Medworth Energy from Waste
Combined Heat and Power Facility

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Environmental Statement
Chapter 8: Air Quality

Regulation reference: The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

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Contents

8. Air Quality

8.1 Introduction

8.1.1 This chapter presents the environmental assessment of the likely significant effects of the Proposed Development with respect to Air Quality.

8.1.2 The chapter should be read in conjunction with the description of the development provided in **Chapter 3: Description of the Proposed Development (Volume 6.2)** and with respect to relevant parts of **Chapter 6: Traffic and Transport (Volume 6.2)**, **Chapter 11: Biodiversity (Volume 6.2), Chapter 16 Health** and **Chapter 9: Landscape and Visual Impact Assessment (Volume 6.2)**, where common Receptors have been considered and where there is an overlap or relationship between the assessment of effects. A list of terms and abbreviations can be found in **Chapter 1 Introduction, Appendix 1F (Volume 6.4)**.

8.2 Consultation and Stakeholder engagement

8.2.1 The assessment has been informed by consultation responses and Stakeholder engagement. An overview of the approach to consultation is provided in **Chapter 4: Approach to the EIA (Volume 6.2).**

8.2.2 A summary of the relevant responses received in the EIA Scoping Opinion in relation to Air Quality and confirmation of how these have been considered within the assessment is presented in **Appendix 8A Stakeholder consultation comments on Air Quality (Volume 6.4)**.

8.2.3 A summary of the relevant responses received as a result of consultation, together with any subsequent discussions held in relation to Air Quality and confirmation of how these have been considered within the assessment to date is also presented in **Appendix 8A Stakeholder consultation comments on Air Quality (Volume 6.4)**.

8.3 Relevant legislation, planning policy, technical guidance

Legislative context

8.3.1 Legislation relevant to the assessment of the effects on Air Quality Receptors is provided in **Table 8.1 Legislative context for Air Quality** below:

Table 8.1 Legislative context for Air Quality

Legislation	Implications
Directive 2008/50/EC on Ambient Air Quality	The Directive sets limit, or target levels, for selected pollutants that are to be achieved by specific dates and also details procedures that European Union (EU)

Legislation	Implications
and Cleaner Air for Europe	Member States should take in assessing ambient air quality. Regulated pollutants include sulphur dioxide (SO_2), nitrogen dioxide (NO_2), nitrogen oxides (NO_X), particulate matter PM_{10} and $PM_{2.5}$, lead (Pb), benzene (C_6H_6) and carbon monoxide (CO).
The Air Quality Standards (England) Regulations 2010 (Statutory Instrument (SI) 2010/1001), as amended	The Air Quality Standards (AQS) Regulations implemented the requirements of Directive 2008/50/EC and report limit values at differing averaging periods for certain pollutants. There are limits provided for the protection of human health for SO_2, NO_2, C_6H_6, CO and Pb. Target values have been set for the concentration of $PM_{2.5}$. A limit value for the concentration of $PM_{2.5}$ is also provided. All limit values included in these Regulations should not be exceeded.
The Air Quality (England) Regulations 2000 (SI 2000/928), as amended	Provides UK Air Quality Objectives (AQOs) for a range of different pollutants, unlike Air Quality Standards, there is no statutory obligation to meet AQOs; AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.
The Environment Act 1995	The Environment Act 1995 relates to a wide range of environmental issues. The Act covers the control of pollution and lays out the responsibility of the governing bodies in the UK responsible for the enforcement of environmental laws. Part IV of the Environment Act 1995 requires that Local Authorities periodically review air quality within their individual areas. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's Air Quality Objectives (AQOs).
The Environment Act 2021	The Environment Act 2021 presents the new environmental programme. It aims to improve air and water quality, tackle waste, increase recycling, halt the decline of species and improve the natural environment. The Act establishes legally binding duty to the government to bring two new targets in Secondary legislation in October 2022. These include reducing the annual mean levels of fine particles ($PM_{2.5}$) and reducing public exposure to $PM_{2.5}$.
The Environmental Protection Act 1990	Under Part III Section 79(1)(d) of the Environmental Protection Act 1990 (c. 43), dust and odour can both be statutory nuisances. However, there are no statutory standards for dust deposition or odour which can be used to assess whether a nuisance has occurred, principally due to the normal variability of atmospheric dust and odours.
Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated	Directive 2010/75/EU (the Industrial Emissions Directive, (IED)) requires Competent Authorities in European Union member states to control and reduce the impact of certain industrial emissions on the environment. Operators of activities listed in Annex I of IED are required to apply to the relevant Competent Authority (the 'Regulator') for a permit to operate their installation. Regulators must set conditions in permits so as to achieve a high level of protection for the environment as a whole, based on the use of the best available techniques (BAT). Amongst others, emissions to air from permitted installations must meet the Best Available

Legislation	Implications
pollution prevention and control	Technique Associated Emission Levels (BAT-AEL) set in the relevant sectoral BAT Conclusions and ensure no significant pollution is caused. The UK Government has committed to maintaining environmental standards post-EU exit and continues to apply the successful model of integrated pollution control.
The Environmental Permitting (England and Wales) Regulations 2016 (SI 2016/1154), as amended	The Environment Agency (EA) acts as the Competent Authority and regulates relevant activities under the Environmental Permitting (England and Wales) Regulations 2016 (SI 2016/1154).
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (SI 2018/764), as amended	The Non-Road Mobile Machinery (NRMM) Regulations provide the requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery. This regulation transposed the European Directive 97/68/EC that was repealed and replaced by Regulation EU 2016/1628, into UK law.

Planning policy context

8.3.2 There are a number of policies at the national and local level that are relevant to the Proposed Development. The overarching national policy statements, which provide the primary policy basis for the consideration of Nationally Significant Infrastructure Projects, are provided in **Table 8.2 Planning policy context for Air Quality: Adopted National Policy Statements**. This section should be read in conjunction with **Chapter 5: Legislation and Policy (Volume 6.2)**.

Table 8.2 Planning policy context for Air Quality: Adopted National Policy Statements

Policy reference	Implications	Section addressed
Overarching National Policy Statement for Energy (EN-1)	Paragraph 5.2.1, 5.2.2, 5.2.4 and 5.2.6 in Section 5.2 of EN-1 establishes that where a project is likely to have adverse effects on air quality, an assessment of such impacts must be considered in the Environmental Statement. Paragraph 5.2.7 further establishes that the ES should describe: • any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;	**Sections 8.6 - 8.10** The ES has considered traffic and chimney emissions from the Proposed Development. It has also assessed existing air quality levels and predicted the relative change in air quality.

Policy reference	Implications	Section addressed
	• the predicted absolute emission levels of the proposed project, after mitigation methods have been applied; • existing air quality levels and the relative change in air quality from existing levels; and • any potential eutrophication impacts. The policy informs the scope of this assessment.	
National Policy Statement for Renewable Energy Infrastructure (EN-3)	Paragraph 2.5.40 establishes that developments incorporating combustion of waste should include an assessment of the air emissions resulting from the Proposed Development to demonstrate compliance with the relevant standards having given consideration to Section 5.2 of EN-1 (described above). Paragraph 2.5.43 states: "*Where a proposed waste combustion generating station meets the requirements of WID [Waste Incineration Directive] and will not exceed the local air quality standards, the IPC should not regard the proposed waste generating station as having adverse impacts on health.*"	**Section 8.6 to 8.10** The ES assesses emissions to air from the chimneys at the respective emission limit values (ELVs) in Annex VI of the IED (WID was incorporated into this Directive in 2010) with an assessment of resulting ground level concentrations and associated impacts on human health made against relevant air quality standards, objectives and guideline values.
National Policy Statement for Electricity Networks Infrastructure (EN-5)	EN-5 is relevant to the consideration of the Grid Connection associated with the Proposed Development. However, there is no technology specific information relating to air quality.	N/A.

8.3.3 In September 2021, the Department of Business, Energy and Industrial Strategy (BEIS) consulted upon a review of energy National Policy Statements (NPS) with consultation closing on 29 November 2021. The energy NPS were reviewed to reflect the policies and broader strategic approach set out in the Energy white paper and to ensure a planning framework was in place to support the infrastructure requirement for the transition to net zero.

8.3.4 **Table 8.3 Planning policy context for Air Quality: Draft National Policy Statements** summarises those Draft energy NPS which are considered to be relevant to the Proposed Development.

Table 8.3 Planning policy context for Air Quality: Draft National Policy Statements

Policy reference	Implications	Section addressed
Draft Overarching National Policy Statement for Energy (EN-1)	Section 5.2 provides policy guidance on Air Quality and Emissions. Paragraph 5.2.1 states that the construction, operation and decommissioning phases of national infrastructure projects can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside and species. 5.2.3 states that chimney height is how emissions are dispersed and that the Secretary of State need not to consider the chimney height optimisation process which is controlled via the Environmental Permit (EP). 5.2.6 states that the Applicant's assessment should consider: • any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project. • the predicted absolute emission levels of the proposed project, after mitigation methods have been applied. • existing air quality levels and the relative change in air quality from existing levels. • any potential eutrophication impacts.	**Sections 8.6 – 8.10** The ES has considered traffic and chimney emissions from the Proposed Development. It has also assessed existing air quality levels and predicted the relative change in air quality.
Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)	Section 2.13 considers air quality relative to biomass and waste combustion noting that the Secretary of State does not need to assess individual applications for planning consent against operational carbon emissions and their contribution to carbon budgets, net zero and international climate commitments. Policy regards the EPR process as the means to regulate and control air emissions.	Once the DCO application has been accepted by the Planning Inspectorate for examination, the Applicant intends to submit an application for an EP to the Environment Agency
Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)	Draft EN-5 is relevant to the consideration of the Grid Connection associated with the Proposed	N/A

Policy reference	Implications	Section addressed
	Development. However, there is no technology specific information relating to air quality.	

8.3.5 Other national and local policies which may provide additional guidance which can be considered material to the consideration of a NSIP are detailed in **Table 8.4 Planning Policy Context for Air Quality: National and Local Planning Policies,** below.

Table 8.4 Planning Policy Context for Air Quality: National and Local Planning Policies

Policy reference	Implications	Section addressed
National Planning Policy Framework (NPPF) 2021	Paragraph 186 states: *"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."*	**Section 8.7** and **Section 8.9-8.10** The ES has considered the relevant AQMAs in the vicinity of the Proposed Development. Embedded mitigation has been incorporated in the design.
Clean Air Strategy (2019)	Defra's Clean Air Strategy outlines the Government's proposed ambitions relating to reducing air pollution in order to protect health and nature, whilst boosting the economy. The strategy sits alongside three other UK government strategies: the Industrial Strategy, the Clean Growth Strategy, and the 25 Year Environment Plan. Amongst others, the Clean Air Strategy proposes to halve the number of people living in locations where concentrations of	**Section 8.3** and **Section 8.8** The Proposed Development should not conflict with Government's aims of reducing exposure to $PM_{2.5}$ to below the WHO guideline, whilst emissions from the chimneys should be consistent with the latest BAT, demonstrating a commitment

Policy reference	Implications	Section addressed
	particulate matter are above the World Health Organisation (WHO) guideline limit of 10µg/m^3 by 2025 and work in close collaboration with industry to explore further opportunities for industrial emissions reductions by developing a series of sector roadmaps to set standards aimed at making UK industry world leaders in clean technology.	in clean technology.
Local Policy		
Cambridge and Peterborough Minerals and Waste Local Plan: (2021)	Policy 18 Amenity Considerations states that new development must not result in unacceptable adverse impacts on the amenity of existing occupiers of any land or property, which includes air quality (encompasses factors including 'odour, fumes, dust, smoke, or other sources').	**Section 8.9 - 8.10** The policy has informed the scope of the assessment and the assessment criteria applied.
Fenland Local Plan (Adopted) (2014)	Policy LP16 Delivering and Protecting High Quality Environments across the District permits development subject to a number of criteria and states that proposals should set out how to mitigate risks from odour and dust.	**Section 8.7** The policy aligns with the scope of the assessment and the assessment criteria applied.
King's Lynn and West Norfolk Local Development Framework Core Strategy (2011)	No air quality specific policy references. Key sustainability issues recognise that Air Quality targets are unlikely to be met for NO_2 and PM_{10}.	**Section 8.8** The policy aligns with the scope of this assessment.
King's Lynn and West Norfolk Local Development Framework Site Allocations and Development Management Policies (2016)	Policy DM15 Environment, Design and Amenity states that development must protect and enhance the amenity of the wider environment and that proposals will be assessed against their impact on neighbouring uses and their occupants across a range of subjects including air quality. Policy DM20 Renewable Energy which includes for its associated infrastructure states that applications will be assessed to determine whether the benefits are outweighed by the impacts with reference air quality.	**Section 8.8** The policy aligns with the scope of this assessment.

Technical guidance

8.3.6 Technical guidance used to inform the assessment is listed in **Table 8.5 Technical guidance for Air Quality Assessment** below.

Table 8.5 Technical guidance for Air Quality Assessment

Technical guidance	Implications
Ministry of Housing, Communities & Local Government *Air Quality Planning Practice Guidance* (2019)	This guidance provides guiding principles on how planning can take account of the impact of new development on air quality.
Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) *Land-Use Planning & Development Control: Planning for Air Quality* (2017)	No official procedure exists for classifying the magnitude and significance of air quality effects from a new development for planning purposes, this guidance issued by the IAQM and EPUK suggests ways to address the issue.
(2017)'s *Guidance on the assessment of dust from demolition and construction* (2014)	This guidance presents a series of steps to be undertaken to determine whether dust effects associated with construction and demolition activities are likely to be considered significant.
IAQM's *A guide to the assessment of air quality impacts on designated nature conservation sites* (2020)	This guidance document was produced to assist air quality practitioners to assess the air quality impacts of development on designated nature conservation sites. The guidance clarifies that the overall assessment of the significance of effects on such sites should be made by a suitably qualified ecologist, not the air quality practitioner.
IAQM's *Guidance on the assessment of odour for planning* (2018)	This guidance was introduced by the IAQM as a means for air quality practitioners to assess the significance of odour effects specific to planning applications.
The Environment Agency's *Air Emissions Risk Assessment for your Environmental Permit (2016) (as amended)*	Although this guidance is specifically drafted for EP applications and is not directly applicable to planning applications, it does provide guidance in a number of areas which is considered to represent best practice, including, amongst others: • screening criteria for protected conservation areas; and • guidelines, known as Environmental Assessment Levels (EALs), for certain pollutants that do not have a specified AQS or AQO; and maximum deposition rates (MDRs) for certain metals.
Local Air Quality Management Technical Guidance (LAQM.TG(16)) (2021)	This document provides guidance for technical officers and local authorities to discharge their obligations under the LAQM regime. It contains guidance on numerous areas including, for example: • screening tools and methodologies; • air quality monitoring; and • estimating emissions; and dispersion modelling.

Technical guidance	Implications
The Environment Agency's Environmental Permitting: air dispersion modelling reports	Although this guidance has been drafted specifically for air quality assessments supporting EP applications, it does provide best practice methods and approaches for modelling the dispersion of emissions from industrial chimneys.
World Health Organisation (WHO) Air Quality Guidelines for Europe (2000) and WHO Air Quality Guidelines Global Update (2005)	These documents provide health-based air quality guidelines for a number of pollutants and critical levels for biodiversity Receptors.
Her Majesty's Inspectorate of Pollution (HMIP) Risk Assessment of Dioxin releases from Municipal Waste Incinerators (1996) and US Environmental Protection Agency (US EPA) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities ("HHRAP") (2005)	These documents provide procedures for assessing the risk to human health from total bodily uptake of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), also known as dioxins and furans.

8.4 Data gathering methodology

8.4.1 A desktop study of baseline air quality was undertaken utilising publicly available data. In addition, a monitoring survey was commissioned in October 2020 extending to November 2021 employing passive diffusion tubes whilst the installation of a continuous monitor measuring concentrations of NO_2, PM_{10} and $PM_{2.5}$ began in June 2021 for a period of six months and was extended for a further six months to capture one year's worth of data. Further information is provided in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

Study Area

8.4.2 The following paragraphs detail the Study Area for the different components of the Proposed Development.

EfW CHP Facility, CHP Connection, TCC, Access Improvements and Water Connections

8.4.3 The spatial extent of the Study Area has been informed by the guidance detailed in **Section 8.3**. As the EfW CHP Facility incorporates a combustion activity with a thermal input exceeding 50MW, in accordance with the EA's Air Emissions Risk Assessment for an EP, the assessment is required to consider nature conservation sites up to 15km from the emission source. Consequently, the Study Area includes an area encompassing 15km from the location of the chimney emissions.

8.4.4 The construction phase dust assessment Study Area is based on the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' (2014) and extends 350m from for the different components of the Proposed Development, with varying Receptor sensitivity with distance from the construction activities (refer to

Figure 8.4 Construction Dust Buffers (Volume 6.3)). It also includes Receptors within 50m from the routes used by construction vehicles on the public highway, up to 500m from EfW CHP Facility Site entrance.

8.4.5 For construction and operational traffic, the extent of the road network considered is informed by the level of change in traffic flows as a result of traffic movements associated with the Proposed Development, in line with the indicative criteria detailed in EPUK and IAQM '*Land-Use Planning & Development Control: Planning for Air Quality*' (2017). **Chapter 6: Traffic and Transport (Volume 6.2)** presents detailed information of the traffic data utilised, which are also summarised in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

8.4.6 The temporal scope of the assessment of air quality is consistent with the period over which the project components of the Proposed Development are constructed, in use and decommissioned. It, therefore, covers the construction period expected to start during 2023, operational period in 2027 (first complete opening year)) and decommissioning period from 2066. The construction phase assessment considers the peak year of construction, whilst the operational assessment considers the first complete opening year of the EfW CHP Facility.

8.4.7 Dust and odour emissions during normal operation have been scoped out of the assessment for the reason that these emissions will not give rise to any predicted likely significant effects. This was agreed and confirmed with the Planning Inspectorate (PINS) in the EIA Scoping Opinion (ID 4.3.3, ref 7.5.36, ID 4.3.4, ref 7.5.37)). PINS did ask that the ES explain the measures to be put in place to manage odour and these are outlined in **Section 8.6** and **Chapter 3: Description of the Proposed Development (Volume 6.2)**, with further details presented in the **Outline Odour Management Plan (Volume 7.11)** which will be secured as a DCO Requirement.

Grid Connection

8.4.8 The construction phase dust assessment Study Area for the Grid Connection is based on the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' (2014) and extends 350m from the Grid Connection boundary and 50m from the routes used by construction vehicles on the public highway, up to 500m from the New Bridge Lane site entrance to the construction compound for the Grid Connection.

8.4.9 Other than limited and infrequent maintenance works, there are no activities associated with the Grid Connection that would result in emissions to air, therefore operation of the Grid Connection has been scoped out in agreement with PINS, (Scoping Opinion ID 4.3.1, ref 7.5.34).

Desk study

8.4.10 A summary of the desktop data used to inform the assessment is provided in **Table 8.6 Desktop data for Air Quality Assessment** below.

Table 8.6 Desktop data for Air Quality Assessment

Desktop data	Source of desktop data	Details of the information
Reports	Fenland District Council	2020 Air Quality Annual Status Report (ASR)[1].
Monitoring data	Fenland District Council	Ambient air quality monitoring data[1]
Mapped data	Defra, UK Air Information Resource (UK-air)	Mapped estimates of air pollutant background concentrations.[2]
Monitoring data	Defra, UK Air Information Resource (UK-air)	Monitored data on heavy metals, polycyclic aromatic hydrocarbons (PAHs), PCDD/Fs, ammonia, and acid gases from national monitoring networks.[2]
Monitoring data	UK Air Pollution Information System (APIS)	Mapped estimates of background concentrations and deposition rates at ecological Receptors.[3]
Mapping	Google Earth Pro	Aerial imagery and Ordnance Survey maps.[4]

Survey work

8.4.11 As agreed with Cambridgeshire County Council (CCC) via e-mail letter received 21 July 2020, air quality in the vicinity of the Proposed Development has been monitored using both diffusion tubes and a continuous monitor.

8.4.12 Diffusion tubes monitoring concentrations of NO_2 were installed in triplicate during October 2020 at thirteen locations as shown on **Figure 8.1: Air quality survey monitoring locations (Volume 6.3)**.

8.4.13 Diffusion tubes, supplied and analysed by Gradko International, were exposed for a total period of 14-months. They were changed on a monthly basis every four to five weeks in line with the Defra Diffusion Tube Calendar. The analysis method was 50% triethanolamine (TEA) in water.

8.4.14 Additionally, an automatic monitor was installed at Thomas Clarkson Academy in June 2021 in a background location. A four-month co-location study was undertaken with a triplicate diffusion tube location (site 14) installed alongside the automatic monitor from August to November 2021. This co-location study was used to determine a diffusion tube adjustment factor of 0.69. Full details on diffusion tubes adjustment are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

8.4.15 **Table 8.7 Details of Proposed Development monitoring locations** presents details of the selected monitoring locations and **Table 8.8 Proposed Development**

[1] FDC Website (Accessed February 2022)
[2] Defra UK Air Information Resource (UK-air) Website (Accessed June 2021)
[3] UK Air Pollution Information System (APIS) Website (Accessed June 2021)
[4] Google Earth Pro (Imagery date September 2018)

Monitoring Results for 2021 presents monitoring results for 2021. Full monthly monitoring results are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

8.4.16 In line with LAQM.TG(16), monitoring results with less than 75% of data capture were annualised using three nearby background automatic monitoring sites with a data capture above 85% for 2021. Full details on the annualisation process are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

Table 8.7 Details of Proposed Development monitoring locations

Site ID	Site location	Site type	X (m)	Y (m)	Height	In AQMA?	Distance to kerb (m)	Distance to EfW CHP Facility Site (km)
1	Thomas Clarkson Academy	Roadside	546612	308501	2.1	N	3.9	1.1
2	New Bridge Lane	Roadside	545331	307796	2.0	N	1.2	0.1
3	New Drove	Roadside	546453	308232	1.8	N	1.8	0.8
4	Cromwell Road	Roadside	545503	308691	1.9	N	1.2	0.6
5	Cromwell Road	Roadside	544979	307825	1.9	N	2.4	0.4
6	Wisbech Bypass	Suburban	545729	307468	1.7	N	15.0	0.4
7	Weasenham Lane	Roadside	546600	308401	1.9	N	1.6	1.0
8	Weasenham Lane	Roadside	546444	308355	1.9	N	0.8	0.9
9	Railway Road	Roadside	546215	308856	1.8	N	1.4	1.0
10	Algores Way	Roadside	546106	308390	2.0	N	1.6	0.6
11	Elm High Road	Roadside	547083	307871	1.8	N	2.3	1.4
12	Elm High Road	Roadside	546904	308258	1.9	N	5.5	1.3
13	Churchill Road	Roadside	546531	309265	1.7	Y	1.7	1.5

Site ID	Site location	Site type	X (m)	Y (m)	Height	In AQMA?	Distance to kerb (m)	Distance to EfW CHP Facility Site (km)
14 (co-located passive and automatic)	Thomas Clarkson Academy	Suburban	546350	308490	1.5	N	N/a	0.8

Table 8.8 Proposed Development Monitoring Results for 2021

Site ID	Type	Site location	2021 Data capture (%)	2021 Bias adjusted and annualised average (µg m^{-3})
1	Passive	Thomas Clarkson Academy	67%	9.6
2	Passive	New Bridge Lane	83%	8.6
3	Passive	New Drove	83%	8.7
4	Passive	Cromwell Road	83%	19.8
5	Passive	Cromwell Road	92%	18.2
6	Passive	Wisbech Bypass	92%	10.7
7	Passive	Weasenham Lane	92%	15.7
8	Passive	Weasenham Lane	92%	16.6
9	Passive	Railway Road	50%	11.8
10	Passive	Algores Way	92%	12.5
11	Passive	Elm High Road	92%	21.5
12	Passive	Elm High Road	92%	15.2
13	Passive	Churchill Road	75%	29.8
14	Passive	Thomas Clarkson Academy	33%	11.9
14	Automatic	Thomas Clarkson Academy	NO_2: 58% PM_{10}: 55% $PM_{2.5}$: 54%	NO_2: 11.3 PM_{10}: 15.8 $PM_{2.5}$: 9.9

8.5 Baseline

8.5.1 The following paragraphs present a review of the current and future baseline regarding air quality for the different components of the Proposed Development.

Current baseline

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

Local Air Quality Management

8.5.2 In line with Local Air Quality Management (LAQM) requirements, Fenland District Council (FDC) carry out air quality monitoring and produce ASRs.

8.5.3 FDC has declared three AQMAs in Wisbech:

- Wisbech AQMA No.1 (SO_2) approximately 1.0km north of the EfW CHP Facility Site;
- Wisbech AQMA No.2 (PM_{10}) approximately 1.7km north-east of the EfW CHP Facility Site; and
- Wisbech AQMA No.3 (NO_2) approximately 1.2km north-east of the EfW CHP Facility Site.

8.5.4 As stated in the 2020 ASR, in 2019 FDC proposed to revoke Wisbech AQMAS No. 1 & 2. As these have yet to be revoked they have been considered in this assessment.

Continuous monitoring

8.5.5 There are currently two continuous monitors operated by FDC located in Whittlesea, approximately 21km to the south-west of Wisbech. **Table 8.9 Fenland District Council Continuous Monitors** provides details of the monitoring sites, whilst **Table 8.10 Monitored Exceedances of SO_2 AQOs** provides monitoring data collected between 2015 and 2019. The location of the monitoring sites is presented in **Figure 8.2: Local Authority monitoring locations (Volume 6.3).**

Table 8.9 Fenland District Council Continuous Monitors

Site ID	Site location	Site type	X	Y	Pollutants
AM1	Park Lane	Urban Background	526382	296859	SO_2
AM2	Bradley Fen	Industrial	523924	297974	SO_2

Table 8.10 Monitored Exceedances of SO_2 AQOs

Site ID	National objective	Number of exceedances				
		2015	2016	2017	2018	2019
AM1	15-minute average – 35 exceedances of 266 µg m^{-3} permitted	1	1	4	0	1

Site ID	National objective	Number of exceedances				
		2015	2016	2017	2018	2019
	Hourly average – 24 exceedances of 350 µg m^{-3} permitted	0	0	0	0	0
	Daily average – 3 exceedances of 125 µg m^{-3} permitted	0	0	0	0	0
AM2	15-minute average – 35 exceedances of 266 µg m^{-3} permitted	0	8	2	9	17
	Hourly average – 24 exceedances of 350 µg m^{-3} permitted	0	0	0	0	1
	Daily average – 3 exceedances of 125 µg m^{-3} permitted	0	0	0	0	0

Passive monitoring

8.5.6 FDC undertakes passive diffusion tube monitoring of NO_2 at 25 locations across the District. Details of the monitoring sites closest to the Proposed Development are included in **Table 8.11 Details of Passive Monitoring in Wisbech**, with data collected between 2015 and 2019 included in **Table 8.12 Monitored Annual Mean Concentrations of NO_2**. The location of the diffusion tube sites is presented in **Figure 8.2: Local Authority monitoring locations (Volume 6.3).**

Table 8.11 Details of Passive Monitoring in Wisbech

Site ID	Site location	Site type	X	Y	In AQMA?	Distance to kerb (m)	Distance to EfW CHP Facility Site (km)
S3	Ramnoth	Kerbside	546857	308553	Y	1	1.4
S5	Bowthorpe	Kerbside	546414	309585	Y	2	1.7
S8	Westmead Avenue	Kerbside	546886	308366	Y	1	1.4
S12	AWS Lynn Road	Industrial	546588	310192	Y	N/A	2.4
S13	Lynn Road/Mt Pleasant	Roadside	546661	310396	Y	1	2.6
S15	Weasenham Lane JCN	Roadside	546828	308543	Y	2	1.4

Site ID	Site location	Site type	X	Y	In AQMA?	Distance to kerb (m)	Distance to EfW CHP Facility Site (km)
S16	Lynn Road R'about	Roadside	546260	309987	Y	2	2.1
S17	Weasenham/ Cromwell	Roadside	545509	308731	N	2	0.7
S20	Napier	Roadside	546485	309389	Y	2	1.6

Table 8.12 Monitored Annual Mean Concentrations of NO_2

Site ID	Data capture 2019 (%)	Annual mean concentrations of NO_2 (µg m^{-3})				
		2015	2016	2017	2018	2019
S3	100	27.8	24.4	25.7	21.1	21.6
S5	100	33.4	35.4	35.7	28.2	30.1
S8	100	18.4	18.5	20.3	29.1	28.7
S12	100	16.7	16.1	16.1	14.8	16.6
S13	100	29.8	27.1	26.3	27.2	25.5
S15	100	34.9	34.4	33.7	29.7	30.3
S16	100	32.1	30.5	29.7	30.6	29.6
S17	92	19.2	20.3	20.4	17.6	18.9
S20	92	31.4	31.8	29.0	27.3	26.9

8.5.7 **Table 8.12 Monitored Annual Mean Concentrations of NO_2** shows annual mean concentrations of NO_2 were below the 40 µg m^{-3} related AQS at all monitoring locations in Wisbech between 2014 and 2019. However, Wisbech AQMA No. 3 has not yet been revoked.

Estimated background concentrations

8.5.8 Defra has made estimates of background pollutant concentrations on a 1km^2 grid for the UK for seven of the main pollutants, including NO_X, NO_2, PM_{10} and $PM_{2.5}$. **Table 8.13 Defra Mapped Annual Mean Background Concentrations for 2021** shows the estimated values of these pollutants for 2021 for the grid squares containing each of the EfW CHP Facility, CHP Connection, TCC, Access Improvements and Water Connections.

Table 8.13 Defra Mapped Annual Mean Background Concentrations for 2021

Pollutant	Concentration Range within the Study Area (µg m^{-3})
NO_X	7.4 – 18.6
NO_2	5.8 – 13.6
PM_{10}	14.2 – 16.3
$PM_{2.5}$	8.7 – 9.9
CO	239 - 282
SO_2	0.9 – 2.2

Note: Background concentrations of CO and SO_2 available for 2001 only.

Monitoring survey

8.5.9 As detailed in Section 8.4, Survey Work subsection, a monitoring survey using diffusion tubes as well as an automatic monitor was undertaken at 14 locations near to the Proposed Development. Bias adjusted and annualised results for 2021 are presented in **Table 8.8 Proposed Development Monitoring Results for 2021**. Annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were comfortably below their respective AQS at all monitoring stations.

8.5.10 Concentrations obtained at roadside monitoring locations were used to determine a verification factor in the road traffic dispersion modelling assessment. Full details of model verification are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

Hydrogen chloride (HCl)

8.5.11 Hydrogen chloride concentrations are routinely measured at 30 sites across the UK as part of the Acid Gas and Aerosol Network (AGANet). The closest monitoring site to the project components of the Proposed Development, approximately 25km to the south-east. The annual mean concentration of HCl in 2016, the year in which monitoring ceased at this location, was 0.21 µg m^{-3}.

Ammonia

8.5.12 Ammonia (NH_3) is measured at 85 sites across the UK under the National Ammonia Monitoring Network (NAMN). The nearest monitoring locations to the project components of the Proposed Development and the 2021 annual mean concentrations of NH_3 are as follows:

- Stoke Ferry (28km south-east) – 0.77 µg m^{-3};
- Pointon (38km north-west) – 1.20 µg m^{-3};
- Monks Wood (39km south-west) – 1.37 µg m^{-3} and
- Stanford 2 (43km west) – 2.00 µg m^{-3}.

8.5.13 The monitoring result of Pointon in 2021 was not recorded and the result in 2020 is shown.

Hydrogen fluoride

8.5.14 Hydrogen fluoride concentrations are not routinely measured in the UK. In heavily polluted urban areas, the World Health Organisation (WHO) reports that total fluoride concentrations in air can reach 3 µg m^{-3} (WHO, 2000).

Metals

8.5.15 Metal concentrations are measured in the UK by Defra under the Heavy Metals Network.

8.5.16 The closest monitoring site to the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections with recent data is Heigham Holmes, approximately 97km to the east. A summary of the monitoring data is detailed in **Table 8.14 2020 monitored metal concentrations at Heigham Holmes**.

Table 8.14 2020 monitored metal concentrations at Heigham Holmes

Metal	2020 Annual Mean Concentration (ng m^{-3})
Antimony	0.04
Arsenic	0.53
Cadmium	0.09
Chromium	0.46
Cobalt	0.04
Copper	1.49
Lead	3.12
Manganese	2.37
Mercury	0.01
Nickel	0.49
Vanadium	0.97

8.5.17 The Heavy Metals Network monitors chromium concentrations as total Cr. EPAQS (Expert Panel on Air Quality Standards) report that ambient Cr(VI) concentrations may typically constitute 3-8% of total Cr. The higher value of this range is used to derive a Cr(VI) background concentration from the total monitored Cr.

PCDD/Fs

8.5.18 In the UK, Defra's Toxic Organic Micropollutants (TOMPS) survey is the principal source of data on the measured concentrations of PCDD/Fs, dioxin-like PCBs and

PAHs in ambient air at five locations (one urban background site and four rural background sites). The closest monitoring station to the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections is the rural background station High Muffles approximately 195km distant.

8.5.19 The most recent (2010) annual mean dioxin PCDD/F data measured is 2.76 fg I-TEQ m^{-3}.

PAHs

8.5.20 PAHs are measured at 31 sites in the UK. The nearest urban background monitoring station to the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections which has recent data is Stoke Ferry, approximately 28km to the south-east of the Proposed Development. The 2020 monitored PAH concentration (as benzo[a]pyrene - B(a)P) was 0.06 ng m^{-3}.

PCBs

8.5.21 In the UK, Defra's Toxic Organic Micropollutants (TOMPS) survey is the principal source of data on the measured concentrations of PCDD/Fs, dioxin-like PCBs and PAHs in ambient air at five locations (one urban background site and four rural background sites). The closest monitoring station to the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections is the rural background station High Muffles approximately 195km distant.

8.5.22 The most recent (2018) annual mean dioxin PCBs data measured is 8.7 pg m^{-3}.

Nitrogen and acid deposition rates

8.5.23 The Air Pollution Information System (APIS) provides background nitrogen and acid deposition rates specific to sensitive biodiversity sites. The deposition rates used in this assessment are detailed in **Table 8.15 Nitrogen and acid deposition rates.**

Table 8.15 Nitrogen and acid deposition rates

Sensitive ecological Receptor	Nitrogen deposition (kgN/ha/yr)	Acid deposition – nitrogen (keq N/ha/yr)	Acid deposition – sulphur (keq S/ha/yr)
Nene Washes Special Area Conservation (SAC), Special Protection Area (SPA) & Ramsar	17.6	1.3	0.2
Ouse washes SAC, SPA & Ramsar	15.3	1.1	0.1
River Nene County Wildlife Site (CWS)	16.8	1.2	0.2

Grid Connection

8.5.24 Pollutant concentrations summarised above are also representative of baseline conditions at the Grid Connection. The Defra background map data, as seen in **Table 8.13 Defra Mapped Annual Mean Background Concentrations for 2021**,

indicate that concentrations of PM_{10}, the main pollutant of concern from dust emissions during construction, are comfortably below the relevant AQOs.

Future baseline

8.5.25 This section summarises how the current baseline is predicted to change between now and the 2026 (opening year of the Proposed Development), in the absence of the Proposed Development. It should be noted that for all pollutants apart from NO_2/NO_x baseline concentrations, as reported above, are below their relevant long-term objectives.

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

8.5.26 In the absence of the development components listed above, it is expected there would be a gradual decline in current baseline concentrations recorded as a result of expected improvements in air quality, such as the Government's Clean Air Strategy objectives being implemented, improvements in real world emissions performance of road vehicles and more stringent emission limits for industrial sources as EPs are updated in a phased manner to bring them in line with the requirements of the IED. As the anticipated improvements are not guaranteed, as a worst-case approach, such anticipated reductions are not reflected in the future baseline and baseline year background concentrations are used for all model scenarios.

8.5.27 Regarding the potential effects of climate change on the future air quality baseline, the 2007 report produced by the Air Quality Expert Group (AQEG) indicated that the winter season may become windier with fewer less stable weather conditions by the end of the century, whilst summer seasons are anticipated to become hotter and sunnier, with an increase in unstable weather conditions by the 2040s. The net effect of these anticipated changes on baseline air quality is difficult to establish but is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of any assessment. Other factors such as changes in technology and the move away from combusting fossil fuels, driven by climate change mitigation, would potentially lead to decreases in emissions of the key pollutants considered in this assessment and a corresponding decrease in background concentrations of air pollutants into the future.

8.5.28 In its EIA Scoping Opinion, PINS agreed that the effects of climate change upon air quality could be scoped out of the assessment (ID 3.4.5, ref 7.5.39, **Scoping Opinion (Volume 6.4)**).

Grid Connection

8.5.29 The future baseline described above, is also applicable to the Grid Connection.

8.6 Scope of the assessment

8.6.1 This section presents information relating to the current scope following receipt of the EIA Scoping Opinion, at statutory consultation and further Stakeholder engagement undertaken after the statutory consultation.

8.6.2 This section relates to the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections project components of the Proposed Development.

Spatial scope

8.6.3 The spatial scope of the assessment of air quality covers the area of the Proposed Development, together with the Zones of Influence (ZOIs) that have formed the basis of the Study Area the approach to which is described above in **Section 8.4.**

Temporal scope

8.6.4 The temporal scope of the assessment of air quality is consistent with the period over which the development would be carried out and therefore covers the construction, operational and decommissioning periods, 2023-2026 for the construction phase, 2027-2066 for the operational phase and 2067 for the decommissioning phase.

Potential Receptors

8.6.5 Receptors potentially affected by the Proposed Development comprise residents living in proximity, schools, and recreational areas. In addition, there are statutory and non-statutory biodiversity sites in the locality which may be susceptible to direct exposure to air pollutants emitted from the Proposed Development and through indirect effects associated with nitrogen and acid deposition. The location of the relevant Receptors is presented in **Figure 8.3: Modelled Receptors (Volume 6.3)**.

Human Receptors

8.6.6 Guidance from Defra in LAQM.TG(16) establishes that exceedances of the human health-based objectives should only be assessed at outdoor locations where members of the general public are regularly present over the averaging time of the objective. **Table 8.16 Typical examples of relevant exposure for different averaging periods** provides an indication of those locations that may be relevant for different averaging periods, as extracted from LAQM.TG(16).

Table 8.16 Typical examples of relevant exposure for different averaging periods

Averaging period	Objectives should apply	Objectives should not apply
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades 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),

Averaging period	Objectives should apply	Objectives should not apply
		or any other location where public exposure is expected to be short term.
24-hour mean, and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g., pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be expected to spend a period of 15-minutes or longer.	

8.6.7 The human Receptors included in the assessment for the purposes of assessing chimney and road traffic emissions have been chosen based on the above guidance by identifying places where people may be located, judged in terms of the likely duration of their exposure to pollutants, and proximity to the Proposed Development. These human Receptor locations are displayed in **Figure 8.3: Modelled Receptors (Volume 6.3)** and include residential properties, schools (including, but not limited to, Trinity School, Unity Academy, Thomas Clarkson Academy), residential care homes, hospitals, places of worship, etc. It should be noted that this list of Receptors is by no means exhaustive but considers the Receptors most likely to experience potential impacts from emissions from the Proposed Development, with certain Receptors grouped together to represent exposure over a wider area, rather than at specific residential properties, for example.

8.6.8 There are several Receptors on the adjacent business park and industrial estate where there is no fixed habitation but where members of the general public (i.e., excluding the workforce) may be present for short periods of time. Such Receptors

include gyms, restaurants, and cinemas. Potential short-term air quality impacts, i.e., the impact from those pollutants with an AQS averaging period of 1-hour or less, at these locations are assessed with reference to the outputs from the gridded concentration data produced by the dispersion model (discussed in more detail in the following sections). Long-term impacts are not considered at these Receptors as members of the public are unlikely to be present over the full duration of the AQS averaging period.

8.6.9 In line with the IAQMs guidance (2014), human Receptors within 350m of dust generating activities (including those associated with the construction of the Proposed Development), and 50m from the kerb up to 500m from the construction site entrances in terms of trackout, are considered.

Biodiversity sites

8.6.10 SPAs, SACs, Ramsar sites and Sites of Special Scientific Interest (SSSIs) within 15km of the Proposed Development and all further statutory and non-statutory biodiversity sites within 2km are considered in the assessment of chimney emissions. These distances are reduced to 50m from the project components and up to 500m from the site entrance along public highway, for the purposes of assessing construction dust effects as per the IAQM guidance (2014).

8.6.11 The following statutory designated biodiversity sites of international importance (internationally designated biodiversity sites) have been identified within 15km of the Site:

- Nene Washes Ramsar site, SAC and SPA (7.2km south-west); and
- Ouse Washes Ramsar, SAC and SPA (12.5km south-east).

8.6.12 In addition, there is a non-statutory CWS, called River Nene, within 2km of the Proposed Development that has also been taken into consideration.

8.6.13 **Chapter 11: Biodiversity (Volume 6.2)** discusses sensitive biodiversity sites in more detail and their locations are shown in **Figure 11.2: Statutory and non-statutory designated sites for nature conservation identified within areas of search (Volume 6.3)**. In addition, **Figure 8.3: Modelled Receptors (Volume 6.3)** shows modelled Receptors; points E1-10 represent River Nene CWS, E11 represents Ouse Washes Ramsar, SAC and SPA and E12 represents Nene Washes Ramsar, SAC and SPA.

8.6.14 Honington House Farm CWS is listed within **Chapter 11: Biodiversity (Volume 6.2)**, however, has been scoped out of the air quality assessment as it is located greater than 2km from the chimneys. The CWS is located approximately 1.5km from the Grid Connection, however there will be no emissions to air from the Grid Connection therefore operational effects have not been considered further in this assessment.

Likely significant effects

Construction

Construction dust

8.6.15 Dust generated during the construction phase of the Proposed Development is assessed using the IAQM's 'Guidance on the assessment of dust from demolition and construction' (2014) to assess the dust risk and recommend appropriate mitigation measures to be included in a Dust Management Plan. The construction phase dust assessment considers construction activities associated with the Proposed Development.

Construction traffic

8.6.16 The EPUK and IAQM's 'Land-Use Planning & Development Control: Planning for Air Quality guidance' (2017) is used to screen the requirement for a more detailed assessment of construction traffic emissions applying the indicative criteria detailed in Table 6.2 of the guidance. The criteria relating to changes in vehicle movements are applied to cumulative traffic flows (i.e., the Proposed Development plus other committed development) rather than the Proposed Development flows alone.

8.6.17 A traffic survey was undertaken in October 2021 and the survey results used to inform the assessment. The screening of traffic flows indicated the need for detailed assessment. A quantitative assessment using the ADMS Roads dispersion model and the latest emission factors from Defra's Emissions Factor Toolkit (EFT) has been undertaken to predict the incremental changes in concentrations of NO_X, NH_3, NO_2, PM_{10} and $PM_{2.5}$ at relevant Receptors within 200m of affected roads.

8.6.18 The scenarios considered are:

- 2021 Baseline - the current baseline based on 2021 emission factors, traffic data and background data;
- 2024 Baseline – future case based on 2024 emission factors, traffic data and 2021 background data; and
- 2024 With Construction – future case based on 2024 emission factors, traffic data with Proposed Development and 2021 background data.

8.6.19 The output from the 2021 Baseline model has been verified using the results from roadside diffusion tube monitoring undertaken in the vicinity of the Proposed Development. Verification is undertaken by comparing modelled versus monitored concentrations and identifying a factor that is then applied to the outputs from the traffic models. The year 2024 is considered the worst-case year regarding construction traffic. Receptors within the Wisbech AQMA No.3 as well as along the affected roads have been considered and reported. Full parameters used in the road model are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

Operation

Chimney emissions

8.6.20 Chimney emissions during the operational phase of the EfW CHP Facility are assessed using the ADMS 5.2 dispersion model. Prior to undertaking the full modelling assessment, a chimney height assessment was undertaken to identify the optimum chimney height by predicting the maximum ground level concentration for a range of different chimney heights in the range 50 – 150m. Details of the chimney height assessment are provided in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

8.6.21 Releases to air from developments of this nature are controlled by ELVs provided by the Environmental Permitting (England and Wales) Regulations 2016, as amended, which implement the requirements of Annex VI of the IED. These ELVs are used as the basis for defining the pollutant emission concentrations discharged from the chimneys. Where ELVs are not specified for certain pollutants, but it is known emissions of these pollutants may occur from EfW facilities (e.g., PAHs), emissions data are derived from manufacturer's data or from typical levels monitored at other similar UK facilities.

8.6.22 BAT Conclusions for incineration activities were published in November 2019 as a Commission Implementing Decision. The BAT Associated Emission Levels (BAT-AELs) established by the BAT Conclusions have been used as the basis for defining the pollutant emission concentrations in preference to the ELVs in Annex VI of the IED.

8.6.23 The assessment assumes that the EfW CHP Facility is emitting at these concentrations and at maximum waste throughput continually for 24-hours a day, 365-days a year. This provides a conservative estimate of annual mean impacts since the EfW CHP Facility is expected to achieve an annual availability closer to 90%.

8.6.24 The pollutants assessed include:

- Oxides of nitrogen (NO_X as NO_2);
- Particulate matter (PM_{10} and $PM_{2.5}$);
- Carbon monoxide (CO);
- Sulphur dioxide (SO_2);
- Hydrogen chloride (HCl);
- Hydrogen fluoride (HF);
- Group 1 metals (cadmium (Cd) and thallium (Tl));
- Group 2 metals (mercury (Hg));
- Group 3 metals (antimony (Sb), arsenic (As), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), nickel, (Ni) and vanadium (V));
- Volatile organic compounds (VOCs);
- Ammonia (NH_3);

- Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs);
- Polychlorinated biphenyls (PCBs); and
- Polycyclic aromatic hydrocarbons (PAHs).

8.6.25 Given that the speciation of VOCs and PAHs are not known, it is assumed that VOCs are emitted as benzene and compared against the benzene Air Quality Standard in line with EA Air Emission Risk Assessment guidance, whilst it is assumed that all PAHs are emitted as benzo [a] pyrene (B[a]P) for comparison against the PAH Environmental Assessment Level. Similarly, it is assumed that all particles are emitted in the PM_{10} and $PM_{2.5}$ fractions for comparison against the PM_{10} and $PM_{2.5}$ Air Quality Standards.

8.6.26 An assessment of chimney emissions during abnormal operating scenarios has also been considered. These may have the potential for emissions to temporarily increase above ELVs; such scenarios include failure of a filter bag (affecting particulate matter and metal emissions), failure of the lime dosing system (affecting emissions of acid gases, including SO_2, HF and HCl); and failure of the urea dosing system (affecting emissions of NO_x). Article 46(6) of the IED does permit ELVs to be exceeded for no more than 4-hours uninterrupted and up to 60-hours per annum.

8.6.27 The model uses five years of hourly sequential meteorological data from the Met Office's Numerical Weather Prediction (NWP) model interpolated for the specific location of the Proposed Development. The nearest synoptic weather station that provides model-quality monitored meteorological data is located at RAF Marham, approximately 27km to the east of Wisbech. Due to this distance, data from this station may not be representative of conditions within Wisbech and therefore NWP data have been used in this assessment.

8.6.28 The model includes appropriate treatments for buildings, terrain and surface characteristics. Sensitivity analysis is undertaken to investigate how these treatments and other assumptions incorporated into the modelling approach affect the predictions of the model.

8.6.29 Receptors within the three Wisbech AQMAs are also included within the model.

8.6.30 An emergency diesel generator is provided to shut down the plant safely in the event of total power loss (failure of the Grid Connection coinciding with failure of island mode operation). This is also modelled as an emergency scenario and only short term NO_2 emissions have been considered.

8.6.31 The plume visibility option in the model was also run for the five meteorological years using the additional input of % moisture in kg/kg. The plume visibility runs predicted, amongst other parameters, the maximum length of the plume and the % of the year that the plume is visible. These outputs are presented in **Chapter 9 Landscape and Visual (Volume 6.2)**.

Traffic Emissions

8.6.32 As discussed in the construction traffic section, air dispersion modelling was undertaken to predict the process contribution from traffic emissions on the identified sensitive Receptors. The operational scenarios considered for traffic emissions are:

- 2027 Baseline – future case based on 2027 emission factors, traffic data and 2021 background data; and
- 2027 With Development – future case based on 2027 emission factors, traffic data with Proposed Development and 2021 background data.

8.6.33 A verification model (2021 Baseline) was also considered to identify an appropriate verification factor for the traffic emissions assessments. The year 2027 is the anticipated year at full operation.

8.6.34 It is worth noting that impacts from traffic emissions have been combined with impacts from emissions from the EfW CHP Facility Site, to calculate the overall process contribution from the Proposed Development on local air quality.

Assessment of deposition to land of emissions to air of metals

8.6.35 The dispersion model described above is used to predict the deposition rate of metals emitted from the chimneys using the methodology in the EA's 'Air Emissions Risk Assessment for your Environmental Permit guidance'. The resultant deposition rates are compared against the Maximum Deposition Rates (MDR) in the same guidance.

Human health risk assessment for exposure to PCDD/Fs

8.6.36 NPS EN-3 establishes the human-health based air quality standards that can be used to assess the potential effects on human health associated with emissions from EfW plants. However, in the case of PCDD/Fs, no air quality standards or other guideline values exist, as the overwhelming majority of human exposure to PCDD/Fs originates via ingestion, rather than inhalation.

8.6.37 The total human bodily uptake of PCDD/Fs as a result of chimney emissions from the Proposed Development is assessed using a risk assessment process based on the application of the US EPA Human Health Risk Assessment Protocol (HHRAP)[5]. This protocol has been assembled into a commercially available model, Industrial Risk Assessment Program (IRAP, Version 5.1.0) and marketed by Lakes Environmental of Ontario. The approach seeks to quantify the *hazard* faced by the Receptor, the *exposure* of the Receptor to the substances identified as being a potential hazard and then to assess the *risk* of the exposure.

8.6.38 The resultant prediction of total daily bodily uptake is compared against the Food Standards Agency Committee on Toxicity's Tolerable Daily Intake (TDI) for PCDD/Fs.

Assessment of operational road traffic emissions

8.6.39 An assessment of the effects of operational road traffic emissions is undertaken using the same methodology described for construction traffic movements.

5 US EPA Office of Solid Waste (September 2005) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities

Assessment of odour during abnormal operation

8.6.40 During normal operation of the plant, odorous air drawn from within the waste bunker and tipping hall will be used as the primary combustion air supply for the furnace. This will ensure any odours are destroyed at the high temperatures within the combustion chamber.

8.6.41 However, during periods of abnormal operation, which may require a temporary shutdown of the furnace, waste is likely to remain within the storage bunker. In this event, either building air will continue to be extracted via the primary air supplied to the other furnace or, in the event that both furnaces are shutdown, building air would be extracted and vented through carbon filters, before being released to atmosphere, or a permanently installed odour neutralisation system will be deployed. An assessment of discharges via these vents is undertaken using the ADMS 5.2 dispersion model.

8.6.42 Procedures in an Odour Management Plan developed as a condition of the installation's EP and consistent with the **Outline Odour Management Plan** (**Volume 7.11**) will ensure full breakthrough does not occur.

Assessment of concentrations of NO_X, NH_3, SO_2 and HF, and nitrogen and acid deposition rates at biodiversity sites

8.6.43 The chimney emissions and road traffic dispersion models described above are used to calculate the incremental contributions to baseline concentrations of NO_X, NH_3, SO_2 and HF, in addition to nitrogen and acid deposition rates, at the biodiversity sites considered in the assessment. These predictions are compared against critical levels and critical loads provided by APIS.

8.6.44 However, in accordance with IAQM guidance (2017), the assessment of the significance of any resultant effects is made in **Chapter 11: Biodiversity (Volume 6.2)** of the ES.

Receptors and effects scoped out of the assessment

8.6.45 The following Receptors have been scoped out from being subject to further assessment because the potential effects are not likely to be significant:

- Operational effects relating to the Grid Connection;
- Construction plant (non-road mobile machinery) emissions during the construction phase;
- Dust emissions during the operational phase;
- Odour emissions during normal operation; and
- Effects of climate change on air quality.

8.6.46 Justification for scoping out is discussed below.

Operational effects relating to the Grid Connection

8.6.47 Other than limited and infrequent maintenance works, there are no activities associated with the Grid Connection that would result in emissions to air.

Construction plant (non-road mobile machinery) emissions during the construction phase

8.6.48 These effects have been scoped out since construction plant emissions are controlled by the Non-Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) Regulations 2018 and the scale, duration, and distance of construction activity to relevant Receptors is not considered to be of a magnitude that would require detailed assessment. Additionally, according to LAQM.TG(16) guidance, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are "*unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed*".

8.6.49 In its EIA Scoping Opinion PINS recommended to assess effects from NRMM emissions where significant effects were expected. However, specific mitigation measures incorporated into the Construction Environmental Management Plan (CEMP) consistent with the **Outline CEMP (Volume 7.12)** secured via a DCO Requirement and with best practice measures in maintaining NRMM equipment ensures that residual effects will be negligible (**Not Significant**) at all sensitive Receptors. These mitigation measures are presented in **Section 8.9**.

Dust emissions during the operational phase

8.6.50 These effects have been scoped out since all waste, incinerator bottom ash and APCr handling and storage will be within enclosed buildings.

Odour emissions during the operational phase (normal operation)

8.6.51 These effects have been considered further since the EfW CHP Facility is required to apply to the EA for an EP before it can commence operation. As a condition of this EP, the installation will operate an Odour Management Plan to ensure no significant odour is detectable beyond the EfW CHP Facility Site boundary. Furthermore, a number of measures have been incorporated into the design to ensure odour effects during the operational phase will be no greater than negligible, including:

- All waste will be delivered in enclosed refuse collection vehicles;
- Vehicles will enter the waste reception area via fast-acting roller shutter doors;
- The waste processing areas of the building and the furnaces themselves will be maintained under a slight negative pressure to prevent leakage of building air;
- Air from the waste reception and storage areas of the buildings will be routed to the furnaces to be used as primary combustion air. This will ensure any odorous compounds are destroyed by the high temperatures in the combustion chamber; and
- When the furnace is shutdown, waste is still stored in the bunker, therefore, shutdowns of each furnace will be staggered wherever possible. Where this is not possible a permanently installed odour neutralisation spray system or carbon filters will be deployed, subject to further discussions with the EA concerning application of BAT.

8.6.52 For clarity, an assessment of odour during abnormal operation, when both furnaces are shut down and odour neutralisation spray system or carbon filters are in use has been included in the scope of the assessment.

Effects of climate change on air quality

8.6.53 Whilst the net effect of climate change on the baseline air quality is difficult to establish, given the complexity of the systems involved, it is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of any assessment. Other factors such as changes in technology and the move away from combusting fossil fuels, driven by climate change mitigation, would potentially lead to decreases in emissions of the key pollutants considered in this assessment, leading to a decrease in background concentrations of air pollutants into the future (refer to **Chapter 14: Climate Change (Volume 6.2)** for further information). This is in line with PINS Scoping pinion where it acknowledged that effects of climate change on air quality can be scoped out of the assessment.

8.7 Embedded environmental measures

8.7.1 Environmental measures have been embedded into the Proposed Development and **Table 8.17 Summary of the embedded environmental measures and how these influence the air quality assessment** outlines how these embedded measures will influence the air quality assessment.

Table 8.17 Summary of the embedded environmental measures and how these influence the air quality assessment

Receptor	Changes and effects	Embedded measures and influence on assessment
Human Receptors within 350m from site boundary	Reduction in dust emissions and likely beneficial effects on human Receptors.	CEMP will implement standard construction management measures consistent with **Outline CEMP (Volume 7.12)**. As per IAQM guidance, significance of impact is determined after consideration of construction dust mitigation.
Human Receptors; biodiversity sites	Reduction in chimney emissions and likely beneficial effects on human Receptors and biodiversity sites.	Suitable height of chimneys to ensure adequate dispersion to ensure no significant impacts to Receptors will be used in dispersion modelling. A chimney height determination forms part of this assessment and is a standard requirement in an EP.
Human Receptors; biodiversity sites	Reduction in chimney emissions and likely beneficial effects on human Receptors and biodiversity sites.	Selective non-catalytic reduction (SNCR) to be implemented within the furnace. Implementation of this measure will form part of the EP application to demonstrate BAT.

Receptor	Changes and effects	Embedded measures and influence on assessment
Human Receptors; odour	Minimisation of odour effects.	All waste will be kept in buildings with negative pressure. Refuse vehicles will be covered. Implementation of an odour Management Plan consistent with the **Outline Odour Management Plan (Volume 7.11).**

8.8 Assessment methodology

8.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4 Approach to the EIA (Volume 6.2)**, and specifically in **Sections 4.7 to 4.10**. However, whilst this has informed the approach that has been used in this air quality assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this air quality assessment. The assessment uses a combination of detailed, quantitative modelling and semi-quantitative risk-based approaches to identify potential effects on air quality using the methods described in the preceding sub-section. The stakeholders who were consulted and with whom agreement was reached on the assessment approach were:

- CCC (representing the relevant local authorities);
- EA; and
- Natural England (in the context of the HRA screening assessment).

Determination of significance

8.8.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations) recognise that developments will affect different environmental elements to differing degrees, and that not all potential impacts warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are “likely to be significantly affected by the development”.

8.8.3 The EIA Regulations do not define significance and it is necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly, in accordance with industry guidance and practice, assessed by reference to the sensitivity (or value) of a Receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

8.8.4 Approaches to assess the significance of the different elements of the air quality assessment are presented in the sub-sections below.

Air quality effects on human Receptors

8.8.5 The significance of long-term air quality effects of road traffic and chimney emissions on human Receptors are based on the EPUK and IAQM '*Land-Use Planning & Development Control: Planning for Air Quality*'(2017) guidance, using the impact descriptors defined in Table 6.3 of the guidance and replicated in **Table 8.18 Impact descriptors at individual Receptors**.

Table 8.18 Impact descriptors at individual Receptors

Absolute concentration with Proposed Development, relative to assessment level	% change in Concentration Relative to Assessment Level				
	0%	1%	2–5%	6-10%	>10%
75% or less	Negligible	Negligible	Negligible	Slight	Moderate
76–94%	Negligible	Negligible	Slight	Moderate	Moderate
95–102%	Negligible	Slight	Moderate	Moderate	Substantial
103–109%	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more	Negligible	Moderate	Substantial	Substantial	Substantial

Table notes: When defining the concentration as a percentage of the AQAL, the 'without scheme' concentration is used where there is a decrease in pollutant concentration, and the 'with scheme;' concentration for an increase. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e., well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

8.8.6 In the EPUK and IAQM guidance (2017), the magnitude of impact due to an increase/decrease in annual mean concentrations of air pollutants is described as "negligible", "slight", "moderate" or "substantial", taking into account both the change in concentration at a Receptor brought about by a new development as a percentage of the assessment level, and the actual concentration at that Receptor.

8.8.7 It must be emphasised that these impact descriptors are not intended to be used as the only measure of the significance of a proposed development. As the EPUK and IAQM guidance states:

> *"The overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one Receptor may not mean that the overall impact has a significant effect. Other factors need to be considered."*

8.8.8 As such, whilst the impact descriptors from Table 6.3 of the guidance are used in the determination of significance, the overall conclusion of significance of effect is based on professional judgement.

8.8.9 The EPUK and IAQM guidance further establishes that:

> *"For most road transport related emissions, and diffuse emissions associated with development, long term average concentrations are the most useful for evaluating the severity of impacts."*

8.8.10 Consequently, short-term concentrations attributable to road traffic emissions are zero. However, the EPUK and IAQM guidance (2017) establishes that this is a potential important factor for chimney emissions. Such effects are therefore described by the magnitude and severity of short-term process contributions (PCs) of chimney emissions. The guidance indicates that PCs <10% of the AQAL can be classified as 'negligible', 10-20% 'small', 20-50% 'medium', and >50% 'large' and the significance of this impact can be described as 'negligible', 'slight', 'moderate', or 'substantial' respectively without considering background concentrations.

Dust effects

8.8.11 The significance of dust effects is based on professional judgement after establishing the dust risk for the Proposed Development using the IAQM's '*Guidance on the assessment of dust from demolition and construction*' (2014). The guidance provides a four-step process (screening the requirement for a more detailed assessment, assessing the risk of dust impacts, determining the site-specific mitigation and examining residual effects) for evaluating the risk associated with dust emissions from construction and demolition sites on different types of Receptors to dust soiling, health effects and ecological effects. This level of risk is determined separately for each of the four defined activities (demolition; earthworks; construction; and trackout) and takes account of the scale and nature of the works, which determines the potential dust emission magnitude, and the sensitivity of the area.

8.8.12 Site-specific mitigation for each of the activities is then defined using the recommendations in the guidance before the overall significance of dust effects is determined. In respect to the latter, the IAQM (2014) guidance states:

> *"For almost all construction activity, the aim should be to prevent significant effects on Receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.*
>
> *There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that the conclusion of no significant effect is robust."*

8.8.13 The sensitivity of Receptors to dust effects during the construction phase has been determined following the IAQM's '*Guidance on the assessment of dust from demolition and construction*' (2014) (Box 6) general principles:

- High sensitivity Receptors:
  - users can reasonably expect enjoyment of a high level of amenity; or

- the appearance, aesthetics or value of their property would be diminished by soiling;
- the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land; and
- indicative examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.

- Medium sensitivity Receptors:
  - users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or
  - the appearance, aesthetics or value of their property could be diminished by soiling;
  - the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land; and
  - indicative examples include parks and places of work.
- Low sensitivity Receptors:
  - the enjoyment of amenity would not reasonably be expected; or
  - property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
  - there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land; and
  - indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

Odour effects

8.8.14 The significance of odour effects was made using professional judgement in accordance with the IAQM's Guidance on the assessment of odour for planning (2018). The guidance provides two tables for determining an effect descriptor for odour impacts predicted by dispersion modelling in terms of "Negligible", "Slight", "Moderate" and "Substantial" dependent upon whether the odour is deemed to be "Most Offensive" or "Moderately Offensive". Due to the nature of odours from management of municipal wastes, the descriptors for "Most Offensive" odours will be adopted.

8.8.15 Whilst the descriptors can assist in guiding a practitioner in the determination of significance, the IAQM (2018) guidance clarifies that, when concluding the significance of odour effects, the practitioner also needs to give the right amount of weight to the results provided and how well-suited that tool is to the study scenario in question. In the context of modelling, such factors generally involve appropriate consideration of model uncertainty.

8.8.16 Ultimately, the significance of odour effects is determined using professional judgement.

Air quality effects on ecological Receptors

8.8.17 Regarding internationally designated biodiversity sites, namely Nene Washes and Ouse Washes SPA, SAC and Ramsar for this assessment and in line with the EA guidance, effects may be screened out as insignificant and do not require further assessment if the long-term PC is less than 1%, or the short-term PC is less than 10% of the air quality assessment level (AQAL).

8.8.18 For CWS, such as River Nene, effects may be screened out as insignificant if the long and short-term PCs are less than 100% of the AQAL, in line with EA Air Emissions Risk Assessment guidance.

8.8.19 In accordance with the IAQM's 'A guide to the assessment of air quality on designated nature conservation sites' (2020), whilst concentrations and deposition rates are provided in this chapter with an indication as to whether effects may be screened out, the assessment of significance is made in **Chapter 11: Biodiversity (Volume 6.2).**

Assumptions

8.8.20 This assessment makes use of atmospheric dispersion models to identify the potential air quality effects associated with the Proposed Development. Dispersion models have been widely used in the UK for both regulatory compliance and planning purposes for several decades and are an accepted approach for this type of assessment. The models employed have also undergone extensive validation by the model developers, CERC. However, the use of any dispersion model is associated with an inherent element of uncertainty as it attempts to represent a complex system such as atmospheric chemistry and weather using a set of algorithms, the magnitude of which will vary on a case-by-case basis.

8.8.21 The approach to considering the potential effects of model uncertainty on the conclusions of an air quality assessment is to, firstly, acknowledge that such uncertainty exists and, secondly, to include a number of conservative ('worst-case') assumptions which will result in an overestimation of the model output compared to the 'true' impact of an emission source. As a result of these worst-case assumptions, the predicted results in this air quality assessment should be considered to represent the upper limit of model uncertainty for an equivalent scenario which aims to predict the actual impact of development emissions. Examples of conservative assumptions to be included in the assessment include:

- The Proposed Development is not yet operational and actual monitored emissions data from the chimneys is not available, the assessment therefore, assumes emissions from the chimneys occur continuously throughout the year at their respective emission limit values. Where the emission limit value is expressed as a range, the upper value is assumed.
- With respect to the assessment of road traffic emissions, no account of anticipated improvements to the emissions performance of vehicles in the future baseline is made. Vehicle emission factors in the future baseline and with

development scenario are based on those applicable to the current baseline year.

- The assessment of odour emissions when the furnace is in shutdown and waste remains within the bunker, assumes partial breakthrough of the odour neutralisation spray system or carbon filters.

8.8.22 The air quality assessment uses sensitivity analysis to explore how assumptions on various model input parameters, e.g., buildings, terrain, emissions etc may affect the conclusions of the assessment. These assessments, including detailed outputs, are contained within technical appendices of the ES. **Appendix 8B Air Quality Technical Report (Volume 6.4)** details the model inputs and sensitivity tests applied within the assessment and the full set of results.

8.9 Environmental assessment of air quality effects - construction

NRMM Exhaust Emissions during Construction

8.9.1 As stated previously, according to LAQM.TG(16) guidance, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are "*unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed*".

8.9.2 In addition, embedded mitigation in the form of a CEMP, consistent with the **Outline CEMP (Volume 7.12)**, will include the following controls in regards to NRMM:

- all NRMM should use fuel equivalent to ultralow sulphur diesel;
- all NRMM should comply with either the current or previous EU Directive Staged Emission Standards;
- all NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
- the on-going conformity of plant retrofitted with DPF, to a defined performance standard shall be ensured through a programme of on-site checks; and
- implementation of fuel conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient fuel consumption.

8.9.3 Successful implementation of the above mitigation measures would ensure that emissions from the NRMM used during construction are negligible.

Road Traffic Exhaust Emissions during Construction

8.9.4 The impact of road traffic emissions associated with the construction phase upon sensitive Receptors was assessed using the ADMS-Road dispersion modelling tool. Full details on model inputs and results are presented in **Appendix 8B Air Quality Technical Report (Volume 6.4)**. Traffic data representative of the peak construction period in 2024 was used.

NO_2 during construction

8.9.5 2024 NO_2 annual mean concentrations are predicted to remain comfortably below the NO_2 annual mean AQO of 40µg/m^3 at all modelled Receptors.

8.9.6 The maximum predicted 2024 annual mean NO_2 concentration during the construction phase is 30.1µg/m^3 at Receptor R41 situated at the junction between Weasenham Lane and Churchill Road. This represents a slight increase of 0.06µg/m^3 compared to 2024 baseline annual mean concentration. This is a result of assumptions based around the direction of travel taken by construction workers in light vehicles only and represents a Negligible impact in IAQM terms, which is considered **Not Significant**.

8.9.7 The maximum increase in NO_2 annual mean concentration associated with the construction phase (construction workers) is predicted to be 0.51µg/m^3 at Receptor R85 situated on Weasenham Lane at the junction with Algores Way. 2024 annual mean concentration is predicted to be 23.6µg/m^3. This also represents a Negligible impact in IAQM terms, which is considered **Not Significant**. The impact of the construction phase on NO_2 annual mean concentration is Negligible in IAQM terms, which is considered **Not Significant**.

8.9.8 The likelihood of exceedance of the NO_2 short-term AQS can be assessed with reference to the predicted annual means and the relationships recommended by LAQM.TG(16). The 1-hour mean NO_2 AQS is unlikely to be exceeded if the annual mean is less than 60µg/m^{-3}. As detailed in the above paragraphs, maximum concentrations are predicted to be significantly below the 60µg/m^{-3} threshold at all Receptors and the 1-hour mean NO_2 AQS is therefore predicted not to be exceeded at any Receptors.

PM_{10} during construction

8.9.9 2024 PM_{10} annual mean concentrations are predicted to remain comfortably below the PM_{10} annual mean AQO of 40µg/m^3 at all modelled Receptors.

8.9.10 The maximum predicted 2024 annual mean PM_{10} concentration during the construction phase is 17.2µg/m^3 at Receptor R53 situated on Nene Quay. This represents a very slight increase of 0.02µg/m^3 compared to 2024 baseline annual mean concentration. This prediction is based on travel taken by construction workers in light vehicles only along Nene Quay per day and represents a Negligible impact in IAQM terms, which is considered **Not Significant**.

8.9.11 The maximum increase in PM_{10} annual mean concentration associated with the construction phase is predicted to be 0.04µg/m^3 at Receptor R84 situated on Algores Way at the junction with Weasenham Lane. 2024 annual mean concentration is predicted to be 15.8µg/m^3. This also represents a Negligible impact in IAQM terms, which is considered **Not Significant**. The impact of the construction phase on PM_{10} annual mean concentration is Negligible in IAQM terms, which is considered **Not Significant**.

8.9.12 The likelihood of exceedance of the PM_{10} short-term AQO can be assessed with reference to the predicted annual means and the relationships recommended by LAQM.TG(16). An estimate of potential exceedances of the 24-hour mean PM_{10} objective is given by:

$$Number\ of\ 24\ hour\ mean\ exceedences = -18.5 + 0.00145\ x\ annual\ mean^3 + \frac{206}{annual\ mean}$$

8.9.13 On the basis of the above relationship, the 24-hour mean AQO for PM_{10} is likely to be met if the predicted annual-mean PM_{10} concentration is 31.8µg/m^{-3} or less.

8.9.14 As detailed in the above paragraphs, maximum concentrations are predicted to be significantly below the 31.8µg/m^{-3} threshold at all Receptors and the daily mean PM_{10} AQS is therefore predicted not to be exceeded at any Receptors. Therefore, anticipated effects are **Not Significant**.

$PM_{2.5}$ during construction

8.9.15 2024 $PM_{2.5}$ annual mean concentrations are predicted to remain comfortably below the $PM_{2.5}$ annual mean AQO of 25µg/m^3 at all modelled Receptors.

8.9.16 The maximum predicted 2024 annual mean $PM_{2.5}$ concentration during the construction phase is 11.1µg/m^3 at Receptor R53 situated on Nene Quay. This represents a very slight increase of less than 0.01µg/m^3 compared to 2024 baseline annual mean concentration. This prediction is based on travel taken by construction workers in light vehicles only along Nene Quay per day and represents a Negligible impact in IAQM terms, which is considered **Not Significant**.

8.9.17 The maximum increase in $PM_{2.5}$ annual mean concentration associated with the construction phase is predicted to be 0.02µg/m^3 at Receptor R84 situated on Algores Way at the junction with Weasenham Lane. 2024 annual mean concentration is predicted to be 10.1µg/m^3. This also represents a Negligible impact in IAQM terms, which is considered **Not Significant**.

The impact of the construction phase on $PM_{2.5}$ annual mean concentration is Negligible in IAQM terms, which is considered **Not Significant**.

Dust effects during construction

8.9.18 **Figure 8.4: Construction dust risk buffers (Volume 6.3)** presents construction dust buffers for all components of the Proposed Development, identifying an area's sensitivity to dust impacts according to distance criteria detailed in the IAQM (2014) guidance.

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

Magnitude of impacts

Demolition

8.9.19 According to the IAQM (2014) guidance the total volume of the existing Waste Transfer Station (WTS) to be removed is assumed to be below the screening criteria of 20,000m^3. As a result, it is considered that there will be a Small dust emission magnitude for demolition.

Earthworks

8.9.20 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements, and Water Connections together form an area that exceeds the IAQM screening criteria of 10,000 m^2. As a result, it is considered that there will be a Large dust emission magnitude for earthworks.

Construction

8.9.21 It is assumed that the total volume of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections infrastructure to be built will be over the IAQM (2014) screening criteria of 100,000m^3. It is therefore considered that there will be a Large dust emission magnitude for construction activities associated with the infrastructure.

Trackout

8.9.22 Dust emissions may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This is known as trackout. The total number of daily HGV movements will exceed the IAQM (2014) criteria of 50 HGV during peak construction periods. It is therefore considered that there will be a Large dust emission magnitude for this activity.

8.9.23 The magnitude of impacts from the above four activities is summarised in **Table 8.19 Construction Dust Emissions Magnitude as Defined by the IAQM (2014) Guidance.**

Table 8.19 Construction Dust Emissions Magnitude as Defined by the IAQM (2014) Guidance

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of Receptors

8.9.24 When considering sensitivity of Receptors to emissions of dust from construction activities, 20m, 50m, 100m and 350m distance buffers, as represented in **Figure 8.4: Construction dust risk buffers (Volume 6.3),** which determines the sensitivity of the area to dust effects on people and property, to human health or biodiversity sites.

Demolition

8.9.25 There are 10 commercial properties within 50m of the existing WTS to be demolished. The sensitivity of the current area assessed using Table 2 of the IAQM (2014) guidance with respect to dust soiling effects on people and property in relation to demolition, is therefore considered to be Low.

Earthworks

8.9.26 There are less than 10 commercial properties within 20m of the EfW CHP Facility Site and TCC, to the north and east which are considered medium sensitivity Receptors.

8.9.27 There are less than 10 residential properties within 20m of the Water Connections route on New Bridge Lane. The Water Connections could be in open cut trenches or HDD with open cut having the greatest potential to lead to dust emissions.

8.9.28 There are less than 10 residential properties within 20m of Access Improvements activities on New Bridge Lane.

8.9.29 There are less than 10 residential properties along the northern section of the CHP connection route on Victory Road and Oldfield Lane.

8.9.30 Overall, there are more than residential 10 properties located within 20m of earthwork activities. The sensitivity of the current area assessed using Table 2 of the IAQM (2014) guidance with respect to dust soiling effects on people and property in relation to earthworks activities is therefore considered to be High.

Construction

8.9.31 There are less than 10 commercial properties within 20m of the EfW CHP Facility Site and TCC to the north and east which are considered medium sensitivity Receptors. The sensitivity of the current area assessed using Table 2 of the IAQM (2014) guidance with respect to dust soiling effects on people and property in relation to earthworks and activities is therefore considered to be Medium.

Trackout

8.9.32 The EfW CHP Facility Site access is on Algores Way. No highly sensitive Receptors have been identified within 50m of the road that would be used by construction traffic within 500m from the EfW CHP Facility Algores Way site entrance. There are more than 10 commercial properties, considered to be medium sensitivity, located within 20m of the road to be used by construction traffic up to 500m from the site entrance on Algores Way. The sensitivity of the area with respect to dust soiling effects on people and property in relation to trackout (i.e., removal of materials) using a site entrance on Algores Way is therefore considered to be Medium (with reference to Table 2 of the IAQM (2014) construction dust guidance).

8.9.33 There will also be a site access for HGVs from New Bridge Lane. There are less than 10 high sensitivity Receptors located within 20m of the road that would be used by construction traffic up to 500m from the site entrance on New Bridge Lane. These include 3 residential properties (plus caravans to the rear of 1 New Bridge Lane) and one car showroom (located Cromwell Road/New Bridge Lane junction),

considered to be high sensitivity Receptors. The sensitivity of the area with respect to dust soiling effects on people and property in relation to trackout (i.e., removal of materials) using a site entrance on New Bridge Lane is therefore considered to be Medium (with reference to Table 2 of the IAQM (2014) construction dust guidance).

Health effects

8.9.34 The maximum estimated existing background PM_{10} concentration at the EfW CHP Facility, the CHP Connection, Water Connections, TCC and Access Improvements is below 24µg/m^{-3}. Given that there are less than 100 residential properties located within 20m of all activities, the sensitivity of the area assessed using Table 3 of IAQM (2014) is Low.

Ecological effects

8.9.35 There are no ecological sites located within 350m of the EfW CHP Facility Site, or within 50m of roads that may be used by construction traffic up to 500m from the two proposed site entrances. The sensitivity of the area with respect to dust soiling effects on ecological Receptors has, accordingly, not been considered further.

8.9.36 The sensitivity of the surrounding area is summarised in

8.9.37 **Table 8.20 Sensitivity of Surrounding Area**.

Table 8.20 Sensitivity of Surrounding Area

Potential impacts	Demolition	Earthworks	Construction	Trackout
Dust soiling	Low	High	Medium	Medium
Human health	Low	Low	Low	Low

Risk categorisation of Dust Impacts

8.9.38 The risk of dust impacts is defined using Tables 7, 8 and 9 in the guidance for earthworks, construction and trackout (material movement), respectively. The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the risk categories (before mitigation) shown in **Table 8.21 Main Development Site Construction Dust Summary of Dust Risk as Defined by IAQM Guidance, before Mitigation.**

Table 8.21 Main Development Site Construction Dust Summary of Dust Risk as Defined by IAQM Guidance, before Mitigation

Potential impacts	Demolition	Earthworks	Construction	Trackout
Dust soiling	Negligible	High risk	Medium risk	Medium risk

Potential impacts	Demolition	Earthworks	Construction	Trackout
Human health	Negligible	Low risk	Low risk	Low risk

8.9.39 The IAQM (2014) guidance considers the risk of effects in the absence of mitigation measures so that the mitigation approach can be developed accordingly. Before mitigation measures are applied, the risk categorisation of construction dust impact is assessed to be High Risk of dust soiling for earthwork activities, Medium Risk of dust soiling for construction and trackout (material movement) activities, Low to Negligible Risk in regard to dust soiling due to demolition activities and human health impacts.

Significance of Effects

8.9.40 IAQM (2014) recommends that significance is only assigned to the effect after considering the construction activity with mitigation. The finding that without dust controls there would be a high risk of impact informed the mitigation measures to be applied (detailed in the following sections of this chapter), and these measures are expected to ensure that the risk of impact is reduced to a negligible level. The effect of the construction phase through dust emissions will be Negligible with applied site-specific mitigations and the effect is therefore **Not Significant** for the purposes of the EIA Regulations.

8.9.41 There are no predicted permanent or long-term impacts, so the effect will be Negligible and **Not Significant** in the long-term.

Grid Connection: Connection to Walsoken Substation

Magnitude of impacts

Demolition

8.9.42 No significant demolition is required as part of the Grid Connection and therefore it is not considered further. From the onsite substation located in the southern area of the EfW CHP Facility Site, the Grid Connection would run underground for its entire length, and approximately 3.8km along the A47, to a point of connection (POC) to the National Electricity transmission Network distribution system at UKPN's substation off Broadend Road, Walsoken.

Earthworks

8.9.43 The cables would be installed in open cut trenches, which could lead to dust impacts on nearby Receptors. For open cut trenching, the cable would be set in a trench a maximum of 2m in depth. The width of the trench would be typically be 450mm to 600mm within a construction area typically up to 3m in width, widening to approximately 5m along New Bridge Lane to accommodate a Private Wire Connection. The LoD for the cable connection allows for it to be placed within the

width of New Bridge Lane and Broadend Road along the length at which the cable would be laid and the width of the A47 verge in the control of National Highways.

8.9.44 The buried sections of cable are to be connected at 7 joint bays, each measuring approximately 10m in length, 2.5m in width and up to 2m deep. The bays will be installed at approximately 500m intervals. The joint bays would be buried.

8.9.45 The total surface to be worked would exceed the IAQM (2014) criteria of 10,000m^2. It is therefore considered that there will be a Large dust emission magnitude for earthworks in line with IAQM (2014) construction dust guidance.

Construction

8.9.46 The Walsoken Substation compound will consist of an outdoor air insulated switchgear. The substation compound covers an area of approximately 190 m^2. Up to two GRP metering kiosks are attached to the substation compound, measuring 3.5m in height, 2.7m in length and 2.7m in width. The total volume of structures constructed will fall under the IAQM criteria of 25,000 m^3. It is considered that there will be a Small dust emission magnitude for construction in line with IAQM (2014) construction dust guidance.

Trackout

8.9.47 The construction of the Grid Connection will be progressed along New Bridge Lane and Broadend Road and alongside, in the verge of, the A47 with no dedicated access points. Trackout effects (i.e., removal of materials) have therefore not been considered further.

8.9.48 The magnitude of impacts from the above activities is summarised in **Table 8.22 Construction Dust Emissions Magnitude as Defined by the IAQM (2014) Guidance**.

Table 8.22 Construction Dust Emissions Magnitude as Defined by the IAQM (2014) Guidance

Source	Dust Emission Magnitude
Earthworks	Large
Construction	Small

Sensitivity of Receptors

Earthworks

8.9.49 Regarding earthworks activities, there are two properties within 20m of the first section of the Grid Connection on New Bridge Lane, and approximately 12 properties within 50m to the south or east of the A47. There are also a maximum of approximately 15 properties within 20m of the section of the Grid Connection along Broadend Road. The sensitivity of the area with respect to dust soiling on people and property in relation to earthworks is therefore considered to be High.

Construction

8.9.50 There are less than 10 residential properties located within 100m of the Walsoken Substation. The sensitivity of the area with respect to dust soiling on people and property in relation to construction is therefore considered to be Low.

Health effects

8.9.51 The maximum estimated existing background PM_{10} concentration is below 24µg/m^{-3}. Given that there are less than 100 residential properties located within 20m of the Grid Connection the sensitivity of the area assessed using Table 3 of IAQM (2014) with respect to human health impacts in relation to earthworks and construction activities is Low.

Ecological effects

8.9.52 There are also no ecological sites located within 350m of the Grid Connection or within 50m of roads that may be used by construction traffic up to 500m from the Grid Connection. The sensitivity of the area with respect to dust soiling on ecological Receptors has not been considered further.

8.9.53 The sensitivity of the surrounding area is summarised in

8.9.54 **Table** 8.23 **Sensitivity of Surrounding Area**.

Table 8.23 Sensitivity of Surrounding Area

Potential impacts	Earthworks	Construction
Dust soiling	High	Low
Human health	Low	Low

Risk categorisation of Dust Impacts

8.9.55 The risk of dust impacts is defined using Tables 7, 8 and 9 in the guidance for earthworks, construction and removal of materials, respectively. The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the risk categories (before mitigation) shown in **Table 8.24 Grid Connection Construction Dust Summary of Dust Risk as defined by IAQM Guidance, before Mitigation.**

Table 8.24 Grid Connection Construction Dust Summary of Dust Risk as defined by IAQM Guidance, before Mitigation

Potential impacts	Earthworks	Construction
Dust soiling	High risk	Low risk

Human health	Low risk	Low risk

8.9.56 Before mitigation measures are applied, the risk categorization of construction dust impact is assessed to be High Risk for earthworks and Low Risk for construction. It is assessed to be Low Risk regarding human health impact.

Significance of Effects

8.9.57 The finding that without dust controls there would be a high risk of impact has helped inform the mitigation measures to be applied (detailed in the following sections of this chapter) and these measures are expected to ensure that the risk of impact is reduced to negligible levels. The impact of the construction phase through dust emissions will be Negligible with applied site-specific mitigations and the effect is considered to be **Not Significant** in terms of the EIA Regulations.

8.9.58 There are no predicted permanent or long-term impacts, so the effects will be Negligible and **Not Significant** in the long-term.

Recommended Dust Mitigation Measures

8.9.59 **Table 8.25 Recommended Mitigation Measures** lists the IAQM (2014) recommended mitigation measures for dust effect according to the construction activity. These measures will be considered for inclusion within a Dust Management Plan as consistent with the Outline Dust Management Plan forming part of the **Outline CEMP (Volume 7.12)**.

Table 8.25 Recommended Mitigation Measures

Measures	Considered for
Communication	
1. Develop and implement a Stakeholder communications plan that includes community engagement before work commences on site.	Proposed Development
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager	Proposed Development
3. Display the head or regional office contact information.	Proposed Development
Site Management	

Measures	Considered for
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures [in this document]. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	Proposed Development
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Proposed Development
6. Make the complaints log available to the local authority when requested.	Proposed Development
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.	Proposed Development
8. Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	Proposed Development
Monitoring	
9. Undertake daily on-site and off-site inspection, where Receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars, and window sills within 100m of site boundary, with cleaning to be provided if necessary.	Proposed Development
10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when requested.	Proposed Development
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Proposed Development
12. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	Proposed Development
Preparing and maintaining the site	

Measures	Considered for
13. Plan site layout so that machinery and dust causing activities are located away from Receptors, as far as is possible.	Proposed Development
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Proposed Development
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Proposed Development
16. Avoid site runoff of water or mud.	Proposed Development
17. Keep site fencing, barriers and scaffolding clean using wet methods.	Proposed Development
18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	Proposed Development
19. Cover, seed, or fence stockpiles to prevent wind whipping.	Proposed Development
Operating vehicle/machinery and sustainable travel	
20. Ensure all vehicles switch off engines when stationary - no idling vehicles.	Proposed Development
21. Where possible, avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Proposed Development
22. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	Proposed Development
23. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	Proposed Development
Operations	
24. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.	Proposed Development

Measures	Considered for
25. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Proposed Development
26. Use enclosed chutes and conveyors and covered skips.	Proposed Development
27. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate	Proposed Development
28. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Proposed Development
Waste management	
29. Prohibition of bonfires and burning of waste materials.	Proposed Development
Measures specific to demolition	
30. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	EfW CHP Facility Site
31. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	EfW CHP Facility Site
32. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	EfW CHP Facility Site
33. Bag and remove any biological debris or damp down such material before demolition.	EfW CHP Facility Site
Measures specific to earthworks	
34. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Proposed Development
35. Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Proposed Development
36. Where possible, only remove the cover in small areas during work and not all at once.	Proposed Development
Measures specific to construction	

Measures	Considered for
37. Avoid scabbling (roughening of concrete surfaces) if possible.	Proposed Development
38. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Proposed Development
39. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Proposed Development
40. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	Proposed Development
Measures specific to trackout	
41. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Proposed Development
42. Avoid dry sweeping of large areas.	Proposed Development
43. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Proposed Development
44. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	Proposed Development
45. Record all inspections of haul routes and any subsequent action in a site log book.	Proposed Development
46. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	Proposed Development
47. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Proposed Development
48. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Proposed Development
49. Access gates to be located at least 10m from Receptors where possible.	Proposed Development

8.10 Environmental assessment of air quality effects - Operation

Odour effects during operation

8.10.1 Shutdown of furnaces will be staggered where possible, however an assessment of odour during abnormal operation, when both furnaces are shut down and waste remains within the bunker has been included in the scope of the assessment. In this situation, building air would be extracted and vented through carbon filters, before being released to atmosphere, or a permanently installed odour neutralisation system will be deployed.

8.10.2 During normal operation the waste bunker odour neutralisation system is run intermittently to facilitate maintenance activities. An Outline Odour Management Plan has been prepared for the Proposed Development outlining the measures and design features to be applied to control potential odour emissions (**Volume 7.11**).

Air quality effects during operation

8.10.3 This section provides a summary of results from the chimney emission and roads modelling assessments. Traffic data for the operational phase is provided in **Chapter 6: Traffic and Transport (Volume 6.2)**.

8.10.4 The contribution to the predicted concentrations from the Proposed Development (i.e., the PC) from both traffic and chimney emissions, where applicable, are presented along with the total PEC, which include the background contribution from sources unrelated to the Proposed Development, where the impact is predicted to be greater than negligible.

8.10.5 All model inputs and a full detailed breakdown of results can be seen in **Appendix 8B Air Quality Technical Report (Volume 6.4)**. **Figure 8.5: Annual mean NO_2 concentration contours (Volume 6.3)** and **Figure 8.6: Hourly mean NO_2 PC concentration contours (equivalent of 99.79th percentile) (Volume 6.3)** show annual mean and hourly mean NO_2 PC contours from chimney emissions, respectively.

Human Receptors

8.10.6 **Table 8.26 Impact to air quality at human Receptors (Maximum PC)** presents a summary of the maximum predicted PC at any human Receptor for all pollutants modelled. The PC for pollutants NO_2, PM_{10}, $PM_{2.5}$, and NH_3, is the combined traffic and chimney PC. For the remaining pollutants that are only associated with chimney emissions the PC only relates to the chimneys. **Table 8.27 Impact to air quality at human Receptors (Maximum PEC)** presents a summary of the maximum predicted PEC at any human Receptor for pollutants emitted by both traffic and chimney sources.

8.10.7 For the majority of pollutants, the maximum PC is predicted to be less than 5% for long-term averages and less than 10% for short-term averages (where the PEC is less than 75% of the AQAL) therefore the change in concentration as a result of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections is considered to be Negligible.

8.10.8 The recommended $PM_{2.5}$ objective is 10µg/m^{-3} in the Environmental Bill, which is still under consultation. Therefore, the AQAL used in this report is still 20µg/m^{-3}, while there is no significant impact in the $PM_{2.5}$ PC if 10µg/m^{-3} is used.

8.10.9 The predicted NO_2 and SO_2 PC for 1-hour average and 15-minute averaging periods are predicted to be greater than 10%, which according to IAQM (2017) guidance (can be classified as Small as detailed in paragraph 8.8.10).

8.10.10 Therefore, all changes in concentration at human Receptors as a result of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are considered to be **Not Significant**.

8.10.11 **Table 8.28 Impact to air quality at human Receptors in the emergency scenario** presents a summary of the maximum predicted NO_2 PC for 1-hour averaging period at the human Receptor with the highest predicted impact. The PEC is predicted to be 37% of the AQAL and therefore comfortably below the objective. As the diesel generator is expected to operate 1 – 2 hours per month and a maximum of 60-hours per year, the effect on human Receptors is considered to be **Not Significant** in the emergency scenario.

8.10.12 **Table 8.29 Impact to air quality at human Receptors in abnormal operation scenario** presents the model results during abnormal operating conditions of the combustion unit and associated FGT infrastructure for the specific Receptor experiencing the maximum PC and PEC. The effect on human Receptors is considered to be **Not Significant** in the abnormal operating scenario, as the PC for all pollutants modelled is less than 40% of AQAL, and the PEC is comfortably below the relevant objectives.

8.10.13 An assessment of potential effects from odour emissions during abnormal operations was also undertaken and presented in detail in **Appendix 8B Air Quality Technical Report (Volume 6.4)**. The assessment concluded that predicted odour is below the relevant guideline value.

8.10.14 An assessment of potential effect from potential exposure to PCDD/Fs from the EfW CHP Facility Site is presented as part of the HHRA in **Appendix 8B Air Quality Technical Report (Volume 6.4)**. The quantitative assessment concluded that for the maximally exposed individual, exposure to dioxins, furans and dioxin-like PCBs is **Not Significant**.

Table 8.26 Impact to air quality at human Receptors (Maximum PC)

Pollutant	Averaging Period	AQAL (µg/m^3)	Receptor at which maximum PC occurs	Maximum PC (µg/m^3)	Maximum PC as a % of AQAL	Maximum PEC (µg/m^3)	Maximum PEC as a % of AQAL	Impact descriptor
NO_2	Annual	40	R84	0.79	2%	17.82	45%	Negligible
NO_2	1-hour mean, no more than 18 exceedances a year (equivalent of 99.79 Percentile)	200	R5	29.83	15%	52.26	26%	Small
CO	8-hour	10,000	R96	20.49	<0.01%	542.49	5%	Negligible
CO	1-hour	30,000	R96	30.85	<0.01%	588.85	2%	Negligible
PM_{10}	Annual	40	R83	0.08	0.2%	15.95	40%	Negligible
PM_{10}	24-hour mean, no more than 35 exceedances per year (90.41 percentile)	50	R84	0.17	0%	31.76	64%	Negligible
$PM_{2.5}$	Annual	20	R84	0.05	0.2%	10.08	50%	Negligible
SO_2	1-hour mean, not to be exceeded more than 24 times per year (equivalent to 99.73 percentile)	350	R5	42.17	12%	45.42	13%	Small

Pollutant	Averaging Period	AQAL (µg/m^3)	Receptor at which maximum PC occurs	Maximum PC (µg/m^3)	Maximum PC as a % of AQAL	Maximum PEC (µg/m^3)	Maximum PEC as a % of AQAL	Impact descriptor
SO_2	24-hour mean not to be exceeded more than 3 times a year (equivalent to 99.18 percentile)	125	R5	20.23	16%	23.48	19%	Negligible
SO_2	15-minute mean, not to be exceeded more than 35 times a year (equivalent to 99.9 percentile)	266	R6	47.29	18%	50.30	19%	Small
NH_3	Annual	180	R83	0.14	0.1%	2.54	1%	Negligible
NH_3	1-hour	2,500	R108	3.09	0.1%	7.57	0.3%	Negligible
VOC as benzene	Annual	5	R96	0.09	2%	0.36	7%	Negligible
VOC as benzene	1-hour	195	R108	6.17	3.2%	6.70	3.4%	Negligible
HCL(human)	1-hour	750	R108	18.51	2.5%	18.93	3%	Negligible
HF (human)	1-hour	160	R108	1.23	0.8%	7.23	5%	Negligible
Group 1 metals - Cadmium	Annual	0.005	R96	<0.01	4%	<0.01	6%	Negligible
Group 1 metals - Cadmium	1-hour	1.5	R108	<0.01	0.17%	<0.01	0.18%	Negligible

Pollutant	Averaging Period	AQAL (µg/m^3)	Receptor at which maximum PC occurs	Maximum PC (µg/m^3)	Maximum PC as a % of AQAL	Maximum PEC (µg/m^3)	Maximum PEC as a % of AQAL	Impact descriptor
Group 2 metals – Mercury	Annual	0.25	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 2 metals – Mercury	1-hour	7.5	R108	<0.01	0.03%	<0.01	0.03%	Negligible
Group 3 metals – Antimony	Annual	5	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals – Antimony	1-hour	5	R108	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - Arsenic	Annual	0.003	R96	<0.01	0.05%	<0.01	18%	Negligible
Group 3 metals - Arsenic	1-hour	15	R108	<0.01	<0.01%	<0.01	0.01%	Negligible
Group 3 metals - Chromium III	Annual	5	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - Chromium III	1-hour	150	R108	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - Chromium VI	Annual	0.0002	R96	<0.01	<0.01%	<0.01	23%	Negligible

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PEC as a % of AQAL	Impact descriptor
Group 3 metals – Copper	Annual	10	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals – Copper	1-hour	200	R108	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - Lead	Annual	0.25	R96	<0.01	<0.01%	<0.01	1%	Negligible
Group 3 metals – Manganese	Annual	0.15	R96	<0.01	<0.01%	<0.01	2%	Negligible
Group 3 metals – Manganese	1-hour	1500	R108	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - nickel	Annual	0.02	R96	<0.01	0.07%	<0.01	3%	Negligible
Group 3 metals - nickel	1-hour	30	R108	<0.01	<0.01%	<0.01	0.01%	Negligible
Group 3 metals - Vanadium	Annual	5	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible
Group 3 metals - Vanadium	1-hour	1	R108	<0.01	0.20%	<0.01	0.39%	Negligible
PAH as B(a)P	Annual	0.001	R96	<0.01	0.04	<0.01	10%	Negligible
PCBs	Annual	0.2	R96	<0.01	<0.01%	<0.01	<0.01%	Negligible

Pollutant	Averaging Period	AQAL ($\mu g/m^{-3}$)	Receptor at which maximum PC occurs	Maximum PC ($\mu g/m^{-3}$)	Maximum PC as a % of AQAL	Maximum PEC ($\mu g/m^{-3}$)	Maximum PEC as a % of AQAL	Impact descriptor
PCBs	1-hour	6	R108	<0.01	<0.01%	<0.01	<0.01%	Negligible

Note: Process contribution from change in traffic flows added to maximum PC for NO_2, PM_{10}, $PM_{2.5}$ and NH_3.

Table 8.27 Impact to air quality at human Receptors (Maximum PEC)

Pollutant	Averaging Period	AQAL ($\mu g/m^{-3}$)	Receptor at which maximum PEC occurs	Maximum PC ($\mu g/m^{-3}$)	Maximum PC as a % of AQAL	Maximum PEC ($\mu g/m^{-3}$)	Maximum PEC as a % of AQAL	Impact descriptor
NO_2	Annual	40	R41	0.40	1%	28.19	70%	Negligible
NO_2	1-hour mean, no more than 18 exceedances a year (equivalent of 99.79 Percentile)	200	R41	13.80	7%	69.38	35%	Small
CO	8 hour	10,000	R86	18.75	<0.01%	580.75	6%	Negligible
CO	1 hour	30,000	R108	30.85	<0.01%	588.85	2%	Negligible
PM_{10}	Annual	40	R53	0.02	0.1%	17.23	43%	Negligible
PM_{10}	24-hour mean, no more than 35 exceedances per year (90.41 percentile)	50	R53	0.06	<0.01%	34.47	69%	Negligible

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PEC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PEC as a % of AQAL	Impact descriptor
$PM_{2.5}$	Annual	20	R53	0.02	0.1%	11.12	56%	Negligible
NH_3	Annual	180	R53	0.05	0.03%	5.43	3%	Negligible
NH_3	1 hour	2,500	R6	49.42	2%	56.03	2.%	Negligible

Note: Process contribution from change in traffic flows added to maximum PC for NO_2, PM_{10}, $PM_{2.5}$ and NH_3.

Table 8.28 Impact to air quality at human Receptors in the emergency scenario

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PC as a % of AQAL
NO_2	1-hour mean, no more than 18 exceedances a year (equivalent of 99.79 Percentile)	200	R83	50.98	25%	70.63	35%

Table 8.29 Impact to air quality at human Receptors in abnormal operation scenario

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PEC as a % of AQAL
NO_2	1-hour mean, no more than 18 exceedances a year (equivalent of 99.79 Percentile)	200	R5	59.62	30%	82.05	41%
CO	8-hour	10,000	R5	102.44	1%	624.44	6%
CO	1-hour	30,000	R108	154.23	1%	712.23	2%
SO_2	1-hour mean, not to be exceeded more than 24 times per year (equivalent to 99.73 percentile)	350	R5	52.71	15%	55.96	16%

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PEC as a % of AQAL
SO_2	24-hour mean not to be exceeded more than 3 times a year (equivalent to 99.18 percentile)	125	R5	25.28	20%	28.54	23%
SO_2	1-minute mean, not to be exceeded more than 35 times a year (equivalent to 99.9 percentile)	266	R6	59.11	22%	62.12	23%
HCl	1 hour	750	R108	370.14	49%	370.35	49%
HF (human)	1-hour	160	R108	18.51	11.6%	24.51	15%
Group 1 metals – Cadmium	1-hour	1.5	R108	0.03	2%	0.03	2%
Group 2 metals – Mercury	1-hour	7.5	R108	0.03	0.4%	0.03	0.4%
Group 3 metals – Arsenic	1-hour	15	R108	<0.01	0.01%	<0.01	0.01%
Group 3 metals - Chromium III	1-hour	150	R108	<0.01	<0.01%	<0.01	<0.01%

Pollutant	Averaging Period	AQAL (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of AQAL	Maximum PEC (µg/m^{-3})	Maximum PEC as a % of AQAL
Group 3 metals – Copper	1-hour	200	R108	<0.01	<0.01%	<0.01	<0.01%
Group 3 metals - Manganese	1-hour	1500	R108	<0.01	<0.01%	<0.01	<0.01%
Group 3 metals – nickel	1-hour	30	R108	<0.01	0.01%	<0.01	0.01%
Group 3 metals - Vanadium	1-hour	1	R108	0.01	1.00%	0.01	1.20%

Biodiversity sites

8.10.15 **Table 8.30 Impact to air quality at ecological Receptors at internationally designated biodiversity sites** and **Table 8.32 Deposition at ecological Receptors at internationally designated biodiversity sites** present predicted pollutant concentrations compared to critical levels and deposition compared to critical loads, respectively, at internationally designated biodiversity sites. All long-term averages are predicted to be below 1%, and short-term averages below 10% of the critical load. In addition, both nitrogen and acid deposition PC are predicted to contribute less than 1% of the critical load. Therefore, effects to internationally designated biodiversity sites can be screened as insignificant using the EA screening criteria and do not require further consideration.

8.10.16 **Table 8.31 Impact to air quality at ecological Receptors at Local Wildlife Site** and **Table 8.33 Deposition at ecological Receptors at Local Wildlife Sites** present predicted pollutant concentrations compared to critical levels and deposition compared to critical loads, respectively, at LWS. All predicted pollutant concentrations and deposition PC are below 100% of the AQAL and are therefore screened as insignificant using the EA screening criteria and do not require further consideration.

Table 8.30 Impact to air quality at ecological Receptors at internationally designated biodiversity sites

Pollutant	Averaging Period	Critical level (µg/m^{-3})	Receptor at which maximum PC occurs	Maximum PC (µg/m^{-3})	Maximum PC as a % of critical level
NO_X	Annual	30	E12	0.06	<1%
NO_X	Daily	200	E12	1.21	1%
SO_2 (ecological Receptors)	Annual	20	E12	0.01	<1%
HF (ecological Receptors)	24-hour	5	E12	0.01	<1%
HF (ecological Receptors)	Weekly	0.5	E12	<0.01	<1%
NH_3 (ecological Receptors)	Annual	3	E12	<0.01	<1%

Table 8.31 Impact to air quality at ecological Receptors at Local Wildlife Site

Pollutant	Averaging Period	Critical level ($\mu g/m^{-3}$)	Receptor at which maximum PC occurs	Maximum PC ($\mu g/m^{-3}$)	Maximum PC as a % of critical level
NO_X	Annual	30	E1	0.34	1%
NO_X	Daily	200	E8	9.91	5%
SO_2	Annual	20	E1	0.07	<1%
HF	24-hour	5	E1	0.04	<1%
HF	Weekly	0.5	E1	<0.01	<1%
NH_3	Annual	3	E1	0.05	2%

Table 8.32 Deposition at ecological Receptors at internationally designated biodiversity sites

	Critical Load	Maximum N PC	Maximum S PC	Maximum PC as a % of CL
Nitrogen deposition	20 kg N/ ha/ yr	0.031	-	<1%
Acid deposition	0.4 keq N/ ha/ yr (CLminN)	0.002	0.002	<1%

Table 8.33 Deposition at ecological Receptors at Local Wildlife Sites

	Critical Load	Maximum N PC	Maximum S PC	Maximum PC as a % of CL
Nitrogen deposition	10 kg N/ ha/ yr	0.258	-	3%
Acid deposition	1 keq N/ ha/ yr (CLminN)	0.018	0.011	<1%

8.10.17 An assessment of effects from abnormal operations on biodiversity sites is presented in detail in **Appendix 8B Air Quality Technical Report (Volume 6.4)**.

8.10.18 **Table 8.34 Maximum modelled metal deposition rates at human Receptors** presents the results of the assessment of metal deposition at the human Receptors considered in this study that experience the maximum deposition rate associated with process emissions. The deposition rates of all pollutants are comfortably below the maximum deposition rate as defined by EA guidance and there is no significant impact from metal deposition during normal operation.

Table 8.34 Maximum modelled metal deposition rates at human Receptors

Metal	MDR (mg m^{-2} d^{-1})	PC (ng m^{-3})	PDR (mg m^{-2} d^{-1})	%PDR of MDR
Arsenic	0.02	0.28	0.00072	3.6%
Cadmium	0.009	0.19	0.00048	5.3%
Chromium	1.5	0.28	0.00072	0.0%
Copper	0.25	0.28	0.00072	0.3%
Lead	1.1	0.28	0.00072	0.1%
Mercury	0.004	0.19	0.00048	12.0%
Molybdenum	0.016	0.28	0.00072	4.5%
Nickel	0.11	0.28	0.00072	0.7%
Selenium	0.012	0.28	0.00072	6.0%
Zinc	0.48	0.28	0.00072	0.2%

Note: MDR = maximum deposition rate (as defined by EA guidance); PC = process contribution of metal in air; PDR = predicted deposition rate to ground

Grid Connection

8.10.19 The operation of the Grid Connection is not associated with significant emissions to air.

Decommissioning

8.10.20 The environmental effects associated with the decommissioning phase are expected to be of a similar level to those reported for the construction phase works, albeit with a lesser duration of one year. The likely significance of effects relating to the construction phase assessment reported in this chapter are therefore applicable to the decommissioning phase.

Summary

8.10.21 A summary of the results of the assessment of the air quality is provided in **Table 8.35 Summary of significance of effects**.

Table 8.35 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Industrial Receptors (within 350m from EfW CHP Facility/50m from construction routes within 500m from main development site entrance) **- Increased dust emissions during the construction period**	Medium	Large-Small	Negligible (Medium risk prior to embedded mitigation)	Implementation of a CEMP consistent with **Outline CEMP** (**Volume 7.12**) inclusive of some of the mitigation measures detailed in this chapter.
Residential Receptors (within 350m from Grid Connection/ 50m from construction routes within 500m from entrances) **- Increased dust emissions during the construction period**	High	Large-Small	Negligible (Medium risk prior to embedded mitigation)	Implementation of a CEMP consistent with **Outline CEMP** (**Volume 7.12) i**nclusive of the mitigation measures detailed in this chapter.
Residential Receptors (at areas of relevant exposure as defined by Table 8.16) **- Increased air emissions from chimneys and traffic during the operational period**	High	Small - Negligible	Negligible	Procurement of suitable plant equipment; Adoption of considerate layout and design; Plant to be designed to achieve defined ELVs.
Residential Receptors (at areas of relevant exposure as defined by Table 8.16) **- Increased exposure to dioxins, furans and dioxin-like PCBs**	High	Negligible	Negligible	Procurement of suitable plant equipment; Adoption of considerate layout and design; Plant to be designed to achieve defined ELVs.
Biodiversity sites (Internationally designated sites within 15km and LWS with 2km)	High	Negligible	Negligible	Procurement of suitable plant equipment; Adoption of considerate layout and design;

Receptor and summary of predicted effects	Sensitivity/ importance/value of Receptor[1]	Magnitude change[2]	of Significance[3]	Summary rationale
- **Increased ambient ground level concentrations of HF, NO_X, SO_2, NH_3 during the operational period** - **Increased nitrogen and acid deposition during the operational period**				Plant to be designed to achieve defined ELVs.

1. The sensitivity/importance/value of a Receptor is defined using the criteria set out in Section 1.9 above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a Receptor resulting from activities relating to the development is defined using the criteria set out in Section 1.9 above and is defined as very low, low, medium, high, and very high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a Receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in Section 1.9.
4. Reference of a range e.g., Large – Small records the magnitude of change before and after embedded mitigation.

8.11 Consideration of optional additional mitigation or compensation

8.11.1 No additional mitigation measures are proposed at this stage to further reduce the air quality effects that are identified in this chapter of the ES. This is because all relevant and implementable measures have been embedded into the Proposed Development and are assessed above in this chapter. These measures are considered to be likely to be effective and deliverable, and address the likely significant effects of the Proposed Development.

8.12 Implementation of environmental measures

8.12.1 **Table 8.36 Summary of environmental measures to be implemented – relating to Air Quality** describes the environmental measures embedded within the Proposed Development and the proposed means by which they will be implemented.

Table 8.36 Summary of environmental measures to be implemented – relating to Air Quality

Environmental measure	Responsibility for implementation	Proposed Compliance mechanism	ES section reference
Standard construction dust management measures	Applicant/EPC Contractor	DCO requirement/CEMP	**Table 8.25**
Suitable chimney height to ensure adequate dispersion	Applicant/EPC Contractor	Project Description	**Table 8.17**
Selective non-catalytic reduction (SNCR) to be implemented within furnace	Applicant/EPC Contractor	Project Description	**Table 8.17**
All waste will be kept in enclosed buildings with negative pressure. Refuse vehicles will be covered	Applicant/EPC Contractor	DCO Requirement/Odour Management Plan	**Section 8.6**

8.13 Conclusion

8.13.1 This chapter presents the environmental assessment of the likely significant effects during the construction and operation of the Proposed Development with respect to air quality.

8.13.2 The environmental assessment presented in this chapter has concluded that during the construction and operation phase, with the implementation of embedded mitigation, there will be no significant effects upon human Receptors and biodiversity sites arising from the Proposed Development.