MOTT MACDONALD

Cambridge Sludge Treatment Centre

Air quality assessment to accompany permit application

30 November 2021

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Contents

1 Introduction

1.1 Overview

Anglian Water Services Limited (AWS) is applying to vary their existing standard rules permit (EPR/LP3196ER) and waste operations environmental permit (EPR/WP3535HT). The application seeks to consolidate these into a bespoke installation environmental permit for the Cambridge Sludge Treatment Centre (STC) (hereafter referred to as 'the permitting boundary') at Cambridge Water Recycling Centre (WRC) (hereafter referred to as 'the Site') to meet the requirements of the Environmental Permitting Regulations (EPR) 2016, as amended and the Industrial Emissions Directive (IED).

This report provides an assessment of the point source emissions to air, and subsequent air quality effects, associated with the proposed operation of the Site to demonstrate compliance with the requirements of the Medium Combustion Plant Directive (MCPD) and Specified Generator (SG) regulations. This report will be submitted as part of the wider IED permit application. The assessment has been undertaken in accordance with current Environment Agency (EA) guidance.

1.2 Site description and operating envelope

The Site will consist of one new 1.5MWth combined heat and power (CHP) plant, two existing biogas CHPs with rated thermal inputs of 1.4MWth and 0.9MWth respectively and three existing 1.0MWth gas oil boilers. The new and existing plant will provide heat and power to the Site and excess electricity from the two existing CHPs will be exported to the National Grid.

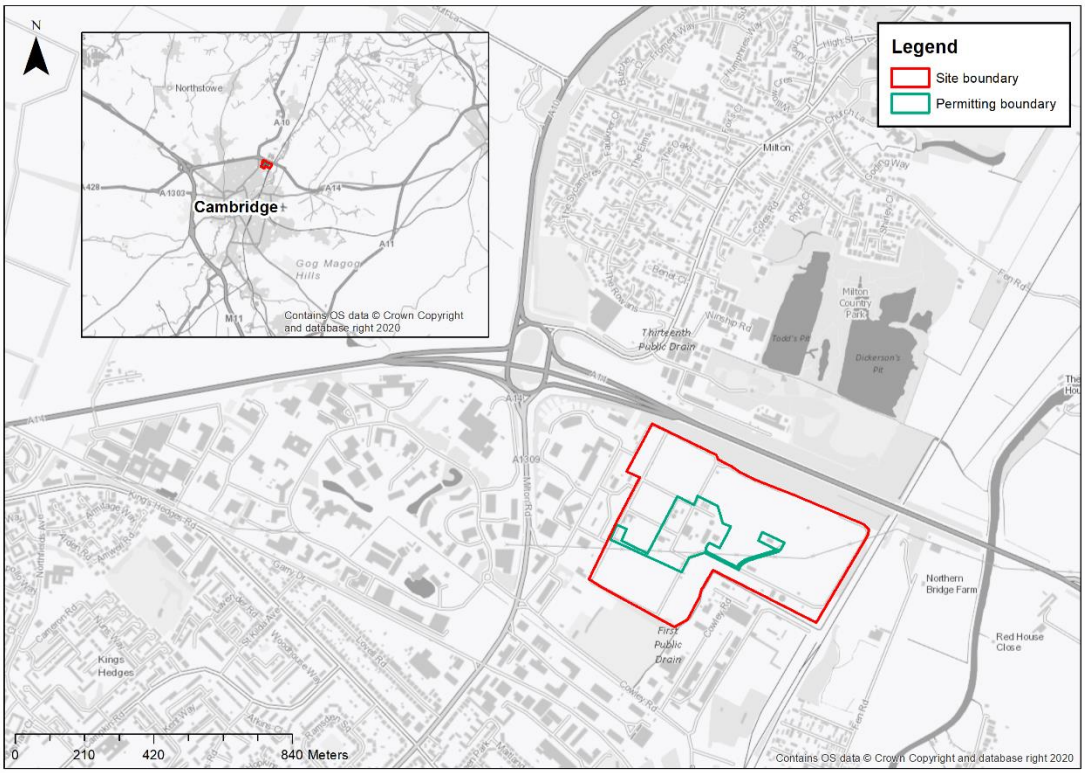
The proposed operation of the plant on the Site includes:

- A 1.5MWth biogas CHP operated continuously with no restrictions to operational hours
- A 1.4MWth biogas CHP operated continuously with no restrictions to operational hours
- A 0.9MWth biogas CHP operated continuously with no restrictions to operational hours
- Three 1.0MWth gas oil boilers operated as back-up only during testing or maintenance of the CHPs

1.3 Site location

The Site, which is owned and operated by AWS, is situated north of Cowley Road, just south of A14, Junction 33, within the administrative area of Cambridge City Council (CCC). The Site is surrounded primarily by industrial/commercial land use and the nearest residential receptors are approximately 500m to the south east of the Site at the Grange Park Residential Park on Fen Road. Figure 1 shows the location of the Site and the extent of the Site boundary.

Figure 1: Site location



1.4 Key pollutants

The assessment includes consideration of emissions of oxides of nitrogen (NO_X) and sulphur dioxide (SO_2). These are the key pollutants of potential concern given that the fuel used by the new CHP is biogas. The following sub-sections present a brief description of the key pollutants referred to above and their behaviour in the atmosphere.

1.4.1 Oxides of nitrogen

Oxides of nitrogen is a term used to describe a mixture of nitric oxide (NO) and NO_2, referred to collectively as NO_X. These are primarily formed from atmospheric and fuel nitrogen as a result of high temperature combustion. The main sources in the UK are road traffic and power generation.

During the process of combustion, atmospheric and fuel nitrogen is partially oxidised via a series of complex reactions to NO. The process is dependent on the temperature, pressure, oxygen concentration and residence time of the combustion gases in the combustion zone. Most NO_X exhausting from a combustion process is in the form of NO, which is a colourless and tasteless gas. It is readily oxidised to NO_2, a more harmful form of NO_X, by chemical reactions with ozone and other chemicals in the atmosphere. NO_2 is a yellowish-orange to reddish-brown gas with a pungent, irritating odour and is a strong oxidant.

1.4.2 Sulphur dioxide

SO_2 is a colourless, non-flammable gas with a penetrating odour that can irritate the eyes and air passages. It reacts on the surface of a variety of airborne solid particles, is soluble in water

and can be oxidised within airborne water droplets. The most common sources of SO_2 include fossil fuel combustion, smelting, manufacture of sulphuric acid, conversion of wood pulp to paper, incineration of waste and production of elemental sulphur. Coal burning is the single largest man-made source of sulphur dioxide accounting for about 50% of annual global emissions, with oil burning accounting for a further 25-30%. The most common natural source of SO_2 is volcanoes.

2 Legislative context

2.1 Overview

This section summarises the relevant international and national legislation, policy and guidance in relation to air quality at the Site.

2.2 England

The Air Quality Standards Regulations 2010[1], Air Quality Standards (amendment) Regulations 2016[2] and Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019[3] Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[4] implement Directive 2008/50/EC on ambient air quality[5].

Schedule 11 of the Environment Act 2021[6] presents amendments to Part IV of the Environment Act 1995[7], setting out the duties required by public authorities in England. Local authorities have to consider and assess whether current and forecasted air quality levels in their areas are likely to exceed the objectives set out in the Air Quality (England) Regulations 2000[8] and the Air Quality (England) (Amendment) Regulations 2002[9].The objectives that are set out in these regulations are, in most cases, numerically synonymous with the limit values specified within the legislation, although compliance dates differ. Where an area exceeds an air quality objective, an Air Quality Management Area (AQMA) must be declared, and an Air Quality Action Plan (AQAP) must be prepared to specify and implement measures to improve air quality.

The Environment Act 1995[10] and The Environment Act 2021 requires the UK Government to produce a national 'Air Quality Strategy' (AQS). The AQS establishes the UK framework for air quality improvements. Measures agreed at the national and international level are the foundations on which the strategy is based. The first Air Quality Strategy was adopted in 1997[11] and replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, published in January 2000[12]. The 2000 Strategy has subsequently been replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007[13] and the Clean Air Strategy 2019 (CAS).[14]

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

[2] Statutory Instrument. (2016) *The Air Quality Standards (Amendment) Regulations*, No. 1184.

[3] Statutory Instrument. (2019) Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations

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

[5] European Union. (April 2008) *Directive on ambient air quality and cleaner Air for Europe, Directive 2008/50/EC* Official Journal, vol. 152, pp. 0001-0044

[6] Department for Environment Food and Rural Affairs. (2021) Schedule 11 of the Environment Act 2021

[7] Department for Environment Food and Rural Affairs. (2003) Part IV of the Environment Act 1995 Local Air Quality Management

[8] Statutory Instrument. (2000), 'Air Quality (England) Regulations', No. 928

[9] Statutory Instrument. (2002), 'Air Quality (England) (Amendment) Regulations', No. 3043

[10] Department for Environment Food and Rural Affairs. (2003) Part IV of the Environment Act 1995 Local Air Quality Management

[11] Department for Environment Food and Rural Affairs. (March 1997), 'The United Kingdom National Air Quality Strategy', Cm 3587, Department for Environment Food and Rural Affairs.

[12] Department for Environment Food and Rural Affairs. (January 2000), 'The Environment Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air', Cm 4548, Department for Environment Food and Rural Affairs

[13] Department for Environment Food and Rural Affairs. (July 2007), 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland', Cm 7169, Department for Environment Food and Rural Affairs

[14] Department for Environment Food and Rural Affairs. (January 2019), 'The Clean Air Strategy'

Although the CAS does not set legally binding objectives, the CAS instead has targets for reducing total UK emissions of NOx from sectors such as road transport, domestic sources and industry.

2.3 Permitting requirements and associated guidance

2.3.1 Overview

The Medium Combustion Plant Directive (MCPD) (Directive 2015/2193) [15] regulates emissions of NOx, SO_2 and particles into the air from combustion plants with a rated thermal input equal to or greater than 1 megawatt thermal (MWth) and less than 50 MWth. Schedules 25A and 25B of the Environmental Permitting (Amendment) Regulations 2018[16] implements this directive while also including additional provisions for generators. Generators are subject to the Environmental Permitting (EP) regulations if they:

- Have a capacity agreement or an agreement to provide balancing services, or,
- They form part of a specified generator[17] (SG) with a total rated thermal input of 1-50MWth.

Specified generators are subject to more stringent requirements than the MCPD in that, depending on the type of generator, they may be required to have a permit by an earlier date than would be required under the MCPD.

Depending on the potential level of risk to air quality, the preparation of a permit application can include the requirement for an air quality assessment. Key guidance issued by the EA to assist with undertaking an air quality assessment for an environmental permit includes:

- Air emissions risk assessment for your environmental permit[18]
- Environmental permitting: air dispersion modelling reports[19]
- Specified generators: dispersion modelling assessment guidance[20]
- Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air[21]

2.3.2 Permitting requirements at the Site

AWS are applying to vary their existing standard rules permit and waste operations environmental permit to consolidate these into a bespoke installation environmental permit for the Site.

The 1.5MWth CHP would be classified as ‘new’ under the MCPD. The CHP is classified as a Tranche B specified generator and is required to meet the requirements associated with generators under Schedule 25B of the EP (Amendment) Regulations 2018.

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

[16] The Environmental Permitting (England and Wales) Regulations 2016 No.1154

[17] Specified generator = Individual or multiple generators at the same location or site, operated by the same Operator and for the same purpose

[18] Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

[19] Environment Agency, 2014. Environmental permitting: air dispersion modelling reports. Available at: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports

[20] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

[21] Environment Agency (2006). Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air: Habitats Directive 2004 (AQTAG 06).

The existing 1.4MWth and 0.9MWth CHPs were commissioned before the 1st December 2016 and are therefore classified as 'existing' plant under the MCPD. These are classified as Tranche A specified generators and are required to meet the requirements associated with generators under Schedule 25B of the EP (Amendment) Regulations 2018. This is in addition to the emission limits set out in the MCPD, as the Site is proposed to be operating for more than 500 hours a year.

All the CHPs are proposed to be fired on biogas. The new CHP will be required to meet a NOx emission limit of 190mg/Nm^3 and a SO_2 emission limit of 40mg/Nm^3 (standard conditions[22], dry @ 15% O_2) and the existing CHPs will be required to meet NOx emission limit of 190mg/Nm^3 and a SO_2 emission limit of 60mg/Nm^3 (standard conditions[23], dry @ 15% O_2). The CHPs will only operate on biogas so there are no applicable emission limits for carbon monoxide (CO) or dust/particulate matter. As the CHPs have a rated thermal input of less than 20MWth, the Site is exempt from the requirements of Schedule 24 of the EP Regulations 2016 which implement the relevant requirements of the Energy Efficiency Directive (2012/27/EU).

The three gas oil boilers qualify for the MCPD regulations as they have a rated thermal input of 1MWth each. The boilers will be required to meet a NO_X emission limit of 200mg/Nm^3 (standard conditions[24], dry @ 3% O_2).

2.3.3 Assessment criteria

The following section presents the relevant air quality standards that are applicable to the Site and that the Site will be assessed against. These are collectively described as the Environmental Quality Standards (EQS).

The EA's risk assessment guidance[25] provides guidelines on Ambient Air Directive (AAD) limit values, UK air quality objectives and environmental assessment levels (EALs) that the impact should be compared against. Further EQS to assess the potential impact at designated sites are available from the Air Pollution Information System[26] (APIS).

2.3.3.1 Air quality limit values and objectives

Table 1 summarises the AAD limit values and air quality objectives for the pollutants relevant to this assessment.

Table 1: Summary of relevant air quality objectives and AAD limit values

Pollutant	Averaging period	Objective / limit value (µg/m³)	Allowance (per calendar year)
For the protection of human health			
Nitrogen dioxide (NO_2)	1-hour	200	18
	Annual	40	–
Sulphur dioxide (SO_2)	24-hour	125	3
	1-hour	350	24
	15-minute	266	35
For the protection of vegetation and ecosystems			
Nitrogen oxides (NO_X)	Annual	30	–

[22] At a temperature of 273.15K, pressure of 101.3kPa
[23] At a temperature of 273.15K, pressure of 101.3kPa
[24] At a temperature of 273.15K, pressure of 101.3kPa
[25] Environment Agency. (2016) 'Air Emissions Risk Assessment for your Environmental Permit'.
[26] UK Air Pollution Information System (APIS) www.apis.ac.uk [last accessed 09/07/2019]

Pollutant	Averaging period	Objective / limit value (µg/m³)	Allowance (per calendar year)
SO_2	Annual	20	–

The limit values apply everywhere with the exception of:

a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation
b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply
c) On the carriageway of roads, and
d) On the central reservations of roads except where there is normally pedestrian access to the central reservation.

Table 2 provides examples of the locations where the UK air quality objectives apply for the protection of human health. This has been used to define where the AAD limit values and air quality objectives should apply within the assessment.

Table 2: Locations where air quality objectives apply

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

Specified generator guidance published by the EA[27] states that the annual and hourly NO_2 objectives should be considered at sensitive receptors where "there is relevant public exposure". Relevant public exposure is defined as a location where members of the public:

- Have access
- Are regularly present, and
- Can be exposed for a significant portion of the averaging time of the standard.

Consequently, the standards do not apply where health and safety at work provisions exist and where members of the public do not have access, such as within the Site boundary.

[27] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

2.3.3.2 Environmental Assessment Levels

In addition to the AAD limit values and air quality objectives, the EA risk assessment guidance[28] provides further assessment criteria in the form of Environmental Assessment Levels (EALs). The EALs cover a wide range of pollutants and also specify target values for the protection of conservation areas. Any exceedances of these EALs may result in further action needing to be taken to reduce the impact on the environment. EALs applicable to the assessment (also referred to as critical levels in the context of designated sites) are presented in Table 3.

Table 3: Summary of relevant EALs/critical levels for the protection of conservation areas

Pollutant	Averaging period	EAL/critical level (µg/m³)
NO_X	24 hours	75
	Annual	30[(a)]
SO_2	Annual	10-20[(b)]

Notes: (a) Numerically synonymous with the annual AAD limit value
(b) 10µg/m³ where lichens or bryophytes are present, 20µg/m³ where they are not present

In addition to these EALs, APIS provides targets for nitrogen and acid deposition for specific habitats and species. These EALs, also known as critical loads, are only available for Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Sites of Special Scientific Interest (SSSI).

[28] Environment Agency. (2016) 'Air Emissions Risk Assessment for your Environmental Permit'.

3 Methodology

3.1 Overview

In accordance with EA risk assessment guidance[29], the approach to the air quality assessment has involved the following key elements:

- Calculation of the environmental concentration of pollutants released to the air (Process Contributions (PC) and Predicted Environmental Concentrations (PEC))
- Identification of whether the PCs and PECs have a significant environmental impact by comparing with the relevant EQS

PECs have been calculated by adding the PC to a representative value for the background concentration. Section 3.3.2 provides further details on the background concentrations used in this assessment.

As a complex bespoke permit application is required to meet the MCP and SG requirements of the wider IED permit, detailed modelling has been undertaken to calculate PCs and PECs to determine whether emissions from the Site are significant. A simple bespoke risk assessment cannot be undertaken using the Specified Generator Tranche B Screening tool as the Site includes CHPs operating on biogas.

3.2 Modelling approach

3.2.1 Model selection

Commercially available dispersion models are available to predict ground level concentrations arising from emissions to air from elevated point sources.

ADMS is a “new generation” dispersion model, developed by Cambridge Environmental Research Consultants (CERC), which models a wide range of buoyant and passive releases to the atmosphere either individually or in combination. ADMS brings together the results of recent research on dispersion modelling. The model calculates the mean concentration over flat terrain, allowing for the effect of plume rise, complex terrain, buildings, radioactive decay and deposition. The model has been subject to extensive validation. ADMS comprises of a number of individual modules each representing one of the processes contributing to dispersion or an aspect of data input and output. The latest version of the model, ADMS 5.2.2.0, has been used in this assessment.

3.2.2 Buildings

The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 - 40% of the stack height, downwash effects can be significant. ADMS includes a building effects module to calculate the dispersion of pollution from sources near large structures. The buildings likely to have a dominant effect (i.e. with the greatest dimensions likely to promote turbulence) which have been included within the model are listed in Table 4 and illustrated in Figure 2.

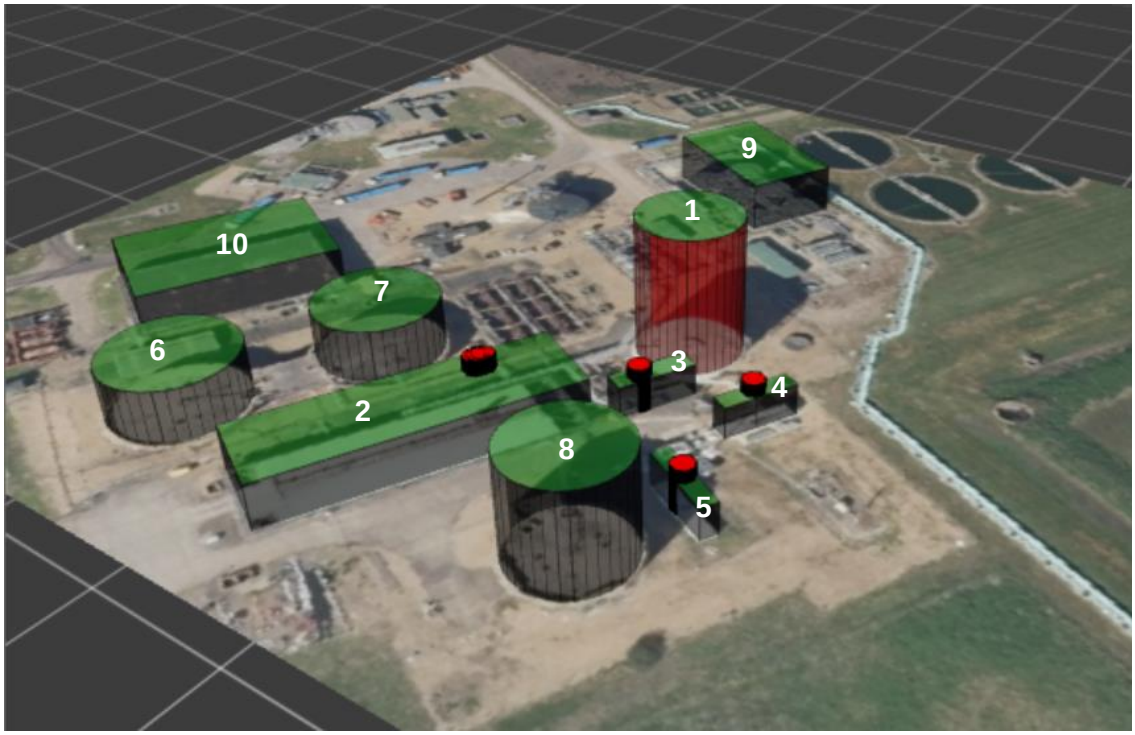
[29] Environment Agency. (2016) ‘Air Emissions Risk Assessment for your Environmental Permit’.

A sensitivity test was conducted to determine which buildings to model as the ‘main’ building. The ‘Boiler House’ was found to result in the highest emission contributions at the greatest number of modelled receptors, therefore was assigned as the ‘main’ building for the model.

Table 4: Building dimensions used within the assessment

No.	Name	X (m)	Y (m)	Height (m)	Length (m)	Width (m)	Angle (°)
1	Gas Holder	547523.4	261646.5	22.0	16.2	16.2	0
2	Boiler House	547506.0	261604.9	7.0	14.1	46.4	27
3	CHP 1	547526.9	261631.3	5.0	3.6	12.1	27
4	CHP 2	547541.7	261634.9	5.0	3.1	11.7	27
5	CHP 3	547543.8	261613.7	5.0	2.8	12.7	117.5
6	Anaerobic Digester 1	547471.3	261594.2	8.4	20.0	20.0	0
7	Anaerobic Digester 2	547484.6	261620.5	8.4	19.2	19.2	0
8	Anaerobic Digester 3	547536.8	261599.6	16.0	17.2	17.2	0
9	EEH Tank Area	547503.9	261698.5	8.4	15.7	25.7	117
10	Maintenance Building	547448.5	261622.1	6.5	22.2	31.7	27

Figure 2: Building layout



3.2.3 Meteorology

The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability as described below:

- Wind direction determines the sector of the compass into which the plume is dispersed.
- Wind speed affects the distance the plume travels over time and can affect plume dispersion by increasing the initial dilution of pollutants and inhibiting plume rise.
- Atmospheric stability is a measure of the turbulence of the air, and particularly of its vertical motion. It therefore affects the spread of the plume as it travels away from the source. ADMS uses a parameter known as the Monin-Obukhov length that, together with the wind speed, describes the stability of the atmosphere.

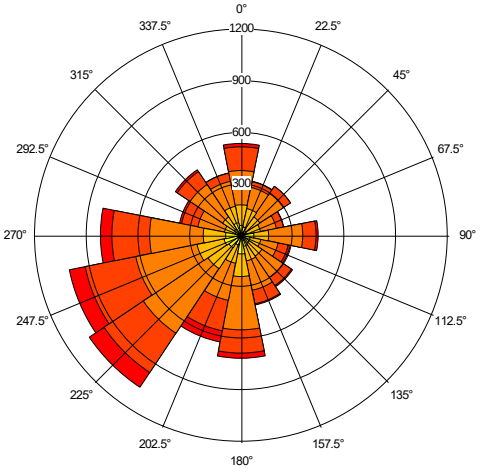
For meteorological data to be suitable for dispersion modelling purposes, parameters need to be measured on an hourly basis. These parameters include wind speed, wind direction, cloud cover and temperature. There are only a limited number of sites where the required meteorological measurements are made.

The year of meteorological data that is used for a modelling assessment can have a significant effect on source contribution concentrations. As recommended by the EA dispersion modelling guidance[30], modelling was undertaken using five years of data. Data from Mildenhall meteorological station was used as this was the most representative station due to its proximity to the Site, located approximately 25 kilometres to the north east, and is located at a similar elevation to the Site. Data from the last five years were used, comprising the years 2016 to 2020.

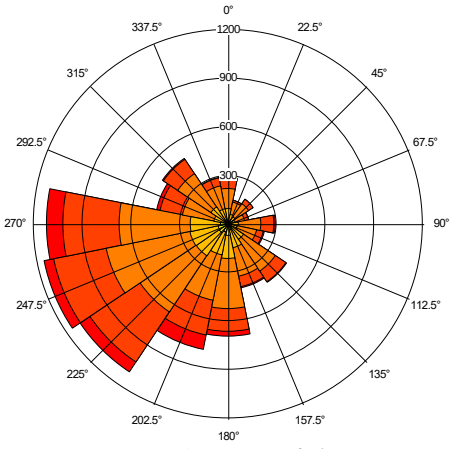
Wind roses have been constructed for each of the five years of meteorological data used in this assessment. The wind roses presented in Figure 3 illustrate that in most years there is dominance in winds from the south west.

[30] Environment Agency, 2014. Environmental permitting: air dispersion modelling reports. Available at: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports

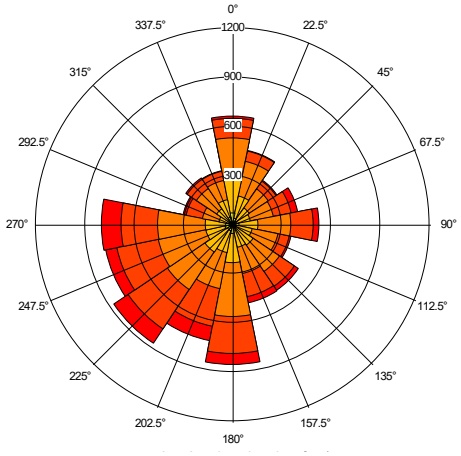
Figure 3: Wind roses for Mildenhall (2016 – 2020)



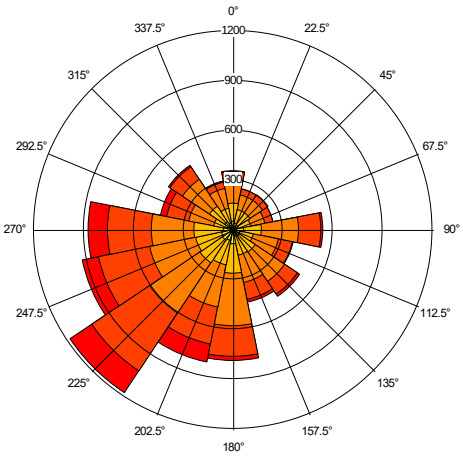
2016



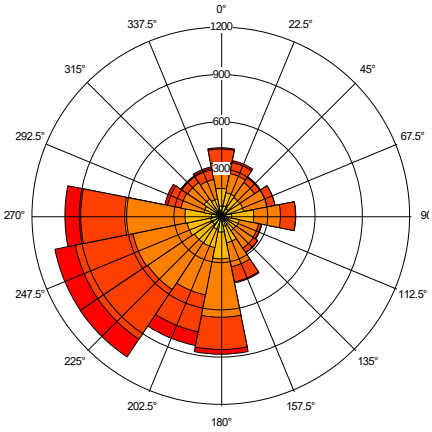
2017



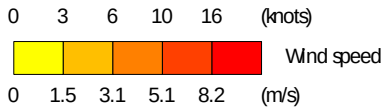
2018



2019



2020



Scale

3.2.4 Terrain

The presence of elevated terrain can significantly affect (usually increase) ground level concentrations of pollutants emitted from elevated sources such as stacks by reducing the distance between the plume centre line and ground level and increasing turbulence and, hence, plume mixing.

Terrain in the region of the Site is generally flat, although there are some slopes with gradients more than 10%. Therefore, in accordance with EA specified generator guidance[31], terrain data has been included in the dispersion model.

3.2.5 Surface roughness

The roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height and the degree of atmospheric turbulence. This is accounted for by a parameter called the surface roughness length. A surface roughness length of 0.5m has been assigned to the model domain while a surface roughness length of 0.3m has been assigned to the Mildenhall meteorological station.

3.2.6 Emissions data

Emissions for the new CHP used in this assessment are based on a plant load of 100% and assumes that exhaust gases will contain the maximum guaranteed concentration of pollutants permitted.

The NOx emissions modelled in this assessment are based on the emissions guaranteed by the engine manufacturer and information supplied by AWS. These emission guarantees are compliant with the MCP ELVs within the MCPD and the specified generator ELV within the EP regulations.

Table 5 presents the emission parameters used in the dispersion modelling and is based on information provided by the engine supplier. Emission rates have been calculated using the equations presented below:

Emission rate = Plant emission limit x Normalised gas flow.

Correcting for water content:

Dry value = Measured value x 100 / (100 – H_2O measured concentrations [%]).

Correcting for oxygen content:

Corrected value = Measured value x (21 – O_2 Reference value [%] / 21 – O_2 Measured Value [%]).

Correcting for temperature:

Corrected value = Measured value x (Temperature of measured value [K] / 273 [K]).

[31] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

Table 5: Stack emission parameters

Parameter	Units	New CHP 1.5MWth[(h)]	Existing CHP 1.4MWth	Existing CHP 0.9MWth	3 x existing boilers 1.0MWth
Stack location	x,y	X: 547543, Y: 261613	X: 547541, Y: 261634	X: 547526, Y: 261629	X: 547508, Y: 261615 X: 547508, Y: 261616 X: 547509, Y: 261616
Fuel	-		Biogas		Gas Oil
Stack height	m	7	7	7	9.5
Stack diameter	m	0.23	0.25	0.20	0.5
Exit temperature	°C	447	447	447	210
Efflux velocity (actual)	m/s	42.3	17.9	8.7	10.0
Volumetric flow rate (actual)	Am^3/s	4.484[(a)]	2.311[(b)]	0.724[(C)]	3.473[(d)]
Volumetric flow rate (normalised) [(b)]	Nm^3/s	3.073[(e)]	1.707[(e)]	0.494[(e)]	1.442[(f)]
NO_x emission	mg/Nm^3	190	190	190	67.7[(g)]
	g/s	0.584	0.324	0.094	0.098
SO_2 emission	mg/Nm^3	40	60	60	-
	g/s	0.123	0.102	0.030	-

Notes:
(a) Actual conditions = 7.85% O_2, 447°C, 1 atm, 11.6% H_2O
(b) Actual conditions = 6.73% O_2, 447°C, 1 atm, 13.0% H_2O
(c) Actual conditions = 8.13% O_2, 447°C, 1 atm, 10.5% H_2O
(d) Actual conditions = 5.6% O_2, 447°C, 1 atm, 10.3% H_2O
(e) Normalised conditions = 15% O_2, 0°C, 1 atm, dry air
(f) Normalised conditions = 3% O_2, 0°C, 1 atm, dry air
(g) based on 33ppm monitored emission concentration
(h) emissions calculated based on the two stacks of the new CHP emitting from a single stack

3.3 Post processing of results

3.3.1 NOx to NO_2 relationship

The NOx emissions associated with combustion activities at the Site will typically comprise approximately 90-95% nitric oxide (NO) and 5-10% nitrogen dioxide (NO_2) at source. As described previously, the NO oxidises in the atmosphere in the presence of sunlight, ozone and volatile organic compounds to form NO_2, which is the principal concern in terms of environmental health effects.

There are various techniques available for estimating the portion of the NOx that is converted to NO_2, which will increase with distance from the source. The EA's specified generator modelling guidance[32] identifies that a 70% conversion of NOx to NO_2 should be used for calculation of annual average concentrations and a 35% conversion of NOx to NO_2 should be used for calculation of short-term concentrations. The EA's recommended conversion rates have been used in this assessment.

3.3.2 Background/ambient concentrations

Background concentrations, or ambient concentrations (AC), are added to the PCs to determine the PEC at modelled receptors. EA dispersion modelling guidance[33] states that Defra background maps or local authority/Defra monitoring data can be used as a representative value for the background concentrations in the assessment. Therefore, Defra background maps have been used to represent the AC at gridded receptors (see Section 4.3 for more details).

However, the EA specified generator guidance[34] states that low resolution grid average background values may not be suitable for receptor locations close to other sources such as busy roads or major industry. Receptors 2 and 4 are located within approximately 200m of the A14 and therefore the 2019 monitored NO_2 concentrations at 96 High Street Sawston (a nearby monitoring site located at a similar location) has been used to represent the worst-case AC at receptors 2 and 4 for NO_2. The Defra background maps have been used to represent the AC at the remaining discrete receptors, which are located away from busy roads and major industry.

As the concentrations from the background maps and monitoring locations are representative of long-term (annual) average concentrations, short-term background concentrations have been estimated by doubling the long-term background concentrations. This is in accordance with EA risk assessment guidance[35].

3.4 Sensitive receptors

Gridded receptors and discrete human health receptors have been considered within this assessment.

3.4.1 Gridded receptors

Pollutant concentrations have been modelled across a Cartesian grid with 20 metre spacing up to 1km from the Site and 100m spacing up to 5km from the Site. The extent of the grid has been

[32] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

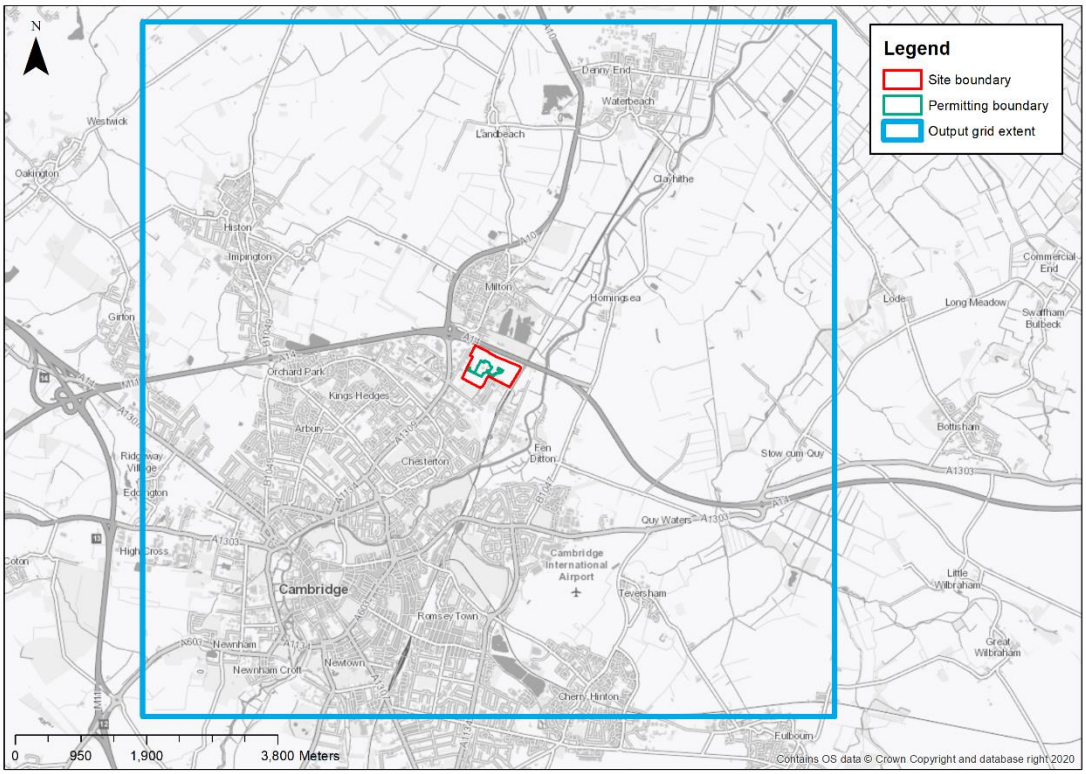
[33] Environment Agency, 2014. Environmental permitting: air dispersion modelling reports. Available at: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports

Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

presented in Figure 4. This assessment has not considered on-site concentrations as the EQSs would not apply at these locations as there is no relevant public exposure.

Figure 4: Gridded receptor model extent



3.4.2 Human health

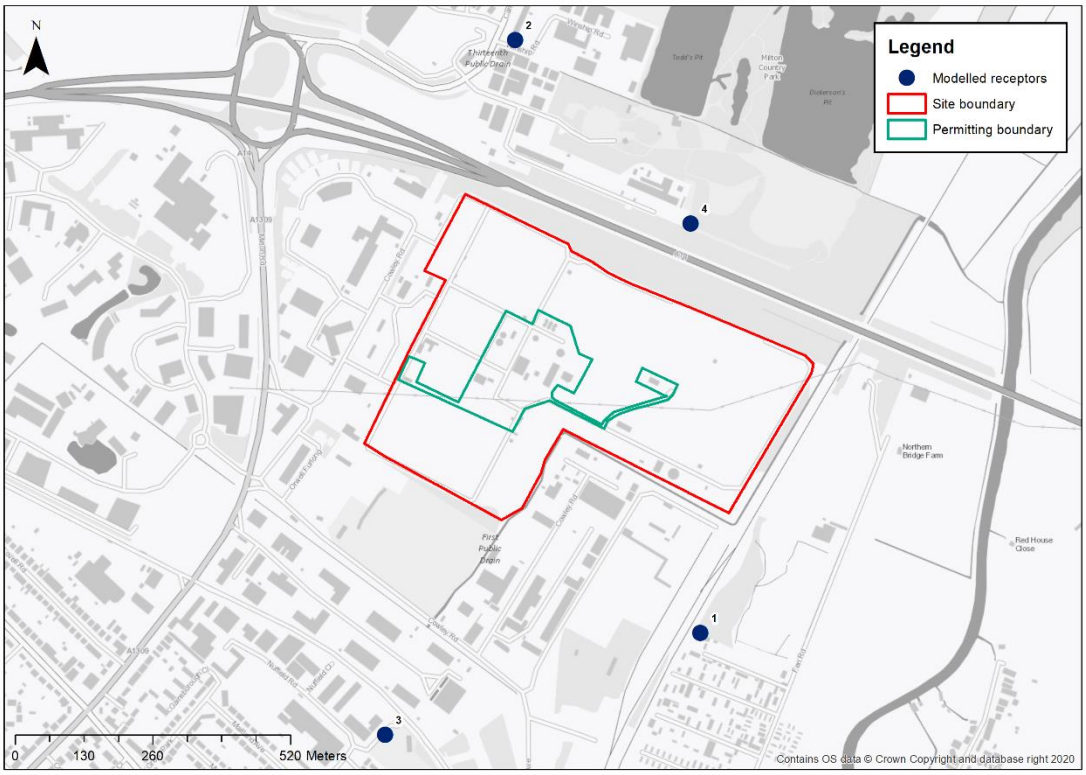
Four discrete human health receptors representing the façades of the closest sensitive receptors (residential properties, commercial properties and recreation areas) have been included within the model so that a comparison against the EQS can be made. Table 6 and Figure 5 show the locations of the discrete receptors considered within this assessment.

Table 6: Modelled human health receptors

Receptor number	Receptor name	X	Y	Height (m)
1	Cambridge Road, Milton	547437	262236	1.5
2	Discovery Way Allotment [(a)]	547191	260926	1.5
3	Grange Park Residential Caravan Site	547788	261117	1.5
4	Milton Country Park [(a)]	547769	261890	1.5

Note: (a) Annual objectives would not apply to these receptors, see Table 2 for more details

Figure 5: Modelled human health receptors



3.4.3 Ecological receptors

A review of ecological receptors has been carried out. Specific sites designated for their ecological importance need only be considered where they fall within set distances from the assessment site, as specified in the EA specified generator guidance[36]:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km
- Sites of Special Scientific Interest (SSSIs) within 2km.

There are no SPAs, SACs or Ramsar sites located with 5km of the Site and no SSSI within 2km. The nearest SSSI is approximately 3.6km west of the Site (Stow-cum-Quy-Fen SSSI) while the nearest SPA/SAC/Ramsar site is approximately 10.5km north west of the site (Fenland SAC). Therefore, as there are no relevant conservation sites within the screening distances, the effects of the Site on conservation sites has not been considered further within this assessment

3.5 Significance criteria

Several approaches can be used to determine whether the potential air quality effects of a development are significant. However, there remains no universally recognised definition of what constitutes ‘significance’.

[36] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment

Guidance is available from a range of regulatory authorities and advisory bodies on how best to determine and present the significance of effects within an air quality assessment. It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively.

Definitions of significance have been adopted from the EA's air dispersion modelling guidance[37]. Where the PCs do not meet the EA's description of 'insignificant', the PEC is compared against the relevant EQS to establish if this is exceeded, as per the EA risk assessment guidance[38]. Table 7 provides a summary of criteria used to screen out insignificant impacts.

Table 7: Summary of assessment criteria

Parameter	Long term standards	Short term standards
Screen out insignificant emissions (PCs)	Emissions can be seen as insignificant where: PC long term <= 1% of standard	Emissions can be seen as insignificant where: PC short term <= 10% of standard
Screen out insignificant PECs	Resulting PEC does not exceed the relevant EQS	

Note: PC = Process Contribution; PEC = Predicted Environmental Concentration (PC + Ambient Concentration, AC)

[37] Environment Agency, 2014. Environmental permitting: air dispersion modelling reports. Available at: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports

[38] Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

4 Baseline conditions

4.1 Introduction

Information on air quality within the UK can be obtained from a variety of sources including local authorities, national network monitoring sites and other published sources. The primary sources of data examined in this assessment are from CCC[39], South Cambridgeshire District Council (SCDC)[40] and Defra[41]. The most recent full year of monitoring data available is for 2019. Data from 2020 is currently available, however this data would have the potential to be impacted by effects associated with the coronavirus (Covid-19) pandemic such as a reduction in traffic movements resulting in reduced monitored pollutant concentrations. Therefore, it is likely data from 2020 would not be representative of existing concentrations.

4.2 Review and assessment of air quality in the study area

Two AQMAs have been declared in the vicinity of the Site. One is approximately 2.0 kilometres south west of the Site, declared by CCC and covers the centre of Cambridge, bounded by the inner ring road. This AQMA was declared in 2004 for exceedances of the NO_2 annual mean objective. The other is approximately 1.3 kilometres west of the Site, declared by SCDC for exceedances of the NO_2 annual mean objective and daily PM_{10}, short-term objective. The locations of these AQMAs are presented in Figure 6.

4.2.1 Local authority automatic monitoring

CCC undertake automatic monitoring at five sites within its district. These sites however are all roadside within the centre of Cambridge and therefore are not considered representative of the Site or nearby receptors.

SCDC undertake automatic monitoring at three sites within its district. One of these sites is a background site located within school grounds close to the A14. The other two sites are at roadside locations and therefore not considered to be representative of air quality at the Site or nearby receptors. Table 8 presents results at the Orchard Park School automatic monitor and highlights no recent exceedances of the annual NO_2 objective.

4.2.2 Local authority diffusion tube monitoring

CCC undertakes diffusion tube monitoring at 72 locations across its district. No exceedances of the annual NO_2 objective were identified within 2019. SCDC also carry out diffusion tube monitoring at 31 locations across its district. No exceedances of the annual NO_2 objective were identified within 2019.

Table 8 presents the monitoring results at the locations considered representative of the Site and nearby sensitive receptors. Figure 6 present the location of these monitoring sites in relation to the Site.

[39] Cambridge City Council, 2020. Annual Summary Report June 2020.
[40] South Cambridgeshire District Council, 2021. 2021 Air Quality Status Report (ASR), June 2021.
[41] Department for Environment, Food and Rural Affairs (2021), Monitoring networks. Available at: https://uk-air.defra.gov.uk/networks

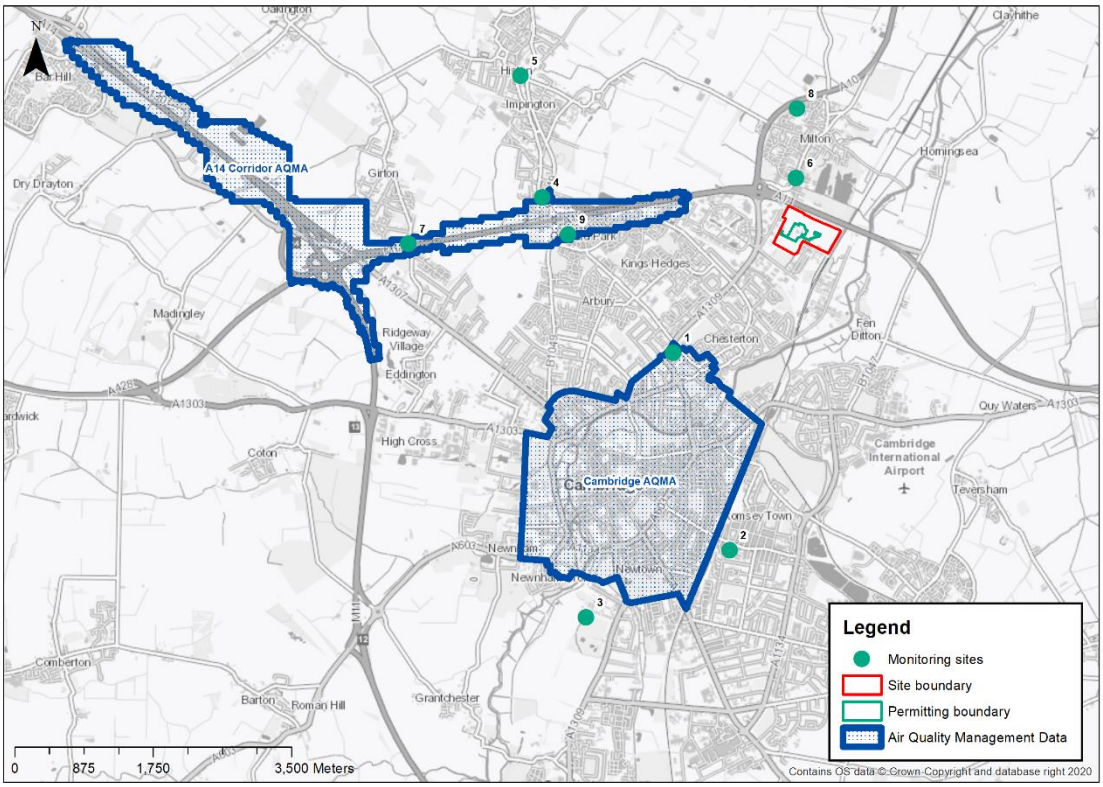
Table 8: Annual mean NO_2 diffusion tube monitoring data

ID	Site Name	National grid reference		Site Classification	Annual mean NO_2 concentration µg/m^3		
		X	Y		2018	2019	2020
1	Oaktree Avenue (DT37) [a]	545885	260088	Urban Background	15.0	15.0	11.0
2	Cockburn Street (DT36) [a]	546596	257594	Urban Background	16.0	15.0	11.0
3	Latham Road (DT11) [a]	544784	256746	Background	10.0	11.0	7.0
4	The Coppice, Impington (DT1) [b]	544230	262048	Urban Background	14.7	14.7	11.4
5	1 Brook Close Histon (DT13) [b]	543955	263588	Urban Background	17.2	16.3	11.5
6	96 High Street Sawston (DT-28N) [b]	547436	262295	Roadside	22.8	23.0	18.8
7	1A Weavers Field, opp Co-op Girton (DT10) [b]	542537	261467	Urban Background	25.8	19.0	15.4
8	3 Garner Close Milton (DT9) [b]	547452	263175	Urban Background	14.4	15.5	13.3
9	Orchard Park School (automatic monitor) [b] [c]	544558	261579	Urban Background	18.0	17.0	12.0

Source: (a) Cambridge City Council, 2020. Annual Summary Report June 2020.
(b) South Cambridgeshire District Council, 2021 2021 Air Quality Annual Status Report (ASR), July 2021

Note: Data capture for the Orchard Park School was >97% in all years.
CCC bias adjustment factor was 0.68 in 2019
SCDC bias adjustment factor was 0.76 in 2018.
SCDC bias adjustment factor was 0.75 in 2019.
SCDC bias adjustment factor was 0.77 in 2020.

Figure 6: AQMAs in the area and nearby monitoring locations to the Site



Due to the close proximity and similar surrounding areas of monitoring location 6 to receptors 2 and 4, the 2019 NO_2 monitored concentration at this location has been used to represent the worst-case AC at the modelled receptors (see Section 3.3.2 for details). The remaining receptors are located away from busy roadsides, and therefore the Defra backgrounds have been used to represent the long-term ACs at these receptors (see Section 4.3 below).

4.3 Defra projected background pollutant concentrations

Defra provides estimates of background pollutant concentrations for NOx and NO_2 across the UK for each one-kilometre grid square for every year from 2018 to 2030. Future year projections have been developed from the base year of the background maps, which is currently 2018. The maps include a breakdown of background concentrations by emission source, including road and industrial sources which have been calibrated against 2018 UK monitoring data. Defra also provides estimates of background concentrations for SO_2 across the UK for each one kilometre grid square for 2001.

The background concentrations for the 1km grid square containing the Site for the worst-case opening year of 2021 for NOx and NO_2 and for the most recent year of data available of 2001 for SO_2 are presented in Table 9. The data shows background concentrations are all below the relevant objectives.

Table 9: 2021 Defra projected annual concentration at the Site (µg/m^3)

1km Grid Square Location (OS Grid Reference)	2021 NO_x [(a)]	2021 NO_2 [(a)]	2001 SO_2 [(b) (c)]
547500,261500	17.6	13.0	4.7

Source: (a) https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018
(b) https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2001
(c) 2001 SO_2 background concentration data is the latest available. This is appropriate for use in the assessment with 2021 predicted concentrations as pollutant concentrations are expected to improve in the future, therefore 2001 backgrounds provide a worst case.

2021 NO_2 and NO_X and 2001 SO_2 Defra background concentrations have been used to represent the long-term AC at gridded and discrete human health receptors (see Section 3.3.2 for details). The concentrations used within the assessment correspond to the background concentrations for the 1km grid square the receptor is located within.

5 Results

5.1 Overview

The results of modelling atmospheric emissions from the Site at gridded and human health receptors are summarised and interpreted below. The model results are presented in tabular form and as contour plots. The PCs and PECs have been compared against the EQSs and assessment criteria stated within EA's risk assessment guidance[42], as presented in Table 7, to assess the significance of the air quality impacts from the Site.

The results are based on the CHPs and the boilers operating at full load continuously all year. This is a very conservative approach as it is anticipated that the boilers would only operate as backup during periods of maintenance or outage for the CHPs.

5.2 Gridded receptors

Table 10 presents the maximum NO_2 and SO_2 PCs at offsite locations across the modelled grid. The annual NO_2 PC is greater than 1% of the long term EQS and the hourly NO_2, 15-minute SO_2 and 24-hour SO_2 PCs are greater than 10% of the short-term EQS. Therefore, these impacts cannot be screened out according to the EA significance criteria[43] and the PECs have been considered within Table 11. The modelled PCs for hourly SO_2 are all below 10% of the relevant EQS and have therefore been screened out and not been considered further.

Table 10: Maximum NO_2 and SO_2 PCs (µg/m³) – Gridded receptors

Averaging period	Max PC	Max PC as % of EQS	EQS (µg/m³)
NO_2 99.79 %'ile of hourly averages	44.2	**22.1**	200
NO_2 Annual average	7.9	**19.8**	40
SO_2 99.90th %'ile of 15-minute averages	36.8	**13.8**	266
SO_2 99.18th %'ile of 24-hour averages	17.4	**13.9**	125
SO_2 99.73rd %'ile of hourly averages	27.8	7.9	350

Notes: Values rounded to 1 decimal place
PC = Process Contribution; EQS = Environmental Quality Standard, equivalent to the ambient air quality objectives
The results in **bold** are those that cannot be screened out as insignificant according to EA criteria

Table 11 presents the PECs at the locations of the maximum offsite PCs. The maximum annual mean NO_2, hourly NO_2, 15-minute SO_2 and 24-hour SO_2 PECs, when assuming continuous operation all year off the CHPs and boilers, are well below the respective EQS so can be screened out as insignificant in accordance with the EA guidance.

[42] Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

[43] the PCs are greater than 1% of the long-term standards, and the 10% of the short-term standards

Table 11: Maximum NO_2 and SO_2 predicted environmental concentrations (PECs) (µg/m³) – Gridded receptors

Averaging period	EQS (µg/m³)	AC (µg/m³)	Max PC	Max PEC (µg/m³)	Max PEC as % of EQS (µg/m³)
99.79 %'ile of hourly averages	200	26.1	44.2	70.3	35.1
Annual average	40	13.0	7.9	20.9	52.5
SO2 99.90th %'ile of 15-minute averages	266	9.4	36.8	46.2	17.4
SO2 99.18th %'ile of 24-hour averages	125	9.4	17.4	26.8	21.4

Notes: Values rounded to 1 decimal place
AC= Ambient Concentration (2021 Defra background concentration)
PC = Process Contribution
PEC = Predicted Environmental Concentration (AC+PC=PEC)
EQS = Environmental Quality Standard, equivalent to the ambient air quality objectives

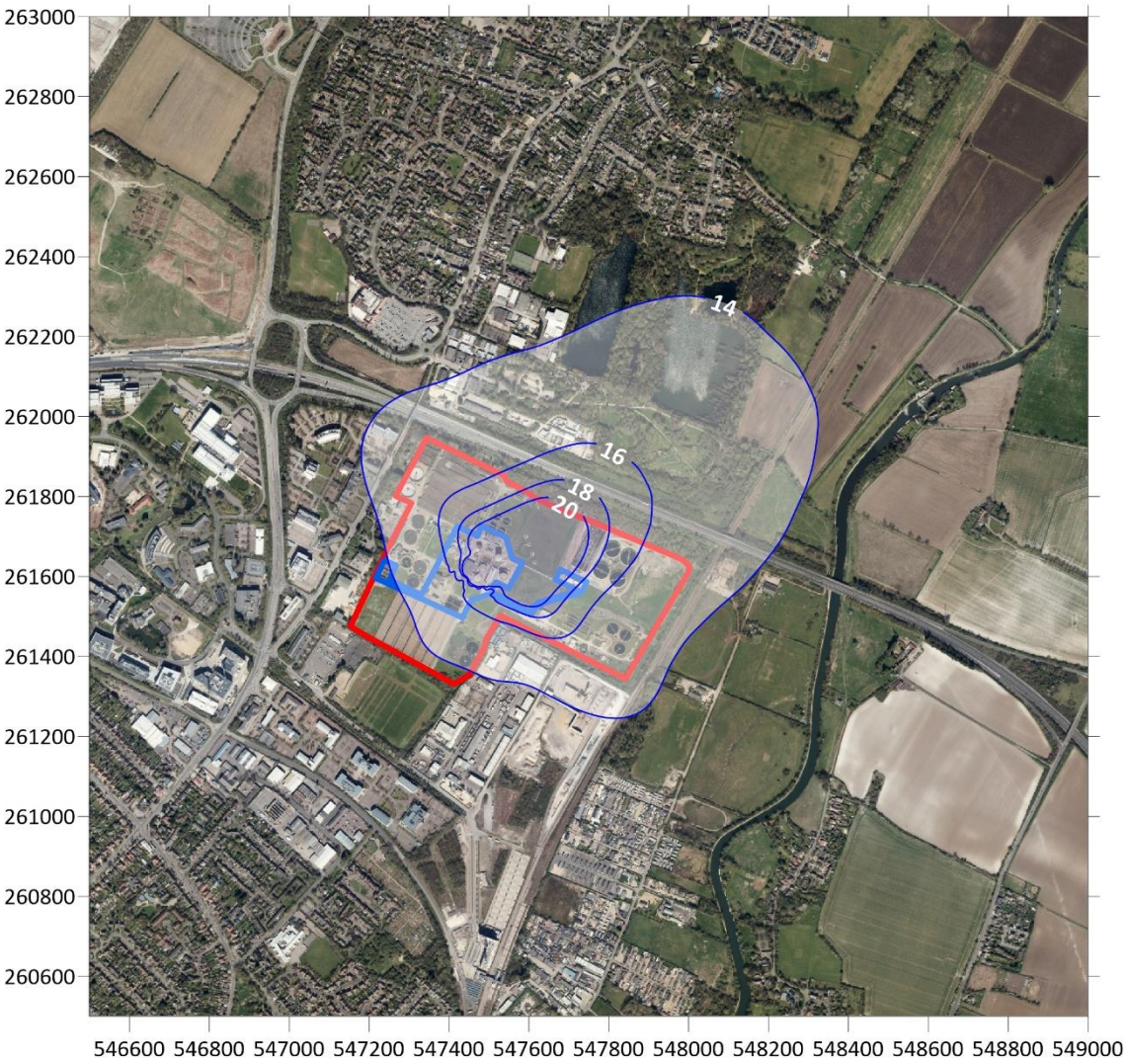
Figure 7 to Figure 10 present contour plots of the annual and hourly NO_2 PECs and the 15-minute and 24-hour SO_2 PECs in the worst-case meteorological years. The contours demonstrate that the air quality impacts from the Site are highly localised close to the perimeter of the Site.

The maximum offsite annual NO_2 and 15-minute SO_2 PCs are found close to the northern boundary of the Site in an inaccessible area of scrubland between the site boundary and the A14 and the maximum 1-hour NO_2, and 24-hour SO_2 PCs are found just to the south of the Site within the Cowley Road industrial area. At these locations of maximum impact, there would be no relevant public exposure and therefore the air quality objectives would not be applicable (see Table 2).

As the maximum PCs are found very close to the Site boundary, the emissions to air from the Site are expected to have de minimis impact on the nearest AQMA (which is approximately 1.3km to the west).

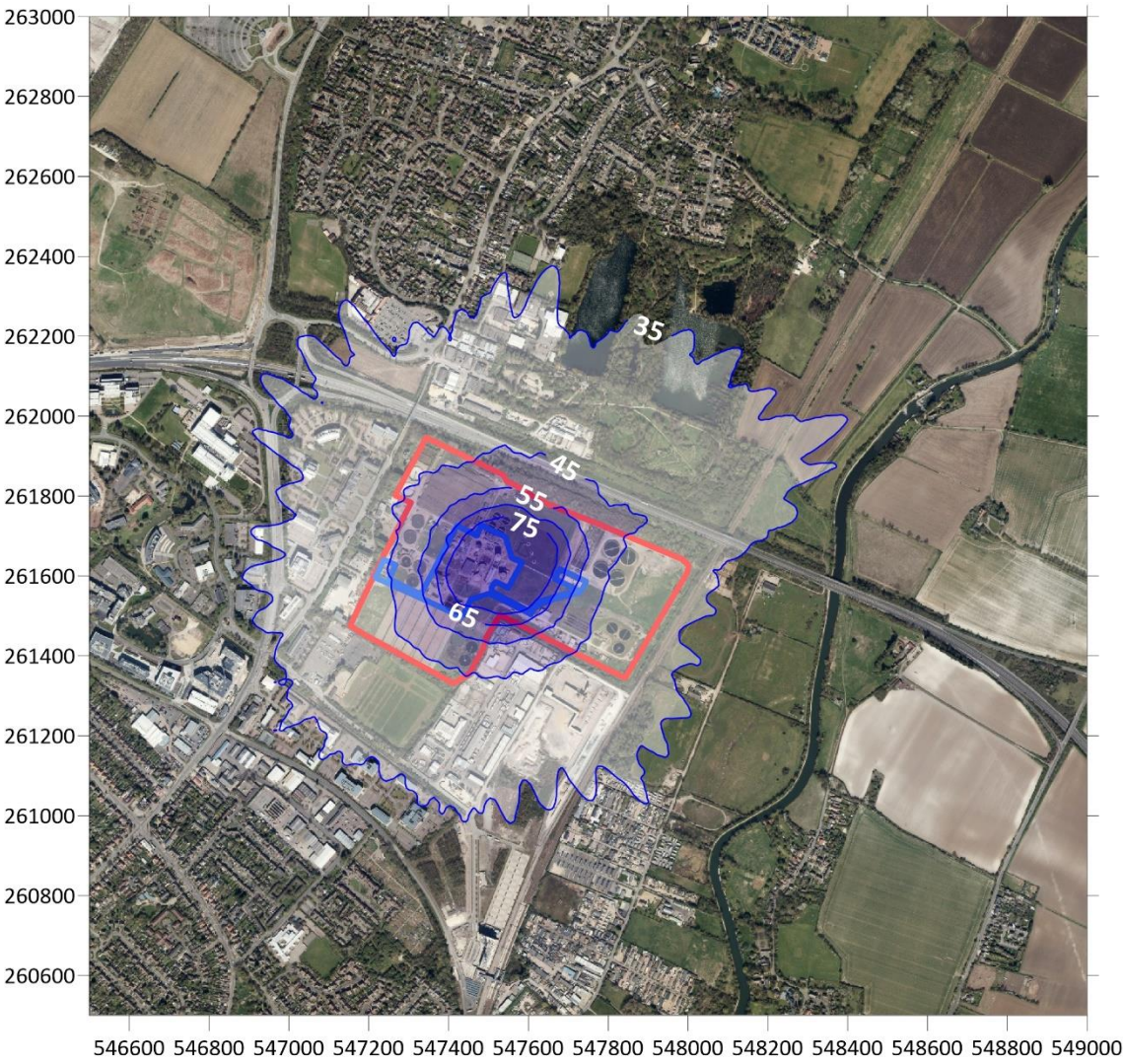
Therefore, as demonstrated by the concentrations modelled and the locations of the maximum annual and hourly NO_2 concentrations, the impact at gridded receptors is considered insignificant with respect to NO_2 and SO_2 concentrations.

Figure 7: Annual mean NO_2 PEC (µg/m^3)



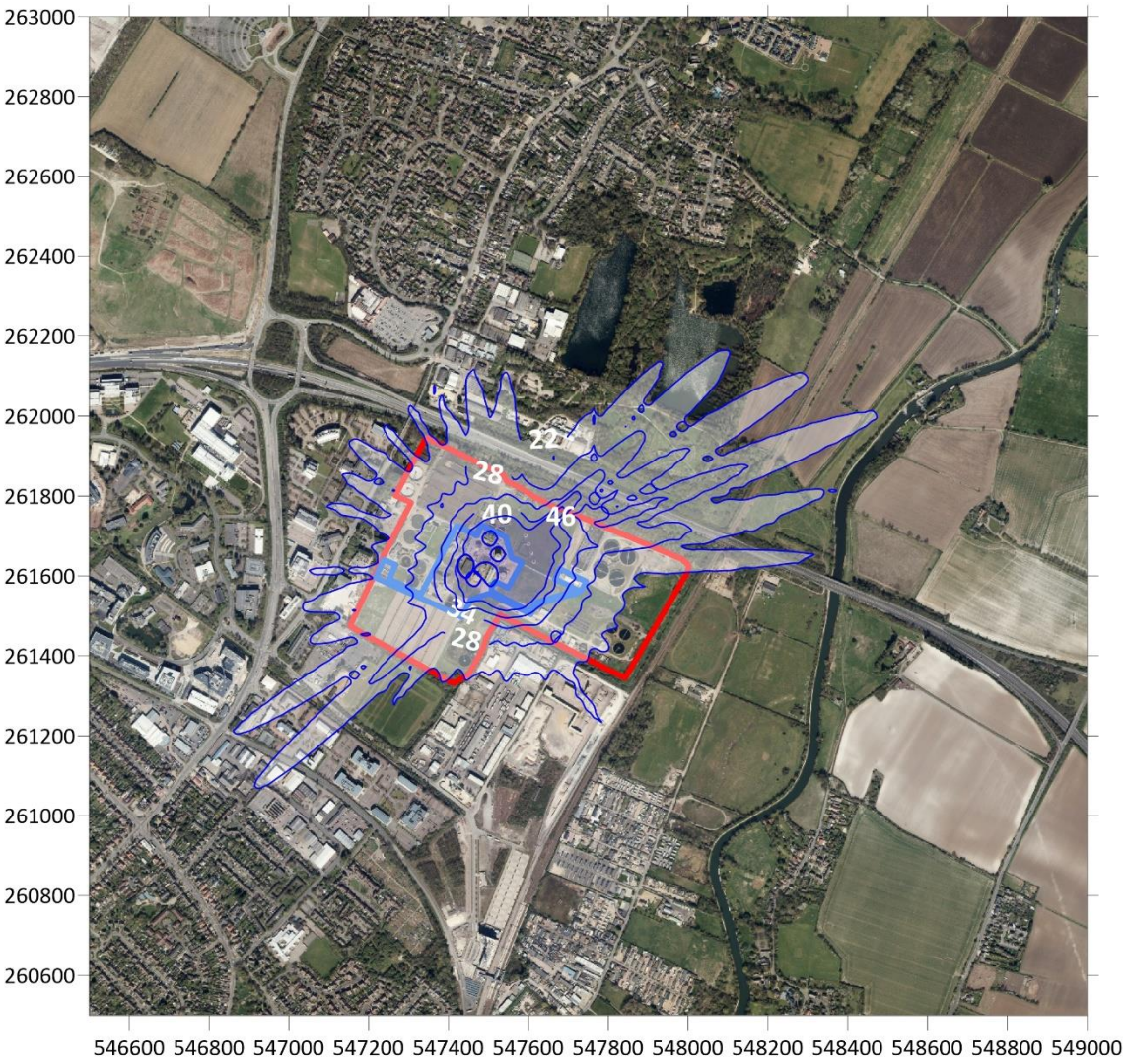
Note: Results presented for the worst case meteorological year of 2017. Contour interval = 2µg/m³. Minimum contour = 14µg/m^3, maximum contour = 20µg/m^3. Site boundary outlined in red. 2021 Defra background concentrations have been assumed for the ambient concentrations for all gridded receptors.

Figure 8: Hourly mean NO_2 PEC (99.79th %ile) (µg/m³)



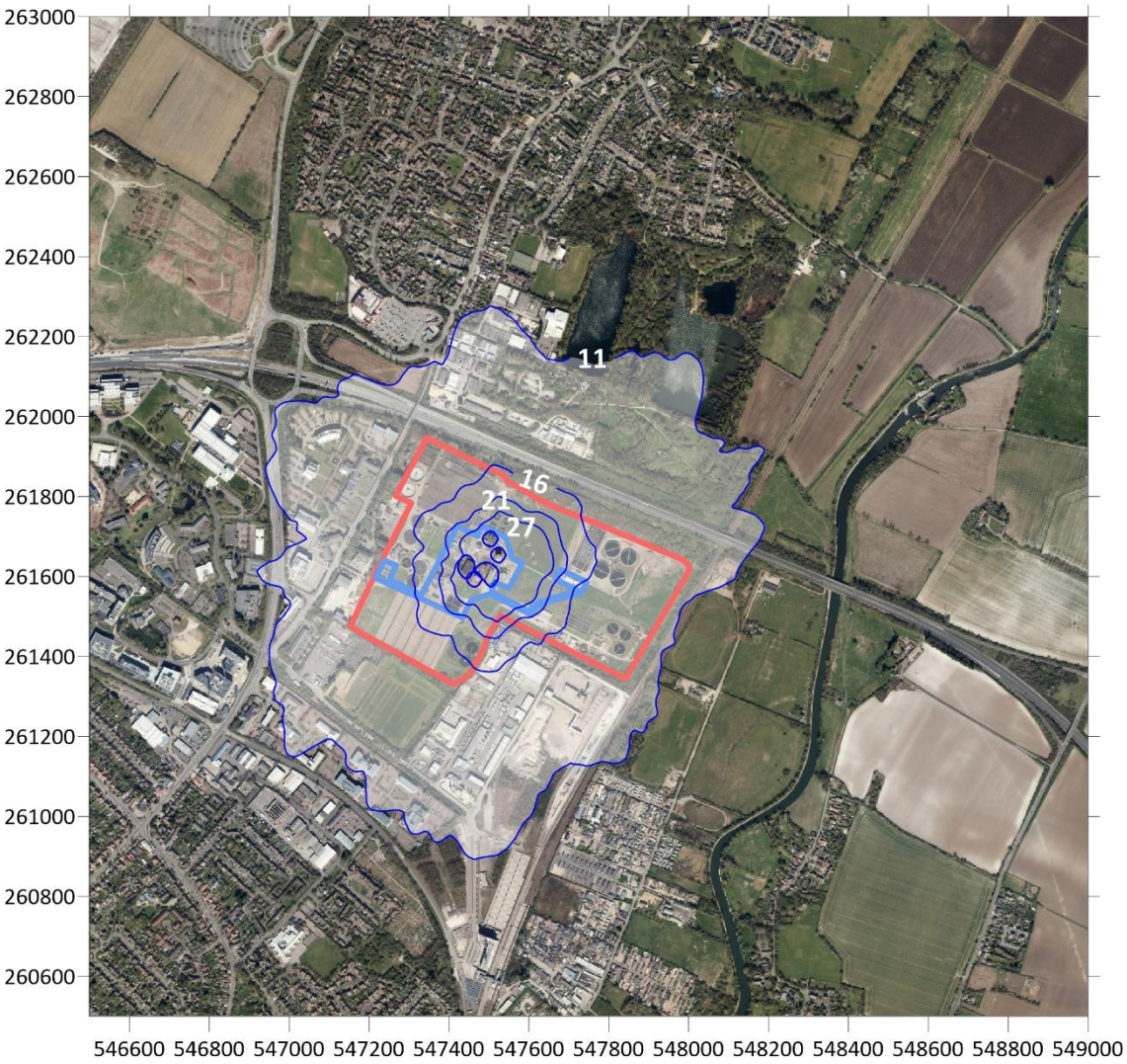
Note: Results presented for the worst case meteorological year of 2018. Contour interval = 10µg/m³. Minimum contour= 35µg/m³, maximum contour = 75µg/m³. Site boundary outlined in red. 2021 Defra background concentrations (multiplied by 2 to represent short-term backgrounds) have been assumed for the ambient concentrations for all gridded receptors.

Figure 9: 15 minute mean SO_2 PEC (99.90th %ile) (µg/m^3)



Note: Results presented for the worst case meteorological year of 2019. Contour interval = 6µg/m³. Minimum contour= 22µg/m^3, maximum contour = 46µg/m^3. Site boundary outlined in red. 2001 Defra background concentrations (multiplied by 2 to represent short-term backgrounds) have been assumed for the ambient concentrations for all gridded receptors.

Figure 10: 24 hour mean SO_2 PEC (99.18th %ile) (µg/m³)



Note: Results presented for the worst case meteorological year of 2018. Contour interval = 5µg/m³. Minimum contour = 11µg/m³, maximum contour = 27µg/m³. Site boundary outlined in red. 2001 Defra background concentrations have been assumed for the ambient concentrations for all gridded receptors.

5.3 Human health discrete receptors

The NO_2 and SO_2 PCs and PECs at the discrete human health receptors are summarised in Table 12 and Table 13. The maximum hourly NO^2 (100th percentile) PC and PECs have been presented in Appendix A.

The greatest increases in hourly NO_2, 15-minute, 24-hourly and hourly SO_2 are predicted at receptor 4 (footpath within the Milton Country Park, approximately 150m north of the Site). The maximum increase in annual NO_2 concentrations is predicted at receptor 1 (a residential property within the Grange Residential Caravan Park, located approximately 25m south of the Site).

No exceedances of the hourly (99.79th percentile) or annual NO_2 or the 15-minute (99.90th percentile), 24-hourly (99.18th percentile) or hourly (99.73rd percentile) SO_2 air quality objectives are predicted at discrete receptors as a result of the Site.

In accordance with EA risk assessment guidance[44], the short term mean PCs at all modelled human health receptors are below 10% of the EQS and therefore can be screened out as insignificant. Therefore, the short-term impact at human health receptors are considered insignificant with respect to NO_2 and SO_2 concentrations.

For the annual mean, PCs are above 1% of the EQS at modelled receptors where the annual mean objective applies, as shown in Table 13. However, the PEC is below the objective at both locations and therefore the impact of the Site on human health receptors is also considered insignificant for annual mean NO_2.

Table 12: Hourly NO_2 (99.79th %ile) PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC	EQS	Max PC as % of EQS	AC	Max PEC	Max PC as % of EQS
1	10.7	200	5.3	26.1	36.8	18.4
2	7.6	200	3.8	46.0	53.6	26.8
3	8.8	200	4.4	26.1	34.9	17.5
4	16.3	200	8.2	46.0	62.3	31.2

Notes: AC= Ambient Concentration (based on the 2021 Defra background concentrations); PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard

Table 13: Annual NO_2 PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC (a)	EQS	Max PC as % of EQS	AC	Max PEC	Max PEC as % of EQS
1	0.77	40	1.9	13.0	13.8	34.5
2 (b)	-	-	-	-	-	-
3	0.68	40	1.7	13.0	13.7	34.3
4 (b)	-	-	-	-	-	-

Notes: AC= Ambient Concentration (based on the 2021 Defra background concentrations); PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard (a) 2 decimal places have been used to show the level of change and do not reflect model accuracy (b) annual objective would not apply at these locations and therefore have not been presented

Table 14: 15-minute mean SO_2 (99.90th %ile) PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC	EQS	Max PC as % of EQS	AC	Max PEC	Max PC as % of EQS
1	11.7	266	4.4	9.4	21.1	7.9
2	8.6	266	3.2	9.4	18.0	6.8
3	8.3	266	3.1	9.4	17.7	6.7
4	16.3	266	6.1	9.4	25.7	9.7

Notes: AC= Ambient Concentration (based on the 2001 Defra background concentrations at all receptors); PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard

[44] Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Table 15: 24-hourly mean SO_2 (99.18th %ile) PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC	EQS	Max PC as % of EQS	AC	Max PEC	Max PC as % of EQS
1	1.7	125	1.3	9.4	11.0	8.8
2	1.4	125	1.1	9.4	10.8	8.6
3	2.0	125	1.6	9.4	11.4	9.1
4	4.3	125	3.4	9.4	13.7	10.9

Notes: AC= Ambient Concentration (based on the 2001 Defra background concentrations at all receptors); PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard

Table 16: 1-hourly mean SO_2 (99.73rd %ile) PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC	EQS	Max PC as % of EQS	AC	Max PEC	Max PC as % of EQS
1	6.3	350	1.8	9.4	15.7	4.5
2	4.7	350	1.3	9.4	14.1	4.0
3	5.4	350	1.6	9.4	14.8	4.2
4	12.2	350	3.5	9.4	21.6	6.2

Notes: AC= Ambient Concentration (based on the 2001 Defra background concentrations at all receptors); PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard

6 Conclusions

An assessment has been undertaken to determine the effect on air quality associated with emissions from the Site using advanced dispersion modelling. For gridded and human health receptors, the emissions of NO_2 and SO_2 have been considered in accordance with EA guidance. The method of the assessment has taken a conservative approach by assuming worst-case conditions for factors such as emission characteristics, the operating envelope and meteorological conditions.

No exceedances of the EQS are predicted as a result of the operation of the Site at locations of relevant public exposure. The air quality effects are highly localised and the impact at sensitive human health receptors is insignificant in accordance with EA guidance. The Site is not considered to conflict with the relevant air quality regulations.

Appendices

A. Maximum hourly NO_2 PECs

In accordance with the EA specified generator guidance[45], the maximum hourly (100th %ile) PECs have been presented in Table 17. There are no EQS for this averaging period and therefore significance cannot be commented upon, however the maximum hourly NO_2 PEC is predicted to remain below the hourly NO_2 EQS, which is from the 99.79th percentile of values.

Table 17: Hourly max NO_2 (100th %ile) PCs and PECs (µg/m³) at discrete human health receptors

Receptor	Max PC	AC	Max PEC
1	13.6	26.1	39.6
2	9.0	46.0	55.0
3	12.2	26.1	38.3
4	18.1	46.0	64.1

Notes: AC= Ambient Concentration (based on the 2021 Defra background concentrations at all receptors; PC = Process Contribution; PEC = Predicted Environmental Concentration (AC+PC=PEC); EQS = Environmental Quality Standard

[45] Environment Agency, 2019. Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment