200770	50.4	2017	38.8	19%	89.2	45%	Insignificant
HR18	534473	201464	31.6	2018	113.8	57%	145.5	73%	Insignificant
HR19	533885	201869	29.0	2018	53.9	27%	82.9	41%	Insignificant
HR20	533962	202274	27.6	2017	57.4	29%	85.0	43%	Insignificant
HR21	534814	201708	31.6	2020	372.3	186%	403.9	202%	Insignificant
HR22	534593	201553	31.6	2018	174.2	87%	205.9	103%	Insignificant
HR23	535641	201515	36.3	2017	57.4	29%	93.7	47%	Insignificant
HR24	535635	201357	36.3	2017	57.2	29%	93.5	47%	Insignificant
HR25	535594	201237	36.3	2017	57.0	29%	93.4	47%	Insignificant
HR26	535615	201836	36.3	2017	62.4	31%	98.7	49%	Insignificant
HR27	535292	201243	36.3	2017	78.0	39%	114.3	57%	Insignificant
HR28	534882	201856	31.6	2017	220.6	110%	252.2	126%	Insignificant
HR29	534944	201984	31.6	2018	146.2	73%	177.8	89%	Insignificant
HR30	535169	201989	36.3	2018	111.5	56%	147.9	74%	Insignificant
HR31	534841	201791	31.6	2018	325.1	163%	356.8	178%	Insignificant
HR32	534759	201702	31.6	2017	358.0	179%	389.6	195%	Insignificant
HR33	534725	201693	31.6	2018	293.7	147%	325.3	163%	Insignificant
HR34	534830	201759	31.6	2020	382.8	191%	414.4	207%	Insignificant
HR35	534816	201736	31.6	2018	392.2	196%	423.9	212%	Insignificant
HR36	534777	201643	31.6	2018	354.8	177%	386.4	193%	Insignificant
HR37	534776	201607	31.6	2020	328.7	164%	360.4	180%	Insignificant

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR38	534773	201563	31.6	2020	411.2	206%	442.9	221%	Insignificant
HR39	534763	201496	31.6	2020	267.9	134%	299.5	150%	Insignificant
HR40	534768	201451	31.6	2020	215.6	108%	247.2	124%	Insignificant
HR41	534773	201408	31.6	2020	186.3	93%	218.0	109%	Insignificant
HR42	534900	201794	31.6	2021	255.8	128%	287.4	144%	Insignificant
HR43	534950	201783	31.6	2020	259.7	130%	291.4	146%	Insignificant
HR44	535009	201768	36.3	2018	255.4	128%	291.7	146%	Insignificant
HR45	535070	201756	36.3	2020	210.1	105%	246.4	123%	Insignificant
AQMA 1	535226	201678	36.3	2018	154.5	77%	190.8	95%	Insignificant
AQMA 2	535220	201525	36.3	2017	158.5	79%	194.9	97%	Insignificant
AQMA 3	535215	201387	36.3	2017	111.3	56%	147.6	74%	Insignificant
ER1	536612	201393	33.2	2017	31.4	16%	64.6	32%	Insignificant
ER2	534607	203679	28.9	2020	28.4	14%	57.4	29%	Insignificant
ER3	539016	209557	25.4	2020	7.1	4%	32.5	16%	Insignificant
ER4	541137	199555	37.3	2017	11.2	6%	48.4	24%	Insignificant
ER5	538079	196106	35.4	2018	9.5	5%	44.9	22%	Insignificant
ER6	534667	207161	22.9	2018	11.3	6%	34.2	17%	Insignificant
ER7	532269	205102	21.9	2018	16.3	8%	38.2	19%	Insignificant
AQS: 200µg/m^3 *Results are to 2d.p.									

C.1.2 PM_{10} results for scenario 1

Table 30 PM_{10} annual mean results (µg/m^3)

Receptor	X	Y	Long term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	16.0	2018	<0.01	<0.01%	16.0	2018	Insignificant
HR2	534422	202671	16.0	2018	<0.01	<0.01%	16.0	2018	Insignificant
HR3	534821	202677	16.0	2020	<0.01	<0.01%	16.0	2020	Insignificant
HR4	534922	202614	16.0	2020	<0.01	<0.01%	16.0	2020	Insignificant
HR5	534989	202539	16.0	2020	<0.01	<0.01%	16.0	2020	Insignificant
HR6	534950	202219	16.0	2020	<0.01	<0.01%	16.0	2020	Insignificant
HR7	535094	202104	16.9	2020	<0.01	<0.01%	16.9	2020	Insignificant
HR8	535308	202249	16.9	2020	<0.01	<0.01%	16.9	2020	Insignificant
HR9	535292	202367	16.9	2020	<0.01	<0.01%	16.9	2020	Insignificant
HR10	535357	202235	16.9	2020	<0.01	<0.01%	16.9	2020	Insignificant
HR11	535525	202257	16.9	2019	<0.01	<0.01%	16.9	2019	Insignificant
HR12	535316	202007	16.9	2020	<0.01	<0.01%	16.9	2020	Insignificant
HR13	535287	201681	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR14	535196	201187	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR15	535246	200678	18.2	2021	<0.01	<0.01%	18.2	2021	Insignificant
HR16	535775	200601	18.2	2017	<0.01	<0.01%	18.2	2017	Insignificant
HR17	535967	200770	18.2	2017	<0.01	<0.01%	18.2	2017	Insignificant
HR18	534473	201464	16.4	2019	<0.01	<0.01%	16.4	2019	Insignificant
HR19	533885	201869	16.8	2019	<0.01	<0.01%	16.8	2019	Insignificant
HR20	533962	202274	15.6	2018	<0.01	<0.01%	15.6	2018	Insignificant
HR21	534814	201708	16.4	2018	<0.01	<0.01%	16.4	2018	Insignificant
HR22	534593	201553	16.4	2019	<0.01	<0.01%	16.4	2019	Insignificant
HR23	535641	201515	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR24	535635	201357	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR25	535594	201237	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR26	535615	201836	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR27	535292	201243	17.2	2017	<0.01	<0.01%	17.2	2017	Insignificant
HR28	534882	201856	16.4	2020	<0.01	<0.01%	16.4	2020	Insignificant
HR29	534944	201984	16.4	2020	<0.01	<0.01%	16.4	2020	Insignificant
HR30	535169	201989	17.2	2020	<0.01	<0.01%	17.2	2020	Insignificant
HR31	534841	201791	16.4	2020	<0.01	<0.01%	16.4	2020	Insignificant
HR32	534759	201702	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR33	534725	201693	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR34	534830	201759	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR35	534816	201736	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant

Receptor	X	Y	Long term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR37	534776	201607	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR38	534773	201563	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR39	534763	201496	16.4	2018	<0.01	<0.01%	16.4	41%	Insignificant
HR40	534768	201451	16.4	2021	<0.01	<0.01%	16.4	41%	Insignificant
HR41	534773	201408	16.4	2021	<0.01	<0.01%	16.4	41%	Insignificant
HR42	534900	201794	16.4	2020	<0.01	<0.01%	16.4	41%	Insignificant
HR43	534950	201783	16.4	2020	<0.01	<0.01%	16.4	41%	Insignificant
HR44	535009	201768	17.2	2020	<0.01	<0.01%	17.2	43%	Insignificant
HR45	535070	201756	17.2	2020	<0.01	<0.01%	17.2	43%	Insignificant
AQMA 1	535226	201678	17.2	2017	<0.01	<0.01%	17.2	43%	Insignificant
AQMA 2	535220	201525	17.2	2017	<0.01	<0.01%	17.2	43%	Insignificant
AQMA 3	535215	201387	17.2	2017	<0.01	<0.01%	17.2	43%	Insignificant
ER1	536612	201393	16.4	2017	<0.01	<0.01%	16.4	41%	Insignificant
ER2	534607	203679	15.6	2018	<0.01	<0.01%	15.6	39%	Insignificant
ER3	539016	209557	15.0	2020	<0.01	<0.01%	15.0	37%	Insignificant
ER4	541137	199555	17.9	2017	<0.01	<0.01%	17.9	45%	Insignificant
ER5	538079	196106	16.4	2019	<0.01	<0.01%	16.4	41%	Insignificant
ER6	534667	207161	14.4	2018	<0.01	<0.01%	14.4	36%	Insignificant
ER7	532269	205102	14.8	2018	<0.01	<0.01%	14.8	37%	Insignificant
AQS: 40µg/m^3 *Results are to 2d.p.									

Table 31 PM_{10} daily mean results (µg/m^3)

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	31.9	2018	0.01	<0.01%	31.9	64%	Insignificant
HR2	534422	202671	31.9	2018	0.01	<0.01%	31.9	64%	Insignificant
HR3	534821	202677	31.9	2018	0.02	0.01%	31.9	64%	Insignificant
HR4	534922	202614	31.9	2020	0.02	0.01%	31.9	64%	Insignificant
HR5	534989	202539	31.9	2020	0.02	0.01%	31.9	64%	Insignificant
HR6	534950	202219	31.9	2020	0.04	0.01%	31.9	64%	Insignificant
HR7	535094	202104	33.8	2020	0.07	0.02%	33.8	68%	Insignificant
HR8	535308	202249	33.8	2021	0.05	0.02%	33.8	68%	Insignificant
HR9	535292	202367	33.8	2020	0.03	0.01%	33.8	68%	Insignificant
HR10	535357	202235	33.8	2019	0.05	0.02%	33.8	68%	Insignificant
HR11	535525	202257	33.8	2021	0.04	0.01%	33.8	68%	Insignificant
HR12	535316	202007	33.8	2021	0.08	0.03%	33.8	68%	Insignificant
HR13	535287	201681	34.4	2017	0.18	0.06%	34.4	69%	Insignificant
HR14	535196	201187	34.4	2021	0.07	0.02%	34.4	69%	Insignificant
HR15	535246	200678	36.5	2018	0.02	0.01%	36.5	73%	Insignificant
HR16	535775	200601	36.5	2017	0.01	<0.01%	36.5	73%	Insignificant
HR17	535967	200770	36.5	2017	0.01	<0.01%	36.5	73%	Insignificant
HR18	534473	201464	32.9	2019	0.05	0.02%	32.9	66%	Insignificant
HR19	533885	201869	33.6	2019	0.02	0.01%	33.6	67%	Insignificant
HR20	533962	202274	31.2	2018	0.02	0.01%	31.2	62%	Insignificant
HR21	534814	201708	32.9	2018	0.31	0.10%	32.9	66%	Insignificant
HR22	534593	201553	32.9	2019	0.10	0.03%	32.9	66%	Insignificant
HR23	535641	201515	34.4	2017	0.04	0.01%	34.4	69%	Insignificant
HR24	535635	201357	34.4	2017	0.03	0.01%	34.4	69%	Insignificant
HR25	535594	201237	34.4	2017	0.03	0.01%	34.4	69%	Insignificant
HR26	535615	201836	34.4	2017	0.05	0.02%	34.4	69%	Insignificant
HR27	535292	201243	34.4	2017	0.07	0.02%	34.4	69%	Insignificant
HR28	534882	201856	32.9	2020	0.16	0.05%	32.9	66%	Insignificant
HR29	534944	201984	32.9	2020	0.10	0.03%	32.9	66%	Insignificant
HR30	535169	201989	34.4	2019	0.10	0.03%	34.4	69%	Insignificant
HR31	534841	201791	32.9	2018	0.23	0.08%	32.9	66%	Insignificant
HR32	534759	201702	32.9	2018	0.29	0.10%	32.9	66%	Insignificant
HR33	534725	201693	32.9	2018	0.24	0.08%	32.9	66%	Insignificant
HR34	534830	201759	32.9	2018	0.30	0.10%	32.9	66%	Insignificant
HR35	534816	201736	32.9	2018	0.33	0.11%	32.9	66%	Insignificant
HR36	534777	201643	32.9	2018	0.36	0.12%	32.9	66%	Insignificant

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	32.9	2019	0.34	0.11%	32.9	66%	Insignificant
HR38	534773	201563	32.9	2019	0.33	0.11%	32.9	66%	Insignificant
HR39	534763	201496	32.9	2019	0.29	0.10%	32.9	66%	Insignificant
HR40	534768	201451	32.9	2019	0.30	0.10%	32.9	66%	Insignificant
HR41	534773	201408	32.9	2021	0.33	0.11%	32.9	66%	Insignificant
HR42	534900	201794	32.9	2020	0.16	0.05%	32.9	66%	Insignificant
HR43	534950	201783	32.9	2020	0.23	0.08%	32.9	66%	Insignificant
HR44	535009	201768	34.4	2019	0.25	0.08%	34.4	69%	Insignificant
HR45	535070	201756	34.4	2020	0.20	0.07%	34.4	69%	Insignificant
AQMA 1	535226	201678	34.4	2020	0.24	0.08%	34.4	69%	Insignificant
AQMA 2	535220	201525	34.4	2017	0.22	0.07%	34.4	69%	Insignificant
AQMA 3	535215	201387	34.4	2019	0.14	0.05%	34.4	69%	Insignificant
ER1	536612	201393	32.8	2017	0.01	<0.01%	32.8	66%	Insignificant
ER2	534607	203679	31.3	2018	0.01	<0.01%	31.3	63%	Insignificant
ER3	539016	209557	30.0	2021	<0.01	<0.01%	30.0	60%	Insignificant
ER4	541137	199555	35.8	2017	<0.01	<0.01%	35.8	72%	Insignificant
ER5	538079	196106	32.7	2021	<0.01	<0.01%	32.7	65%	Insignificant
ER6	534667	207161	28.8	2018	<0.01	<0.01%	28.8	58%	Insignificant
ER7	532269	205102	29.6	2017	<0.01	<0.01%	29.6	59%	Insignificant
AQS: 50µg/m^3 *Results are to 2d.p.									

C.1.3 SO_2 results for scenario 1

Table 32 SO_2 99.9th percentile 15-minute mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.03	0.01%	8.4	3%	Insignificant
HR2	534422	202671	8.4	2019	0.03	0.01%	8.4	3%	Insignificant
HR3	534821	202677	8.4	2021	0.03	0.01%	8.4	3%	Insignificant
HR4	534922	202614	8.4	2018	0.03	0.01%	8.4	3%	Insignificant
HR5	534989	202539	8.4	2018	0.03	0.01%	8.4	3%	Insignificant
HR6	534950	202219	8.4	2019	0.04	0.01%	8.4	3%	Insignificant
HR7	535094	202104	11.5	2019	0.04	0.02%	11.5	4%	Insignificant
HR8	535308	202249	11.5	2019	0.03	0.01%	11.5	4%	Insignificant
HR9	535292	202367	11.5	2017	0.03	0.01%	11.5	4%	Insignificant
HR10	535357	202235	11.5	2019	0.03	0.01%	11.5	4%	Insignificant
HR11	535525	202257	11.5	2017	0.03	0.01%	11.5	4%	Insignificant
HR12	535316	202007	11.5	2017	0.04	0.02%	11.5	4%	Insignificant
HR13	535287	201681	9.8	2020	0.10	0.04%	9.9	4%	Insignificant
HR14	535196	201187	9.8	2021	0.07	0.03%	9.9	4%	Insignificant
HR15	535246	200678	8.8	2019	0.03	0.01%	8.8	3%	Insignificant
HR16	535775	200601	8.8	2019	0.03	0.01%	8.9	3%	Insignificant
HR17	535967	200770	8.8	2017	0.03	0.01%	8.9	3%	Insignificant
HR18	534473	201464	7.8	2020	0.06	0.02%	7.9	3%	Insignificant
HR19	533885	201869	7.4	2021	0.03	0.01%	7.5	3%	Insignificant
HR20	533962	202274	7.6	2018	0.04	0.01%	7.7	3%	Insignificant
HR21	534814	201708	7.8	2019	0.22	0.08%	8.0	3%	Insignificant
HR22	534593	201553	7.8	2019	0.09	0.03%	7.9	3%	Insignificant
HR23	535641	201515	9.8	2017	0.04	0.01%	9.9	4%	Insignificant
HR24	535635	201357	9.8	2017	0.04	0.02%	9.9	4%	Insignificant
HR25	535594	201237	9.8	2019	0.04	0.02%	9.9	4%	Insignificant
HR26	535615	201836	9.8	2017	0.04	0.01%	9.9	4%	Insignificant
HR27	535292	201243	9.8	2017	0.07	0.03%	9.9	4%	Insignificant
HR28	534882	201856	7.8	2017	0.11	0.04%	7.9	3%	Insignificant
HR29	534944	201984	7.8	2021	0.06	0.02%	7.9	3%	Insignificant
HR30	535169	201989	9.8	2019	0.05	0.02%	9.9	4%	Insignificant
HR31	534841	201791	7.8	2018	0.19	0.07%	8.0	3%	Insignificant
HR32	534759	201702	7.8	2020	0.20	0.08%	8.0	3%	Insignificant
HR33	534725	201693	7.8	2018	0.17	0.06%	8.0	3%	Insignificant
HR34	534830	201759	7.8	2020	0.21	0.08%	8.0	3%	Insignificant
HR35	534816	201736	7.8	2020	0.20	0.08%	8.0	3%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	7.8	2017	0.25	0.09%	8.1	3%	Insignificant
HR37	534776	201607	7.8	2018	0.24	0.09%	8.0	3%	Insignificant
HR38	534773	201563	7.8	2020	0.28	0.10%	8.1	3%	Insignificant
HR39	534763	201496	7.8	2021	0.23	0.09%	8.0	3%	Insignificant
HR40	534768	201451	7.8	2019	0.24	0.09%	8.0	3%	Insignificant
HR41	534773	201408	7.8	2019	0.24	0.09%	8.0	3%	Insignificant
HR42	534900	201794	7.8	2017	0.10	0.04%	7.9	3%	Insignificant
HR43	534950	201783	7.8	2021	0.11	0.04%	7.9	3%	Insignificant
HR44	535009	201768	9.8	2020	0.12	0.04%	10.0	4%	Insignificant
HR45	535070	201756	9.8	2020	0.13	0.05%	10.0	4%	Insignificant
AQMA 1	535226	201678	9.8	2017	0.15	0.06%	10.0	4%	Insignificant
AQMA 2	535220	201525	9.8	2020	0.15	0.06%	10.0	4%	Insignificant
AQMA 3	535215	201387	9.8	2018	0.12	0.05%	10.0	4%	Insignificant
ER1	536612	201393	9.9	2020	0.03	<0.01%	9.9	4%	Insignificant
ER2	534607	203679	8.3	2020	0.02	<0.01%	8.3	3%	Insignificant
ER3	539016	209557	9.9	2020	<0.01	<0.01%	9.9	4%	Insignificant
ER4	541137	199555	8.1	2017	<0.01	<0.01%	8.1	3%	Insignificant
ER5	538079	196106	8.3	2019	<0.01	<0.01%	8.3	3%	Insignificant
ER6	534667	207161	7.1	2019	<0.01	<0.01%	7.1	3%	Insignificant
ER7	532269	205102	7.1	2021	0.01	<0.01%	7.1	3%	Insignificant
AQS: 266µg/m^3 *Results are to 2d.p.									

Table 33 SO_2 99.18th percentile 24-hour mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	<0.01	<0.01%	8.4	7%	Insignificant
HR2	534422	202671	8.4	2018	<0.01	<0.01%	8.4	7%	Insignificant
HR3	534821	202677	8.4	2020	<0.01	<0.01%	8.4	7%	Insignificant
HR4	534922	202614	8.4	2020	<0.01	<0.01%	8.4	7%	Insignificant
HR5	534989	202539	8.4	2021	<0.01	<0.01%	8.4	7%	Insignificant
HR6	534950	202219	8.4	2021	<0.01	<0.01%	8.4	7%	Insignificant
HR7	535094	202104	11.5	2021	<0.01	<0.01%	11.5	9%	Insignificant
HR8	535308	202249	11.5	2021	<0.01	<0.01%	11.5	9%	Insignificant
HR9	535292	202367	11.5	2021	<0.01	<0.01%	11.5	9%	Insignificant
HR10	535357	202235	11.5	2021	<0.01	<0.01%	11.5	9%	Insignificant
HR11	535525	202257	11.5	2021	<0.01	<0.01%	11.5	9%	Insignificant
HR12	535316	202007	11.5	2020	<0.01	<0.01%	11.5	9%	Insignificant
HR13	535287	201681	9.8	2017	0.01	<0.01%	9.9	8%	Insignificant
HR14	535196	201187	9.8	2017	<0.01	<0.01%	9.8	8%	Insignificant
HR15	535246	200678	8.8	2018	<0.01	<0.01%	8.8	7%	Insignificant
HR16	535775	200601	8.8	2017	<0.01	<0.01%	8.8	7%	Insignificant
HR17	535967	200770	8.8	2017	<0.01	<0.01%	8.8	7%	Insignificant
HR18	534473	201464	7.8	2019	<0.01	<0.01%	7.8	6%	Insignificant
HR19	533885	201869	7.4	2018	<0.01	<0.01%	7.4	6%	Insignificant
HR20	533962	202274	7.6	2018	<0.01	<0.01%	7.6	6%	Insignificant
HR21	534814	201708	7.8	2018	0.02	0.02%	7.8	6%	Insignificant
HR22	534593	201553	7.8	2017	<0.01	<0.01%	7.8	6%	Insignificant
HR23	535641	201515	9.8	2019	<0.01	<0.01%	9.8	8%	Insignificant
HR24	535635	201357	9.8	2017	<0.01	<0.01%	9.8	8%	Insignificant
HR25	535594	201237	9.8	2019	<0.01	<0.01%	9.8	8%	Insignificant
HR26	535615	201836	9.8	2017	<0.01	<0.01%	9.8	8%	Insignificant
HR27	535292	201243	9.8	2021	<0.01	<0.01%	9.8	8%	Insignificant
HR28	534882	201856	7.8	2018	0.01	<0.01%	7.8	6%	Insignificant
HR29	534944	201984	7.8	2021	<0.01	<0.01%	7.8	6%	Insignificant
HR30	535169	201989	9.8	2020	<0.01	<0.01%	9.8	8%	Insignificant
HR31	534841	201791	7.8	2017	0.02	0.01%	7.8	6%	Insignificant
HR32	534759	201702	7.8	2018	0.02	0.02%	7.8	6%	Insignificant
HR33	534725	201693	7.8	2017	0.02	0.01%	7.8	6%	Insignificant
HR34	534830	201759	7.8	2018	0.02	0.02%	7.8	6%	Insignificant
HR35	534816	201736	7.8	2018	0.02	0.02%	7.8	6%	Insignificant
HR36	534777	201643	7.8	2017	0.03	0.02%	7.8	6%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2017	0.03	0.02%	7.8	6%	Insignificant
HR38	534773	201563	7.8	2019	0.03	0.02%	7.8	6%	Insignificant
HR39	534763	201496	7.8	2018	0.03	0.02%	7.8	6%	Insignificant
HR40	534768	201451	7.8	2018	0.03	0.02%	7.8	6%	Insignificant
HR41	534773	201408	7.8	2018	0.03	0.02%	7.8	6%	Insignificant
HR42	534900	201794	7.8	2021	0.01	<0.01%	7.8	6%	Insignificant
HR43	534950	201783	7.8	2021	0.01	0.01%	7.8	6%	Insignificant
HR44	535009	201768	9.8	2021	0.01	<0.01%	9.9	8%	Insignificant
HR45	535070	201756	9.8	2021	0.01	<0.01%	9.9	8%	Insignificant
AQMA 1	535226	201678	9.8	2017	0.01	0.01%	9.9	8%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.01	0.01%	9.9	8%	Insignificant
AQMA 3	535215	201387	9.8	2019	<0.01	<0.01%	9.8	8%	Insignificant
ER1	536612	201393	9.9	2017	<0.01	<0.01%	9.9	8%	Insignificant
ER2	534607	203679	8.3	2021	<0.01	<0.01%	8.3	7%	Insignificant
ER3	539016	209557	9.9	2021	<0.01	<0.01%	9.9	8%	Insignificant
ER4	541137	199555	8.1	2017	<0.01	<0.01%	8.1	7%	Insignificant
ER5	538079	196106	8.3	2021	<0.01	<0.01%	8.3	7%	Insignificant
ER6	534667	207161	7.1	2020	<0.01	<0.01%	7.1	6%	Insignificant
ER7	532269	205102	7.1	2018	<0.01	<0.01%	7.1	6%	Insignificant
AQS: 125µg/m^3 *Results are to 2d.p.									

Table 34 SO_2 99.73rd percentile 1-hour mean results (µg/m³)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.02	<0.01%	8.4	2%	Insignificant
HR2	534422	202671	8.4	2019	0.02	<0.01%	8.4	2%	Insignificant
HR3	534821	202677	8.4	2018	0.02	<0.01%	8.4	2%	Insignificant
HR4	534922	202614	8.4	2018	0.02	<0.01%	8.4	2%	Insignificant
HR5	534989	202539	8.4	2019	0.02	<0.01%	8.4	2%	Insignificant
HR6	534950	202219	8.4	2019	0.03	<0.01%	8.4	2%	Insignificant
HR7	535094	202104	11.5	2019	0.04	0.01%	11.5	3%	Insignificant
HR8	535308	202249	11.5	2019	0.02	<0.01%	11.5	3%	Insignificant
HR9	535292	202367	11.5	2019	0.02	<0.01%	11.5	3%	Insignificant
HR10	535357	202235	11.5	2021	0.02	<0.01%	11.5	3%	Insignificant
HR11	535525	202257	11.5	2019	0.02	<0.01%	11.5	3%	Insignificant
HR12	535316	202007	11.5	2019	0.04	0.01%	11.5	3%	Insignificant
HR13	535287	201681	9.8	2017	0.09	0.03%	9.9	3%	Insignificant
HR14	535196	201187	9.8	2021	0.06	0.02%	9.9	3%	Insignificant
HR15	535246	200678	8.8	2018	0.02	<0.01%	8.8	3%	Insignificant
HR16	535775	200601	8.8	2017	0.02	<0.01%	8.8	3%	Insignificant
HR17	535967	200770	8.8	2017	0.02	<0.01%	8.8	3%	Insignificant
HR18	534473	201464	7.8	2020	0.05	0.01%	7.8	2%	Insignificant
HR19	533885	201869	7.4	2019	0.02	<0.01%	7.5	2%	Insignificant
HR20	533962	202274	7.6	2017	0.02	<0.01%	7.6	2%	Insignificant
HR21	534814	201708	7.8	2018	0.20	0.06%	8.0	2%	Insignificant
HR22	534593	201553	7.8	2020	0.07	0.02%	7.9	2%	Insignificant
HR23	535641	201515	9.8	2017	0.03	<0.01%	9.9	3%	Insignificant
HR24	535635	201357	9.8	2021	0.03	<0.01%	9.9	3%	Insignificant
HR25	535594	201237	9.8	2018	0.03	<0.01%	9.9	3%	Insignificant
HR26	535615	201836	9.8	2017	0.03	<0.01%	9.9	3%	Insignificant
HR27	535292	201243	9.8	2017	0.06	0.02%	9.9	3%	Insignificant
HR28	534882	201856	7.8	2020	0.10	0.03%	7.9	2%	Insignificant
HR29	534944	201984	7.8	2020	0.06	0.02%	7.9	2%	Insignificant
HR30	535169	201989	9.8	2017	0.04	0.01%	9.9	3%	Insignificant
HR31	534841	201791	7.8	2018	0.18	0.05%	8.0	2%	Insignificant
HR32	534759	201702	7.8	2018	0.15	0.05%	7.9	2%	Insignificant
HR33	534725	201693	7.8	2019	0.19	0.04%	8.0	2%	Insignificant
HR34	534830	201759	7.8	2019	0.19	0.05%	8.0	2%	Insignificant
HR35	534816	201736	7.8	2019	0.23	0.05%	8.0	2%	Insignificant
HR36	534777	201643	7.8	2018	0.23	0.06%	8.0	2%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2020	0.24	0.06%	8.0	2%	Insignificant
HR38	534773	201563	7.8	2021	0.20	0.07%	8.0	2%	Insignificant
HR39	534763	201496	7.8	2019	0.21	0.06%	8.0	2%	Insignificant
HR40	534768	201451	7.8	2020	0.21	0.06%	8.0	2%	Insignificant
HR41	534773	201408	7.8	2019	0.10	0.06%	7.9	2%	Insignificant
HR42	534900	201794	7.8	2020	0.10	0.03%	7.9	2%	Insignificant
HR43	534950	201783	7.8	2020	0.11	0.03%	9.9	3%	Insignificant
HR44	535009	201768	9.8	2020	0.12	0.03%	10.0	3%	Insignificant
HR45	535070	201756	9.8	2017	0.13	0.03%	10.0	3%	Insignificant
AQMA 1	535226	201678	9.8	2019	0.14	0.04%	10.0	3%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.11	0.04%	9.9	3%	Insignificant
AQMA 3	535215	201387	9.8	2018	0.18	0.03%	8.0	2%	Insignificant
ER1	536612	201393	9.9	2017	0.01	<0.01%	9.9	3%	Insignificant
ER2	534607	203679	8.3	2020	<0.01	<0.01%	8.3	2%	Insignificant
ER3	539016	209557	9.9	2017	<0.01	<0.01%	9.9	3%	Insignificant
ER4	541137	199555	8.1	2017	<0.01	<0.01%	8.1	2%	Insignificant
ER5	538079	196106	8.3	2019	<0.01	<0.01%	8.3	2%	Insignificant
ER6	534667	207161	7.1	2019	<0.01	<0.01%	7.1	2%	Insignificant
ER7	532269	205102	7.1	2018	<0.01	<0.01%	7.1	2%	Insignificant
AQS: 350µg/m^3 *Results are to 2d.p.									

C.1.4 CO results for scenario 1

Table 35 CO 8-hour rolling mean (µg/m³)

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	0.3	2018	0.01	<0.01%	0.3	<0.01%	Insignificant
HR2	534422	202671	0.3	2018	0.02	<0.01%	0.3	<0.01%	Insignificant
HR3	534821	202677	0.3	2020	0.02	<0.01%	0.3	<0.01%	Insignificant
HR4	534922	202614	0.3	2020	0.02	<0.01%	0.3	<0.01%	Insignificant
HR5	534989	202539	0.3	2020	0.03	<0.01%	0.4	<0.01%	Insignificant
HR6	534950	202219	0.3	2020	0.06	<0.01%	0.4	<0.01%	Insignificant
HR7	535094	202104	0.3	2020	0.11	<0.01%	0.4	<0.01%	Insignificant
HR8	535308	202249	0.3	2020	0.07	<0.01%	0.4	<0.01%	Insignificant
HR9	535292	202367	0.3	2020	0.06	<0.01%	0.4	<0.01%	Insignificant
HR10	535357	202235	0.3	2020	0.07	<0.01%	0.4	<0.01%	Insignificant
HR11	535525	202257	0.3	2020	0.06	<0.01%	0.4	<0.01%	Insignificant
HR12	535316	202007	0.3	2020	0.12	<0.01%	0.4	<0.01%	Insignificant
HR13	535287	201681	0.3	2017	0.28	<0.01%	0.6	<0.01%	Insignificant
HR14	535196	201187	0.3	2017	0.09	<0.01%	0.4	<0.01%	Insignificant
HR15	535246	200678	0.3	2018	0.03	<0.01%	0.4	<0.01%	Insignificant
HR16	535775	200601	0.3	2017	0.02	<0.01%	0.4	<0.01%	Insignificant
HR17	535967	200770	0.3	2017	0.02	<0.01%	0.4	<0.01%	Insignificant
HR18	534473	201464	0.3	2019	0.05	<0.01%	0.4	<0.01%	Insignificant
HR19	533885	201869	0.3	2018	0.02	<0.01%	0.3	<0.01%	Insignificant
HR20	533962	202274	0.3	2018	0.02	<0.01%	0.3	<0.01%	Insignificant
HR21	534814	201708	0.3	2018	0.37	<0.01%	0.7	<0.01%	Insignificant
HR22	534593	201553	0.3	2019	0.11	<0.01%	0.4	<0.01%	Insignificant
HR23	535641	201515	0.3	2017	0.06	<0.01%	0.4	<0.01%	Insignificant
HR24	535635	201357	0.3	2017	0.04	<0.01%	0.4	<0.01%	Insignificant
HR25	535594	201237	0.3	2017	0.04	<0.01%	0.4	<0.01%	Insignificant
HR26	535615	201836	0.3	2017	0.08	<0.01%	0.4	<0.01%	Insignificant
HR27	535292	201243	0.3	2017	0.09	<0.01%	0.4	<0.01%	Insignificant
HR28	534882	201856	0.3	2020	0.21	<0.01%	0.5	<0.01%	Insignificant
HR29	534944	201984	0.3	2020	0.14	<0.01%	0.5	<0.01%	Insignificant
HR30	535169	201989	0.3	2020	0.15	<0.01%	0.5	<0.01%	Insignificant
HR31	534841	201791	0.3	2018	0.31	<0.01%	0.6	<0.01%	Insignificant
HR32	534759	201702	0.3	2018	0.34	<0.01%	0.7	<0.01%	Insignificant
HR33	534725	201693	0.3	2018	0.28	<0.01%	0.6	<0.01%	Insignificant
HR34	534830	201759	0.3	2018	0.39	<0.01%	0.7	<0.01%	Insignificant
HR35	534816	201736	0.3	2018	0.39	<0.01%	0.7	<0.01%	Insignificant

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	0.3	2019	0.41	<0.01%	0.7	<0.01%	Insignificant
HR37	534776	201607	0.3	2019	0.37	<0.01%	0.7	<0.01%	Insignificant
HR38	534773	201563	0.3	2019	0.34	<0.01%	0.7	<0.01%	Insignificant
HR39	534763	201496	0.3	2019	0.31	<0.01%	0.6	<0.01%	Insignificant
HR40	534768	201451	0.3	2020	0.32	<0.01%	0.7	<0.01%	Insignificant
HR41	534773	201408	0.3	2021	0.35	<0.01%	0.7	<0.01%	Insignificant
HR42	534900	201794	0.3	2020	0.24	<0.01%	0.6	<0.01%	Insignificant
HR43	534950	201783	0.3	2020	0.36	<0.01%	0.7	<0.01%	Insignificant
HR44	535009	201768	0.3	2020	0.39	<0.01%	0.7	<0.01%	Insignificant
HR45	535070	201756	0.3	2017	0.30	<0.01%	0.6	<0.01%	Insignificant
AQMA 1	535226	201678	0.3	2017	0.37	<0.01%	0.7	<0.01%	Insignificant
AQMA 2	535220	201525	0.3	2017	0.35	<0.01%	0.7	<0.01%	Insignificant
AQMA 3	535215	201387	0.3	2017	0.19	<0.01%	0.5	<0.01%	Insignificant
ER1	536612	201393	0.3	2017	0.01	<0.01%	0.4	<0.01%	Insignificant
ER2	534607	203679	0.3	2018	<0.01	<0.01%	0.3	<0.01%	Insignificant
ER3	539016	209557	0.3	2019	<0.01	<0.01%	0.3	<0.01%	Insignificant
ER4	541137	199555	0.3	2017	<0.01	<0.01%	0.3	<0.01%	Insignificant
ER5	538079	196106	0.3	2019	<0.01	<0.01%	0.3	<0.01%	Insignificant
ER6	534667	207161	0.3	2018	<0.01	<0.01%	0.3	<0.01%	Insignificant
ER7	532269	205102	0.3	2018	<0.01	<0.01%	0.3	<0.01%	Insignificant
AQS: 10,000µg/m^3 *Results are to 2d.p.									

C.1.5 Ecological results for scenario 1

Table 36 NO_x daily mean results (µg/m^3)

Receptor	X	Y	Short term NO_x background	Maximum Year	Maximum modelled PC	% of standard	PEC	% of standard	Significance
ER1	536612	201393	46.1	2018	0.90	1.20%	47.0	63%	Insignificant
ER2	534607	203679	39.5	2020	0.60	0.81%	40.1	53%	Insignificant
ER3	539016	209557	34.2	2020	0.08	0.10%	34.3	46%	Insignificant
ER4	541137	199555	52.4	2021	0.17	0.22%	52.6	70%	Insignificant
ER5	538079	196106	49.9	2021	0.46	0.61%	50.4	67%	Insignificant
ER6	534667	207161	30.4	2021	0.19	0.25%	30.6	41%	Insignificant
ER7	532269	205102	29.0	2018	0.29	0.39%	29.3	39%	Insignificant
Critical level: 75µg/m^3									

Table 37 NO_x annual mean results (µg/m^3)

Receptor	X	Y	Long term NO_x background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
ER1	536612	201393	23.1	2017	0.02	0.07%	23.1	77%	Insignificant
ER2	534607	203679	19.7	2019	0.01	0.05%	19.8	66%	Insignificant
ER3	539016	209557	17.1	2021	<0.01	<0.01%	17.1	57%	Insignificant
ER4	541137	199555	26.2	2017	<0.01	0.01%	26.2	87%	Insignificant
ER5	538079	196106	24.9	2020	<0.01	0.01%	25.0	83%	Insignificant
ER6	534667	207161	15.2	2019	<0.01	0.01%	15.2	51%	Insignificant
ER7	532269	205102	14.5	2019	<0.01	0.02%	14.5	48%	Insignificant
Critical level: 30µg/m^3 *Results are to 2d.p.									

Table 38 Nutrient nitrogen deposition results

Ecological receptor ID	Critical load min	Background Nitrogen deposition	Annual mean NO_2 PC ($\mu g/m^3$)	Dry deposition (kg N/ha/yr)	Proportion of PC to CL (%) Min	Proportion of PEC to CL (%) Min
ER1	15	21.9	0.01432	0.0021	0.0069	146
ER2	5	25.9	0.00986	0.0014	0.0142	518
ER3	15	21.9	0.00198	0.0003	0.0009	146
ER4	10	22.9	0.00304	0.0009	0.0044	229
ER5	10	22.9	0.00271	0.0008	0.0039	229
ER6	15	39.8	0.00283	0.0004	0.0020	265
ER7	15	39.8	0.00370	0.0005	0.0027	265

Table 39 Acid deposition results

Ecological receptor ID	Critical Load max Sulphur (kg S/ha/yr)	Critical Load min Nitrogen (kg N/ha/yr)	Critical Load max Nitrogen (kg N/ha/yr)	Background Nitrogen deposition (kg N/ha/yr)	Background Sulphur deposition (kg S/ha/yr)	PC Nitrogen (keq N/ha/yr)	PC Sulphur (keq S/ha/yr)	Exceedance
ER1	0.88	0.223	1.113	1.6	0.2	0.000147	0.000002	PC < CL No exceedance
ER2	1.65	0.438	2.088	1.91	0.15	0.000101	0.000002	PC < CL No exceedance
ER3	0.88	0.223	1.113	1.6	0.2	0.000020	0.000002	PC < CL No exceedance
ER4	0.88	0.714	1.594	1.6	0.2	0.000063	0.000005	PC < CL No exceedance
ER5	0.88	0.714	1.594	1.6	0.2	0.000056	0.000005	PC < CL No exceedance
ER6	1.603	0.142	1.745	2.8	0.2	0.000029	0.000002	PC < CL No exceedance
ER7	1.603	0.142	1.745	2.8	0.2	0.000038	0.000002	PC < CL No exceedance

C.2 Scenario 2

C.2.1 NO_2 results for scenario 2

Table 40 NO_2 99.79th percentile hourly mean results (µg/m^3)

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	30.3	2017	53.8	27%	84.1	42%	Insignificant
HR2	534422	202671	30.3	2018	53.7	27%	84.0	42%	Insignificant
HR3	534821	202677	30.3	2018	50.4	25%	80.7	40%	Insignificant
HR4	534922	202614	30.3	2020	50.0	25%	80.3	40%	Insignificant
HR5	534989	202539	30.3	2018	54.1	27%	84.4	42%	Insignificant
HR6	534950	202219	30.3	2018	82.5	41%	112.8	56%	Insignificant
HR7	535094	202104	35.5	2018	99.1	50%	134.7	67%	Insignificant
HR8	535308	202249	35.5	2018	69.2	35%	104.8	52%	Insignificant
HR9	535292	202367	35.5	2018	59.9	30%	95.4	48%	Insignificant
HR10	535357	202235	35.5	2021	68.7	34%	104.2	52%	Insignificant
HR11	535525	202257	35.5	2018	59.2	30%	94.7	47%	Insignificant
HR12	535316	202007	35.5	2018	86.9	43%	122.4	61%	Insignificant
HR13	535287	201681	36.3	2020	129.7	65%	166.0	83%	Insignificant
HR14	535196	201187	36.3	2021	81.4	41%	117.8	59%	Insignificant
HR15	535246	200678	50.4	2021	48.1	24%	98.4	49%	Insignificant
HR16	535775	200601	50.4	2021	40.1	20%	90.5	45%	Insignificant
HR17	535967	200770	50.4	2017	38.8	19%	89.2	45%	Insignificant
HR18	534473	201464	31.6	2018	113.8	57%	145.5	73%	Insignificant
HR19	533885	201869	29.0	2018	53.9	27%	82.9	41%	Insignificant
HR20	533962	202274	27.6	2017	57.4	29%	85.0	43%	Insignificant
HR21	534814	201708	31.6	2020	**372.3**	**186%**	**403.9**	**202%**	Insignificant**
HR22	534593	201553	31.6	2018	**174.2**	**87%**	**205.9**	**103%**	Insignificant**
HR23	535641	201515	36.3	2017	57.4	29%	93.7	47%	Insignificant
HR24	535635	201357	36.3	2017	57.2	29%	93.5	47%	Insignificant
HR25	535594	201237	36.3	2017	57.0	29%	93.4	47%	Insignificant
HR26	535615	201836	36.3	2017	62.4	31%	98.7	49%	Insignificant
HR27	535292	201243	36.3	2017	78.0	39%	114.3	57%	Insignificant
HR28	534882	201856	31.6	2017	**220.6**	**110%**	**252.2**	**126%**	Insignificant**
HR29	534944	201984	31.6	2018	146.2	73%	177.8	89%	Insignificant
HR30	535169	201989	36.3	2018	111.5	56%	147.9	74%	Insignificant
HR31	534841	201791	31.6	2018	**325.1**	**163%**	**356.8**	**178%**	Insignificant**

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR32	534759	201702	31.6	2017	**358.0**	**179%**	**389.6**	**195%**	Insignificant**
HR33	534725	201693	31.6	2018	**293.7**	**147%**	**325.3**	**163%**	Insignificant**
HR34	534830	201759	31.6	2020	**382.8**	**191%**	**414.4**	**207%**	Insignificant**
HR35	534816	201736	31.6	2018	**392.2**	**196%**	**423.9**	**212%**	Insignificant**
HR36	534777	201643	31.6	2018	**354.8**	**177%**	**386.4**	**193%**	Insignificant**
HR37	534776	201607	31.6	2020	**328.7**	**164%**	**360.4**	**180%**	Insignificant**
HR38	534773	201563	31.6	2020	**411.2**	**206%**	**442.9**	**221%**	Insignificant**
HR39	534763	201496	31.6	2020	**267.9**	**134%**	**299.5**	**150%**	Insignificant**
HR40	534768	201451	31.6	2020	**215.6**	**108%**	**247.2**	**124%**	Insignificant**
HR41	534773	201408	31.6	2020	**186.3**	**93%**	**218.0**	**109%**	Insignificant**
HR42	534900	201794	31.6	2021	**255.8**	**128%**	**287.4**	**144%**	Insignificant**
HR43	534950	201783	31.6	2020	**259.7**	**130%**	**291.4**	**146%**	Insignificant**
HR44	535009	201768	36.3	2018	**255.4**	**128%**	**291.7**	**146%**	Insignificant**
HR45	535070	201756	36.3	2020	**210.1**	**105%**	**246.4**	**123%**	Insignificant**
AQMA 1	535226	201678	36.3	2018	154.5	77%	190.8	95%	Insignificant
AQMA 2	535220	201525	36.3	2017	158.5	79%	194.9	97%	Insignificant
AQMA 3	535215	201387	36.3	2017	111.3	56%	147.6	74%	Insignificant
ER1	536612	201393	33.2	2017	31.4	16%	64.6	32%	Insignificant
ER2	534607	203679	28.9	2020	28.4	14%	57.4	29%	Insignificant
ER3	539016	209557	25.4	2020	7.1	4%	32.5	16%	Insignificant
ER4	541137	199555	37.3	2017	11.2	6%	48.4	24%	Insignificant
ER5	538079	196106	35.4	2018	9.5	5%	44.9	22%	Insignificant
ER6	534667	207161	22.9	2018	11.3	6%	34.2	17%	Insignificant
ER7	532269	205102	21.9	2018	16.3	8%	38.2	19%	Insignificant

AQS: 200µg/m^3
*Results are to 2d.p.
**Although exceedances are predicted at these receptors, this scenario only occurs every other three years and is not a continuously operating process, therefore this is considered to be insignificant.

Table 41 NO_2 hourly mean hypergeometric distribution analysis (48 hours)

Receptor	N	P	Likelihood of exceedance
HR1	48	<0.01%	Highly unlikely
HR2	48	<0.01%	Highly unlikely
HR3	48	<0.01%	Highly unlikely
HR4	48	<0.01%	Highly unlikely
HR5	48	<0.01%	Highly unlikely
HR6	48	<0.01%	Highly unlikely
HR7	48	<0.01%	Highly unlikely
HR8	48	<0.01%	Highly unlikely
HR9	48	<0.01%	Highly unlikely
HR10	48	<0.01%	Highly unlikely
HR11	48	<0.01%	Highly unlikely
HR12	48	<0.01%	Highly unlikely
HR13	48	<0.01%	Highly unlikely
HR14	48	<0.01%	Highly unlikely
HR15	48	<0.01%	Highly unlikely
HR16	48	<0.01%	Highly unlikely
HR17	48	<0.01%	Highly unlikely
HR18	48	<0.01%	Highly unlikely
HR19	48	<0.01%	Highly unlikely
HR20	48	<0.01%	Highly unlikely
HR21	48	<0.01%	Highly unlikely
HR22	48	<0.01%	Highly unlikely
HR23	48	<0.01%	Highly unlikely
HR24	48	<0.01%	Highly unlikely
HR25	48	<0.01%	Highly unlikely
HR26	48	<0.01%	Highly unlikely
HR27	48	<0.01%	Highly unlikely
HR28	48	<0.01%	Highly unlikely
HR29	48	<0.01%	Highly unlikely
HR30	48	<0.01%	Highly unlikely
HR31	48	<0.01%	Highly unlikely
HR32	48	<0.01%	Highly unlikely
HR33	48	<0.01%	Highly unlikely
HR34	48	<0.01%	Highly unlikely
HR35	48	<0.01%	Highly unlikely
HR36	48	<0.01%	Highly unlikely
HR37	48	<0.01%	Highly unlikely

HR38	48	<0.01%	Highly unlikely
HR39	48	<0.01%	Highly unlikely
HR40	48	<0.01%	Highly unlikely
HR41	48	<0.01%	Highly unlikely
HR42	48	<0.01%	Highly unlikely
HR43	48	<0.01%	Highly unlikely
HR44	48	<0.01%	Highly unlikely
HR45	48	<0.01%	Highly unlikely
AQMA 1	48	<0.01%	Highly unlikely
AQMA 2	48	<0.01%	Highly unlikely
AQMA 3	48	<0.01%	Highly unlikely
ER1	48	<0.01%	Highly unlikely
ER2	48	<0.01%	Highly unlikely
ER3	48	<0.01%	Highly unlikely
ER4	48	<0.01%	Highly unlikely
ER5	48	<0.01%	Highly unlikely
ER6	48	<0.01%	Highly unlikely
ER7	48	<0.01%	Highly unlikely
N= operating hours per year; P = Probability of exceedance of the standard.			

C.2.2 PM_{10} results for scenario 2

Table 42 PM_{10} daily mean results (µg/m^3)

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	31.9	2018	0.09	0.09%	32.0	64%	Insignificant
HR2	534422	202671	31.9	2018	0.11	0.11%	32.0	64%	Insignificant
HR3	534821	202677	31.9	2020	0.13	0.13%	32.0	64%	Insignificant
HR4	534922	202614	31.9	2020	0.16	0.16%	32.0	64%	Insignificant
HR5	534989	202539	31.9	2020	0.18	0.18%	32.0	64%	Insignificant
HR6	534950	202219	31.9	2020	0.36	0.36%	32.1	64%	Insignificant
HR7	535094	202104	33.8	2020	0.53	0.53%	34.1	68%	Insignificant
HR8	535308	202249	33.8	2021	0.36	0.36%	34.0	68%	Insignificant
HR9	535292	202367	33.8	2020	0.28	0.28%	34.0	68%	Insignificant
HR10	535357	202235	33.8	2017	0.37	0.37%	34.0	68%	Insignificant
HR11	535525	202257	33.8	2018	0.31	0.31%	34.0	68%	Insignificant
HR12	535316	202007	33.8	2020	0.55	0.55%	34.1	68%	Insignificant
HR13	535287	201681	34.4	2017	0.53	0.53%	34.6	69%	Insignificant
HR14	535196	201187	34.4	2017	0.28	0.28%	34.5	69%	Insignificant
HR15	535246	200678	36.5	2021	0.13	0.13%	36.6	73%	Insignificant
HR16	535775	200601	36.5	2017	0.10	0.10%	36.5	73%	Insignificant
HR17	535967	200770	36.5	2017	0.09	0.09%	36.5	73%	Insignificant
HR18	534473	201464	32.9	2021	0.32	0.32%	33.0	66%	Insignificant
HR19	533885	201869	33.6	2018	0.11	0.11%	33.6	67%	Insignificant
HR20	533962	202274	31.2	2018	0.12	0.12%	31.3	63%	Insignificant
HR21	534814	201708	32.9	2018	1.66	1.66%	33.7	67%	Insignificant
HR22	534593	201553	32.9	2018	0.52	0.52%	33.1	66%	Insignificant
HR23	535641	201515	34.4	2017	0.18	0.18%	34.5	69%	Insignificant
HR24	535635	201357	34.4	2017	0.17	0.17%	34.5	69%	Insignificant
HR25	535594	201237	34.4	2017	0.17	0.17%	34.5	69%	Insignificant
HR26	535615	201836	34.4	2017	0.29	0.29%	34.5	69%	Insignificant
HR27	535292	201243	34.4	2017	0.26	0.26%	34.5	69%	Insignificant
HR28	534882	201856	32.9	2020	1.12	1.12%	33.4	67%	Insignificant
HR29	534944	201984	32.9	2020	0.73	0.73%	33.2	66%	Insignificant
HR30	535169	201989	34.4	2018	0.77	0.77%	34.8	70%	Insignificant
HR31	534841	201791	32.9	2020	1.55	1.55%	33.7	67%	Insignificant
HR32	534759	201702	32.9	2018	1.93	1.93%	33.8	68%	Insignificant
HR33	534725	201693	32.9	2018	1.75	1.75%	33.8	68%	Insignificant
HR34	534830	201759	32.9	2020	1.53	1.53%	33.6	67%	Insignificant

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR35	534816	201736	32.9	2020	1.58	1.58%	33.7	67%	Insignificant
HR36	534777	201643	32.9	2018	1.74	1.74%	33.8	68%	Insignificant
HR37	534776	201607	32.9	2018	1.04	1.04%	33.4	67%	Insignificant
HR38	534773	201563	32.9	2021	0.82	0.82%	33.3	67%	Insignificant
HR39	534763	201496	32.9	2020	0.67	0.67%	33.2	66%	Insignificant
HR40	534768	201451	32.9	2021	0.71	0.71%	33.2	66%	Insignificant
HR41	534773	201408	32.9	2021	0.62	0.62%	33.2	66%	Insignificant
HR42	534900	201794	32.9	2020	1.31	1.31%	33.5	67%	Insignificant
HR43	534950	201783	32.9	2020	1.95	1.95%	33.9	68%	Insignificant
HR44	535009	201768	34.4	2020	1.93	1.93%	35.3	71%	Insignificant
HR45	535070	201756	34.4	2017	1.49	1.49%	35.1	70%	Insignificant
AQMA 1	535226	201678	34.4	2017	0.65	0.65%	34.7	69%	Insignificant
AQMA 2	535220	201525	34.4	2018	0.55	0.55%	34.6	69%	Insignificant
AQMA 3	535215	201387	34.4	2017	0.41	0.41%	34.6	69%	Insignificant
ER1	536612	201393	32.8	2017	0.06	0.06%	32.9	66%	Insignificant
ER2	534607	203679	31.3	2020	0.05	0.05%	31.3	63%	Insignificant
ER3	539016	209557	30.0	2021	0.01	0.01%	30.0	60%	Insignificant
ER4	541137	199555	35.8	2017	0.02	0.02%	35.8	72%	Insignificant
ER5	538079	196106	32.7	2021	0.01	0.01%	32.8	66%	Insignificant
ER6	534667	207161	28.8	2018	0.01	0.01%	28.8	58%	Insignificant
ER7	532269	205102	29.6	2017	0.02	0.02%	29.6	59%	Insignificant
AQS: 50µg/m^3 *Results are to 2d.p.									

C.2.3 SO_2 results for scenario 2

Table 43 SO_2 99.9th percentile 15-minute mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.27	0.10%	8.6	3.24%	Insignificant
HR2	534422	202671	8.4	2018	0.28	0.10%	8.6	3.25%	Insignificant
HR3	534821	202677	8.4	2018	0.22	0.08%	8.6	3.23%	Insignificant
HR4	534922	202614	8.4	2018	0.24	0.09%	8.6	3.23%	Insignificant
HR5	534989	202539	8.4	2020	0.22	0.08%	8.6	3.23%	Insignificant
HR6	534950	202219	8.4	2018	0.31	0.12%	8.7	3.26%	Insignificant
HR7	535094	202104	11.5	2018	0.36	0.14%	11.9	4.46%	Insignificant
HR8	535308	202249	11.5	2018	0.28	0.10%	11.8	4.43%	Insignificant
HR9	535292	202367	11.5	2018	0.26	0.10%	11.8	4.42%	Insignificant
HR10	535357	202235	11.5	2021	0.28	0.10%	11.8	4.43%	Insignificant
HR11	535525	202257	11.5	2017	0.27	0.10%	11.8	4.42%	Insignificant
HR12	535316	202007	11.5	2021	0.34	0.13%	11.8	4.45%	Insignificant
HR13	535287	201681	9.8	2020	0.45	0.17%	10.3	3.87%	Insignificant
HR14	535196	201187	9.8	2018	0.31	0.12%	10.1	3.81%	Insignificant
HR15	535246	200678	8.8	2017	0.21	0.08%	9.0	3.40%	Insignificant
HR16	535775	200601	8.8	2017	0.20	0.07%	9.0	3.39%	Insignificant
HR17	535967	200770	8.8	2017	0.19	0.07%	9.0	3.39%	Insignificant
HR18	534473	201464	7.8	2018	0.42	0.16%	8.2	3.09%	Insignificant
HR19	533885	201869	7.4	2018	0.26	0.10%	7.7	2.90%	Insignificant
HR20	533962	202274	7.6	2018	0.26	0.10%	7.9	2.96%	Insignificant
HR21	534814	201708	7.8	2020	1.20	0.45%	9.0	3.38%	Insignificant
HR22	534593	201553	7.8	2018	0.61	0.23%	8.4	3.16%	Insignificant
HR23	535641	201515	9.8	2021	0.25	0.09%	10.1	3.79%	Insignificant
HR24	535635	201357	9.8	2017	0.26	0.10%	10.1	3.80%	Insignificant
HR25	535594	201237	9.8	2021	0.25	0.09%	10.1	3.79%	Insignificant
HR26	535615	201836	9.8	2020	0.27	0.10%	10.1	3.80%	Insignificant
HR27	535292	201243	9.8	2017	0.30	0.11%	10.1	3.81%	Insignificant
HR28	534882	201856	7.8	2017	0.72	0.27%	8.5	3.20%	Insignificant
HR29	534944	201984	7.8	2018	0.52	0.20%	8.3	3.13%	Insignificant
HR30	535169	201989	9.8	2018	0.40	0.15%	10.2	3.85%	Insignificant
HR31	534841	201791	7.8	2021	1.06	0.40%	8.9	3.33%	Insignificant
HR32	534759	201702	7.8	2017	1.19	0.45%	9.0	3.38%	Insignificant
HR33	534725	201693	7.8	2020	0.97	0.36%	8.8	3.30%	Insignificant
HR34	534830	201759	7.8	2020	1.24	0.46%	9.0	3.40%	Insignificant
HR35	534816	201736	7.8	2017	1.26	0.47%	9.1	3.41%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	7.8	2018	1.17	0.44%	9.0	3.37%	Insignificant
HR37	534776	201607	7.8	2020	1.08	0.41%	8.9	3.34%	Insignificant
HR38	534773	201563	7.8	2018	1.68	0.63%	9.5	3.56%	Insignificant
HR39	534763	201496	7.8	2020	0.90	0.34%	8.7	3.27%	Insignificant
HR40	534768	201451	7.8	2020	0.72	0.27%	8.5	3.20%	Insignificant
HR41	534773	201408	7.8	2021	0.62	0.23%	8.4	3.17%	Insignificant
HR42	534900	201794	7.8	2021	0.83	0.31%	8.6	3.24%	Insignificant
HR43	534950	201783	7.8	2020	0.84	0.32%	8.6	3.25%	Insignificant
HR44	535009	201768	9.8	2018	0.83	0.31%	10.7	4.01%	Insignificant
HR45	535070	201756	9.8	2020	0.70	0.26%	10.5	3.96%	Insignificant
AQMA 1	535226	201678	9.8	2018	0.54	0.20%	10.4	3.90%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.56	0.21%	10.4	3.91%	Insignificant
AQMA 3	535215	201387	9.8	2017	0.39	0.15%	10.2	3.85%	Insignificant
ER1	536612	201393	9.9	2021	0.16	0.06%	10.0	3.77%	Insignificant
ER2	534607	203679	8.3	2020	0.16	0.06%	8.4	3.17%	Insignificant
ER3	539016	209557	9.9	2020	0.04	0.02%	10.0	3.75%	Insignificant
ER4	541137	199555	8.1	2020	0.07	0.03%	8.2	3.09%	Insignificant
ER5	538079	196106	8.3	2018	0.07	0.03%	8.4	3.16%	Insignificant
ER6	534667	207161	7.1	2018	0.06	0.02%	7.2	2.69%	Insignificant
ER7	532269	205102	7.1	2021	0.10	0.04%	7.2	2.71%	Insignificant
AQS: 266µg/m^3 *Results are to 2d.p.									

Table 44 SO_2 99.18th percentile 24-hour mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.02	0.02%	8.4	6.71%	Insignificant
HR2	534422	202671	8.4	2018	<0.01	<0.01%	8.4	6.71%	Insignificant
HR3	534821	202677	8.4	2020	<0.01	<0.01%	8.4	6.71%	Insignificant
HR4	534922	202614	8.4	2020	<0.01	<0.01%	8.4	6.71%	Insignificant
HR5	534989	202539	8.4	2021	<0.01	<0.01%	8.4	6.71%	Insignificant
HR6	534950	202219	8.4	2021	<0.01	<0.01%	8.4	6.74%	Insignificant
HR7	535094	202104	11.5	2021	<0.01	<0.01%	11.5	9.27%	Insignificant
HR8	535308	202249	11.5	2021	<0.01	<0.01%	11.5	9.25%	Insignificant
HR9	535292	202367	11.5	2021	<0.01	<0.01%	11.5	9.24%	Insignificant
HR10	535357	202235	11.5	2021	<0.01	<0.01%	11.5	9.25%	Insignificant
HR11	535525	202257	11.5	2021	<0.01	<0.01%	11.5	9.24%	Insignificant
HR12	535316	202007	11.5	2020	<0.01	<0.01%	11.5	9.26%	Insignificant
HR13	535287	201681	9.8	2017	0.01	<0.01%	9.9	7.95%	Insignificant
HR14	535196	201187	9.8	2017	<0.01	<0.01%	9.8	7.93%	Insignificant
HR15	535246	200678	8.8	2018	<0.01	<0.01%	8.8	7.08%	Insignificant
HR16	535775	200601	8.8	2017	<0.01	<0.01%	8.8	7.07%	Insignificant
HR17	535967	200770	8.8	2017	<0.01	<0.01%	8.8	7.07%	Insignificant
HR18	534473	201464	7.8	2019	<0.01	<0.01%	7.8	6.31%	Insignificant
HR19	533885	201869	7.4	2018	<0.01	<0.01%	7.4	5.97%	Insignificant
HR20	533962	202274	7.6	2018	<0.01	<0.01%	7.6	6.12%	Insignificant
HR21	534814	201708	7.8	2018	0.02	0.02%	7.8	6.55%	Insignificant
HR22	534593	201553	7.8	2017	<0.01	<0.01%	7.8	6.35%	Insignificant
HR23	535641	201515	9.8	2019	<0.01	<0.01%	9.8	7.90%	Insignificant
HR24	535635	201357	9.8	2017	<0.01	<0.01%	9.8	7.91%	Insignificant
HR25	535594	201237	9.8	2019	<0.01	<0.01%	9.8	7.90%	Insignificant
HR26	535615	201836	9.8	2017	<0.01	<0.01%	9.8	7.92%	Insignificant
HR27	535292	201243	9.8	2021	<0.01	<0.01%	9.8	7.92%	Insignificant
HR28	534882	201856	7.8	2018	0.01	<0.01%	7.8	6.41%	Insignificant
HR29	534944	201984	7.8	2021	<0.01	<0.01%	7.8	6.35%	Insignificant
HR30	535169	201989	9.8	2020	<0.01	<0.01%	9.8	7.96%	Insignificant
HR31	534841	201791	7.8	2017	0.02	0.01%	7.8	6.49%	Insignificant
HR32	534759	201702	7.8	2018	0.02	0.02%	7.8	6.58%	Insignificant
HR33	534725	201693	7.8	2017	0.02	0.01%	7.8	6.52%	Insignificant
HR34	534830	201759	7.8	2018	0.02	0.02%	7.8	6.55%	Insignificant
HR35	534816	201736	7.8	2018	0.02	0.02%	7.8	6.55%	Insignificant
HR36	534777	201643	7.8	2017	0.03	0.02%	7.8	6.51%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2017	0.03	0.02%	7.8	6.45%	Insignificant
HR38	534773	201563	7.8	2019	0.03	0.02%	7.8	6.51%	Insignificant
HR39	534763	201496	7.8	2018	0.03	0.02%	7.8	6.46%	Insignificant
HR40	534768	201451	7.8	2018	0.03	0.02%	7.8	6.42%	Insignificant
HR41	534773	201408	7.8	2018	0.03	0.02%	7.8	6.39%	Insignificant
HR42	534900	201794	7.8	2021	0.01	<0.01%	7.8	6.44%	Insignificant
HR43	534950	201783	7.8	2021	0.01	0.01%	7.8	6.50%	Insignificant
HR44	535009	201768	9.8	2021	0.01	<0.01%	9.9	8.09%	Insignificant
HR45	535070	201756	9.8	2021	0.01	<0.01%	9.9	8.07%	Insignificant
AQMA 1	535226	201678	9.8	2017	0.01	0.01%	9.9	7.97%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.01	0.01%	9.9	7.96%	Insignificant
AQMA 3	535215	201387	9.8	2019	<0.01	<0.01%	9.8	7.94%	Insignificant
ER1	536612	201393	9.9	2017	<0.01	<0.01%	9.9	7.91%	Insignificant
ER2	534607	203679	8.3	2021	<0.01	<0.01%	8.3	6.62%	Insignificant
ER3	539016	209557	9.9	2021	<0.01	<0.01%	9.9	7.95%	Insignificant
ER4	541137	199555	8.1	2017	<0.01	<0.01%	8.1	6.51%	Insignificant
ER5	538079	196106	8.3	2021	<0.01	<0.01%	8.3	6.68%	Insignificant
ER6	534667	207161	7.1	2020	<0.01	<0.01%	7.1	5.68%	Insignificant
ER7	532269	205102	7.1	2018	<0.01	<0.01%	7.1	5.70%	Insignificant
AQS: 125µg/m^3 *Results are to 2d.p.									

Table 45 SO_2 99.73rd percentile 1-hour mean results (µg/m³)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.17	0.05%	8.5	2.44%	Insignificant
HR2	534422	202671	8.4	2018	0.16	0.05%	8.5	2.44%	Insignificant
HR3	534821	202677	8.4	2018	0.15	0.04%	8.5	2.43%	Insignificant
HR4	534922	202614	8.4	2020	0.15	0.04%	8.5	2.43%	Insignificant
HR5	534989	202539	8.4	2018	0.16	0.05%	8.5	2.43%	Insignificant
HR6	534950	202219	8.4	2018	0.25	0.07%	8.6	2.46%	Insignificant
HR7	535094	202104	11.5	2018	0.30	0.09%	11.8	3.37%	Insignificant
HR8	535308	202249	11.5	2018	0.21	0.06%	11.7	3.35%	Insignificant
HR9	535292	202367	11.5	2018	0.18	0.05%	11.7	3.34%	Insignificant
HR10	535357	202235	11.5	2021	0.21	0.06%	11.7	3.35%	Insignificant
HR11	535525	202257	11.5	2018	0.18	0.05%	11.7	3.34%	Insignificant
HR12	535316	202007	11.5	2018	0.27	0.08%	11.8	3.36%	Insignificant
HR13	535287	201681	9.8	2020	0.40	0.11%	10.2	2.93%	Insignificant
HR14	535196	201187	9.8	2021	0.25	0.07%	10.1	2.88%	Insignificant
HR15	535246	200678	8.8	2017	0.14	0.04%	9.0	2.56%	Insignificant
HR16	535775	200601	8.8	2021	0.12	0.03%	8.9	2.55%	Insignificant
HR17	535967	200770	8.8	2017	0.12	0.03%	8.9	2.55%	Insignificant
HR18	534473	201464	7.8	2018	0.35	0.10%	8.1	2.33%	Insignificant
HR19	533885	201869	7.4	2018	0.16	0.05%	7.6	2.17%	Insignificant
HR20	533962	202274	7.6	2017	0.18	0.05%	7.8	2.23%	Insignificant
HR21	534814	201708	7.8	2020	1.14	0.33%	8.9	2.55%	Insignificant
HR22	534593	201553	7.8	2018	0.54	0.15%	8.3	2.38%	Insignificant
HR23	535641	201515	9.8	2017	0.18	0.05%	10.0	2.86%	Insignificant
HR24	535635	201357	9.8	2017	0.18	0.05%	10.0	2.86%	Insignificant
HR25	535594	201237	9.8	2017	0.17	0.05%	10.0	2.86%	Insignificant
HR26	535615	201836	9.8	2017	0.19	0.05%	10.0	2.87%	Insignificant
HR27	535292	201243	9.8	2017	0.24	0.07%	10.1	2.88%	Insignificant
HR28	534882	201856	7.8	2021	0.68	0.19%	8.5	2.42%	Insignificant
HR29	534944	201984	7.8	2018	0.45	0.13%	8.3	2.36%	Insignificant
HR30	535169	201989	9.8	2018	0.34	0.10%	10.2	2.91%	Insignificant
HR31	534841	201791	7.8	2020	1.00	0.29%	8.8	2.51%	Insignificant
HR32	534759	201702	7.8	2017	1.10	0.32%	8.9	2.54%	Insignificant
HR33	534725	201693	7.8	2018	0.91	0.26%	8.7	2.49%	Insignificant
HR34	534830	201759	7.8	2020	1.18	0.34%	9.0	2.57%	Insignificant
HR35	534816	201736	7.8	2018	1.21	0.35%	9.0	2.57%	Insignificant
HR36	534777	201643	7.8	2021	1.08	0.31%	8.9	2.54%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2020	1.00	0.29%	8.8	2.52%	Insignificant
HR38	534773	201563	7.8	2020	1.22	0.35%	9.0	2.58%	Insignificant
HR39	534763	201496	7.8	2020	0.81	0.23%	8.6	2.46%	Insignificant
HR40	534768	201451	7.8	2020	0.66	0.19%	8.5	2.42%	Insignificant
HR41	534773	201408	7.8	2020	0.57	0.16%	8.4	2.39%	Insignificant
HR42	534900	201794	7.8	2021	0.79	0.23%	8.6	2.45%	Insignificant
HR43	534950	201783	7.8	2020	0.80	0.23%	8.6	2.46%	Insignificant
HR44	535009	201768	9.8	2018	0.78	0.22%	10.6	3.04%	Insignificant
HR45	535070	201756	9.8	2020	0.65	0.19%	10.5	3.00%	Insignificant
AQMA 1	535226	201678	9.8	2018	0.48	0.14%	10.3	2.95%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.48	0.14%	10.3	2.95%	Insignificant
AQMA 3	535215	201387	9.8	2020	0.34	0.10%	10.2	2.91%	Insignificant
ER1	536612	201393	9.9	2017	0.10	0.03%	10.0	2.85%	Insignificant
ER2	534607	203679	8.3	2020	0.08	0.02%	8.3	2.38%	Insignificant
ER3	539016	209557	9.9	2018	0.02	<0.01%	10.0	2.85%	Insignificant
ER4	541137	199555	8.1	2017	0.03	<0.01%	8.2	2.34%	Insignificant
ER5	538079	196106	8.3	2020	0.03	<0.01%	8.4	2.39%	Insignificant
ER6	534667	207161	7.1	2018	0.03	<0.01%	7.1	2.04%	Insignificant
ER7	532269	205102	7.1	2018	0.04	0.01%	7.2	2.05%	Insignificant
AQS: 350µg/m^3 *Results are to 2d.p.									

C.2.4 CO results for scenario 2

Table 46 CO 8-hour rolling mean (µg/m³)

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	0.3	2018	<0.01	<0.01%	0.3	<0.01%	Insignificant
HR2	534422	202671	0.3	2018	<0.01	<0.01%	0.3	<0.01%	Insignificant
HR3	534821	202677	0.3	2020	0.37	<0.01%	0.7	<0.01%	Insignificant
HR4	534922	202614	0.3	2020	0.43	<0.01%	0.8	<0.01%	Insignificant
HR5	534989	202539	0.3	2020	0.49	<0.01%	0.8	<0.01%	Insignificant
HR6	534950	202219	0.3	2020	0.95	<0.01%	1.3	0.01%	Insignificant
HR7	535094	202104	0.3	2020	1.69	0.02%	2.0	0.02%	Insignificant
HR8	535308	202249	0.3	2020	1.18	0.01%	1.5	0.02%	Insignificant
HR9	535292	202367	0.3	2020	0.90	<0.01%	1.2	0.01%	Insignificant
HR10	535357	202235	0.3	2020	1.17	0.01%	1.5	0.01%	Insignificant
HR11	535525	202257	0.3	2017	0.97	<0.01%	1.3	0.01%	Insignificant
HR12	535316	202007	0.3	2017	1.75	0.02%	2.1	0.02%	Insignificant
HR13	535287	201681	0.3	2017	1.64	0.02%	2.0	0.02%	Insignificant
HR14	535196	201187	0.3	2017	0.75	<0.01%	1.1	0.01%	Insignificant
HR15	535246	200678	0.3	2021	0.33	<0.01%	0.7	<0.01%	Insignificant
HR16	535775	200601	0.3	2017	0.26	<0.01%	0.6	<0.01%	Insignificant
HR17	535967	200770	0.3	2017	0.26	<0.01%	0.6	<0.01%	Insignificant
HR18	534473	201464	0.3	2021	0.76	<0.01%	1.1	0.01%	Insignificant
HR19	533885	201869	0.3	2018	0.27	<0.01%	0.6	<0.01%	Insignificant
HR20	533962	202274	0.3	2018	0.30	<0.01%	0.6	<0.01%	Insignificant
HR21	534814	201708	0.3	2018	4.66	0.05%	5.0	0.05%	Insignificant
HR22	534593	201553	0.3	2021	1.23	0.01%	1.6	0.02%	Insignificant
HR23	535641	201515	0.3	2017	0.51	<0.01%	0.8	<0.01%	Insignificant
HR24	535635	201357	0.3	2017	0.48	<0.01%	0.8	<0.01%	Insignificant
HR25	535594	201237	0.3	2017	0.48	<0.01%	0.8	<0.01%	Insignificant
HR26	535615	201836	0.3	2017	0.90	<0.01%	1.2	0.01%	Insignificant
HR27	535292	201243	0.3	2017	0.74	<0.01%	1.1	0.01%	Insignificant
HR28	534882	201856	0.3	2020	3.18	0.03%	3.5	0.04%	Insignificant
HR29	534944	201984	0.3	2020	2.10	0.02%	2.4	0.02%	Insignificant
HR30	535169	201989	0.3	2020	2.42	0.02%	2.8	0.03%	Insignificant
HR31	534841	201791	0.3	2020	3.84	0.04%	4.2	0.04%	Insignificant
HR32	534759	201702	0.3	2018	4.82	0.05%	5.2	0.05%	Insignificant
HR33	534725	201693	0.3	2018	3.87	0.04%	4.2	0.04%	Insignificant
HR34	534830	201759	0.3	2020	4.23	0.04%	4.6	0.05%	Insignificant
HR35	534816	201736	0.3	2018	4.57	0.05%	4.9	0.05%	Insignificant

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	0.3	2018	3.84	0.04%	4.2	0.04%	Insignificant
HR37	534776	201607	0.3	2020	2.44	0.02%	2.8	0.03%	Insignificant
HR38	534773	201563	0.3	2020	2.31	0.02%	2.6	0.03%	Insignificant
HR39	534763	201496	0.3	2021	1.88	0.02%	2.2	0.02%	Insignificant
HR40	534768	201451	0.3	2021	1.68	0.02%	2.0	0.02%	Insignificant
HR41	534773	201408	0.3	2021	1.51	0.02%	1.8	0.02%	Insignificant
HR42	534900	201794	0.3	2020	3.99	0.04%	4.3	0.04%	Insignificant
HR43	534950	201783	0.3	2020	5.89	0.06%	6.2	0.06%	Insignificant
HR44	535009	201768	0.3	2020	5.89	0.06%	6.2	0.06%	Insignificant
HR45	535070	201756	0.3	2017	4.60	0.05%	4.9	0.05%	Insignificant
AQMA 1	535226	201678	0.3	2017	2.02	0.02%	2.4	0.02%	Insignificant
AQMA 2	535220	201525	0.3	2017	1.42	0.01%	1.8	0.02%	Insignificant
AQMA 3	535215	201387	0.3	2017	1.09	0.01%	1.4	0.01%	Insignificant
ER1	536612	201393	0.3	2017	0.18	<0.01%	0.5	<0.01%	Insignificant
ER2	534607	203679	0.3	2020	0.14	<0.01%	0.4	<0.01%	Insignificant
ER3	539016	209557	0.3	2020	0.03	<0.01%	0.3	<0.01%	Insignificant
ER4	541137	199555	0.3	2017	0.04	<0.01%	0.3	<0.01%	Insignificant
ER5	538079	196106	0.3	2018	0.04	<0.01%	0.4	<0.01%	Insignificant
ER6	534667	207161	0.3	2020	0.04	<0.01%	0.3	<0.01%	Insignificant
ER7	532269	205102	0.3	2017	0.05	<0.01%	0.3	<0.01%	Insignificant
AQS: 10,000µg/m^3 *Results are to 2d.p.									

C.2.5 Ecological results for scenario 2

Table 47 NO_x daily mean results (µg/m^3)

Receptor	X	Y	Short term NO_x background	Maximum Year	Maximum modelled PC	% of standard	PEC	% of standard	Significance
ER1	536612	201393	46.1	2020	17.34	23%	63.5	85%	Insignificant
ER2	534607	203679	39.5	2020	15.89	21%	55.4	74%	Insignificant
ER3	539016	209557	34.2	2021	1.88	3%	36.1	48%	Insignificant
ER4	541137	199555	52.4	2017	4.34	6%	56.7	76%	Insignificant
ER5	538079	196106	49.9	2021	10.74	14%	60.6	81%	Insignificant
ER6	534667	207161	30.4	2021	5.00	7%	35.4	47%	Insignificant
ER7	532269	205102	29.0	2017	7.29	10%	36.3	48%	Insignificant
Critical level: 75µg/m^3									

Table 48 Nutrient nitrogen deposition results

Ecological receptor ID	Critical load min	Background Nitrogen deposition	Annual mean NO_2 PC ($\mu g/m^3$)	Dry deposition (kg N/ha/yr)	Proportion of PC to CL (%) Min	Proportion of PEC to CL (%) Min
ER1	15	21.9	0.03937	0.0057	0.0378	146
ER2	5	25.9	0.02617	0.0038	0.0754	518
ER3	15	21.9	0.00543	0.0008	0.0052	146
ER4	10	22.9	0.00836	0.0024	0.0241	229
ER5	10	22.9	0.00745	0.0021	0.0215	229
ER6	15	39.8	0.00712	0.0010	0.0068	265
ER7	15	39.8	0.00943	0.0014	0.0091	265

Table 49 Acid deposition results

Ecological receptor ID	Critical Load max Sulphur (kg S/ha/yr)	Critical Load min Nitrogen (kg N/ha/yr)	Critical Load max Nitrogen (kg N/ha/yr)	Background Nitrogen deposition (kg N/ha/yr)	Background Sulphur deposition (kg S/ha/yr)	PC Nitrogen (keq N/ha/yr)	PC Sulphur (keq S/ha/yr)	Exceedance
ER1	0.88	0.223	1.113	1.6	0.2	0.000405	0.000007	PC < CL No exceedance
ER2	1.65	0.438	2.088	1.91	0.15	0.000269	0.000005	PC < CL No exceedance
ER3	0.88	0.223	1.113	1.6	0.2	0.000056	0.000001	PC < CL No exceedance
ER4	0.88	0.714	1.594	1.6	0.2	0.000172	0.000003	PC < CL No exceedance
ER5	0.88	0.714	1.594	1.6	0.2	0.000153	0.000003	PC < CL No exceedance
ER6	1.603	0.142	1.745	2.8	0.2	0.000073	0.000001	PC < CL No exceedance
ER7	1.603	0.142	1.745	2.8	0.2	0.000097	0.000002	PC < CL No exceedance

C.3 Scenario 3

C.3.1 NO_2 results for scenario 3

Table 50 NO_2 99.79th percentile hourly mean results (µg/m^3)

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	30.3	2017	53.8	27%	84.1	42%	Insignificant**
HR2	534422	202671	30.3	2018	53.7	27%	84.0	42%	Insignificant**
HR3	534821	202677	30.3	2018	50.4	25%	80.7	40%	Insignificant**
HR4	534922	202614	30.3	2020	50.0	25%	80.3	40%	Insignificant**
HR5	534989	202539	30.3	2018	54.1	27%	84.4	42%	Insignificant**
HR6	534950	202219	30.3	2018	82.5	41%	112.8	56%	Insignificant**
HR7	535094	202104	35.5	2018	99.1	50%	134.7	67%	Insignificant**
HR8	535308	202249	35.5	2018	69.2	35%	104.8	52%	Insignificant**
HR9	535292	202367	35.5	2018	59.9	30%	95.4	48%	Insignificant**
HR10	535357	202235	35.5	2021	68.7	34%	104.2	52%	Insignificant**
HR11	535525	202257	35.5	2018	59.2	30%	94.7	47%	Insignificant**
HR12	535316	202007	35.5	2018	86.9	43%	122.4	61%	Insignificant**
HR13	535287	201681	36.3	2020	129.7	65%	166.0	83%	Insignificant**
HR14	535196	201187	36.3	2021	81.4	41%	117.8	59%	Insignificant**
HR15	535246	200678	50.4	2021	48.1	24%	98.4	49%	Insignificant**
HR16	535775	200601	50.4	2021	40.1	20%	90.5	45%	Insignificant**
HR17	535967	200770	50.4	2017	38.8	19%	89.2	45%	Insignificant**
HR18	534473	201464	31.6	2018	113.8	57%	145.5	73%	Insignificant**
HR19	533885	201869	29.0	2018	53.9	27%	82.9	41%	Insignificant**
HR20	533962	202274	27.6	2017	57.4	29%	85.0	43%	Insignificant**
HR21	534814	201708	31.6	2020	**372.3**	**186%**	**403.9**	**202%**	Insignificant***
HR22	534593	201553	31.6	2018	**174.2**	**87%**	**205.9**	**103%**	Insignificant***
HR23	535641	201515	36.3	2017	57.4	29%	93.7	47%	Insignificant**
HR24	535635	201357	36.3	2017	57.2	29%	93.5	47%	Insignificant**
HR25	535594	201237	36.3	2017	57.0	29%	93.4	47%	Insignificant**
HR26	535615	201836	36.3	2017	62.4	31%	98.7	49%	Insignificant**
HR27	535292	201243	36.3	2017	78.0	39%	114.3	57%	Insignificant**
HR28	534882	201856	31.6	2017	**220.6**	**110%**	**252.2**	**126%**	Insignificant***
HR29	534944	201984	31.6	2018	146.2	73%	177.8	89%	Insignificant**

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR30	535169	201989	36.3	2018	111.5	56%	147.9	74%	Insignificant**
HR31	534841	201791	31.6	2018	**325.1**	**163%**	**356.8**	**178%**	Insignificant***
HR32	534759	201702	31.6	2017	**358.0**	**179%**	**389.6**	**195%**	Insignificant***
HR33	534725	201693	31.6	2018	**293.7**	**147%**	**325.3**	**163%**	Insignificant***
HR34	534830	201759	31.6	2020	**382.8**	**191%**	**414.4**	**207%**	Insignificant***
HR35	534816	201736	31.6	2018	**392.2**	**196%**	**423.9**	**212%**	Insignificant***
HR36	534777	201643	31.6	2018	**354.8**	**177%**	**386.4**	**193%**	Insignificant***
HR37	534776	201607	31.6	2020	**328.7**	**164%**	**360.4**	**180%**	Insignificant***
HR38	534773	201563	31.6	2020	**411.2**	**206%**	**442.9**	**221%**	Insignificant***
HR39	534763	201496	31.6	2020	**267.9**	**134%**	**299.5**	**150%**	Insignificant***
HR40	534768	201451	31.6	2020	**215.6**	**108%**	**247.2**	**124%**	Insignificant***
HR41	534773	201408	31.6	2020	**186.3**	**93%**	**218.0**	**109%**	Insignificant***
HR42	534900	201794	31.6	2021	**255.8**	**128%**	**287.4**	**144%**	Insignificant***
HR43	534950	201783	31.6	2020	**259.7**	**130%**	**291.4**	**146%**	Insignificant***
HR44	535009	201768	36.3	2018	**255.4**	**128%**	**291.7**	**146%**	Insignificant***
HR45	535070	201756	36.3	2020	**210.1**	**105%**	**246.4**	**123%**	Insignificant***
AQMA 1	535226	201678	36.3	2018	154.5	77%	190.8	95%	Insignificant**
AQMA 2	535220	201525	36.3	2017	158.5	79%	194.9	97%	Insignificant**
AQMA 3	535215	201387	36.3	2017	111.3	56%	147.6	74%	Insignificant**
ER1	536612	201393	33.2	2017	31.4	16%	64.6	32%	Insignificant
ER2	534607	203679	28.9	2020	28.4	14%	57.4	29%	Insignificant
ER3	539016	209557	25.4	2020	7.1	4%	32.5	16%	Insignificant
ER4	541137	199555	37.3	2017	11.2	6%	48.4	24%	Insignificant
ER5	538079	196106	35.4	2018	9.5	5%	44.9	22%	Insignificant
ER6	534667	207161	22.9	2018	11.3	6%	34.2	17%	Insignificant
ER7	532269	205102	21.9	2018	16.3	8%	38.2	19%	Insignificant

AQS: 200µg/m^3
*Results are to 2d.p.
** Although concentrations at these receptors cannot be screened out as they do not meet the EA criteria, they do not exceed the air quality objectives and the process is not continuously operating and only occurs every six years, so this is considered to be insignificant.
***Although exceedances are predicted at these receptors, this scenario only occurs every six years and is not a continuously operating process, therefore this is considered to be insignificant.

Table 51 NO_2 hourly mean hypergeometric distribution analysis (96 hours)

Receptor	N	P	Likelihood of exceedance
HR1	96	<0.01%	Highly unlikely
HR2	96	<0.01%	Highly unlikely
HR3	96	<0.01%	Highly unlikely
HR4	96	<0.01%	Highly unlikely
HR5	96	<0.01%	Highly unlikely
HR6	96	<0.01%	Highly unlikely
HR7	96	<0.01%	Highly unlikely
HR8	96	<0.01%	Highly unlikely
HR9	96	<0.01%	Highly unlikely
HR10	96	<0.01%	Highly unlikely
HR11	96	<0.01%	Highly unlikely
HR12	96	<0.01%	Highly unlikely
HR13	96	<0.01%	Highly unlikely
HR14	96	<0.01%	Highly unlikely
HR15	96	<0.01%	Highly unlikely
HR16	96	<0.01%	Highly unlikely
HR17	96	<0.01%	Highly unlikely
HR18	96	<0.01%	Highly unlikely
HR19	96	<0.01%	Highly unlikely
HR20	96	<0.01%	Highly unlikely
HR21	96	0.08%	Highly unlikely
HR22	96	<0.01%	Highly unlikely
HR23	96	<0.01%	Highly unlikely
HR24	96	<0.01%	Highly unlikely
HR25	96	<0.01%	Highly unlikely
HR26	96	<0.01%	Highly unlikely
HR27	96	<0.01%	Highly unlikely
HR28	96	<0.01%	Highly unlikely
HR29	96	<0.01%	Highly unlikely
HR30	96	<0.01%	Highly unlikely
HR31	96	<0.01%	Highly unlikely
HR32	96	<0.01%	Highly unlikely
HR33	96	0.02%	Highly unlikely
HR34	96	0.18%	Highly unlikely
HR35	96	<0.01%	Highly unlikely
HR36	96	0.01%	Highly unlikely
HR37	96	0.03%	Highly unlikely

Receptor	N	P	Likelihood of exceedance
HR38	96	<0.01%	Highly unlikely
HR39	96	<0.01%	Highly unlikely
HR40	96	<0.01%	Highly unlikely
HR41	96	<0.01%	Highly unlikely
HR42	96	<0.01%	Highly unlikely
HR43	96	<0.01%	Highly unlikely
HR44	96	4.77%	Unlikely
HR45	96	2.62%	Unlikely
AQMA 1	96	0.03%	Highly unlikely
AQMA 2	96	<0.01%	Highly unlikely
AQMA 3	96	<0.01%	Highly unlikely
ER1	96	<0.01%	Highly unlikely
ER2	96	<0.01%	Highly unlikely
ER3	96	<0.01%	Highly unlikely
ER4	96	<0.01%	Highly unlikely
ER5	96	<0.01%	Highly unlikely
ER6	96	<0.01%	Highly unlikely
ER7	96	<0.01%	Highly unlikely
N= operating hours per year; P = Probability of exceedance of the standard.			

C.3.2 PM_{10} results for scenario 3

Table 52 PM_{10} daily mean results (µg/m^3)

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	31.9	2018	0.09	0.17%	32.0	64%	Insignificant
HR2	534422	202671	31.9	2018	0.11	0.23%	32.0	64%	Insignificant
HR3	534821	202677	31.9	2020	0.13	0.26%	32.1	64%	Insignificant
HR4	534922	202614	31.9	2020	0.16	0.32%	32.1	64%	Insignificant
HR5	534989	202539	31.9	2020	0.18	0.37%	32.1	64%	Insignificant
HR6	534950	202219	31.9	2020	0.36	0.71%	32.3	65%	Insignificant
HR7	535094	202104	33.8	2020	0.53	1.06%	34.3	69%	Insignificant
HR8	535308	202249	33.8	2021	0.36	0.72%	34.2	68%	Insignificant
HR9	535292	202367	33.8	2020	0.28	0.55%	34.1	68%	Insignificant
HR10	535357	202235	33.8	2017	0.37	0.74%	34.2	68%	Insignificant
HR11	535525	202257	33.8	2018	0.31	0.61%	34.1	68%	Insignificant
HR12	535316	202007	33.8	2020	0.55	1.09%	34.4	69%	Insignificant
HR13	535287	201681	34.4	2017	0.53	1.07%	34.9	70%	Insignificant
HR14	535196	201187	34.4	2017	0.28	0.55%	34.6	69%	Insignificant
HR15	535246	200678	36.5	2021	0.13	0.25%	36.6	73%	Insignificant
HR16	535775	200601	36.5	2017	0.10	0.19%	36.6	73%	Insignificant
HR17	535967	200770	36.5	2017	0.09	0.19%	36.6	73%	Insignificant
HR18	534473	201464	32.9	2021	0.32	0.64%	33.2	66%	Insignificant
HR19	533885	201869	33.6	2018	0.11	0.23%	33.7	67%	Insignificant
HR20	533962	202274	31.2	2018	0.12	0.25%	31.3	63%	Insignificant
HR21	534814	201708	32.9	2018	1.66	3.33%	34.5	69%	Insignificant
HR22	534593	201553	32.9	2018	0.52	1.03%	33.4	67%	Insignificant
HR23	535641	201515	34.4	2017	0.18	0.35%	34.5	69%	Insignificant
HR24	535635	201357	34.4	2017	0.17	0.35%	34.5	69%	Insignificant
HR25	535594	201237	34.4	2017	0.17	0.34%	34.5	69%	Insignificant
HR26	535615	201836	34.4	2017	0.29	0.57%	34.7	69%	Insignificant
HR27	535292	201243	34.4	2017	0.26	0.52%	34.6	69%	Insignificant
HR28	534882	201856	32.9	2020	1.12	2.24%	34.0	68%	Insignificant
HR29	534944	201984	32.9	2020	0.73	1.45%	33.6	67%	Insignificant
HR30	535169	201989	34.4	2018	0.77	1.54%	35.1	70%	Insignificant
HR31	534841	201791	32.9	2020	1.55	3.09%	34.4	69%	Insignificant
HR32	534759	201702	32.9	2018	1.75	3.49%	34.6	69%	Insignificant
HR33	534725	201693	32.9	2020	1.53	3.06%	34.4	69%	Insignificant
HR34	534830	201759	32.9	2020	1.58	3.15%	34.5	69%	Insignificant

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR35	534816	201736	32.9	2018	1.74	3.47%	34.6	69%	Insignificant
HR36	534777	201643	32.9	2018	1.04	2.08%	33.9	68%	Insignificant
HR37	534776	201607	32.9	2021	0.82	1.64%	33.7	67%	Insignificant
HR38	534773	201563	32.9	2020	0.67	1.34%	33.5	67%	Insignificant
HR39	534763	201496	32.9	2021	0.71	1.42%	33.6	67%	Insignificant
HR40	534768	201451	32.9	2021	0.62	1.24%	33.5	67%	Insignificant
HR41	534773	201408	32.9	2020	1.31	2.62%	34.2	68%	Insignificant
HR42	534900	201794	32.9	2020	1.95	3.90%	34.8	70%	Insignificant
HR43	534950	201783	32.9	2020	1.93	3.86%	36.3	73%	Insignificant
HR44	535009	201768	34.4	2017	1.49	2.98%	35.9	72%	Insignificant
HR45	535070	201756	34.4	2017	0.65	1.30%	35.0	70%	Insignificant
AQMA 1	535226	201678	34.4	2018	0.55	1.11%	34.9	70%	Insignificant
AQMA 2	535220	201525	34.4	2017	0.41	0.82%	34.8	70%	Insignificant
AQMA 3	535215	201387	34.4	2018	1.75	3.49%	34.6	69%	Insignificant
ER1	536612	201393	32.8	2020	0.05	0.10%	31.3	63%	Insignificant
ER2	534607	203679	31.3	2021	0.01	0.02%	30.0	60%	Insignificant
ER3	539016	209557	30.0	2017	0.02	0.03%	35.8	72%	Insignificant
ER4	541137	199555	35.8	2021	0.01	0.03%	32.8	66%	Insignificant
ER5	538079	196106	32.7	2018	0.01	0.03%	28.8	58%	Insignificant
ER6	534667	207161	28.8	2017	0.02	0.04%	29.6	59%	Insignificant
ER7	532269	205102	29.6	2018	1.93	3.86%	34.8	70%	Insignificant
AQS: 50µg/m^3 *Results are to 2d.p.									

C.3.3 SO_2 results for scenario 3

Table 53 SO_2 99.9th percentile 15-minute mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.27	0.10%	8.6	3.24%	Insignificant
HR2	534422	202671	8.4	2018	0.28	0.10%	8.6	3.25%	Insignificant
HR3	534821	202677	8.4	2018	0.22	0.08%	8.6	3.23%	Insignificant
HR4	534922	202614	8.4	2018	0.24	0.09%	8.6	3.23%	Insignificant
HR5	534989	202539	8.4	2020	0.22	0.08%	8.6	3.23%	Insignificant
HR6	534950	202219	8.4	2018	0.31	0.12%	8.7	3.26%	Insignificant
HR7	535094	202104	11.5	2018	0.36	0.14%	11.9	4.46%	Insignificant
HR8	535308	202249	11.5	2018	0.28	0.10%	11.8	4.43%	Insignificant
HR9	535292	202367	11.5	2018	0.26	0.10%	11.8	4.42%	Insignificant
HR10	535357	202235	11.5	2021	0.28	0.10%	11.8	4.43%	Insignificant
HR11	535525	202257	11.5	2017	0.27	0.10%	11.8	4.42%	Insignificant
HR12	535316	202007	11.5	2021	0.34	0.13%	11.8	4.45%	Insignificant
HR13	535287	201681	9.8	2020	0.45	0.17%	10.3	3.87%	Insignificant
HR14	535196	201187	9.8	2018	0.31	0.12%	10.1	3.81%	Insignificant
HR15	535246	200678	8.8	2017	0.21	0.08%	9.0	3.40%	Insignificant
HR16	535775	200601	8.8	2017	0.20	0.07%	9.0	3.39%	Insignificant
HR17	535967	200770	8.8	2017	0.19	0.07%	9.0	3.39%	Insignificant
HR18	534473	201464	7.8	2018	0.42	0.16%	8.2	3.09%	Insignificant
HR19	533885	201869	7.4	2018	0.26	0.10%	7.7	2.90%	Insignificant
HR20	533962	202274	7.6	2018	0.26	0.10%	7.9	2.96%	Insignificant
HR21	534814	201708	7.8	2020	1.20	0.45%	9.0	3.38%	Insignificant
HR22	534593	201553	7.8	2018	0.61	0.23%	8.4	3.16%	Insignificant
HR23	535641	201515	9.8	2021	0.25	0.09%	10.1	3.79%	Insignificant
HR24	535635	201357	9.8	2017	0.26	0.10%	10.1	3.80%	Insignificant
HR25	535594	201237	9.8	2021	0.25	0.09%	10.1	3.79%	Insignificant
HR26	535615	201836	9.8	2020	0.27	0.10%	10.1	3.80%	Insignificant
HR27	535292	201243	9.8	2017	0.30	0.11%	10.1	3.81%	Insignificant
HR28	534882	201856	7.8	2017	0.72	0.27%	8.5	3.20%	Insignificant
HR29	534944	201984	7.8	2018	0.52	0.20%	8.3	3.13%	Insignificant
HR30	535169	201989	9.8	2018	0.40	0.15%	10.2	3.85%	Insignificant
HR31	534841	201791	7.8	2021	1.06	0.40%	8.9	3.33%	Insignificant
HR32	534759	201702	7.8	2017	1.19	0.45%	9.0	3.38%	Insignificant
HR33	534725	201693	7.8	2020	0.97	0.36%	8.8	3.30%	Insignificant
HR34	534830	201759	7.8	2020	1.24	0.46%	9.0	3.40%	Insignificant
HR35	534816	201736	7.8	2017	1.26	0.47%	9.1	3.41%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	7.8	2018	1.17	0.44%	9.0	3.37%	Insignificant
HR37	534776	201607	7.8	2020	1.08	0.41%	8.9	3.34%	Insignificant
HR38	534773	201563	7.8	2018	1.68	0.63%	9.5	3.56%	Insignificant
HR39	534763	201496	7.8	2020	0.90	0.34%	8.7	3.27%	Insignificant
HR40	534768	201451	7.8	2020	0.72	0.27%	8.5	3.20%	Insignificant
HR41	534773	201408	7.8	2021	0.62	0.23%	8.4	3.17%	Insignificant
HR42	534900	201794	7.8	2021	0.83	0.31%	8.6	3.24%	Insignificant
HR43	534950	201783	7.8	2020	0.84	0.32%	8.6	3.25%	Insignificant
HR44	535009	201768	9.8	2018	0.83	0.31%	10.7	4.01%	Insignificant
HR45	535070	201756	9.8	2020	0.70	0.26%	10.5	3.96%	Insignificant
AQMA 1	535226	201678	9.8	2018	0.54	0.20%	10.4	3.90%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.56	0.21%	10.4	3.91%	Insignificant
AQMA 3	535215	201387	9.8	2017	0.39	0.15%	10.2	3.85%	Insignificant
ER1	536612	201393	9.9	2021	0.16	0.06%	10.0	3.77%	Insignificant
ER2	534607	203679	8.3	2020	0.16	0.06%	8.4	3.17%	Insignificant
ER3	539016	209557	9.9	2020	0.04	0.02%	10.0	3.75%	Insignificant
ER4	541137	199555	8.1	2020	0.07	0.03%	8.2	3.09%	Insignificant
ER5	538079	196106	8.3	2018	0.07	0.03%	8.4	3.16%	Insignificant
ER6	534667	207161	7.1	2018	0.06	0.02%	7.2	2.69%	Insignificant
ER7	532269	205102	7.1	2021	0.10	0.04%	7.2	2.71%	Insignificant
AQS: 266µg/m^3 *Results are to 2d.p.									

Table 54 SO_2 99.18th percentile 24-hour mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.05	0.04%	8.4	6.73%	Insignificant
HR2	534422	202671	8.4	2017	0.05	0.04%	8.4	6.73%	Insignificant
HR3	534821	202677	8.4	2020	0.06	0.05%	8.4	6.73%	Insignificant
HR4	534922	202614	8.4	2021	0.06	0.05%	8.4	6.73%	Insignificant
HR5	534989	202539	8.4	2021	0.07	0.05%	8.4	6.74%	Insignificant
HR6	534950	202219	8.4	2021	0.13	0.10%	8.5	6.79%	Insignificant
HR7	535094	202104	11.5	2021	0.18	0.14%	11.7	9.34%	Insignificant
HR8	535308	202249	11.5	2021	0.12	0.10%	11.6	9.30%	Insignificant
HR9	535292	202367	11.5	2017	0.09	0.07%	11.6	9.27%	Insignificant
HR10	535357	202235	11.5	2021	0.12	0.10%	11.6	9.30%	Insignificant
HR11	535525	202257	11.5	2021	0.10	0.08%	11.6	9.28%	Insignificant
HR12	535316	202007	11.5	2017	0.15	0.12%	11.7	9.32%	Insignificant
HR13	535287	201681	9.8	2017	0.20	0.16%	10.0	8.03%	Insignificant
HR14	535196	201187	9.8	2021	0.15	0.12%	10.0	7.99%	Insignificant
HR15	535246	200678	8.8	2017	0.07	0.06%	8.9	7.11%	Insignificant
HR16	535775	200601	8.8	2017	0.04	0.03%	8.9	7.09%	Insignificant
HR17	535967	200770	8.8	2017	0.05	0.04%	8.9	7.09%	Insignificant
HR18	534473	201464	7.8	2021	0.18	0.14%	8.0	6.38%	Insignificant
HR19	533885	201869	7.4	2018	0.05	0.04%	7.5	5.99%	Insignificant
HR20	533962	202274	7.6	2017	0.07	0.05%	7.7	6.15%	Insignificant
HR21	534814	201708	7.8	2018	0.76	0.61%	8.6	6.85%	Insignificant
HR22	534593	201553	7.8	2021	0.28	0.22%	8.1	6.46%	Insignificant
HR23	535641	201515	9.8	2021	0.08	0.06%	9.9	7.94%	Insignificant
HR24	535635	201357	9.8	2017	0.08	0.07%	9.9	7.94%	Insignificant
HR25	535594	201237	9.8	2017	0.07	0.06%	9.9	7.93%	Insignificant
HR26	535615	201836	9.8	2017	0.11	0.09%	10.0	7.96%	Insignificant
HR27	535292	201243	9.8	2021	0.12	0.10%	10.0	7.97%	Insignificant
HR28	534882	201856	7.8	2021	0.42	0.34%	8.2	6.58%	Insignificant
HR29	534944	201984	7.8	2021	0.28	0.22%	8.1	6.46%	Insignificant
HR30	535169	201989	9.8	2021	0.23	0.18%	10.1	8.06%	Insignificant
HR31	534841	201791	7.8	2017	0.63	0.51%	8.4	6.75%	Insignificant
HR32	534759	201702	7.8	2017	0.84	0.68%	8.6	6.92%	Insignificant
HR33	534725	201693	7.8	2017	0.70	0.56%	8.5	6.80%	Insignificant
HR34	534830	201759	7.8	2017	0.77	0.62%	8.6	6.86%	Insignificant
HR35	534816	201736	7.8	2017	0.78	0.62%	8.6	6.86%	Insignificant
HR36	534777	201643	7.8	2018	0.67	0.54%	8.5	6.78%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2020	0.53	0.43%	8.3	6.67%	Insignificant
HR38	534773	201563	7.8	2017	0.67	0.53%	8.5	6.77%	Insignificant
HR39	534763	201496	7.8	2021	0.54	0.43%	8.3	6.67%	Insignificant
HR40	534768	201451	7.8	2021	0.44	0.35%	8.2	6.59%	Insignificant
HR41	534773	201408	7.8	2021	0.38	0.30%	8.2	6.54%	Insignificant
HR42	534900	201794	7.8	2021	0.51	0.41%	8.3	6.65%	Insignificant
HR43	534950	201783	7.8	2021	0.64	0.51%	8.4	6.75%	Insignificant
HR44	535009	201768	9.8	2020	0.55	0.44%	10.4	8.32%	Insignificant
HR45	535070	201756	9.8	2017	0.49	0.39%	10.3	8.26%	Insignificant
AQMA 1	535226	201678	9.8	2017	0.24	0.19%	10.1	8.06%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.21	0.17%	10.1	8.04%	Insignificant
AQMA 3	535215	201387	9.8	2018	0.16	0.13%	10.0	8.00%	Insignificant
ER1	536612	201393	9.9	2021	0.03	0.02%	9.9	7.92%	Insignificant
ER2	534607	203679	8.3	2021	0.02	0.02%	8.3	6.63%	Insignificant
ER3	539016	209557	9.9	2021	<0.01	<0.01%	9.9	7.95%	Insignificant
ER4	541137	199555	8.1	2017	<0.01	<0.01%	8.1	6.52%	Insignificant
ER5	538079	196106	8.3	2021	<0.01	<0.01%	8.3	6.68%	Insignificant
ER6	534667	207161	7.1	2020	<0.01	<0.01%	7.1	5.69%	Insignificant
ER7	532269	205102	7.1	2021	<0.01	<0.01%	7.1	5.70%	Insignificant
AQS: 125µg/m^3 *Results are to 2d.p.									

Table 55 SO_2 99.73rd percentile 1-hour mean results (µg/m³)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2017	0.17	0.05%	8.5	2.44%	Insignificant
HR2	534422	202671	8.4	2018	0.16	0.05%	8.5	2.44%	Insignificant
HR3	534821	202677	8.4	2018	0.15	0.04%	8.5	2.43%	Insignificant
HR4	534922	202614	8.4	2020	0.15	0.04%	8.5	2.43%	Insignificant
HR5	534989	202539	8.4	2018	0.16	0.05%	8.5	2.43%	Insignificant
HR6	534950	202219	8.4	2018	0.25	0.07%	8.6	2.46%	Insignificant
HR7	535094	202104	11.5	2018	0.30	0.09%	11.8	3.37%	Insignificant
HR8	535308	202249	11.5	2018	0.21	0.06%	11.7	3.35%	Insignificant
HR9	535292	202367	11.5	2018	0.18	0.05%	11.7	3.34%	Insignificant
HR10	535357	202235	11.5	2021	0.21	0.06%	11.7	3.35%	Insignificant
HR11	535525	202257	11.5	2018	0.18	0.05%	11.7	3.34%	Insignificant
HR12	535316	202007	11.5	2018	0.27	0.08%	11.8	3.36%	Insignificant
HR13	535287	201681	9.8	2020	0.40	0.11%	10.2	2.93%	Insignificant
HR14	535196	201187	9.8	2021	0.25	0.07%	10.1	2.88%	Insignificant
HR15	535246	200678	8.8	2017	0.14	0.04%	9.0	2.56%	Insignificant
HR16	535775	200601	8.8	2021	0.12	0.03%	8.9	2.55%	Insignificant
HR17	535967	200770	8.8	2017	0.12	0.03%	8.9	2.55%	Insignificant
HR18	534473	201464	7.8	2018	0.35	0.10%	8.1	2.33%	Insignificant
HR19	533885	201869	7.4	2018	0.16	0.05%	7.6	2.17%	Insignificant
HR20	533962	202274	7.6	2017	0.18	0.05%	7.8	2.23%	Insignificant
HR21	534814	201708	7.8	2020	1.14	0.33%	8.9	2.55%	Insignificant
HR22	534593	201553	7.8	2018	0.54	0.15%	8.3	2.38%	Insignificant
HR23	535641	201515	9.8	2017	0.18	0.05%	10.0	2.86%	Insignificant
HR24	535635	201357	9.8	2017	0.18	0.05%	10.0	2.86%	Insignificant
HR25	535594	201237	9.8	2017	0.17	0.05%	10.0	2.86%	Insignificant
HR26	535615	201836	9.8	2017	0.19	0.05%	10.0	2.87%	Insignificant
HR27	535292	201243	9.8	2017	0.24	0.07%	10.1	2.88%	Insignificant
HR28	534882	201856	7.8	2021	0.68	0.19%	8.5	2.42%	Insignificant
HR29	534944	201984	7.8	2018	0.45	0.13%	8.3	2.36%	Insignificant
HR30	535169	201989	9.8	2018	0.34	0.10%	10.2	2.91%	Insignificant
HR31	534841	201791	7.8	2020	1.00	0.29%	8.8	2.51%	Insignificant
HR32	534759	201702	7.8	2017	1.10	0.32%	8.9	2.54%	Insignificant
HR33	534725	201693	7.8	2018	0.91	0.26%	8.7	2.49%	Insignificant
HR34	534830	201759	7.8	2020	1.18	0.34%	9.0	2.57%	Insignificant
HR35	534816	201736	7.8	2018	1.21	0.35%	9.0	2.57%	Insignificant
HR36	534777	201643	7.8	2021	1.08	0.31%	8.9	2.54%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2020	1.00	0.29%	8.8	2.52%	Insignificant
HR38	534773	201563	7.8	2020	1.22	0.35%	9.0	2.58%	Insignificant
HR39	534763	201496	7.8	2020	0.81	0.23%	8.6	2.46%	Insignificant
HR40	534768	201451	7.8	2020	0.66	0.19%	8.5	2.42%	Insignificant
HR41	534773	201408	7.8	2020	0.57	0.16%	8.4	2.39%	Insignificant
HR42	534900	201794	7.8	2021	0.79	0.23%	8.6	2.45%	Insignificant
HR43	534950	201783	7.8	2020	0.80	0.23%	8.6	2.46%	Insignificant
HR44	535009	201768	9.8	2018	0.78	0.22%	10.6	3.04%	Insignificant
HR45	535070	201756	9.8	2020	0.65	0.19%	10.5	3.00%	Insignificant
AQMA 1	535226	201678	9.8	2018	0.48	0.14%	10.3	2.95%	Insignificant
AQMA 2	535220	201525	9.8	2017	0.48	0.14%	10.3	2.95%	Insignificant
AQMA 3	535215	201387	9.8	2020	0.34	0.10%	10.2	2.91%	Insignificant
ER1	536612	201393	9.9	2017	0.10	0.03%	10.0	2.85%	Insignificant
ER2	534607	203679	8.3	2020	0.08	0.02%	8.3	2.38%	Insignificant
ER3	539016	209557	9.9	2018	0.02	<0.01%	10.0	2.85%	Insignificant
ER4	541137	199555	8.1	2017	0.03	<0.01%	8.2	2.34%	Insignificant
ER5	538079	196106	8.3	2020	0.03	<0.01%	8.4	2.39%	Insignificant
ER6	534667	207161	7.1	2018	0.03	<0.01%	7.1	2.04%	Insignificant
ER7	532269	205102	7.1	2018	0.04	0.01%	7.2	2.05%	Insignificant
AQS: 350µg/m^3 *Results are to 2d.p.									

C.3.4 CO results for scenario 3

Table 56 CO 8-hour rolling mean (µg/m³)

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	0.3	2018	0.24	<0.01%	0.6	<0.01%	Insignificant
HR2	534422	202671	0.3	2018	0.29	<0.01%	0.6	<0.01%	Insignificant
HR3	534821	202677	0.3	2020	0.37	<0.01%	0.7	<0.01%	Insignificant
HR4	534922	202614	0.3	2020	0.43	<0.01%	0.8	<0.01%	Insignificant
HR5	534989	202539	0.3	2020	0.49	<0.01%	0.8	<0.01%	Insignificant
HR6	534950	202219	0.3	2020	0.95	<0.01%	1.3	0.01%	Insignificant
HR7	535094	202104	0.3	2020	1.69	0.02%	2.0	0.02%	Insignificant
HR8	535308	202249	0.3	2020	1.18	0.01%	1.5	0.02%	Insignificant
HR9	535292	202367	0.3	2020	0.90	<0.01%	1.2	0.01%	Insignificant
HR10	535357	202235	0.3	2020	1.17	0.01%	1.5	0.01%	Insignificant
HR11	535525	202257	0.3	2017	0.97	<0.01%	1.3	0.01%	Insignificant
HR12	535316	202007	0.3	2017	1.75	0.02%	2.1	0.02%	Insignificant
HR13	535287	201681	0.3	2017	1.64	0.02%	2.0	0.02%	Insignificant
HR14	535196	201187	0.3	2017	0.75	<0.01%	1.1	0.01%	Insignificant
HR15	535246	200678	0.3	2021	0.33	<0.01%	0.7	<0.01%	Insignificant
HR16	535775	200601	0.3	2017	0.26	<0.01%	0.6	<0.01%	Insignificant
HR17	535967	200770	0.3	2017	0.26	<0.01%	0.6	<0.01%	Insignificant
HR18	534473	201464	0.3	2021	0.76	<0.01%	1.1	0.01%	Insignificant
HR19	533885	201869	0.3	2018	0.27	<0.01%	0.6	<0.01%	Insignificant
HR20	533962	202274	0.3	2018	0.30	<0.01%	0.6	<0.01%	Insignificant
HR21	534814	201708	0.3	2018	4.66	0.05%	5.0	0.05%	Insignificant
HR22	534593	201553	0.3	2021	1.23	0.01%	1.6	0.02%	Insignificant
HR23	535641	201515	0.3	2017	0.51	<0.01%	0.8	<0.01%	Insignificant
HR24	535635	201357	0.3	2017	0.48	<0.01%	0.8	<0.01%	Insignificant
HR25	535594	201237	0.3	2017	0.48	<0.01%	0.8	<0.01%	Insignificant
HR26	535615	201836	0.3	2017	0.90	<0.01%	1.2	0.01%	Insignificant
HR27	535292	201243	0.3	2017	0.74	<0.01%	1.1	0.01%	Insignificant
HR28	534882	201856	0.3	2020	3.18	0.03%	3.5	0.04%	Insignificant
HR29	534944	201984	0.3	2020	2.10	0.02%	2.4	0.02%	Insignificant
HR30	535169	201989	0.3	2020	2.42	0.02%	2.8	0.03%	Insignificant
HR31	534841	201791	0.3	2020	3.84	0.04%	4.2	0.04%	Insignificant
HR32	534759	201702	0.3	2018	4.82	0.05%	5.2	0.05%	Insignificant
HR33	534725	201693	0.3	2018	3.87	0.04%	4.2	0.04%	Insignificant
HR34	534830	201759	0.3	2020	4.23	0.04%	4.6	0.05%	Insignificant
HR35	534816	201736	0.3	2018	4.57	0.05%	4.9	0.05%	Insignificant

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR36	534777	201643	0.3	2018	3.84	0.04%	4.2	0.04%	Insignificant
HR37	534776	201607	0.3	2020	2.44	0.02%	2.8	0.03%	Insignificant
HR38	534773	201563	0.3	2020	2.31	0.02%	2.6	0.03%	Insignificant
HR39	534763	201496	0.3	2021	1.88	0.02%	2.2	0.02%	Insignificant
HR40	534768	201451	0.3	2021	1.68	0.02%	2.0	0.02%	Insignificant
HR41	534773	201408	0.3	2021	1.51	0.02%	1.8	0.02%	Insignificant
HR42	534900	201794	0.3	2020	3.99	0.04%	4.3	0.04%	Insignificant
HR43	534950	201783	0.3	2020	5.89	0.06%	6.2	0.06%	Insignificant
HR44	535009	201768	0.3	2020	5.89	0.06%	6.2	0.06%	Insignificant
HR45	535070	201756	0.3	2017	4.60	0.05%	4.9	0.05%	Insignificant
AQMA 1	535226	201678	0.3	2017	2.02	0.02%	2.4	0.02%	Insignificant
AQMA 2	535220	201525	0.3	2017	1.42	0.01%	1.8	0.02%	Insignificant
AQMA 3	535215	201387	0.3	2017	1.09	0.01%	1.4	0.01%	Insignificant
ER1	536612	201393	0.3	2017	0.18	<0.01%	0.5	<0.01%	Insignificant
ER2	534607	203679	0.3	2020	0.14	<0.01%	0.4	<0.01%	Insignificant
ER3	539016	209557	0.3	2020	0.03	<0.01%	0.3	<0.01%	Insignificant
ER4	541137	199555	0.3	2017	0.04	<0.01%	0.3	<0.01%	Insignificant
ER5	538079	196106	0.3	2018	0.04	<0.01%	0.4	<0.01%	Insignificant
ER6	534667	207161	0.3	2020	0.04	<0.01%	0.3	<0.01%	Insignificant
ER7	532269	205102	0.3	2017	0.05	<0.01%	0.3	<0.01%	Insignificant
AQS: 10,000µg/m^3 *Results are to 2d.p.									

C.3.5 Ecological results for scenario 3

Table 57 NO_x daily mean results (µg/m^3)

Receptor	X	Y	Short term NO_x background	Maximum Year	Maximum modelled PC	% of standard	PEC	% of standard	Significance
ER1	536612	201393	46.1	2020	**34.68**	**46%**	**80.8**	**108%**	Insignificant*
ER2	534607	203679	39.5	2020	31.78	42%	71.3	95%	Insignificant**
ER3	539016	209557	34.2	2021	3.75	5%	37.9	51%	Insignificant
ER4	541137	199555	52.4	2017	8.68	12%	61.1	81%	Insignificant**
ER5	538079	196106	49.9	2021	21.48	29%	71.4	95%	Insignificant**
ER6	534667	207161	30.4	2021	10.00	13%	40.4	54%	Insignificant**
ER7	532269	205102	29.0	2017	14.59	19%	43.6	58%	Insignificant**

Critical level: 75µg/m^3

*Although an exceedance is predicted at this receptor, this scenario only occurs every six years and is not a continuously operating process, therefore this is considered to be insignificant.

** Although concentrations at these receptors cannot be screened out as they do not meet the EA criteria, they do not exceed the air quality objectives and the process is not continuously operating and only occurs every six years, so this is considered to be insignificant.

Table 58 Nutrient nitrogen deposition results

Ecological receptor ID	Critical load min	Background Nitrogen deposition	Annual mean NO_2 PC ($\mu g/m^3$)	Dry deposition (kg N/ha/yr)	Proportion of PC to CL (%) Min	Proportion of PEC to CL (%) Min
ER1	15	21.9	0.06442	0.0093	0.0618	146
ER2	5	25.9	0.04282	0.0062	0.1233	518
ER3	15	21.9	0.00889	0.0013	0.0085	146
ER4	10	22.9	0.01369	0.0039	0.0394	229
ER5	10	22.9	0.01219	0.0035	0.0351	229
ER6	15	39.8	0.01166	0.0017	0.0112	265
ER7	15	39.8	0.01544	0.0022	0.0148	265

Table 59 Acid deposition results

Ecological receptor ID	Critical Load max Sulphur (kg S/ha/yr)	Critical Load min Nitrogen (kg N/ha/yr)	Critical Load max Nitrogen (kg N/ha/yr)	Background Nitrogen deposition (kg N/ha/yr)	Background Sulphur deposition (kg S/ha/yr)	PC Nitrogen (keq N/ha/yr)	PC Sulphur (keq S/ha/yr)	Exceedance
ER1	0.88	0.223	1.113	1.6	0.2	0.000663	0.000011	PC < CL No exceedance
ER2	1.65	0.438	2.088	1.91	0.15	0.000440	0.000007	PC < CL No exceedance
ER3	0.88	0.223	1.113	1.6	0.2	0.000091	0.000002	PC < CL No exceedance
ER4	0.88	0.714	1.594	1.6	0.2	0.000282	0.000005	PC < CL No exceedance
ER5	0.88	0.714	1.594	1.6	0.2	0.000251	0.000004	PC < CL No exceedance
ER6	1.603	0.142	1.745	2.8	0.2	0.000120	0.000002	PC < CL No exceedance
ER7	1.603	0.142	1.745	2.8	0.2	0.000159	0.000003	PC < CL No exceedance

C.4 Scenario 4

C.4.1 NO_2 results for scenario 4

Table 60 NO_2 99.79th percentile hourly mean results (µg/m^3)

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	30.3	2019	**200**	**100%**	**230**	**115%**	Insignificant**
HR2	534422	202671	30.3	2019	**201**	**101%**	**232**	**116%**	Insignificant**
HR3	534821	202677	30.3	2018	**193**	**97%**	**224**	**112%**	Insignificant**
HR4	534922	202614	30.3	2019	**197**	**99%**	**227**	**114%**	Insignificant**
HR5	534989	202539	30.3	2019	**198**	**99%**	**229**	**114%**	Insignificant**
HR6	534950	202219	30.3	2019	**267**	**133%**	**297**	**149%**	Insignificant**
HR7	535094	202104	35.5	2019	**306**	**153%**	**342**	**171%**	Insignificant**
HR8	535308	202249	35.5	2019	**237**	**119%**	**273**	**136%**	Insignificant**
HR9	535292	202367	35.5	2019	**229**	**114%**	**264**	**132%**	Insignificant**
HR10	535357	202235	35.5	2019	**240**	**120%**	**275**	**138%**	Insignificant**
HR11	535525	202257	35.5	2017	**236**	**118%**	**272**	**136%**	Insignificant**
HR12	535316	202007	35.5	2019	**276**	**138%**	**311**	**156%**	Insignificant**
HR13	535287	201681	36.3	2017	**449**	**224%**	**485**	**243%**	Insignificant**
HR14	535196	201187	36.3	2017	**349**	**175%**	**386**	**193%**	Insignificant**
HR15	535246	200678	50.4	2021	**218**	**109%**	**268**	**134%**	Insignificant**
HR16	535775	200601	50.4	2021	**181**	**91%**	**231**	**116%**	Insignificant**
HR17	535967	200770	50.4	2017	**174**	**87%**	**224**	**112%**	Insignificant**
HR18	534473	201464	31.6	2021	**382**	**191%**	**414**	**207%**	Insignificant**
HR19	533885	201869	29.0	2019	**218**	**109%**	**247**	**123%**	Insignificant**
HR20	533962	202274	27.6	2017	**230**	**115%**	**257**	**129%**	Insignificant**
HR21	534814	201708	31.6	2019	**1022**	**511%**	**1053**	**527%**	Insignificant**
HR22	534593	201553	31.6	2020	**518**	**259%**	**549**	**275%**	Insignificant**
HR23	535641	201515	36.3	2017	**252**	**126%**	**288**	**144%**	Insignificant**
HR24	535635	201357	36.3	2017	**245**	**123%**	**282**	**141%**	Insignificant**
HR25	535594	201237	36.3	2018	**251**	**126%**	**288**	**144%**	Insignificant**
HR26	535615	201836	36.3	2017	**255**	**128%**	**291**	**146%**	Insignificant**
HR27	535292	201243	36.3	2020	**337**	**168%**	**373**	**186%**	Insignificant**
HR28	534882	201856	31.6	2018	**610**	**305%**	**642**	**321%**	Insignificant**
HR29	534944	201984	31.6	2018	**423**	**212%**	**455**	**227%**	Insignificant**
HR30	535169	201989	36.3	2019	**321**	**160%**	**357**	**178%**	Insignificant**

Receptor	X	Y	Short term NO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR31	534841	201791	31.6	2018	**733**	**367%**	**765**	**382%**	Insignificant**
HR32	534759	201702	31.6	2019	**866**	**433%**	**898**	**449%**	Insignificant**
HR33	534725	201693	31.6	2019	**783**	**391%**	**814**	**407%**	Insignificant**
HR34	534830	201759	31.6	2020	**834**	**417%**	**866**	**433%**	Insignificant**
HR35	534816	201736	31.6	2019	**922**	**461%**	**953**	**477%**	Insignificant**
HR36	534777	201643	31.6	2020	**913**	**457%**	**945**	**472%**	Insignificant**
HR37	534776	201607	31.6	2020	**829**	**414%**	**861**	**430%**	Insignificant**
HR38	534773	201563	31.6	2019	**818**	**409%**	**850**	**425%**	Insignificant**
HR39	534763	201496	31.6	2019	**829**	**414%**	**860**	**430%**	Insignificant**
HR40	534768	201451	31.6	2021	**867**	**433%**	**898**	**449%**	Insignificant**
HR41	534773	201408	31.6	2021	**930**	**465%**	**962**	**481%**	Insignificant**
HR42	534900	201794	31.6	2019	**706**	**353%**	**737**	**369%**	Insignificant**
HR43	534950	201783	31.6	2018	**665**	**333%**	**697**	**349%**	Insignificant**
HR44	535009	201768	36.3	2021	**573**	**286%**	**609**	**305%**	Insignificant**
HR45	535070	201756	36.3	2019	**473**	**236%**	**509**	**255%**	Insignificant**
AQMA 1	535226	201678	36.3	2020	**477**	**239%**	**514**	**257%**	Insignificant**
AQMA 2	535220	201525	36.3	2020	**477**	**239%**	**514**	**257%**	Insignificant**
AQMA 3	535215	201387	36.3	2017	**591**	**295%**	**627**	**313%**	Insignificant**
ER1	536612	201393	33.2	2018	141	70%	174	87%	Insignificant***
ER2	534607	203679	28.9	2020	123	62%	152	76%	Insignificant***
ER3	539016	209557	25.4	2019	32	16%	57	29%	Insignificant
ER4	541137	199555	37.3	2017	48	24%	85	43%	Insignificant***
ER5	538079	196106	35.4	2019	46	23%	81	40%	Insignificant***
ER6	534667	207161	22.9	2018	45	23%	68	34%	Insignificant***
ER7	532269	205102	21.9	2017	62	31%	83	42%	Insignificant***

AQS**:** 40µg/m^3

*Results are to 2d.p.

****** Statistical analysis using the hypergeometric distribution was used to assess the probability of exceeding the NO_2 hourly mean objective and this indicated that an exceedance would be highly unlikely (<1% probability). The risk of this scenario occurring is also very unlikely based on electrical grid reliability data for the area and inbuilt design resilience.

*** Although concentrations at these receptors cannot be screened out as they do not meet the EA criteria, they do not exceed the air quality objectives and the process is not continuously operating and only occurs in the unlikely event of an emergency, so this is considered to be insignificant.

Table 61 NO_2 hourly mean hypergeometric distribution analysis (30 hours)

Receptor	N	P	Likelihood of exceedance
HR1	30	<0.01%	Highly unlikely
HR2	30	<0.01%	Highly unlikely
HR3	30	<0.01%	Highly unlikely
HR4	30	<0.01%	Highly unlikely
HR5	30	<0.01%	Highly unlikely
HR6	30	<0.01%	Highly unlikely
HR7	30	<0.01%	Highly unlikely
HR8	30	<0.01%	Highly unlikely
HR9	30	<0.01%	Highly unlikely
HR10	30	<0.01%	Highly unlikely
HR11	30	<0.01%	Highly unlikely
HR12	30	<0.01%	Highly unlikely
HR13	30	<0.01%	Highly unlikely
HR14	30	<0.01%	Highly unlikely
HR15	30	<0.01%	Highly unlikely
HR16	30	<0.01%	Highly unlikely
HR17	30	<0.01%	Highly unlikely
HR18	30	<0.01%	Highly unlikely
HR19	30	<0.01%	Highly unlikely
HR20	30	<0.01%	Highly unlikely
HR21	30	<0.01%	Highly unlikely
HR22	30	<0.01%	Highly unlikely
HR23	30	<0.01%	Highly unlikely
HR24	30	<0.01%	Highly unlikely
HR25	30	<0.01%	Highly unlikely
HR26	30	<0.01%	Highly unlikely
HR27	30	<0.01%	Highly unlikely
HR28	30	<0.01%	Highly unlikely
HR29	30	<0.01%	Highly unlikely
HR30	30	<0.01%	Highly unlikely
HR31	30	<0.01%	Highly unlikely
HR32	30	<0.01%	Highly unlikely
HR33	30	<0.01%	Highly unlikely
HR34	30	<0.01%	Highly unlikely
HR35	30	<0.01%	Highly unlikely
HR36	30	<0.01%	Highly unlikely
HR37	30	<0.01%	Highly unlikely

Receptor	N	P	Likelihood of exceedance
HR38	30	<0.01%	Highly unlikely
HR39	30	<0.01%	Highly unlikely
HR40	30	<0.01%	Highly unlikely
HR41	30	<0.01%	Highly unlikely
HR42	30	<0.01%	Highly unlikely
HR43	30	<0.01%	Highly unlikely
HR44	30	0.05%	Highly unlikely
HR45	30	0.10%	Highly unlikely
AQMA 1	30	<0.01%	Highly unlikely
AQMA 2	30	<0.01%	Highly unlikely
AQMA 3	30	<0.01%	Highly unlikely
ER1	30	<0.01%	Highly unlikely
ER2	30	<0.01%	Highly unlikely
ER3	30	<0.01%	Highly unlikely
ER4	30	<0.01%	Highly unlikely
ER5	30	<0.01%	Highly unlikely
ER6	30	<0.01%	Highly unlikely
ER7	30	<0.01%	Highly unlikely
N= operating hours per year; P = Probability of exceedance of the standard.			

Table 62 NO_x daily mean results (µg/m^3)

Receptor	X	Y	Short term NO_x background	Maximum Year	Maximum modelled PC	% of standard	PEC	% of standard	Significance
ER1	536612	201393	23.1	2018	**246**	**328%**	**292**	**390%**	Potentially significant
ER2	534607	203679	19.7	2020	**241**	**322%**	**281**	**374%**	Potentially significant
ER3	539016	209557	17.1	2019	**236**	**315%**	**270**	**360%**	Potentially significant
ER4	541137	199555	26.2	2019	**281**	**375%**	**334**	**445%**	Potentially significant
ER5	538079	196106	24.9	2020	**466**	**622%**	**516**	**688%**	Potentially significant
ER6	534667	207161	15.2	2021	**640**	**854%**	**671**	**894%**	Potentially significant
ER7	532269	205102	14.5	2021	**432**	**576%**	**461**	**614%**	Potentially significant
AQS: 75µg/m^3									

Table 63 NO_2 10-minute mean results (AEGLs) (µg/m^3)

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR1	534162	202720	2016	665	233	24%	1.0%	0.6%
HR2	534422	202671	2018	698	244	26%	1.1%	0.6%
HR3	534821	202677	2017	674	236	25%	1.0%	0.6%
HR4	534922	202614	2018	679	238	25%	1.0%	0.6%
HR5	534989	202539	2017	687	240	25%	1.0%	0.6%
HR6	534950	202219	2018	869	304	32%	1.3%	0.8%
HR7	535094	202104	2018	910	318	33%	1.4%	0.8%
HR8	535308	202249	2018	788	276	29%	1.2%	0.7%
HR9	535292	202367	2018	705	247	26%	1.1%	0.6%
HR10	535357	202235	2018	763	267	28%	1.2%	0.7%
HR11	535525	202257	2017	764	267	28%	1.2%	0.7%
HR12	535316	202007	2018	806	282	29%	1.2%	0.7%
HR13	535287	201681	2019	1315	460	48%	2.0%	1.2%
HR14	535196	201187	2016	1030	360	38%	1.6%	0.9%
HR15	535246	200678	2018	697	244	26%	1.1%	0.6%
HR16	535775	200601	2020	637	223	23%	1.0%	0.6%
HR17	535967	200770	2018	747	261	27%	1.1%	0.7%
HR18	534473	201464	2019	1152	403	42%	1.8%	1.1%
HR19	533885	201869	2018	744	261	27%	1.1%	0.7%
HR20	533962	202274	2020	727	254	27%	1.1%	0.7%
HR21	534814	201708	2020	4004	**1401**	147%	6.1%	3.7%
HR22	534593	201553	2018	1569	549	57%	2.4%	1.4%
HR23	535641	201515	2017	810	284	30%	1.2%	0.7%
HR24	535635	201357	2016	802	281	29%	1.2%	0.7%
HR25	535594	201237	2016	791	277	29%	1.2%	0.7%
HR26	535615	201836	2019	756	265	28%	1.2%	0.7%
HR27	535292	201243	2017	1018	356	37%	1.6%	0.9%
HR28	534882	201856	2017	1920	672	70%	2.9%	1.8%
HR29	534944	201984	2017	1394	488	51%	2.1%	1.3%

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR30	535169	201989	2018	1067	373	39%	1.6%	1.0%
HR31	534841	201791	2020	2288	801	84%	3.5%	2.1%
HR32	534759	201702	2017	2599	910	95%	4.0%	2.4%
HR33	534725	201693	2018	2310	808	85%	3.5%	2.1%
HR34	534830	201759	2016	2721	952	100%	4.1%	2.5%
HR35	534816	201736	2020	3139	**1099**	115%	4.8%	2.9%
HR36	534777	201643	2019	2766	**968**	101%	4.2%	2.5%
HR37	534776	201607	2016	2527	884	92%	3.9%	2.3%
HR38	534773	201563	2018	2536	888	93%	3.9%	2.3%
HR39	534763	201496	2019	2536	888	93%	3.9%	2.3%
HR40	534768	201451	2020	2608	913	95%	4.0%	2.4%
HR41	534773	201408	2019	2810	**983**	103%	4.3%	2.6%
HR42	534900	201794	2017	2227	779	82%	3.4%	2.0%
HR43	534950	201783	2018	2002	701	73%	3.1%	1.8%
HR44	535009	201768	2018	1761	616	64%	2.7%	1.6%
HR45	535070	201756	2018	1505	527	55%	2.3%	1.4%
AQMA 1	535226	201678	2019	1817	636	66%	2.8%	1.7%
AQMA 2	535220	201525	2020	2081	728	76%	3.2%	1.9%
AQMA 3	535215	201387	2018	1423	498	52%	2.2%	1.3%
ER1	536612	201393	2016	517	181	19%	0.8%	0.5%
ER2	534607	203679	2019	481	168	18%	0.7%	0.4%
ER3	539016	209557	2016	205	72	8%	0.3%	0.2%
ER4	541137	199555	2019	223	78	8%	0.3%	0.2%
ER5	538079	196106	2017	220	77	8%	0.3%	0.2%
ER6	534667	207161	2020	265	93	10%	0.4%	0.2%
ER7	532269	205102	2020	251	88	9%	0.4%	0.2%

Table 64 NO_2 30-minute mean results (AEGLs) (µg/m^3)

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR1	534162	202720	2018	794	278.1	29%	1.0%	0.6%
HR2	534422	202671	2018	843	294.9	31%	1.0%	0.6%
HR3	534821	202677	2017	820	287.0	30%	1.0%	0.6%
HR4	534922	202614	2016	804	281.5	29%	1.0%	0.6%
HR5	534989	202539	2016	814	284.9	30%	1.0%	0.6%
HR6	534950	202219	2018	973	340.7	36%	1.2%	0.7%
HR7	535094	202104	2018	996	348.6	36%	1.2%	0.7%
HR8	535308	202249	2018	882	308.6	32%	1.1%	0.6%
HR9	535292	202367	2018	802	280.7	29%	1.0%	0.6%
HR10	535357	202235	2018	827	289.3	30%	1.0%	0.6%
HR11	535525	202257	2017	862	301.8	32%	1.1%	0.6%
HR12	535316	202007	2018	853	298.5	31%	1.0%	0.6%
HR13	535287	201681	2019	1338	468.2	49%	1.6%	1.0%
HR14	535196	201187	2016	1062	371.8	39%	1.3%	0.8%
HR15	535246	200678	2016	803	280.9	29%	1.0%	0.6%
HR16	535775	200601	2020	755	264.3	28%	0.9%	0.6%
HR17	535967	200770	2018	943	330.1	35%	1.2%	0.7%
HR18	534473	201464	2019	1201	420.3	44%	1.5%	0.9%
HR19	533885	201869	2018	864	302.2	32%	1.1%	0.6%
HR20	533962	202274	2020	860	301.1	31%	1.0%	0.6%
HR21	534814	201708	2020	4059	**1420.5**	149%	5.0%	3.0%
HR22	534593	201553	2018	1597	558.9	58%	1.9%	1.2%
HR23	535641	201515	2016	886	310.2	32%	1.1%	0.6%
HR24	535635	201357	2016	881	308.3	32%	1.1%	0.6%
HR25	535594	201237	2018	868	303.6	32%	1.1%	0.6%
HR26	535615	201836	2019	825	288.8	30%	1.0%	0.6%
HR27	535292	201243	2018	1048	366.9	38%	1.3%	0.8%
HR28	534882	201856	2017	2021	707.3	74%	2.5%	1.5%
HR29	534944	201984	2017	1508	527.9	55%	1.8%	1.1%

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR30	535169	201989	2018	1140	399.0	42%	1.4%	0.8%
HR31	534841	201791	2020	2325	813.7	85%	2.8%	1.7%
HR32	534759	201702	2017	2623	918.0	96%	3.2%	1.9%
HR33	534725	201693	2018	2334	817.1	85%	2.8%	1.7%
HR34	534830	201759	2020	2763	**967.0**	101%	3.4%	2.0%
HR35	534816	201736	2020	3187	**1115.6**	117%	3.9%	2.3%
HR36	534777	201643	2019	2781	**973.5**	102%	3.4%	2.0%
HR37	534776	201607	2016	2537	887.8	93%	3.1%	1.9%
HR38	534773	201563	2018	2543	890.0	93%	3.1%	1.9%
HR39	534763	201496	2019	2550	892.5	93%	3.1%	1.9%
HR40	534768	201451	2020	2613	914.6	96%	3.2%	1.9%
HR41	534773	201408	2019	2826	**989.1**	103%	3.4%	2.1%
HR42	534900	201794	2017	2357	824.8	86%	2.9%	1.7%
HR43	534950	201783	2018	2045	715.8	75%	2.5%	1.5%
HR44	535009	201768	2018	1821	637.2	67%	2.2%	1.3%
HR45	535070	201756	2018	1530	535.4	56%	1.9%	1.1%
AQMA 1	535226	201678	2020	1900	664.9	70%	2.3%	1.4%
AQMA 2	535220	201525	2020	2132	746.4	78%	2.6%	1.6%
AQMA 3	535215	201387	2018	1454	509.1	53%	1.8%	1.1%
ER1	536612	201393	2016	631	220.8	23%	0.8%	0.5%
ER2	534607	203679	2016	594	207.9	22%	0.7%	0.4%
ER3	539016	209557	2016	265	92.7	10%	0.3%	0.2%
ER4	541137	199555	2019	296	103.5	11%	0.4%	0.2%
ER5	538079	196106	2017	286	100.0	10%	0.3%	0.2%
ER6	534667	207161	2020	354	124.0	13%	0.4%	0.3%
ER7	532269	205102	2020	335	117.2	12%	0.4%	0.2%

Table 65 NO_2 1-hour mean results (AEGLs) (µg/m^3)

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR1	534162	202720	2018	970	339.5	36%	0.9%	0.5%
HR2	534422	202671	2018	1018	356.3	37%	0.9%	0.5%
HR3	534821	202677	2017	1025	358.9	38%	0.9%	0.6%
HR4	534922	202614	2018	984	344.4	36%	0.9%	0.5%
HR5	534989	202539	2016	1017	356.0	37%	0.9%	0.5%
HR6	534950	202219	2018	1080	377.9	40%	1.0%	0.6%
HR7	535094	202104	2019	1076	376.7	39%	1.0%	0.6%
HR8	535308	202249	2018	972	340.2	36%	0.9%	0.5%
HR9	535292	202367	2016	944	330.4	35%	0.9%	0.5%
HR10	535357	202235	2018	924	323.5	34%	0.8%	0.5%
HR11	535525	202257	2017	954	333.8	35%	0.9%	0.5%
HR12	535316	202007	2018	890	311.6	33%	0.8%	0.5%
HR13	535287	201681	2019	1357	475.0	50%	1.2%	0.7%
HR14	535196	201187	2016	1086	380.1	40%	1.0%	0.6%
HR15	535246	200678	2016	949	332.2	35%	0.9%	0.5%
HR16	535775	200601	2018	884	309.3	32%	0.8%	0.5%
HR17	535967	200770	2018	1202	420.8	44%	1.1%	0.6%
HR18	534473	201464	2019	1237	432.8	45%	1.1%	0.7%
HR19	533885	201869	2017	1013	354.5	37%	0.9%	0.5%
HR20	533962	202274	2020	999	349.6	37%	0.9%	0.5%
HR21	534814	201708	2020	4096	**1433.7**	150%	3.7%	2.2%
HR22	534593	201553	2018	1616	565.7	59%	1.5%	0.9%
HR23	535641	201515	2016	948	331.8	35%	0.9%	0.5%
HR24	535635	201357	2016	946	331.1	35%	0.9%	0.5%
HR25	535594	201237	2018	933	326.4	34%	0.9%	0.5%
HR26	535615	201836	2019	883	308.9	32%	0.8%	0.5%
HR27	535292	201243	2018	1079	377.6	39%	1.0%	0.6%
HR28	534882	201856	2017	2098	734.1	77%	1.9%	1.1%
HR29	534944	201984	2017	1603	561.2	59%	1.5%	0.9%

Receptor	X	Y	Year of Max PC	Max NO_x PC	Max NO_2 PC	AEGL 1 (% of standard)	AEGL 2 (% of standard)	AEGL 3 (% of standard)
HR30	535169	201989	2018	1203	421.2	44%	1.1%	0.6%
HR31	534841	201791	2017	2410	843.6	88%	2.2%	1.3%
HR32	534759	201702	2017	2639	923.6	97%	2.4%	1.4%
HR33	534725	201693	2018	2351	822.9	86%	2.2%	1.3%
HR34	534830	201759	2020	2792	**977.4**	102%	2.6%	1.5%
HR35	534816	201736	2020	3221	**1127.4**	118%	2.9%	1.7%
HR36	534777	201643	2019	2810	**983.4**	103%	2.6%	1.5%
HR37	534776	201607	2019	2553	893.6	93%	2.3%	1.4%
HR38	534773	201563	2018	2547	891.6	93%	2.3%	1.4%
HR39	534763	201496	2019	2559	895.8	94%	2.3%	1.4%
HR40	534768	201451	2020	2616	915.6	96%	2.4%	1.4%
HR41	534773	201408	2019	2837	**992.9**	104%	2.6%	1.5%
HR42	534900	201794	2017	2456	859.6	90%	2.2%	1.3%
HR43	534950	201783	2018	2076	726.5	76%	1.9%	1.1%
HR44	535009	201768	2018	1859	650.8	68%	1.7%	1.0%
HR45	535070	201756	2018	1507	527.4	55%	1.4%	0.8%
AQMA 1	535226	201678	2020	1965	687.9	72%	1.8%	1.1%
AQMA 2	535220	201525	2020	2169	759.1	79%	2.0%	1.2%
AQMA 3	535215	201387	2017	1487	520.4	54%	1.4%	0.8%
ER1	536612	201393	2019	794	277.9	29%	0.7%	0.4%
ER2	534607	203679	2016	809	283.2	30%	0.7%	0.4%
ER3	539016	209557	2016	348	121.9	13%	0.3%	0.2%
ER4	541137	199555	2019	417	146.0	15%	0.4%	0.2%
ER5	538079	196106	2017	381	133.4	14%	0.3%	0.2%
ER6	534667	207161	2020	518	181.3	19%	0.5%	0.3%
ER7	532269	205102	2020	482	168.6	18%	0.4%	0.3%

C.4.2 PM_{10} results for scenario 4

Table 66 PM_{10} 90.41st percentile daily mean results (µg/m³)

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	31.9	2018	0.4	1%	32.3	65%	Insignificant
HR2	534422	202671	31.9	2018	0.5	1%	32.4	65%	Insignificant
HR3	534821	202677	31.9	2018	0.6	1%	32.5	65%	Insignificant
HR4	534922	202614	31.9	2020	0.6	1%	32.5	65%	Insignificant
HR5	534989	202539	31.9	2020	0.7	1%	32.6	65%	Insignificant
HR6	534950	202219	31.9	2020	1.2	2%	33.2	66%	Insignificant
HR7	535094	202104	33.8	2020	1.7	3%	35.5	71%	Insignificant
HR8	535308	202249	33.8	2021	1.2	2%	35.1	70%	Insignificant
HR9	535292	202367	33.8	2020	1.0	2%	34.8	70%	Insignificant
HR10	535357	202235	33.8	2019	1.3	3%	35.1	70%	Insignificant
HR11	535525	202257	33.8	2019	1.3	3%	35.1	70%	Insignificant
HR12	535316	202007	33.8	2019	2.2	4%	36.0	72%	Insignificant
HR13	535287	201681	34.4	2017	3.4	7%	37.8	76%	Insignificant**
HR14	535196	201187	34.4	2021	1.6	3%	35.9	72%	Insignificant
HR15	535246	200678	36.5	2018	0.6	1%	37.1	74%	Insignificant
HR16	535775	200601	36.5	2017	0.5	1%	37.0	74%	Insignificant
HR17	535967	200770	36.5	2017	0.5	1%	37.0	74%	Insignificant
HR18	534473	201464	32.9	2019	1.7	3%	34.6	69%	Insignificant
HR19	533885	201869	33.6	2019	0.6	1%	34.1	68%	Insignificant
HR20	533962	202274	31.2	2018	0.6	1%	31.8	64%	Insignificant
HR21	534814	201708	32.9	2018	5.2	10%	38.1	76%	Insignificant**
HR22	534593	201553	32.9	2019	2.9	6%	35.7	71%	Insignificant
HR23	535641	201515	34.4	2017	1.0	2%	35.4	71%	Insignificant
HR24	535635	201357	34.4	2019	0.9	2%	35.2	70%	Insignificant
HR25	535594	201237	34.4	2017	0.9	2%	35.3	71%	Insignificant
HR26	535615	201836	34.4	2017	1.5	3%	35.9	72%	Insignificant
HR27	535292	201243	34.4	2017	1.5	3%	35.9	72%	Insignificant
HR28	534882	201856	32.9	2020	3.3	7%	36.2	72%	Insignificant
HR29	534944	201984	32.9	2020	2.2	4%	35.1	70%	Insignificant
HR30	535169	201989	34.4	2021	2.5	5%	36.8	74%	Insignificant
HR31	534841	201791	32.9	2018	4.1	8%	37.0	74%	Insignificant**
HR32	534759	201702	32.9	2018	6.0	12%	38.9	78%	Insignificant**
HR33	534725	201693	32.9	2018	5.0	10%	37.9	76%	Insignificant**

Receptor	X	Y	Short term PM_{10} background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR34	534830	201759	32.9	2018	4.7	9%	37.6	75%	Insignificant**
HR35	534816	201736	32.9	2018	5.0	10%	37.9	76%	Insignificant**
HR36	534777	201643	32.9	2018	6.2	12%	39.1	78%	Insignificant**
HR37	534776	201607	32.9	2018	5.6	11%	38.5	77%	Insignificant**
HR38	534773	201563	32.9	2019	5.6	11%	38.5	77%	Insignificant**
HR39	534763	201496	32.9	2019	5.6	11%	38.4	77%	Insignificant**
HR40	534768	201451	32.9	2020	5.3	11%	38.2	76%	Insignificant**
HR41	534773	201408	32.9	2020	5.5	11%	38.4	77%	Insignificant**
HR42	534900	201794	32.9	2020	4.1	8%	37.0	74%	Insignificant**
HR43	534950	201783	32.9	2020	5.2	10%	38.1	76%	Insignificant**
HR44	535009	201768	34.4	2020	5.4	11%	39.7	79%	Insignificant**
HR45	535070	201756	34.4	2020	4.8	10%	39.1	78%	Insignificant**
AQMA 1	535226	201678	34.4	2017	4.3	9%	38.6	77%	Insignificant**
AQMA 2	535220	201525	34.4	2017	3.5	7%	37.8	76%	Insignificant**
AQMA 3	535215	201387	34.4	2017	2.4	5%	36.8	74%	Insignificant
ER1	536612	201393	32.8	2017	0.3	1%	33.1	66%	Insignificant
ER2	534607	203679	31.3	2018	0.2	0%	31.5	63%	Insignificant
ER3	539016	209557	30.0	2020	0.0	0%	30.0	60%	Insignificant
ER4	541137	199555	35.8	2017	0.1	0%	35.9	72%	Insignificant
ER5	538079	196106	32.7	2021	0.1	0%	32.8	66%	Insignificant
ER6	534667	207161	28.8	2018	0.1	0%	28.9	58%	Insignificant
ER7	532269	205102	29.6	2017	0.1	0%	29.6	59%	Insignificant

AQS**:** 50µg/m^3

*Results are to 2d.p.

** Although concentrations at these receptors cannot be screened out as they do not meet the EA criteria, they do not exceed the air quality objectives and the process is not continuously operating and the process only occurs in the unlikely event of an emergency, this is considered to be insignificant.

C.4.3 SO_2 results for scenario 4

Table 67 SO_2 99.9th percentile 15-minute mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2019	0.86	0.32%	9.22	3.47%	Insignificant
HR2	534422	202671	8.4	2018	0.84	0.32%	9.20	3.46%	Insignificant
HR3	534821	202677	8.4	2019	0.86	0.32%	9.22	3.47%	Insignificant
HR4	534922	202614	8.4	2020	0.85	0.32%	9.21	3.46%	Insignificant
HR5	534989	202539	8.4	2019	0.97	0.36%	9.33	3.51%	Insignificant
HR6	534950	202219	8.4	2017	1.05	0.39%	9.41	3.54%	Insignificant
HR7	535094	202104	11.5	2019	0.88	0.33%	12.38	4.66%	Insignificant
HR8	535308	202249	11.5	2017	0.90	0.34%	12.40	4.66%	Insignificant
HR9	535292	202367	11.5	2021	0.88	0.33%	12.38	4.65%	Insignificant
HR10	535357	202235	11.5	2017	0.87	0.33%	12.37	4.65%	Insignificant
HR11	535525	202257	11.5	2019	0.91	0.34%	12.41	4.67%	Insignificant
HR12	535316	202007	11.5	2017	1.32	0.50%	12.82	4.82%	Insignificant
HR13	535287	201681	9.8	2017	1.10	0.41%	10.94	4.11%	Insignificant
HR14	535196	201187	9.8	2018	0.86	0.33%	10.70	4.02%	Insignificant
HR15	535246	200678	8.8	2021	0.75	0.28%	9.57	3.60%	Insignificant
HR16	535775	200601	8.8	2017	0.82	0.31%	9.64	3.62%	Insignificant
HR17	535967	200770	8.8	2021	1.21	0.45%	10.03	3.77%	Insignificant
HR18	534473	201464	7.8	2020	0.95	0.36%	8.75	3.29%	Insignificant
HR19	533885	201869	7.4	2017	0.97	0.36%	8.41	3.16%	Insignificant
HR20	533962	202274	7.6	2018	3.46	1.30%	11.08	4.17%	Insignificant
HR21	534814	201708	7.8	2021	1.61	0.60%	9.41	3.54%	Insignificant
HR22	534593	201553	7.8	2018	0.88	0.33%	8.68	3.26%	Insignificant
HR23	535641	201515	9.8	2021	0.89	0.33%	10.73	4.03%	Insignificant
HR24	535635	201357	9.8	2018	0.91	0.34%	10.75	4.04%	Insignificant
HR25	535594	201237	9.8	2017	0.85	0.32%	10.69	4.02%	Insignificant
HR26	535615	201836	9.8	2017	1.10	0.41%	10.94	4.11%	Insignificant
HR27	535292	201243	9.8	2018	2.01	0.76%	11.85	4.46%	Insignificant
HR28	534882	201856	7.8	2018	1.46	0.55%	9.26	3.48%	Insignificant
HR29	534944	201984	7.8	2019	1.07	0.40%	8.87	3.34%	Insignificant
HR30	535169	201989	9.8	2021	2.36	0.89%	12.20	4.59%	Insignificant
HR31	534841	201791	7.8	2018	0.62	0.23%	8.42	3.16%	Insignificant
HR32	534759	201702	7.8	2019	2.45	0.92%	10.25	3.85%	Insignificant
HR33	534725	201693	7.8	2018	2.71	1.02%	10.51	3.95%	Insignificant
HR34	534830	201759	7.8	2019	3.01	1.13%	10.81	4.06%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR35	534816	201736	7.8	2020	2.85	1.07%	10.65	4.00%	Insignificant
HR36	534777	201643	7.8	2020	2.60	0.98%	10.40	3.91%	Insignificant
HR37	534776	201607	7.8	2020	2.58	0.97%	10.38	3.90%	Insignificant
HR38	534773	201563	7.8	2019	2.54	0.95%	10.34	3.89%	Insignificant
HR39	534763	201496	7.8	2021	2.67	1.00%	10.47	3.94%	Insignificant
HR40	534768	201451	7.8	2021	2.85	1.07%	10.65	4.00%	Insignificant
HR41	534773	201408	7.8	2019	2.25	0.85%	10.05	3.78%	Insignificant
HR42	534900	201794	7.8	2020	2.12	0.80%	9.92	3.73%	Insignificant
HR43	534950	201783	7.8	2020	1.81	0.68%	9.61	3.61%	Insignificant
HR44	535009	201768	9.8	2019	1.49	0.56%	11.33	4.26%	Insignificant
HR45	535070	201756	9.8	2017	1.38	0.52%	11.22	4.22%	Insignificant
AQMA 1	535226	201678	9.8	2019	1.81	0.68%	11.65	4.38%	Insignificant
AQMA 2	535220	201525	9.8	2019	1.53	0.58%	11.37	4.28%	Insignificant
AQMA 3	535215	201387	9.8	2017	0.00	0.00%	9.84	3.70%	Insignificant
ER1	536612	201393	9.9	2020	0.63	0.24%	10.51	3.95%	Insignificant
ER2	534607	203679	8.3	2020	0.19	0.07%	8.45	3.18%	Insignificant
ER3	539016	209557	9.9	2017	0.27	0.10%	10.21	3.84%	Insignificant
ER4	541137	199555	8.1	2017	0.25	0.09%	8.39	3.15%	Insignificant
ER5	538079	196106	8.3	2019	0.25	0.10%	8.59	3.23%	Insignificant
ER6	534667	207161	7.1	2019	0.38	0.14%	7.48	2.81%	Insignificant
ER7	532269	205102	7.1	2019	2.74	1.03%	9.86	3.71%	Insignificant
AQS: 266µg/m^3 *Results are to 2d.p.									

Table 68 SO_2 99.18th percentile 24-hour mean results (µg/m^3)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2018	0.21	0.17%	8.57	6.86%	Insignificant
HR2	534422	202671	8.4	2020	0.21	0.17%	8.57	6.85%	Insignificant
HR3	534821	202677	8.4	2020	0.22	0.17%	8.58	6.86%	Insignificant
HR4	534922	202614	8.4	2021	0.23	0.18%	8.59	6.87%	Insignificant
HR5	534989	202539	8.4	2021	0.41	0.33%	8.77	7.02%	Insignificant
HR6	534950	202219	8.4	2021	0.55	0.44%	8.91	7.13%	Insignificant
HR7	535094	202104	11.5	2021	0.38	0.30%	11.88	9.50%	Insignificant
HR8	535308	202249	11.5	2021	0.31	0.25%	11.81	9.45%	Insignificant
HR9	535292	202367	11.5	2021	0.41	0.33%	11.91	9.53%	Insignificant
HR10	535357	202235	11.5	2021	0.36	0.29%	11.86	9.49%	Insignificant
HR11	535525	202257	11.5	2021	0.57	0.45%	12.07	9.65%	Insignificant
HR12	535316	202007	11.5	2017	0.98	0.79%	12.48	9.99%	Insignificant
HR13	535287	201681	9.8	2021	0.71	0.57%	10.55	8.44%	Insignificant
HR14	535196	201187	9.8	2017	0.31	0.25%	10.15	8.12%	Insignificant
HR15	535246	200678	8.8	2017	0.21	0.17%	9.03	7.22%	Insignificant
HR16	535775	200601	8.8	2017	0.21	0.17%	9.03	7.22%	Insignificant
HR17	535967	200770	8.8	2018	0.72	0.58%	9.54	7.64%	Insignificant
HR18	534473	201464	7.8	2018	0.27	0.22%	8.07	6.46%	Insignificant
HR19	533885	201869	7.4	2018	0.26	0.21%	7.70	6.16%	Insignificant
HR20	533962	202274	7.6	2017	1.86	1.49%	9.48	7.58%	Insignificant
HR21	534814	201708	7.8	2019	1.17	0.94%	8.97	7.18%	Insignificant
HR22	534593	201553	7.8	2019	0.36	0.29%	8.16	6.53%	Insignificant
HR23	535641	201515	9.8	2019	0.33	0.26%	10.17	8.13%	Insignificant
HR24	535635	201357	9.8	2017	0.36	0.29%	10.20	8.16%	Insignificant
HR25	535594	201237	9.8	2017	0.43	0.35%	10.27	8.22%	Insignificant
HR26	535615	201836	9.8	2021	0.58	0.46%	10.42	8.33%	Insignificant
HR27	535292	201243	9.8	2021	1.17	0.94%	11.01	8.81%	Insignificant
HR28	534882	201856	7.8	2021	0.72	0.58%	8.52	6.82%	Insignificant
HR29	534944	201984	7.8	2021	0.67	0.54%	8.47	6.78%	Insignificant
HR30	535169	201989	9.8	2018	1.40	1.12%	11.24	8.99%	Insignificant
HR31	534841	201791	7.8	2017	0.12	0.10%	7.92	6.34%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR32	534759	201702	7.8	2017	1.73	1.38%	9.53	7.62%	Insignificant
HR33	534725	201693	7.8	2017	1.69	1.35%	9.49	7.59%	Insignificant
HR34	534830	201759	7.8	2017	1.84	1.47%	9.64	7.71%	Insignificant
HR35	534816	201736	7.8	2017	1.98	1.58%	9.78	7.82%	Insignificant
HR36	534777	201643	7.8	2019	1.91	1.53%	9.71	7.77%	Insignificant
HR37	534776	201607	7.8	2019	1.84	1.47%	9.64	7.71%	Insignificant
HR38	534773	201563	7.8	2018	1.92	1.53%	9.72	7.77%	Insignificant
HR39	534763	201496	7.8	2018	2.16	1.73%	9.96	7.97%	Insignificant
HR40	534768	201451	7.8	2020	2.16	1.73%	9.96	7.97%	Insignificant
HR41	534773	201408	7.8	2021	1.45	1.16%	9.25	7.40%	Insignificant
HR42	534900	201794	7.8	2021	1.48	1.18%	9.28	7.42%	Insignificant
HR43	534950	201783	7.8	2021	1.35	1.08%	9.15	7.32%	Insignificant
HR44	535009	201768	9.8	2017	1.15	0.92%	10.99	8.80%	Insignificant
HR45	535070	201756	9.8	2017	1.11	0.89%	10.95	8.76%	Insignificant
AQMA 1	535226	201678	9.8	2019	1.09	0.87%	10.93	8.75%	Insignificant
AQMA 2	535220	201525	9.8	2019	0.86	0.68%	10.70	8.56%	Insignificant
AQMA 3	535215	201387	9.8	2017	<0.01	<0.01%	9.84	7.87%	Insignificant
ER1	536612	201393	9.9	2021	0.09	0.07%	9.97	7.98%	Insignificant
ER2	534607	203679	8.3	2021	0.01	0.01%	8.27	6.62%	Insignificant
ER3	539016	209557	9.9	2017	0.03	0.02%	9.97	7.98%	Insignificant
ER4	541137	199555	8.1	2019	0.03	0.03%	8.17	6.54%	Insignificant
ER5	538079	196106	8.3	2018	0.03	0.02%	8.37	6.69%	Insignificant
ER6	534667	207161	7.1	2018	0.04	0.04%	7.14	5.72%	Insignificant
ER7	532269	205102	7.1	2018	1.93	1.54%	9.05	7.24%	Insignificant
AQS: 125µg/m^3 *Results are to 2d.p.									

Table 69 SO_2 99.73rd percentile 1-hour mean results (µg/m³)

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	8.4	2019	0.56	0.16%	8.92	2.55%	Insignificant
HR2	534422	202671	8.4	2018	0.56	0.16%	8.92	2.55%	Insignificant
HR3	534821	202677	8.4	2019	0.57	0.16%	8.93	2.55%	Insignificant
HR4	534922	202614	8.4	2019	0.59	0.17%	8.95	2.56%	Insignificant
HR5	534989	202539	8.4	2019	0.80	0.23%	9.16	2.62%	Insignificant
HR6	534950	202219	8.4	2019	0.90	0.26%	9.26	2.65%	Insignificant
HR7	535094	202104	11.5	2019	0.70	0.20%	12.20	3.48%	Insignificant
HR8	535308	202249	11.5	2019	0.66	0.19%	12.16	3.47%	Insignificant
HR9	535292	202367	11.5	2019	0.70	0.20%	12.20	3.49%	Insignificant
HR10	535357	202235	11.5	2019	0.68	0.19%	12.18	3.48%	Insignificant
HR11	535525	202257	11.5	2019	0.80	0.23%	12.30	3.52%	Insignificant
HR12	535316	202007	11.5	2017	1.27	0.36%	12.77	3.65%	Insignificant
HR13	535287	201681	9.8	2017	1.04	0.30%	10.88	3.11%	Insignificant
HR14	535196	201187	9.8	2021	0.60	0.17%	10.44	2.98%	Insignificant
HR15	535246	200678	8.8	2017	0.50	0.14%	9.32	2.66%	Insignificant
HR16	535775	200601	8.8	2017	0.51	0.14%	9.33	2.66%	Insignificant
HR17	535967	200770	8.8	2021	1.12	0.32%	9.94	2.84%	Insignificant
HR18	534473	201464	7.8	2019	0.63	0.18%	8.43	2.41%	Insignificant
HR19	533885	201869	7.4	2017	0.66	0.19%	8.10	2.31%	Insignificant
HR20	533962	202274	7.6	2019	3.04	0.87%	10.66	3.05%	Insignificant
HR21	534814	201708	7.8	2020	1.53	0.44%	9.33	2.67%	Insignificant
HR22	534593	201553	7.8	2017	0.71	0.20%	8.51	2.43%	Insignificant
HR23	535641	201515	9.8	2017	0.70	0.20%	10.54	3.01%	Insignificant
HR24	535635	201357	9.8	2018	0.72	0.21%	10.56	3.02%	Insignificant
HR25	535594	201237	9.8	2017	0.73	0.21%	10.57	3.02%	Insignificant
HR26	535615	201836	9.8	2017	1.01	0.29%	10.85	3.10%	Insignificant
HR27	535292	201243	9.8	2018	1.83	0.52%	11.67	3.34%	Insignificant
HR28	534882	201856	7.8	2018	1.27	0.36%	9.07	2.59%	Insignificant
HR29	534944	201984	7.8	2019	0.96	0.27%	8.76	2.50%	Insignificant
HR30	535169	201989	9.8	2017	2.20	0.63%	12.04	3.44%	Insignificant
HR31	534841	201791	7.8	2017	0.40	0.11%	8.20	2.34%	Insignificant
HR32	534759	201702	7.8	2019	2.37	0.68%	10.17	2.91%	Insignificant
HR33	534725	201693	7.8	2020	2.53	0.72%	10.33	2.95%	Insignificant
HR34	534830	201759	7.8	2019	2.79	0.80%	10.59	3.03%	Insignificant
HR35	534816	201736	7.8	2020	2.77	0.79%	10.57	3.02%	Insignificant
HR36	534777	201643	7.8	2020	2.50	0.71%	10.30	2.94%	Insignificant

Receptor	X	Y	Short term SO_2 background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR37	534776	201607	7.8	2019	2.42	0.69%	10.22	2.92%	Insignificant
HR38	534773	201563	7.8	2019	2.46	0.70%	10.26	2.93%	Insignificant
HR39	534763	201496	7.8	2021	2.55	0.73%	10.35	2.96%	Insignificant
HR40	534768	201451	7.8	2021	2.72	0.78%	10.52	3.01%	Insignificant
HR41	534773	201408	7.8	2021	2.13	0.61%	9.93	2.84%	Insignificant
HR42	534900	201794	7.8	2018	2.01	0.57%	9.81	2.80%	Insignificant
HR43	534950	201783	7.8	2019	1.73	0.49%	9.53	2.72%	Insignificant
HR44	535009	201768	9.8	2019	1.43	0.41%	11.27	3.22%	Insignificant
HR45	535070	201756	9.8	2017	1.33	0.38%	11.17	3.19%	Insignificant
AQMA 1	535226	201678	9.8	2017	1.74	0.50%	11.58	3.31%	Insignificant
AQMA 2	535220	201525	9.8	2019	1.47	0.42%	11.31	3.23%	Insignificant
AQMA 3	535215	201387	9.8	2017	<0.01	<0.01%	9.84	2.81%	Insignificant
ER1	536612	201393	9.9	2020	0.34	0.10%	10.22	2.92%	Insignificant
ER2	534607	203679	8.3	2017	0.08	0.02%	8.34	2.38%	Insignificant
ER3	539016	209557	9.9	2017	0.14	0.04%	10.08	2.88%	Insignificant
ER4	541137	199555	8.1	2019	0.12	0.03%	8.26	2.36%	Insignificant
ER5	538079	196106	8.3	2018	0.13	0.04%	8.47	2.42%	Insignificant
ER6	534667	207161	7.1	2017	0.18	0.05%	7.28	2.08%	Insignificant
ER7	532269	205102	7.1	2019	2.64	0.75%	9.76	2.79%	Insignificant
AQS: 350µg/m^3 *Results are to 2d.p.									

C.4.4 CO results for scenario 4

Table 70 CO 8-hour rolling mean (µg/m³)

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR1	534162	202720	0.3	2018	1.25	0.01%	1.57	0.02%	Insignificant
HR2	534422	202671	0.3	2020	1.48	0.01%	1.80	0.02%	Insignificant
HR3	534821	202677	0.3	2020	1.66	0.02%	1.99	0.02%	Insignificant
HR4	534922	202614	0.3	2020	1.89	0.02%	2.22	0.02%	Insignificant
HR5	534989	202539	0.3	2020	3.34	0.03%	3.66	0.04%	Insignificant
HR6	534950	202219	0.3	2020	5.39	0.05%	5.72	0.06%	Insignificant
HR7	535094	202104	0.3	2020	4.22	0.04%	4.54	0.05%	Insignificant
HR8	535308	202249	0.3	2020	3.19	0.03%	3.51	0.04%	Insignificant
HR9	535292	202367	0.3	2020	4.38	0.04%	4.70	0.05%	Insignificant
HR10	535357	202235	0.3	2019	4.00	0.04%	4.32	0.04%	Insignificant
HR11	535525	202257	0.3	2020	7.13	0.07%	7.45	0.07%	Insignificant
HR12	535316	202007	0.3	2017	11.60	0.12%	11.92	0.12%	Insignificant
HR13	535287	201681	0.3	2017	4.48	0.04%	4.82	0.05%	Insignificant
HR14	535196	201187	0.3	2021	1.69	0.02%	2.03	0.02%	Insignificant
HR15	535246	200678	0.3	2017	1.28	0.01%	1.62	0.02%	Insignificant
HR16	535775	200601	0.3	2017	1.29	0.01%	1.63	0.02%	Insignificant
HR17	535967	200770	0.3	2019	3.44	0.03%	3.78	0.04%	Insignificant
HR18	534473	201464	0.3	2019	1.24	0.01%	1.57	0.02%	Insignificant
HR19	533885	201869	0.3	2018	1.45	0.01%	1.76	0.02%	Insignificant
HR20	533962	202274	0.3	2018	14.64	0.15%	14.95	0.15%	Insignificant
HR21	534814	201708	0.3	2019	6.38	0.06%	6.71	0.07%	Insignificant
HR22	534593	201553	0.3	2017	2.93	0.03%	3.27	0.03%	Insignificant
HR23	535641	201515	0.3	2017	2.49	0.02%	2.83	0.03%	Insignificant
HR24	535635	201357	0.3	2017	2.49	0.02%	2.82	0.03%	Insignificant
HR25	535594	201237	0.3	2017	4.83	0.05%	5.16	0.05%	Insignificant
HR26	535615	201836	0.3	2017	4.36	0.04%	4.70	0.05%	Insignificant
HR27	535292	201243	0.3	2020	9.41	0.09%	9.74	0.10%	Insignificant
HR28	534882	201856	0.3	2020	6.50	0.07%	6.84	0.07%	Insignificant
HR29	534944	201984	0.3	2020	8.32	0.08%	8.65	0.09%	Insignificant
HR30	535169	201989	0.3	2020	11.05	0.11%	11.39	0.11%	Insignificant
HR31	534841	201791	0.3	2017	0.88	0.01%	1.22	0.01%	Insignificant
HR32	534759	201702	0.3	2018	12.70	0.13%	13.03	0.13%	Insignificant
HR33	534725	201693	0.3	2018	12.48	0.12%	12.81	0.13%	Insignificant
HR34	534830	201759	0.3	2018	13.80	0.14%	14.14	0.14%	Insignificant

Receptor	X	Y	Short term CO background	Maximum Year	Maximum modelled PC*	% of standard	PEC	% of standard	Significance
HR35	534816	201736	0.3	2018	15.91	0.16%	16.24	0.16%	Insignificant
HR36	534777	201643	0.3	2018	15.14	0.15%	15.47	0.15%	Insignificant
HR37	534776	201607	0.3	2018	14.73	0.15%	15.06	0.15%	Insignificant
HR38	534773	201563	0.3	2018	13.49	0.13%	13.82	0.14%	Insignificant
HR39	534763	201496	0.3	2021	13.02	0.13%	13.35	0.13%	Insignificant
HR40	534768	201451	0.3	2021	13.12	0.13%	13.45	0.13%	Insignificant
HR41	534773	201408	0.3	2020	12.46	0.12%	12.79	0.13%	Insignificant
HR42	534900	201794	0.3	2020	17.29	0.17%	17.62	0.18%	Insignificant
HR43	534950	201783	0.3	2020	19.55	0.20%	19.89	0.20%	Insignificant
HR44	535009	201768	0.3	2020	18.09	0.18%	18.43	0.18%	Insignificant
HR45	535070	201756	0.3	2017	14.56	0.15%	14.90	0.15%	Insignificant
AQMA 1	535226	201678	0.3	2017	10.80	0.11%	11.13	0.11%	Insignificant
AQMA 2	535220	201525	0.3	2017	7.07	0.07%	7.41	0.07%	Insignificant
AQMA 3	535215	201387	0.3	2017	0.00	0.00%	0.33	0.00%	Insignificant
ER1	536612	201393	0.3	2018	0.61	0.01%	0.94	0.01%	Insignificant
ER2	534607	203679	0.3	2020	0.12	0.00%	0.43	0.00%	Insignificant
ER3	539016	209557	0.3	2017	0.19	0.00%	0.47	0.00%	Insignificant
ER4	541137	199555	0.3	2019	0.17	0.00%	0.47	0.00%	Insignificant
ER5	538079	196106	0.3	2018	0.17	0.00%	0.52	0.01%	Insignificant
ER6	534667	207161	0.3	2018	0.23	0.00%	0.51	0.01%	Insignificant
ER7	532269	205102	0.3	2018	14.43	0.14%	14.70	0.15%	Insignificant
AQS: 10,000µg/m^3 *Results are to 2d.p.									

C.4.5 Ecological results for scenario 4

Table 71 NO_x daily mean results (µg/m^3)

Receptor	X	Y	Short term NO_x background	Maximum Year	Maximum modelled PC	% of standard	PEC	% of standard	Significance
ER1	536612	201393	46.1	2018	191	255%	237	317%	Insignificant*
ER2	534607	203679	39.5	2020	136	181%	175	234%	Insignificant*
ER3	539016	209557	34.2	2020	17	23%	51	69%	Insignificant*
ER4	541137	199555	52.4	2021	39	52%	91	122%	Insignificant*
ER5	538079	196106	49.9	2021	99	132%	149	199%	Insignificant*
ER6	534667	207161	30.4	2021	42	57%	73	97%	Insignificant*
ER7	532269	205102	29.0	2017	60	80%	89	119%	Insignificant*

Critical level: 75µg/m^3

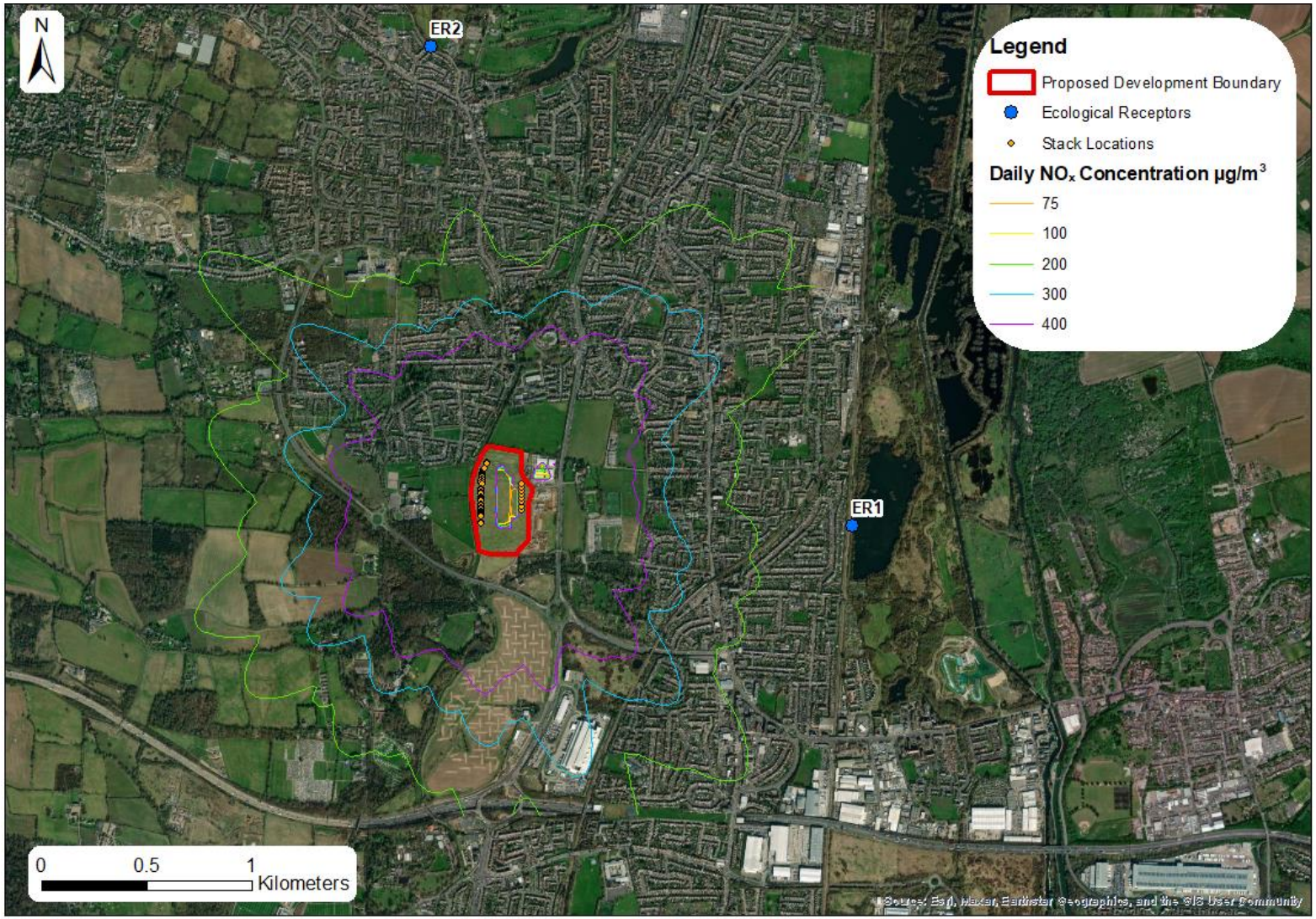
* Whilst the impacts on the NOx daily mean from the back-up generators during the emergency scenario are potentially significant, it should be noted that the chances of this scenario occurring are considered to be unlikely, based on the reliability of the electrical distribution network and the inbuilt design resilience.

Appendix D

Contour Plots

D.1 Scenario 4 Contour Plots

Figure 10 Contour plot of NO_x daily concentrations in Scenario 4, using 2021 meteorological data (worst year)



Appendix E

E.1 APIS Critical Load Acidity Plots

E.1.1.1 This section provides the acidity plots using the APIS critical load function tool for each testing scenario. There is no acidity plot available for ER2 Cheshunt Park LNR using the APIS critical load function tool.

Scenario 1

Figure 11 Acidity plot for ER1

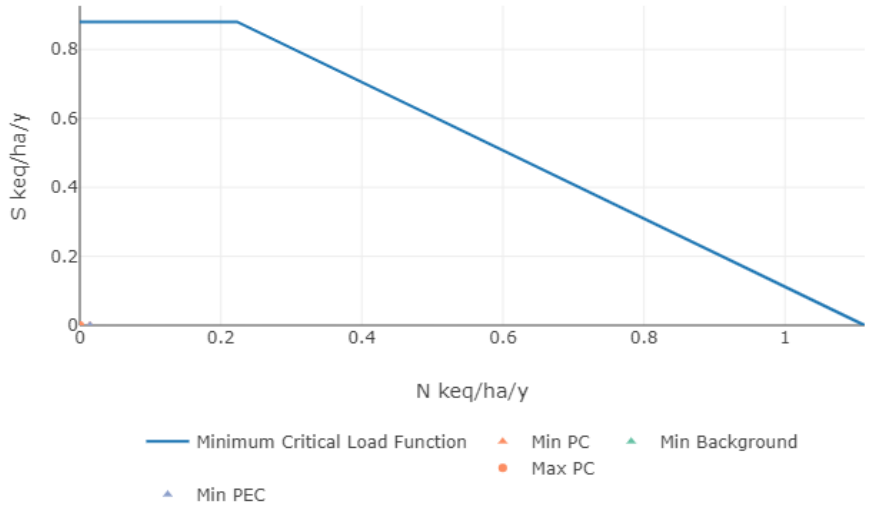


Figure 12 Acidity Plot for ER3

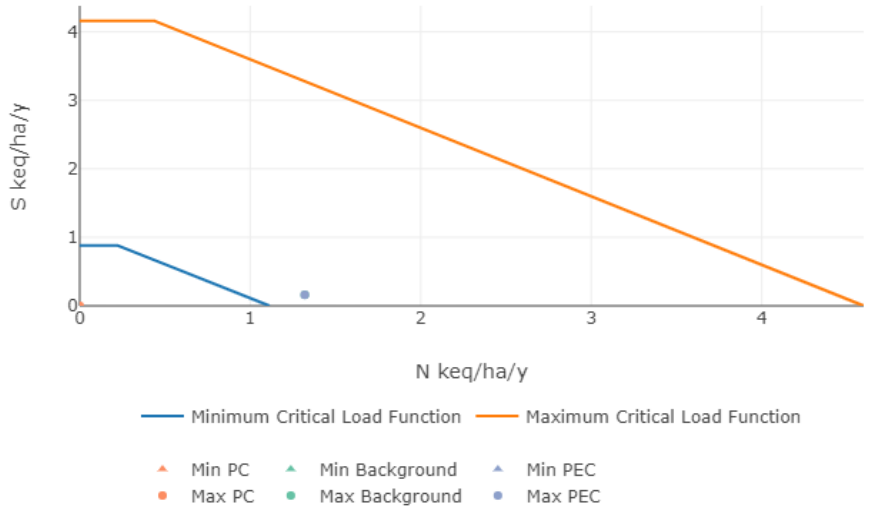


Figure 13 Acidity Plot for ER4

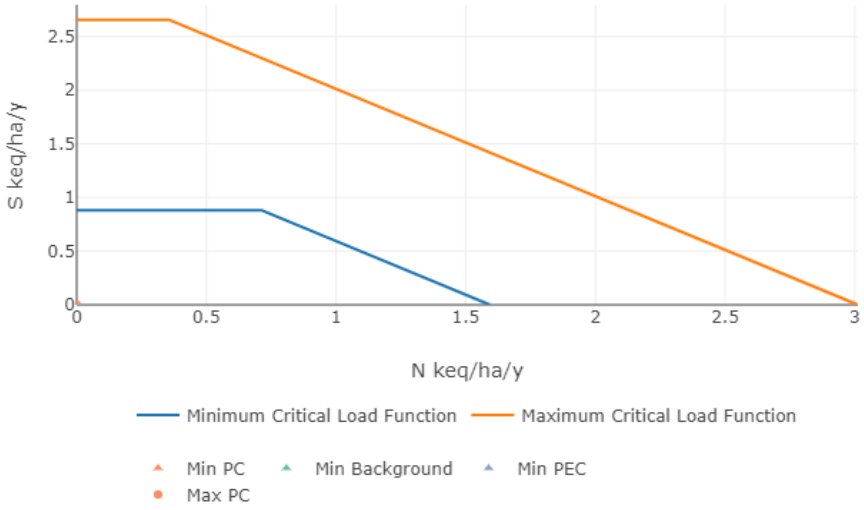


Figure 14 Acidity Plot for ER5

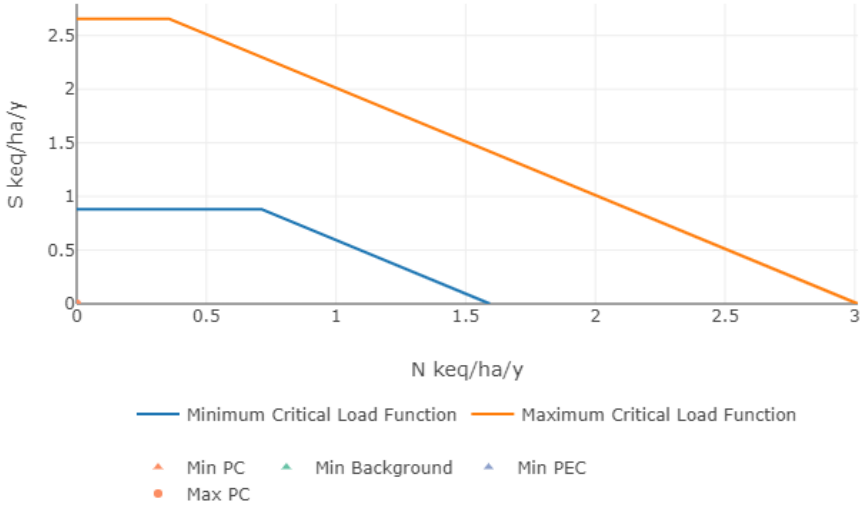


Figure 15 Acidity Plot for ER6

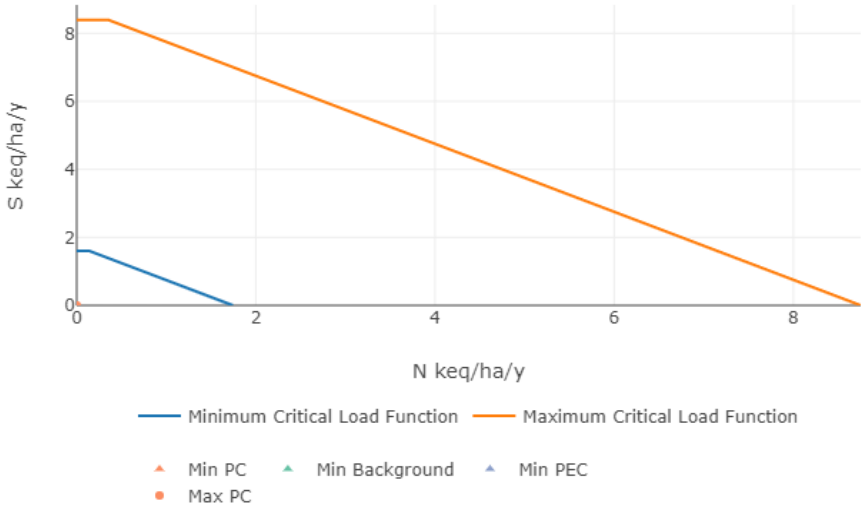
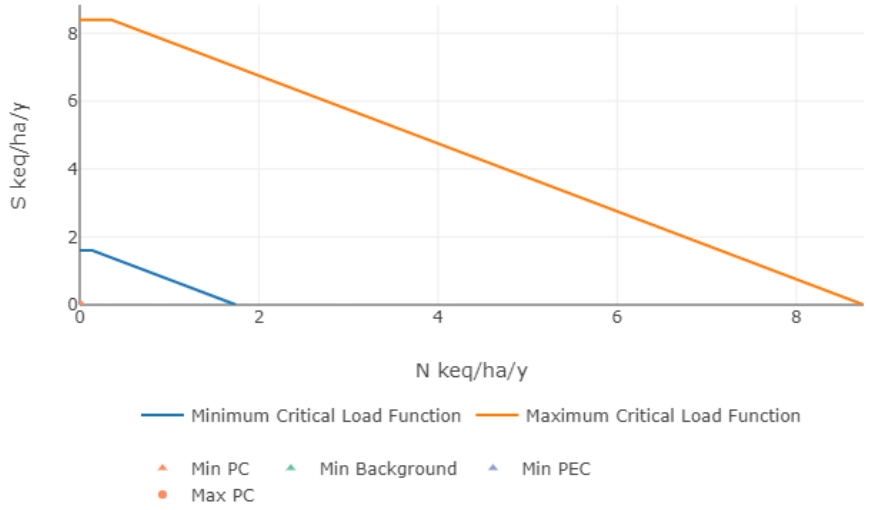


Figure 16 Acidity Plot for ER7



Scenario 2

Figure 17 Acidity plot for ER1A

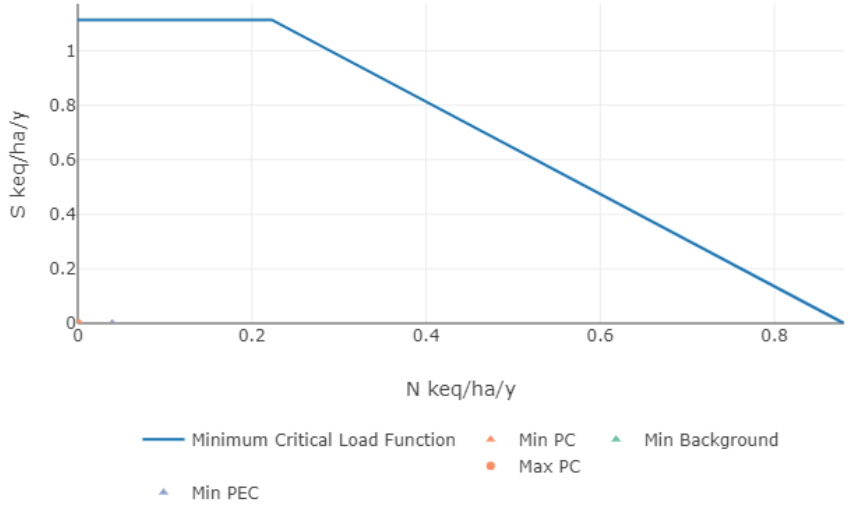


Figure 18 Acidity Plot for ER3

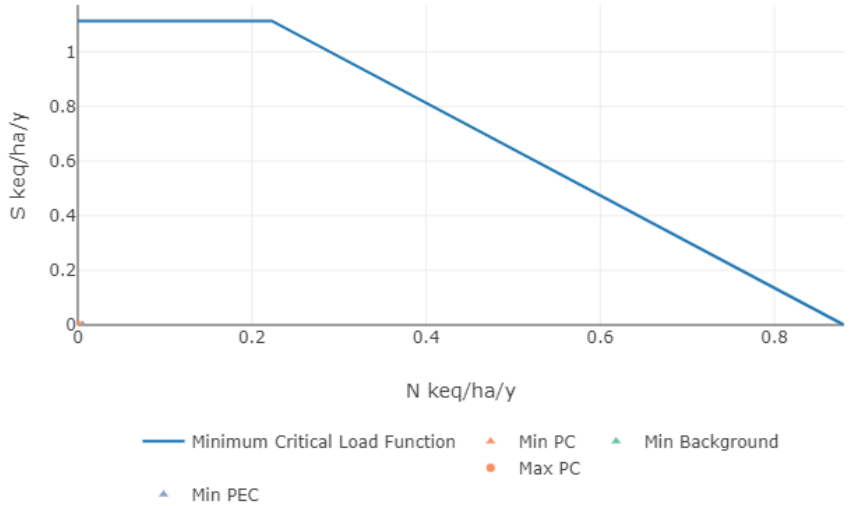


Figure 19 Acidity Plot for ER4

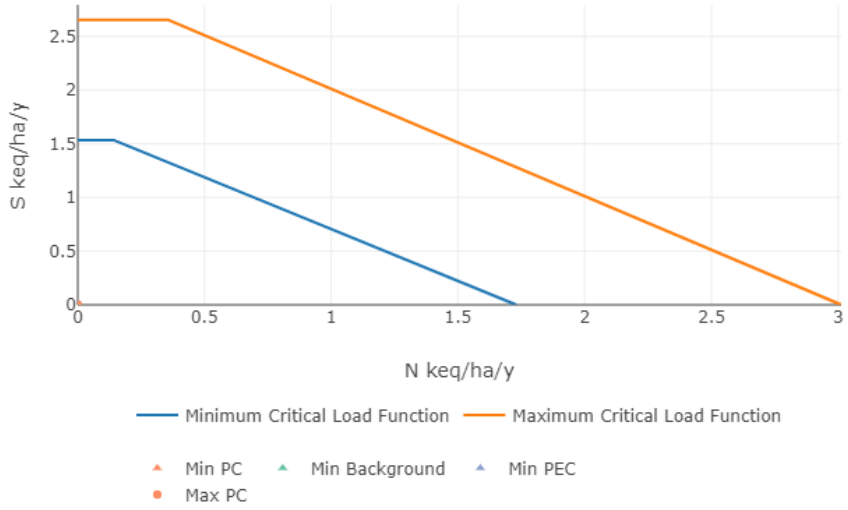


Figure 20 Acidity Plot for ER5

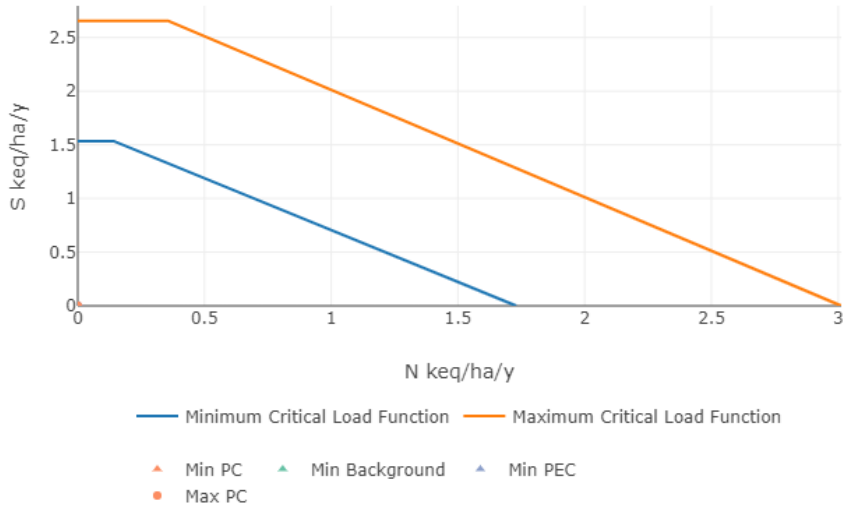


Figure 21 Acidity Plot for ER6

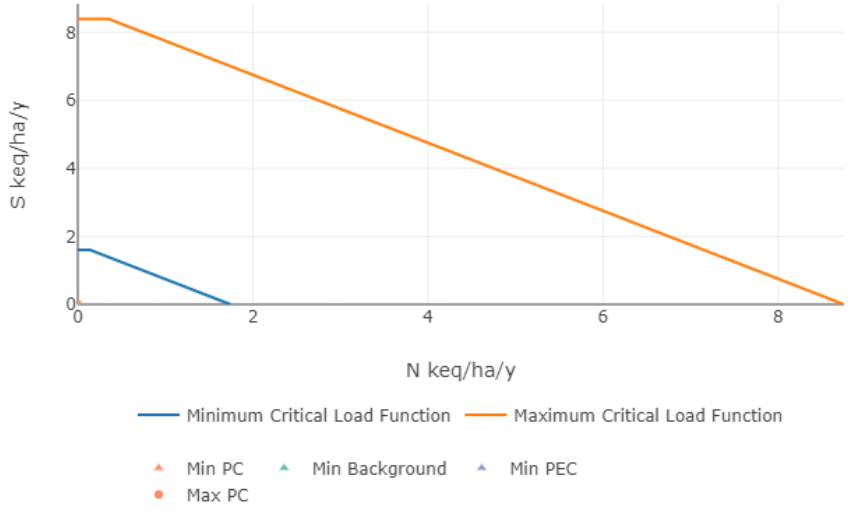
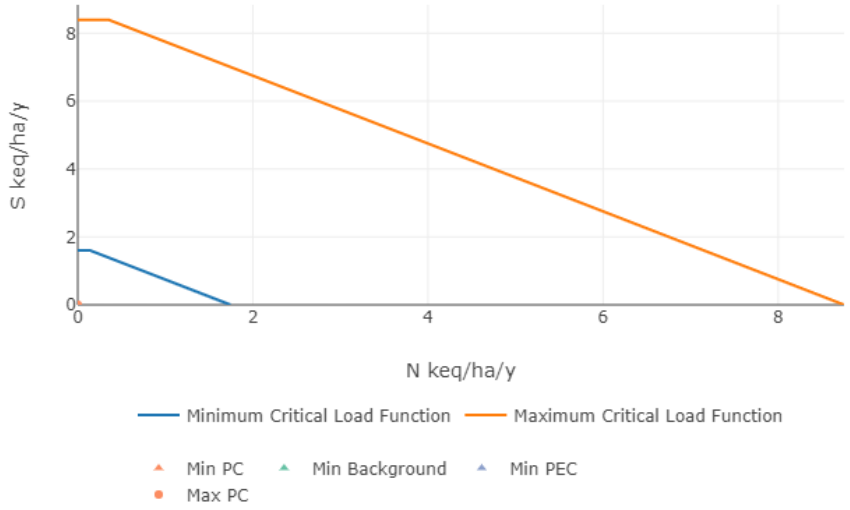


Figure 22 Acidity Plot for ER7



Scenario 3

Figure 23 Acidity plot for ER1

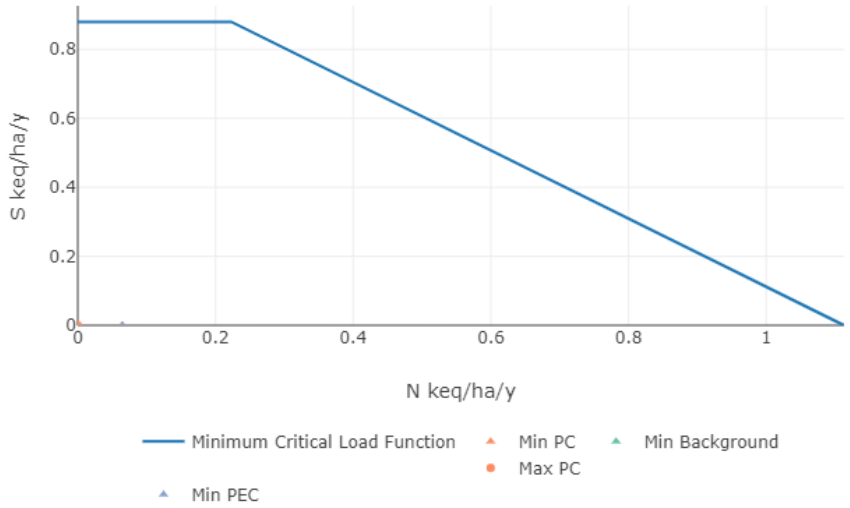


Figure 24 Acidity Plot for ER3

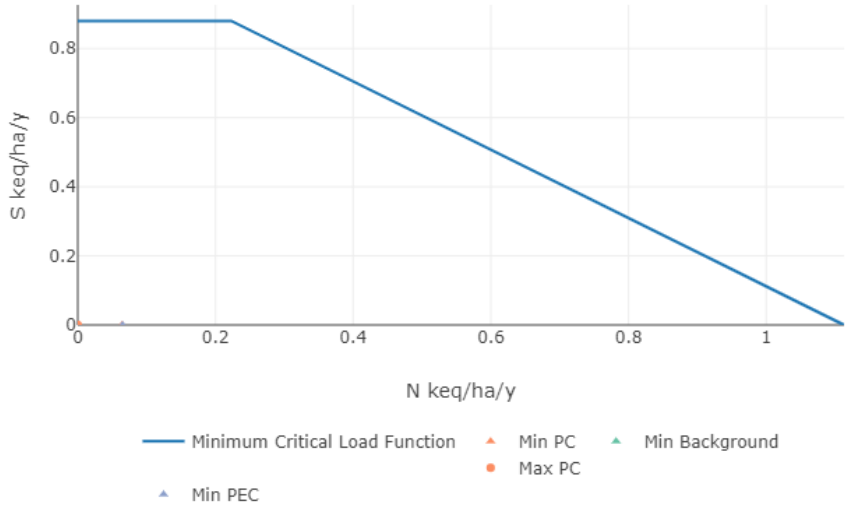


Figure 25 Acidity Plot for ER4

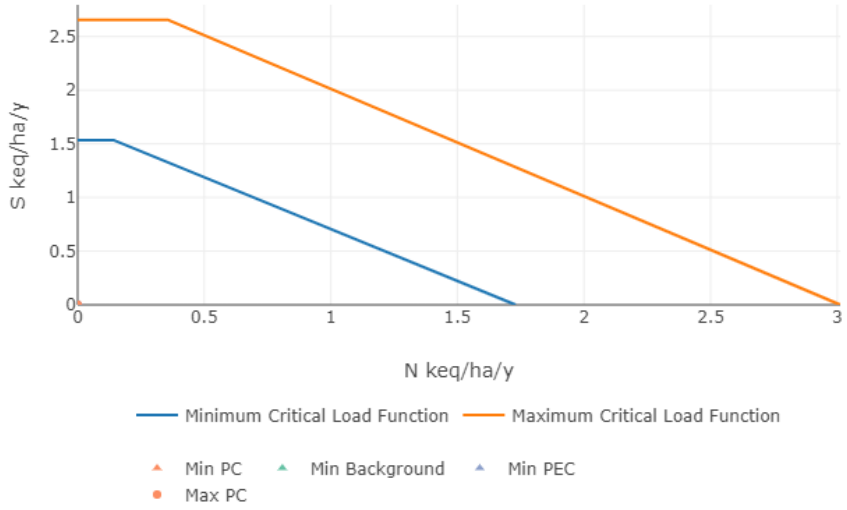


Figure 26 Acidity Plot for ER5

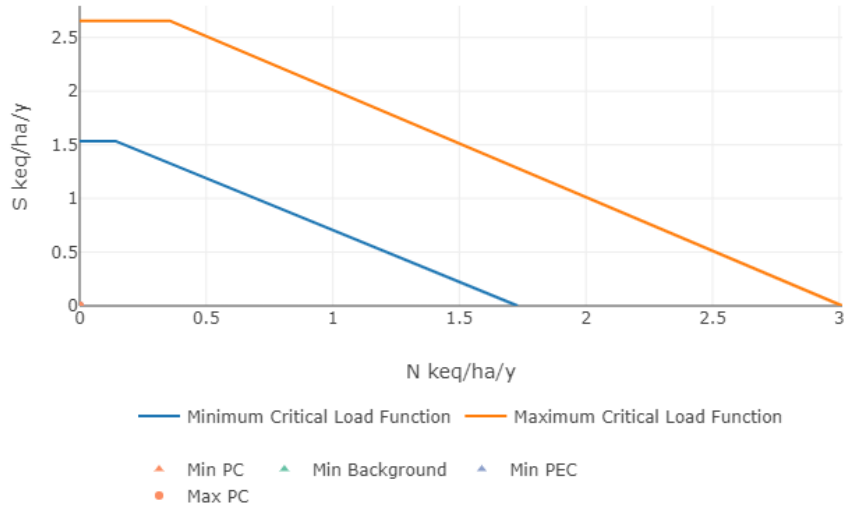


Figure 27 Acidity Plot for ER6

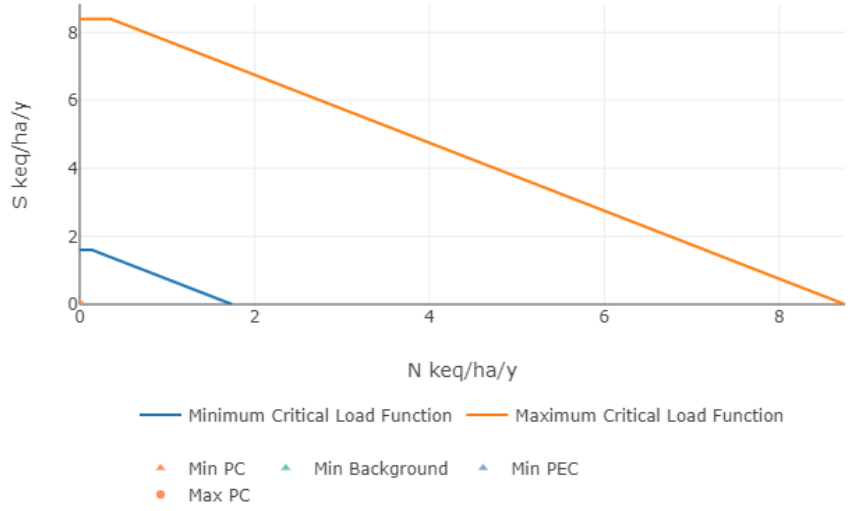


Figure 28 Acidity Plot for ER7