

Cottam Solar Project

Environmental Statement Chapter 17: Air Quality

Prepared by: Tetra Tech
January 2023

PINS reference: EN010133
Document reference: APP/C6.2.17
APFP Regulation 5(2)(a)



Contents

17	AIR QUALITY	3
17.1	INTRODUCTION	3
17.2	CONSULTATION	3
17.3	POLICY CONTEXT	5
17.4	ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA	13
17.5	BASELINE CONDITIONS	19
17.6	EMBEDDED MITIGATION	26
17.7	IDENTIFICATION AND EVALUATION OF LIKELY SIGNIFICANT EFFECTS	28
17.8	MITIGATION MEASURES	31
17.9	CUMULATIVE EFFECTS/IN-COMBINATION EFFECTS	35
17.10	RESIDUAL EFFECTS	36
17.11	REFERENCES	37

Issue Sheet

**Report Prepared for: Cottam Solar Project Ltd.
DCO Submission**

Environmental Statement Chapter 17: Air Quality

Prepared by:

Name: Donald Towler-Tinlin (Tetra Tech)

Title: Senior Environmental Consultant

Approved by:

Name: Nigel Mann (Tetra Tech)

Title: Director

Date: January 2023

Revision: [02]

17 Air Quality

17.1 Introduction

17.1.1 This chapter of the ES assesses the effects of the Scheme on air quality at nearby sensitive receptors during the construction, operation and decommissioning phases. The Scheme, which is assessed in this chapter, is described in Chapter 4 of the ES [EN010133/APP/C6.2.4]. The aim of this assessment is to predict the levels of air quality pollutants and assess them to determine whether there are any likely significant effects, taking account of relevant policy, guidelines and best practice.

17.1.2 This Chapter is supported with the following Appendices:

- **Appendix 17.1** Cottam 1: Qualitative Dust Assessment and Construction Dust Management Plan (CDMP) [EN010133/APP/C6.3.17.1].
- **Appendix 17.2** Cottam 2: Qualitative Dust Assessment and Construction Dust Management Plan (CDMP) [EN010133/APP/C6.3.17.2].
- **Appendix 17.3** Cottam 3a & 3b: Qualitative Dust Assessment and Construction Dust Management Plan (CDMP) [EN010133/APP/C6.3.17.3].
- **Appendix 17.4** Technical Note: Air Quality Assessment on Emission Impact from the Battery Energy Storage Systems (BESS) Fire [EN010133/APP/C6.3.17.4].

17.1.3 The CDMP's and this chapter has been produced by Tetra Tech (see Statement of Competence [EN010133/APP/C6.3.1.1]).

17.2 Consultation

17.2.1 A summary of consultation is provided in Table 17.1.

Table 17.1: Summary of Consultation Responses

Date	Consultee and Response	Action
March 2022	PINS Scoping Opinion, Case Reference: EN010132 (Scoping Report Section 19) 3.14 Major Accidents and Disasters	
	Scoping Report paragraph 19.2.1 sets out a list of potential impacts from major accidents and disasters to/from the Proposed Development and where these will be assessed in other Chapters in the ES. Impacts include: <ul style="list-style-type: none"> • Fire and explosion 	Fire incident impact assessment has been undertaken in this Chapter using detailed air quality dispersion modelling to assess potential smoke effects on the residential receptors a major solar panel fire accident (see para 17.4.10).

	<p>The above impacts are proposed to be assessed in other chapters such as Human Health (Scoping Report paragraph 19.3.1), however, Human Health is also proposed to be assessed in other chapters, rather than a stand-alone chapter. The ES should not be a ‘paperchase’ and should clearly signpost where these impacts are assessed in other relevant chapters and where any relevant mitigation measures are secured.</p>	
<p>PINS Scoping Opinion, Case Reference: EN010132 (Scoping Report Section 20) 3.15 Air Quality</p>	<p>The Scoping Report seeks to scope out detailed air quality modelling and assessment of effects from construction, although a qualitative dust assessment and a CEMP taking account of Institute of Air Quality Management (IAQM) guidance are proposed.</p> <p>Subject to confirmation that the proposed construction vehicle numbers alone or cumulatively with other proposals on relevant links (e.g. for Cottam Solar Project) will not exceed the relevant IAQM/EPUK thresholds e.g. 100 HGV Annual Average Daily Traffic (AADT), the Inspectorate considers that the need for detailed construction air quality modelling and assessment can be scoped out.</p>	<p>An Outline Construction Environmental Management Plan (CEMP) [EN010133/APP/C7.1] relating to the Scheme is submitted with the DCO Application.</p> <p>Assessment of construction vehicles is scoped out of the ES as the vehicle numbers do not exceed the IAQM Screening Threshold.</p>
	<p>Based on the nature of the development and subject to confirmation of the type and number of maintenance vehicles, the Inspectorate considers that operational traffic movements will be limited and that operational traffic air quality modelling may be scoped out.</p>	<p>Assessment of operational vehicles scoped out of the ES.</p>
<p>Statutory consultation</p>	<p>West Lindsey District Council – Recognises that fire risk has been considered, and requests a worst-</p>	<p>Worst-case assessment undertaken in this ES Chapter (see para 17.4.10).</p>

responses August 2022	case assessment where the extent of the battery storage is unknown.	
	Western Power Distribution – No comments regarding Air Quality.	N/A
	Tarmac Aggregates Limited – No comments regarding Air Quality.	N/A
	Royal Mail Group Limited – No comments regarding Air Quality.	N/A
	Nottinghamshire County Council – No comments regarding Air Quality.	N/A
	Natural England – No comments regarding Air Quality.	N/A
	National Highways – No comments regarding Air Quality.	N/A
	National Farmers’ Union – No comments regarding Air Quality.	N/A
	Lincolnshire Fire and Rescue – Request that measures are included within the Scheme to ensure the risk of fire is minimised. Measures should include prevention and suppression through best practice techniques.	Fire suppression is incorporated into the Battery Energy Storage (BESS) units. Additional onsite water supply has been provided at Cottam 1 associated with the BESS, within the layout, through further dialogue with Lincolnshire Fire Service (see further information in the Outline Battery Storage Safety Management Plan [EN010133/APP/ C7.9] accompanying the DCO application).
	Environment Agency – No comments regarding Air Quality.	N/A
Bassetlaw District Council – No comments regarding Air Quality.	N/A	

17.3 Policy Context

17.3.1 This section provides an overview of the legislative and planning policy framework against which the Scheme will be considered for air quality. These policies identify the need for a site-specific air quality assessment to consider the impacts of the construction, operational and decommissioning phases of the Scheme on local sensitive receptors.

Legislation

European Legislation

17.3.2 European air quality legislation is consolidated under Directive 2008/50/EC (as amended), which came into force on 11th June 2008. This Directive consolidated and replaced previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- Directive 1999/30/EC – the First Air Quality "Daughter" Directive – sets ambient air limit values for nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x), sulphur dioxide (SO₂), lead (Pb) and particulate matter (PM);
- Directive 2000/69/EC – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene (C₆H₆) and carbon monoxide (CO);
- Directive 2002/3/EC – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone (O₃) in ambient air.
- The 2008 Ambient Air Quality Directive (2008/50/EC) - The Directive sets limits for key pollutants in the air we breathe outdoors. These legally binding limit values are for concentrations of major air pollutants that impact public health, such as particulate matter (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂). The directive also sets limit values for a range of other pollutants, such as ozone, sulphur dioxide and carbon monoxide.
- Meanwhile, the 4th air quality "Daughter" directive (2004/107/EC) (as amended) sets targets for levels in ambient air, of certain heavy metals and polycyclic aromatic hydrocarbons.
- Both Directives are introduced into the UK through the Air Quality Standards Regulations 2010¹.

17.3.3 The European Commission (EC) Directive Limits, outlined above, have been transposed in the UK through the Air Quality Standards Regulations 2010. In the UK responsibility for meeting ambient air quality limit values is devolved to the national administrations in Scotland, Wales and Northern Ireland.

National Legislation

Air Quality Standards Regulations 2010 (as amended)

17.3.4 The EU Directives referred to above are implemented into domestic law by the Air Quality Standards Regulations 2016 (as amended)¹. The limit values (re ambient air quality) defined within those Regulations are legally-binding and apply across England, with the exception of the carriageway and central reservation of roads where the public does not normally have access, on factory premises or at industrial locations (where health and safety provisions apply) and any locations where the public does not have access and there is no fixed habitation.

17.3.5 The Air Quality Standards Regulations 2010² (as amended) set legally binding limits for concentrations of certain air pollutants (i.e. “limit values”). This is with the intention of avoiding, preventing or reducing harmful effects on human health and the environment as a whole. To the extent that any concentrations exceed limit values, the Secretary of State is required to prepare an “air quality plan” with measures so as to achieve the limit value.

The UK Air Quality Strategy

17.3.6 The UK Air Quality Strategy³ is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

17.3.7 For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates which should be aimed for; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations 2000.

Environmental Protection Act 1990

17.3.8 The Environmental Protection Act 1990⁴ prescribes a statutory nuisance as air quality pollutants emitted from premises (including land), through smoke, fumes or gases, dust, steam or smell that is prejudicial to health or a nuisance.

17.3.9 Local Authorities are required to investigate any public complaints regarding air quality, and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve an abatement notice. A notice is served on the person responsible for the nuisance. It requires either simply the abatement of the nuisance or works to abate the nuisance to be carried out, or it prohibits or restricts the activity.

[National Planning Policy](#)

17.3.10 The following planning policy, legislation, guidance and standards are of particular relevance to air quality.

- Overarching National Policy Statement for Energy (EN-1), including draft revised NPS EN-1⁵;
- National Policy Statement on Renewable Energy Infrastructure (EN-3), including draft revised NPS EN-3⁶;
- National Planning Policy Statement for Electrical Networks (EN-5), including draft revised NPS EN-5⁷;
- The National Planning Policy Framework (NPPF)⁸;
- The National Planning Practice Guidance (PPG) (2019)⁹; and,
- The Clean Air Strategy (2019)¹⁰.

- 17.3.11 The overarching NPS for Energy (EN-1) was adopted in July 2011 and sets out the overall national energy policy for delivering major energy infrastructure. Broadly similar provisions are contained in draft revised NPS EN-1.
- 17.3.12 Paragraphs 5.2.6 and 5.2.7 of EN-1 deal with effects from Air Quality and Emissions, and states;
- “Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES).
- 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;
 - 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
 - and any potential eutrophication impacts.”
- 17.3.13 With regards to the decision-making process, EN-1 states that air quality considerations should be given substantial weight where a project would lead to a deterioration in air quality in an area or lead to a new area where air quality breaches any national air quality limits (see paragraph 5.2.9).
- 17.3.14 Where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits, air quality considerations will also be important. Any relevant statutory air quality limits must be taken account of in all cases. Additionally, where a project is likely to lead to a breach of such limits, appropriate mitigation measures should be secured (paragraphs 5.2.9 and 5.2.10). A notable insertion in the draft of EN-1 is the requirement for applicants to engage with the relevant local authority where a project is in, or in close proximity to, a Local Air Quality Management Area or Clean Air Zone to ensure compatibility with the local air quality plan.
- 17.3.15 EN-3 now applies to Solar developments, and is therefore relevant to the Scheme, however, EN-3 does not reference any specific requirements regarding air quality, in respect of solar developments.
- 17.3.16 The National Policy Statement on Electricity Networks Infrastructure 5 (EN-5) was adopted in July 2011. Whilst EN-5 principally covers above-ground electricity lines of 132 kV and above, paragraph 1.8.2 confirms that EN-5 will also be relevant if the electricity network constitutes an associated development for which consent is sought, such as a generating station. EN-5 is therefore relevant to the Scheme, as a grid connection is proposed, however, EN-5 does not reference any specific requirements regarding air quality.

The National Planning Policy Framework (NPPF)

17.3.17 The NPPF, revised most recently in July 2021, sets out the Government’s planning policies for England, providing a framework within which local policies can be developed. The key principle of the NPPF is a presumption in favour of sustainable development. The NPPF principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The PPG now exists to support the NPPF. With regards to air quality, the NPPF states:

17.3.18 Paragraph 174.

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

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.”

17.3.19 Paragraph 186.

“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.”

17.3.20 Paragraph 188.

“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

Planning Practice Guidance

17.3.21 The relevant Guidance Category of Air Quality in the Planning Practice Guidance (PPG) web-based resource was updated by the Ministry for Housing, Communities

and Local Government (MHCLG) on 1st November 2019 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following key text within the guidance (Paragraph: 001 Reference ID: 32-001-20191101):

“The 2008 Ambient Air Quality Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂).

The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:

- fine particulate matter (PM_{2.5});
- ammonia (NH₃);
- nitrogen oxides (NO_x);
- sulphur dioxide (SO₂); and
- non-methane volatile organic compounds (NMVOCs).

As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity.”

17.3.22 Additionally, the PPG states:

“Where air quality is a relevant consideration the local planning authority may need to establish:

- the ‘baseline’ local air quality, including what would happen to air quality in the absence of the development;
- whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and
- whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.”

Local Planning Policy

17.3.23 West Lindsey District Council replaced the West Lindsey Local plan with the Central Lincolnshire Local Plan in April 2017 following Central Lincolnshire Joint Strategic Planning Committee formally adopting the Plan. The Central Lincolnshire authorities are preparing a new Local Plan to replace the Local Plan adopted in 2017.

17.3.24 Following a review of the Adopted Central Lincolnshire Local Plan (Adopted April 2017), the following policy relating to Air Quality was identified:

“Policy LP26: Design and Amenity

All development, including extensions and alterations to existing buildings, must achieve high quality sustainable design that contributes positively to local character, landscape and townscape, and supports diversity, equality and access for all.

Development proposals will be assessed against the following relevant design and amenity criteria. ...

Amenity Considerations

The amenities which all existing and future occupants of neighbouring land and buildings may reasonably expect to enjoy must not be unduly harmed by or as a result of development. Proposals should demonstrate, where applicable and to a degree proportionate to the proposal, how the following matters have been considered, in relation to both the construction and life of the development: ...

s. Adverse impact upon air quality from odour, fumes, smoke, dust and other sources; ...”

17.3.25 Following a review of the Proposed Submission Central Lincolnshire Local Plan (March 2022), the following policies relating to Air Quality were identified:

“Policy S14: Renewable Energy

The Central Lincolnshire Joint Strategic Planning Committee is committed to supporting the transition to a net zero carbon future and will seek to maximise appropriately located renewable energy generated in Central Lincolnshire (such energy likely being wind and solar based).

Proposals for renewable energy schemes, including ancillary development, will be supported where the direct, indirect, individual and cumulative impacts on the following considerations are, or will be made, acceptable. To determine whether it is acceptable, the following tests will have to be met:

- i. The impacts are acceptable having considered the scale, siting and design, and the consequent impacts on landscape character; visual amenity; biodiversity; geodiversity; flood risk; townscape; heritage assets and their settings; and highway safety; and
- ii. The impacts are acceptable on aviation and defence navigation system/communications; and
- iii. The impacts are acceptable on the amenity of sensitive neighbouring uses (including local residents) by virtue of matters such as noise, dust, odour, shadow flicker, air quality and traffic; ...

In order to test compliance with part (iii) above will require, for relevant proposals, the submission by the applicant of a robust assessment of the potential impact on such users, and the mitigation measures proposed to minimise any identified harm.

For all matters in (i)-(iii), the applicable local planning authority may commission its own independent assessment of the proposals, to ensure it is satisfied what the

degree of harm may be and whether reasonable mitigation opportunities are being taken. ...”

‘Policy S53: Design and Amenity

All development, including extensions and alterations to existing buildings, must achieve high quality sustainable design that contributes positively to local character, landscape and townscape, and supports diversity, equality and access for all.

Good design will be at the centre of every development proposal, and this will be required to be demonstrated through evidence supporting planning applications to a degree proportionate to the proposal. Design Codes may be produced for parts of Central Lincolnshire or in support of specific developments. The approach taken in these Design Codes should be informed by the National Model Design Code and where these codes have been adopted, developments will be expected to adhere to the Code.

Proposals for new buildings should incorporate the Design Principles for Efficient Buildings in Policy S6 at the centre of design.

All development proposals will be assessed against, and will be expected to meet the following relevant design and amenity criteria. All development proposals will:

...

7. Uses

a) Create or contribute to a variety of complementary uses that meet the needs of the community;

b) Be compatible with neighbouring land uses and not result in likely conflict with existing ‘bad neighbour’ uses unless it can be satisfactorily demonstrated that both the ongoing use of the neighbouring site will not be compromised, and that the amenity of occupiers of the new development will be satisfactory with the ongoing normal use of the neighbouring site;

c) Not result in adverse noise and vibration taking into account surrounding uses nor result in adverse impacts upon air quality from odour, fumes, smoke, dust and other sources. ...”.

17.4 Assessment Methodology and Significance Criteria

Construction Assessment Methodology

Construction Phase Dust Assessment

- 17.4.1 The effects during the construction phase have the potential to result in dust nuisance complaints and surface soiling from deposition, as opposed to the risk of exceeding a custom and practice threshold for dust mass deposition of 200 mg m⁻² day⁻¹ averaged over the period of a month (Good practice guide: control and measurement of nuisance dust and PM₁₀ from the extractive industries, Mineral Industry Research Organisation (MIRO)/AEA Technology plc, 25 February 2011). The effects will be direct as they occur as a result of activities associated with the Scheme, temporary as they will only potentially occur during construction activities, short-term because they will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine, and will be reversible.
- 17.4.2 Additional vehicle movements (particularly HGV movements) associated with the construction phase have the potential to generate exhaust emissions, such as NO₂, PM₁₀ and PM_{2.5} on the local road network.
- 17.4.3 The effects identified for the construction phase and considered for the purpose of this assessment from (1) on-site construction activities and (2) the associated construction traffic outside of the site boundary, are as follows:
- On-site construction Activities:*
- Temporary generation of dust arising from construction works within the site boundary can lead to potential impacts from dust soiling and concentrations of particulate matter (as PM₁₀) within the study areas, which are set up in accordance with IAQM guidance as follows:

For human receptors:
 - 350 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
The study area for ecological receptors:
 - 50 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- 17.4.4 Appropriate site-specific mitigation for the on-site construction activities will be recommended in accordance with the IAQM document (Guidance on the assessment of dust from demolition and construction, January 2014) and for inclusion in the Construction Environmental Management Plan (CEMP) that will be required prior to construction.

- 17.4.5 Appropriate site-specific mitigation will be recommended in accordance with the IAQM document and is included within the Outline CEMP **[EN010133/APP/C7.16]** accompanying the DCO application, for the proposed Scheme, which will mitigate any potential adverse effects associated with the construction phase of the development. Following the implementation of the mitigation, it is expected there will be a 'negligible' impact as a result of the Scheme.

Associated Construction Traffic outside of the Site Boundary

- 17.4.6 The anticipated worst-case vehicle movements associated with the Scheme during the construction phase on a single road (A15) are forecast to be 115 HGV AAWT movements, and 466 car and LGV AAWT movements. Following conversion from AAWT to AADT, the worst-case, robust flows are anticipated to be 99 HGV movements, and 399 car and LGV movements. Therefore, the heavy-duty vehicle (HDV) movements on the local road network will not be greater than 100 annual average daily traffic (AADT) and the light duty vehicle (LDV) will not be greater than 500 AADT. Therefore, as the Sites are not located within or adjacent to an AQMA, the construction traffic air quality impact can be scoped out, in accordance with the 'Indicative criteria for requiring an air quality assessment' in IAQM Guidance within Land-use planning & development control: Planning for air quality, June 2016¹¹.
- 17.4.7 Additionally, the calculated construction traffic numbers are considered to be overly robust, where the cumulative movements associated with Cottam 1, 2, 3a and 3b have been uplifted to account for a peak construction period, therefore a worst-case scenario, which would not be experienced year-round. Furthermore, considering the worst-case nature of the predicted vehicle movements, and the low concentrations of air quality pollutants in the vicinity of the A15, it has been determined that the construction vehicles will not result in a significant impact on air quality during the construction phase.

Construction Significance Criteria

Construction Dust Significance Criteria

- 17.4.8 The IAQM Guidance does not assign a significance criterion prior to the implementation of mitigation measures, instead it assigns a 'risk factor' to determine the level of site-specific mitigation measures which should be implemented as part of the Scheme. Further details on the calculation of the 'risk factors' for each site are detailed in Section 3 of each of the **Appendices 17.1, 17.2, and 17.3.**

Operational Phase Assessment Methodology

- 17.4.9 The operational traffic associated with the Scheme is expected to be very low. Solar farm developments do not generate significant traffic flows once operational. Typically, there will be only a handful of trips per month by Transit Van (or similar) for maintenance purposes (less than one vehicle trip per day on average). In addition, it is not anticipated that the effects associated with decommissioning will be worse than during the construction phase. It is anticipated that the number of

vehicle and heavy-duty vehicle (HDV) movements on the local road network will not be greater than the light duty vehicle (LDV) movements (500 AADT). As the Sites are not located within or adjacent to an AQMA, the traffic air quality impact can be scoped out, according to the “Indicative criteria for requiring an air quality assessment” in IAQM Guidance of Land-use planning & development control: Planning for air quality, January 2017¹².

- 17.4.10 The Scheme does not include any fixed plant which may give rise to emissions, such as Combined Heat and Power (CHP) or boilers, therefore there are no emissions associated with the proposed Scheme and the direct impacts on air quality are determined to be ‘imperceptible’.

Fire Incident Impact Assessment

- 17.4.11 The EIA Regulations¹³ has introduced a requirement to consider major accidents or disasters. It is considered likely that the original changes to the EIA Directive¹⁴ to consider major accidents or disasters were made in order to bring certain other statutory requirements, mainly other EU Directives, within the overall ‘wrapper’ of EIA and the ES. The Directive and domestic Regulations cite two specific directives as examples of risk assessments to be brought within EIA, these are Directive 2012/18/EU of the European Parliament and of the European Council (which deals with major accident hazard registered sites¹⁵ and Council Directive 2009/71/Euratom (which deals with nuclear sites) (Ref.191). Neither of these Directives are relevant to the Scheme.
- 17.4.12 ‘Accidents’ are considered to be an occurrence resulting from uncontrolled developments in the course of construction and operation of a development (e.g. major emission, fire or explosion). ‘Disasters’ are considered to be naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).
- 17.4.13 In the absence of established guidance on this topic, the following methodology has been adopted. In general, major accidents or disasters, as they relate to the Scheme, fall into three categories:
- Events that could not realistically occur, due to the nature of the Scheme or its location;
 - Events that could realistically occur, but for which the Scheme, and associated receptors, are no more vulnerable than any other development; and
 - Events that could occur, and to which the Scheme is particularly vulnerable, or which the Scheme has a particular capacity to exacerbate.
- 17.4.14 ‘Accidents’ are considered to be an occurrence resulting from uncontrolled developments in the course of construction and operation of a development (e.g. major emission or fire). As such, the potential impacts on local residents from a fire accident, such as solar panel, battery storage and sub-stations fire, are considered and assessed. Particulate matter exposure is the key principle public health threat

from short-term smoke exposure, therefore, detailed air dispersion modelling of particulate matter impact from smoke has been undertaken to predict the short-term concentrations of PM₁₀ and PM_{2.5} at residential receptors at downwind locations likely to be affected by incidents including fire.

- 17.4.15 Detailed air quality dispersion modelling has been undertaken to generate background concentrations which are required to inform the assessment of Air Quality Impact from a Major Fire Accident.
- 17.4.16 An approved atmospheric dispersion modelling package (ADMS-Roads) has been used in the Air Quality Impact Assessment of a Major Fire Accident, where, smoke levels and their associated air quality category (good to hazardous level) will be estimated using the modelled predicted particulate matter levels, and the potential smoke effects on residential and other sensitive receptors are assessed and mitigation measures are discussed where appropriate.
- 17.4.17 Health effects of fire smoke exposures are assessed for the protection of human health. The guidelines within '*Smoke Exposure from Wildland fires, interim Guidelines for Protecting community Health and wellbeing*', Manitoba Health, Canada (January 26, 2012)¹⁶, are considered to be the most relevant to inform the assessment. The guidelines are used to estimate the smoke levels and air quality category (good to hazardous) using the predicted particulate matter levels displayed in Table 17.2 which provides an approximated conversion between visibility through smoke, as a visibility index provides a quick, alternative way to estimate smoke levels. Using landmarks at known distances, an experienced observer can provide a reasonable estimate of particle concentration.
- 17.4.18 Air quality is a measure of how clean or polluted the air is. For this assessment air quality has been divided into 5 categories from good (healthy) to hazardous using the particulate matter levels in air. Visibility affected by particulate matter is also discussed in the Table below.

Table 17.2 Estimating Smoke Levels from Particulate Matter Concentrations

Air Quality Category	Equivalent approx. PM _{2.5} 1-3-hour average in µg/m ³	Visibility in km
Good	0-40	15 kms and up
Moderate/Unhealthy for Sensitive Groups	41-175	5-14 kms
Unhealthy	176-300	2.5-4 kms
Very Unhealthy	301-500	1.5-2 kms
Hazardous	over 500	Less than 1 km

[Operational Phase Assessment Significance Criteria](#)

17.4.19 The significance of the effects during the operational phase of the Scheme is based on the latest guidance produced by Environmental Protection UK (EPUK) and IAQM in January 2017. The guidance lays a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall significance of the air quality effects based on severity of air quality impacts.

17.4.20 Table 17.3 provides the criteria used for the classification of the magnitude of the air quality impacts during the Site construction, operational and decommissioning phases.

Table 17.3 Methodology for Assessing Magnitude of Effect

Magnitude	Description	Examples
Large	Impact resulting in a considerable change in baseline environmental conditions with severe undesirable/desirable consequences on the receiving environment.	<ul style="list-style-type: none"> Air quality varies between the do minimum and do something by more than 10% of the air quality criterion (Emissions). Substantial risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).
Medium	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions	<ul style="list-style-type: none"> Air quality varies between the do minimum and do something by 5 - 10% of the air quality criterion (Emissions). Moderate risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).
Small	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated.	<ul style="list-style-type: none"> Air quality varies between the do minimum and do something by 1 - 5% of the air quality criterion (Emissions). Slight risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).
Imperceptible	Very low discernible change in baseline environmental conditions.	<ul style="list-style-type: none"> Air quality varies between the do minimum and do something by less than 1-2% of the air quality criterion (Emissions). Little or no cause for nuisance complaints to be made (Construction).

Neutral	No change in baseline conditions	<ul style="list-style-type: none"> Air quality varies between the do minimum and do something by less than 0.5% of the air quality criterion (Emissions).
---------	----------------------------------	--

17.4.21 It is recognised that likely significant air quality impacts can operate over a range of geographical areas and therefore a geographical scale may be taken into account in determining the scale/magnitude of the likely significant impact.

Assessment of Sensitivity

17.4.22 Receptors can demonstrate different sensitivities to changes in their environment. For the purpose of this assessment, sensitivity will be determined as Very High, High, Medium, Low or Negligible, as detailed in Table 17.4 for both the construction and operational phase of the development.

Table 17.4 Methodology for Assessing Sensitivity of Receptor

Sensitivity	Definition
Very High	<ul style="list-style-type: none"> 'Do Minimum' pollutant concentration are 110% and greater than 110% of the relevant Air Quality Objectives (AQO) (Emissions). Receptors of very high sensitivity to dust and odour, such as: hospitals and clinics, retirement homes, painting and furnishing, hi-tech industries and food processing (Construction). Densely populated areas - more than 100 dwellings within 20m of the development site (Construction).
High	<ul style="list-style-type: none"> 'Do Minimum' pollutant concentration between 103 - 109% of the relevant AQO (Emissions). Receptors of high sensitivity to dust and odour, such as: schools, residential areas, food retailers, glasshouses and nurseries, horticultural land and offices (Construction). Densely populated areas - 10-100 dwellings within 20m of the development site (Construction).
Medium	<ul style="list-style-type: none"> 'Do Minimum' pollutant concentration between 95 - 102% of the relevant AQO (Emissions). Receptors of medium sensitivity to dust and odour, such as: farms, outdoor storage, light and heavy industry (Construction). Suburban or edge of town areas (Construction).
Low	<ul style="list-style-type: none"> 'Do Minimum' pollutant concentration between 75-90% of the relevant AQO (Emissions) All other dust/odour sensitive receptors not identified above (Construction). Rural/Industrial areas (Construction).
Negligible	<ul style="list-style-type: none"> Concentration less than 75% of the relevant AQO (Emissions) Receptor more than 350m away (construction)

Assessment of Significance

17.4.23 The level of significance is determined by combining the likely magnitude of impact with the sensitivity of the receptor during the construction and operational phases. Table 17.5 shows how the interaction of magnitude and sensitivity, results in the significance of an environmental impact. If the scale of the impact magnitude is negative, then the resulting impact is adverse. If the scale of the impact magnitude is positive, then the resulting impact is beneficial. If the impact is Moderate to Substantial then the change is considered to have a significant effect on the local air quality, whether positive or negative.

17.4.24 The table has been developed by the Applicant’s consultants, but the matrix combinations and terms used correlate with the significance matrix recommended by Land-Use Planning & Development Control: Planning for Air Quality (2017)¹².

Table 17.5 Criteria for Assessing the Significance of Air Quality Effects

Sensitivity of Receptor	Magnitude of Impact				
	Large	Medium	Small	Imperceptible	Neutral
Very High	Substantial	Substantial	Substantial	Moderate	Negligible
High	Substantial	Substantial	Moderate	Moderate	Negligible
Medium	Substantial	Moderate	Moderate	Slight	Negligible
Low	Moderate	Moderate	Slight	Negligible	Negligible
Negligible	Moderate	Slight	Negligible	Negligible	Negligible

17.4.25 For the purposes of this assessment, moderate or substantial effects are considered to be **significant** in terms of the EIA Regulations

17.5 Baseline Conditions

17.5.1 This section provides a review of the existing air quality in the vicinity of the application Sites and the study areas in order to provide a benchmark against which to assess potential air quality impacts of the proposed development. Baseline air quality in the vicinity of the application Site has been defined from several sources, as described in the following sections.

Local Air Quality Management (LAQM)

17.5.2 The Scheme Sites, and the Cable Route Corridor are located in West Lindsey district. As required under Section 82 of the Environment Act 1995, West Lindsey District Council (WLDC) reviews and assesses air quality within its area of jurisdiction. The assessments have indicated that concentrations of air quality pollutants are not above the relevant AQOs at any locations of relevant public exposure within the district. Therefore, WLDC has not designated any Air Quality Management Areas (AQMAs).

17.5.3 In respect of any cumulative assessment, notably, some of the proposed Sites for the West Burton Solar Project are located within West Lindsey District Council, Lincolnshire County Council, Bassetlaw District Council (BDC), and Nottinghamshire County Council who also review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of air quality pollutants are not

above the relevant AQOs at any locations of relevant public exposure within the district. Therefore, BDC has not designated any Air Quality Management Areas (AQMAs).

Air Quality Monitoring

17.5.4 Monitoring of air quality within WLDC has been undertaken through both automatic and non-automatic monitoring methods in 2019. Automatic methods consists of Automatic analysers continuously draw in ambient (outdoor) air and measure the concentration of the pollutant in the sampled air. Non-automatic Networks measure less frequently compared to automatic networks - either daily, weekly or monthly - and samples are collected by some physical means (such as diffusion tube or filter). These samples are then subjected to chemical analysis, and final pollutant concentrations calculated from these results. These have been reviewed in order to provide an indication of existing air quality in the area surrounding the application Site. WLDC publishes the monitoring data annually and at the time of this assessment the most recently available, representative monitoring data within WLDC was undertaken during 2019.

Automatic Monitoring

17.5.5 WLDC undertook automatic pollution monitoring during 2019 at 4 different locations. The closest monitoring location to the proposed development Site is named as GC, which is located at Gainsborough Cemetery. The most recent available representative data is from 2019, which is presented in Table 17.6, and Figure 17.1.

Table 17.6 Monitored Annual Mean NO₂ Concentrations at Automatic Monitoring Locations

Site ID	Location	Site Type	Distance from Kerb of Nearest Road (m)	Inlet Height (m)	2019 NO ₂ Annual Mean Concentration (µg/m ³)
GC	Gainsborough Cemetery	Industrial	N/A	3.0	7.5

17.5.6 As outlined in Table 17.6, GC monitoring location monitored annual average concentrations below the AQO for NO₂ (40 µg/m³ annual mean) during 2019. Neither WLDC or BDC undertake any monitoring of PM₁₀ or PM_{2.5}.

Non - Automatic Monitoring

17.5.7 WLDC operated a network of 86 passive diffusion tubes during 2019. The most recently available, representative diffusion tube data is from 2019 which is presented in Table 17.7 and Figure 17.1.

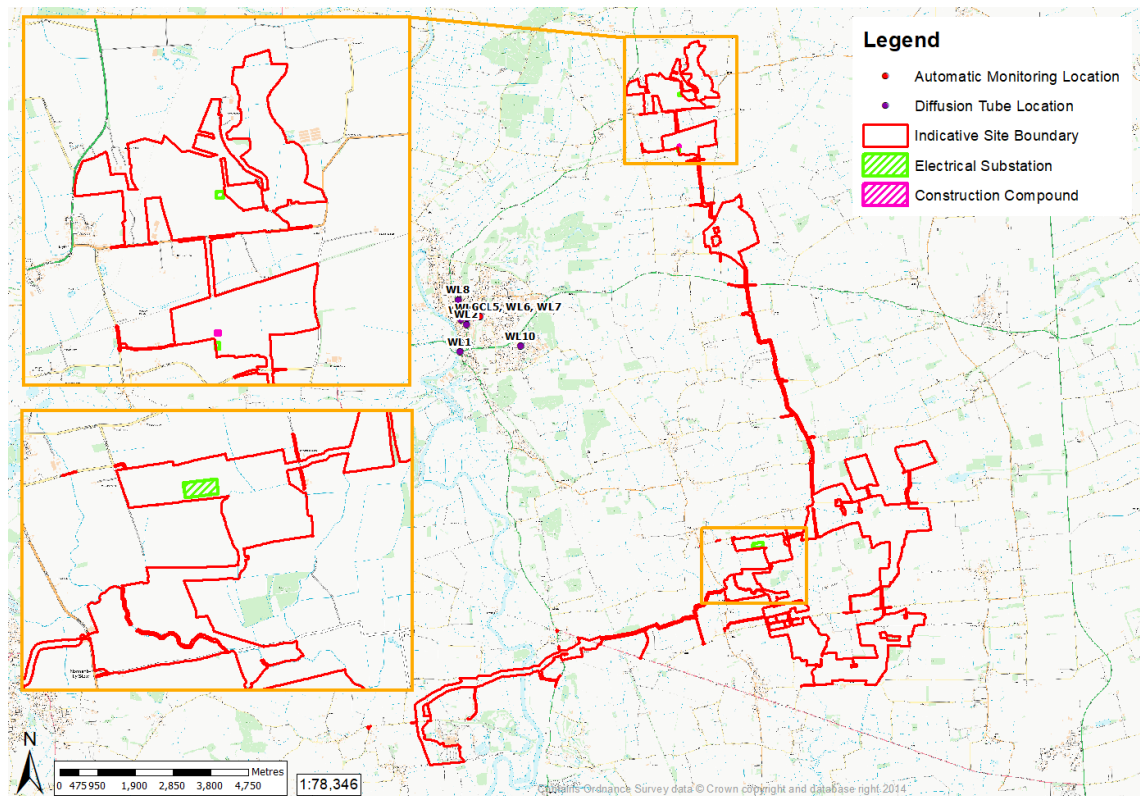
Table 17.7 Monitored Annual Mean NO₂ Concentrations at Diffusion Tubes

Site ID	Location	Site Type	Distance from	Inlet Height (m)	2019 NO ₂ Annual
---------	----------	-----------	---------------	------------------	-----------------------------

			Kerb of Nearest Road (m)		Mean Concentration ($\mu\text{g}/\text{m}^3$)
WL1	3 Lea Road, Gainsborough	Roadside	8.6	2.8	22.8
WL2	58 Etherington Street, Gainsborough	Roadside	1.6	2.8	19.0
WL3	19 Spring Gardens, Gainsborough	Roadside	2.9	2.8	17.3
WL4	Heaton Street	Roadside	2.2	2.8	20.7
WL5, WL6, WL7	Gainsborough Cemetery, Gainsborough	Industrial	13.8	3.0	11.3
WL8	Cherry Tree, Gainsborough	Kerbside	0.2	2.8	14.7
WL10	Marshall Way, Gainsborough	Roadside	15.9	2.8	15.0

17.5.8 As indicated in Table 17.7, all diffusion tubes located within the Air Quality Assessment area monitored annual average NO_2 concentrations below the AQO for NO_2 ($40 \mu\text{g}/\text{m}^3$ annual mean) during 2019.

Figure 17.1 West Lindsey Monitoring Locations



Future Baseline

- 17.5.9 2019 baseline conditions assessed are deemed to be appropriate and representative for application Site conditions at the commencement of works.
- 17.5.10 It should be noted that over time, the number of petrol/diesel cars are predicted to reduce as a result of initiatives to combat air pollution and so emissions associated with vehicles will reduce over time. This would be as a result of greater numbers of electric vehicles making up the fleet and there being fewer older more polluting vehicles on the road. As a worst case, the assessment considered that background concentrations will not improve between the baseline year and the assessed future years, and the same background concentrations were utilised.

Background Pollutant Mapping

- 17.5.11 The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study Site. Several sources have been used to obtain representative background levels as discussed below.
- 17.5.12 The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and Technical Guidance (TG) (16).
- 17.5.13 The IAQM Guidance states:
- “A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.”*
- 17.5.14 Additionally, TG (16) states:
- “Typically, only the process contributions from local sources are represented within an output by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations.”*
- 17.5.15 All the Defra background concentrations detailed in Table 17.8 for 2019, show that the background levels are predicted to be below the relevant AQO within the study area.
- 17.5.16 The relevant background concentrations for this assessment are shown in Table 17.8 were obtained from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the application Sites. Those background data were published by Defra in a data group named as “Background Maps 2018” for nitrogen oxide (NO_x), NO₂, PM₁₀ and PM_{2.5} in August 2020.

Table 17.8 Published Background Air Quality Levels ($\mu\text{g}/\text{m}^3$)

Council	Area	UK NGR (m)		2021 Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)			
		X	Y	NO _x	NO ₂	PM ₁₀	PM _{2.5}
West Lindsey District	Cottam 1	491500	383500	9.02	7.03	15.50	8.41
West Lindsey District	Cottam 2, 3a and 3b	487500	393500	9.00	7.02	15.58	8.44

Note: The background grids cover 1kmx1km grid square, and are determined to be representative of the Cable Route Corridor adjacent to the development.

- 17.5.17 All the Defra background concentrations detailed in Table 17.8 for 2021, show that the background levels were predicted to be below the relevant AQO within the study area. It should be noted that using 2021 background data would produce a worst-case assessment as background data after 2021 would be less than 2021 data as Defra data includes the year-on-year decrease in the data base.

Assessment Locations

Discrete (Individual) Receptors

Receptors for Qualitative Dust Assessment and Construction Dust Management Plan (CDMP)

- 17.5.18 For human receptors:
- 350 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrances (s).
 - The study area for ecological receptors:
 - 50 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrances (s).

Receptors for Fire Impact Assessment

- 17.5.19 Considering the nature of a fire incident, a fire could be taking place anywhere within the Site and it would be a short period before being extinguished, therefore, a set of generic receptor locations has been defined to assess the potential fire impacts on the fire downwind locations. Four sets of receptor locations have been selected to assess the smokes spread in four directions (south, north, east and west).
- Receptor Set 1: Receptor locations affected by west wind (coming from the west and blowing toward the east), A series of 20 receptors, which were spaced at 10 m intervals, are defined eastward away from the fire.

- Receptor Set 2: Receptor locations affected by east wind (coming from the east and blowing toward the west), A series of 20 receptors, which were spaced at 10 m intervals, are defined westward away from the fire.
- Receptor Set 3: Receptor locations affected by south wind (coming from the south and blowing toward the north), A series of 20 receptors, which were spaced at 10 m intervals, are defined northward away from the fire.
- Receptor Set 4: Receptor locations affected by north wind (coming from the north and blowing toward the south), A series of 20 receptors, which were spaced at 10 m intervals, are defined southward away from the fire.

17.5.20 Due to the fact that a fire could occur at any location within the development, a set of generic locations has been used to represent potential receptors for Cottam 1, 2 and 3a & 3b. It is not feasibly possible to evaluate potential fire effects from every possible location of fire at all existing sensitive receptors surrounding the Cottam 1, 2 and 3a & 3b Sites. Therefore, receptor locations have been selected to produce a representative assessment from any location within the Scheme.

17.5.21 The selected generic receptor locations, using Cottam 1 Site OS coordinates as an example, are presented in Table 17.9 and Figure 17.2

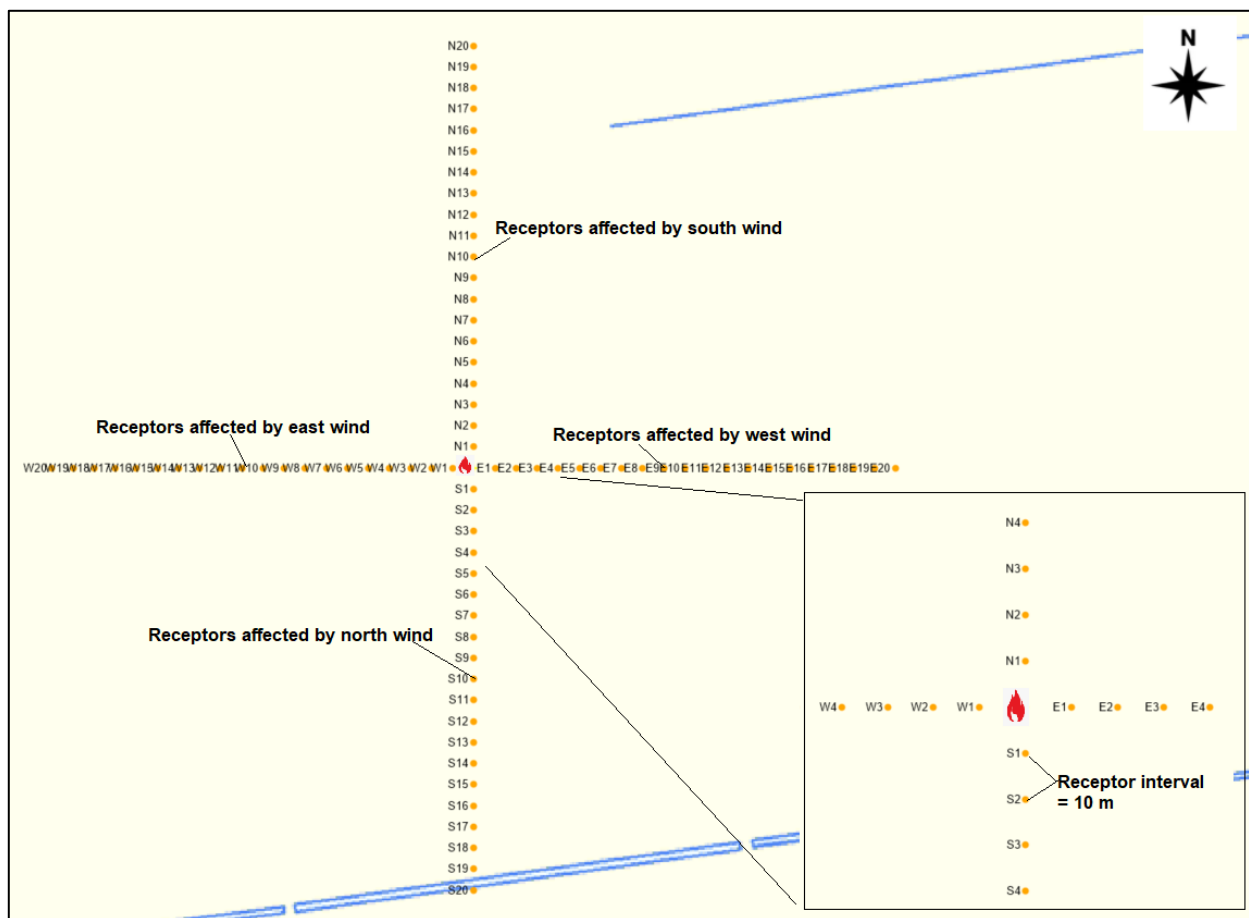
Table 17.9 Selected Sensitive Receptor Locations

Discrete Sensitive Receptor		UK NGR (m)	
		X	Y
E1	Affected by a West Wind	488310	382900
E2		488320	382900
E3		488330	382900
E4		488340	382900
E5		488350	382900
E6		488360	382900
E7		488370	382900
E8		488380	382900
E9		488390	382900
E10		488400	382900
E11		488410	382900
E12		488420	382900
E13		488430	382900
E14		488440	382900
E15		488450	382900
E16		488460	382900
E17		488470	382900
E18		488480	382900
E19		488490	382900
E20		488500	382900
W1	Affected by an East Wind	488290	382900
W2		488280	382900
W3		488270	382900

W4		488260	382900
W5		488250	382900
W6		488240	382900
W7		488230	382900
W8		488220	382900
W9		488210	382900
W10		488200	382900
W11		488190	382900
W12		488180	382900
W13		488170	382900
W14		488160	382900
W15		488150	382900
W16		488140	382900
W17		488130	382900
W18		488120	382900
W19		488110	382900
W20		488100	382900
N1	Affected by a South Wind	488300	382910
N2		488300	382920
N3		488300	382930
N4		488300	382940
N5		488300	382950
N6		488300	382960
N7		488300	382970
N8		488300	382980
N9		488300	382990
N10		488300	383000
N11		488300	383010
N12		488300	383020
N13		488300	383030
N14		488300	383040
N15		488300	383050
N16		488300	383060
N17		488300	383070
N18		488300	383080
N19		488300	383090
N20		488300	383100
S1	Affected by a North Wind	488300	382890
S2		488300	382880
S3		488300	382870
S4		488300	382860
S5		488300	382850
S6		488300	382840
S7		488300	382830
S8		488300	382820
S9		488300	382810
S10		488300	382800

S11		488300	382790
S12		488300	382780
S13		488300	382770
S14		488300	382760
S15		488300	382750
S16		488300	382740
S17		488300	382730
S18		488300	382720
S19		488300	382710
S20		488300	382700

Figure 17.2 Selected Sensitive Receptor Locations



17.6 Embedded Mitigation

17.6.1 The way that potential environmental impacts have been or will be avoided, prevented, reduced, or off-set through design and/or management of the Scheme are outlined below and will be taken into account as part of the assessment of the potential effects. Proposed environmental enhancements are also described where relevant. The mitigation measures for both the construction/decommissioning and operational phases, are outlined below.

Construction and Decommissioning

- 17.6.2 Measures to control construction and decommissioning dust as defined in IAQM's guidance will be adopted, where reasonably practicable. The appropriate site-specific mitigation measures will be determined through the construction phase dust assessment and included within the Outline CEMP **[EN010133/APP/C7.1]**. This will be secured through a DCO Requirement. Site-specific construction dust mitigation has been detailed in the Qualitative dust assessment and construction dust management plans (CDMP's) for the Sites at **Appendices 17.1 – 17.3**.
- 17.6.3 Health and Safety on-site would be managed by the contractor during construction and decommissioning to mitigate the risk of fire. Components and equipment for the Scheme will be installed in accordance with the relevant Fire Regulations and guidance from the Health and Safety Executive. The operational phase of the Proposed Development will include routine maintenance and servicing of equipment to ensure the safe operation of equipment, and reduce the risk of fire during the decommissioning phase. Fire equipment and notices will also be provided on-site for the availability of personnel and will be regularly inspected and serviced in accordance with relevant Fire Regulations.

Operational Phase

- 17.6.4 There is a potential fire risk associated with certain types of batteries such as lithium ion. The Scheme design includes cooling systems which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. The battery technologies on which the design is based, details the following with regards to fire protection:
- 17.6.5 The manufacturer undertakes extensive testing and analysis to assess fire risk:
- Do not install batteries where temperatures routinely approach or exceed 80°C – this is not the case with the Scheme;
 - Do not install batteries near heating equipment or heat sources – this is not the case with the Scheme;
 - Protect the installation area and equipment from flooding, which may cause electrical fires. The risk of flooding has been assessed within Chapter 10 of the ES **Hydrology, Flood Risk and Drainage [EN010133/APP/C6.2.10]** and mitigation measures to protect it from flooding have been recommended which will be developed as part of the detailed design; and
 - Ensure that installation areas comply with appropriate local fire, electrical and building code requirements, including access to fire trucks in case of emergency. This would be the case with the Scheme.
- 17.6.6 Fire detection and suppression features will be installed to detect (e.g., multispectral infrared flame detectors) and suppress fire (e.g. water-based suppression systems) to minimise the effect of any fire. Batteries will be installed in single locked steel containers which would contain a fire and reduce the likelihood of fire spreading.

The Scheme design will include adequate separation between battery banks to ensure that an isolated fire would not become widespread and lead to a major incident.

- 17.6.7 With the above embedded mitigation, any potential risk of fire and the resulting effects would be reduced as far as possible. However, an Outline Battery Safety Storage Safety Management Plan [EN010133/APP/C7.9] has been produced for the Scheme and submitted with the DCO application. This will be secured through a DCO Requirement.

17.7 Identification and Evaluation of Likely Significant Effects

Construction Phase Dust

- 17.7.1 The potential effects during the construction phase include fugitive dust emissions from site activities, such as demolitions, earthworks, construction and trackout, have been assessed in accordance with guidance in the Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction, 2014.
- 17.7.2 Construction activities could give rise to short term elevated dust and/or PM₁₀ concentrations within the vicinity of the Site. This may arise from construction activities, vehicle movements, soiling of the public highway, or windblown stockpiles. Assessment of the potential effects of construction has been undertaken within 50m of the Site boundary, and 50m of roads within 500m radius of the Site.
- 17.7.3 The main emissions during construction works are likely to be dust and particulate matter generated during excavation, earth moving (particularly during dry months), or from construction materials.
- 17.7.4 The main potential effects of particulates/dust are:
- Visual – dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
 - Physical and/or chemical contamination and corrosion of artefacts;
 - Coating of vegetation and soil contamination; and,
 - Health impacts due to inhalation, e.g. asthma or irritation of the eyes.
- 17.7.5 Factors, such as the amount of precipitation and other meteorological conditions, distance from the source, and the type of activity taking place, will also influence the amount of particulate matter generated.
- 17.7.6 The UK Air Quality Standards seek to control the health implications of respirable particulate matter PM₁₀ (less than 10 micrometres (µm) in diameter). However, the majority of particles released from construction works will be greater than this in size. Particles greater than 10µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. There are no formal standards or criteria for nuisance caused by deposited particles, however, a deposition rate of

200mg/m²/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

- 17.7.7 Three CDMP's have been prepared for the Sites.
- 17.7.8 Effects of construction dust impact on the human receptors and ecological receptors for Cottam Sites 1, 2, 3a & 3b are presented in Table 17.10, Table 17.11, and Table 17.12, respectively, as a risk factor to determine the appropriate mitigation measures to be implemented on-site. The assessment of the effects of construction dust on human health and ecological receptors include the Cottam Sites and the Cable Route Corridor.

Table 17.10 Impact Description of Construction Activities without Mitigation – Cottam 1

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM ₁₀	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Medium	Low	Medium
Construction	Medium	Low	Medium
Trackout	Medium	Low	Medium

Table 17.11 Impact Description of Construction Activities without Mitigation – Cottam 2

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM ₁₀	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Low	Low	N/A
Construction	Low	Low	N/A
Trackout	Low	Low	N/A

Table 17.12 Impact Description of Construction Activities without Mitigation – Cottam 3 & 3b

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM ₁₀	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Medium	Low	Low
Construction	Medium	Low	Low
Trackout	Medium	Low	Low

- 17.7.9 It should be noted that the risk relating to ecological receptor locations is determined to be N/A where ecological receptors are not located within 50 m of the application boundary, in accordance with the IAQM Guidance.
- 17.7.10 The effects during the construction works are predicted with regard to the potential for dust nuisance complaints and surface soiling events due to deposition, as opposed to the risk of exceeding any Air Quality Objective (AQO). All dust effects are considered to be direct, temporary, short-term and reversible in nature. The effects are determined to be direct as they occur as a result of activities associated with the Development, temporary as they will only potentially occur during the construction works, short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine, and reversible upon cessation of construction works.
- 17.7.11 The assessment of dust and/or PM₁₀, which is undertaken qualitatively using professional judgement, utilises the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (January 2014) and Part 1 LA105 Air Quality of the Volume 11 Section 3 of the Design Manual for Roads and Bridges¹⁷.
- 17.7.12 Tetra Tech have adapted guidance from the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' published in 2014. In total, four stages are considered, namely demolition, earthworks, construction and trackout. For each of these phases, the significance of the potential dust is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore the worst-case is assessed.
- 17.7.13 Following the implementation of the appropriate site-specific mitigation measures, included within the Outline CEMP, the significance of the effects from dust and PM₁₀ emissions associated with the construction works is considered to be negligible on all receptors which is not significant in EIA terms. This is based on the IAQM Guidance. All effects are considered to be temporary, direct, adverse and short term.

Operational Phase - Fire Incident Impact Assessment

- 17.7.14 Effect of a fire incident on the surrounding residents and public has been assessed using the 'air quality category' which is classified from 'good', 'moderate', 'unhealthy', 'very unhealthy' to 'hazardous'. Each category corresponds to a different level of health concern. The air quality category in this assessment is classified using the values of the fire-generated particulate matter (equivalent to PM_{2.5}) concentrations in air. Furthermore, air quality category zones have been determined according to the air quality category to make it easy for public/site manager/fire safety representative to quickly take appropriate actions in case of a fire.
- 17.7.15 Four air quality category zones have been identified:
- **Hazardous Zone** – within 10m away from a fire;
 - **Unhealthy Zone** – 11 to 20m away from a fire;

- **Moderate/Unhealthy for Sensitive Groups Zone** – 21 to 200m away from a fire; and
- **Good air quality Zone** – more than 200m away from a fire.

17.7.16 In the case of a fire, a site manager/fire safety representative will need to assess the fire location, wind direction and surrounding receptors, and will take appropriate actions accordingly.

17.7.17 An 'Air Quality Assessment on Emission Impact from the Battery Energy Storage Systems (BESS) Fire' has been undertaken and included at **Appendix 17.4** of the ES. Based on the factors of distance to the nearest property, the short-term nature of a fire incident, guidance from the NFCC, and the assessment undertaken, it is concluded that there will not be adverse effects at the closest receptor locations as a result of a BESS fire incident at the proposed development.

17.7.18 Whilst there is low risk of adverse effects at the closest receptors, in the case of a BESS fire at the proposed development, good practice safety measures will be implemented. The actions to be taken include

1. to inform any potential affected residents within the zones and to advise the public about health effects of smoke, related symptoms, and ways to reduce exposure;
2. to cancel outdoor events; and
3. to move affected residents to a cleaner air location.

17.7.19 Following the implementation of these measures during an occurrence of fire incident, the effects are determined to be negligible which is not significant in EIA terms.

17.8 Mitigation Measures

17.8.1 The site-specific construction dust mitigation has been detailed in **Appendices 17.1 – 17.3**.

17.8.2 The appropriate site-specific mitigation measures associated with the determined level of risk can be found in 'Section 8.2' of the 'IAQM Guidance on the Assessment of Dust from Demolition and Construction'. The appropriate site-specific construction dust mitigation for the worst-case Site (Cottam 1) are listed below, and are divided into general measures applicable to all Sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into 'highly recommended' and 'desirable' measures in accordance with the IAQM Guidance.

[IAQM Guidance on the Assessment of Dust from Demolition and Construction 'Highly Recommended' Mitigation Measures](#)

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- 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.
- Display the head or regional office contact information.
- 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 PM10 continuous monitoring and/or visual inspections.

Site Management

- 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.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections (visual dust monitoring) to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- 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.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.

- 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.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- 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.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use covered skips.
- Minimise drop heights from loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Measures applicable to specific activities

Construction

- 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.

Trackout

- 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.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving Sites are covered to prevent escape of materials during transport.

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- 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.
- Access gates to be located at least 10m from receptors where possible.
- The mitigation measures have been divided into general measures applicable to all Sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into ‘highly recommended’ and ‘desirable’ measures.

[IAQM Guidance on the Assessment of Dust from Demolition and Construction ‘Desirable’ Mitigation Measures](#)

Communications

- No Action Required.

Monitoring

- 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.

Operating vehicle/machinery and sustainable travel

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced 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).
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Measures applicable to specific activities

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- 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.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

17.8.3 With regard to the mitigation measures for the decommissioning phase operations, it is anticipated that the dust and particulate matter emission impacts during the decommissioning phase will be less than the impacts during construction. Therefore, following the implementation of the appropriate site-specific mitigation measures identified for the construction phase, the significance of the effects from dust and PM₁₀ emissions associated with the decommissioning works is considered to be negligible on all receptors.

17.9 Cumulative Effects/In-Combination Effects

17.9.1 The Scheme does not include any fixed plant which may give rise to industrial emissions, such as Combined Heat and Power (CHP) or boilers, therefore cumulative effects from industrial emission impacts will be not assessed.

17.9.2 Following the implementation of the site-appropriate mitigation measures detailed in Section 17.8, there will be no effects from the Scheme that could combine with effects from other sites and other developments to lead to cumulative effects during the construction phase.

17.9.3 With regard to traffic air quality impact from the Scheme, the Scoping Opinion concluded that *"Subject to confirmation that the proposed construction vehicle numbers alone or cumulatively with other proposals on relevant links (e.g. for West Burton Solar Project) will not exceed the relevant IAQM EPUK thresholds e.g. 100 HGV Annual Average Daily Traffic (AADT), the Inspectorate considers that the need for detailed construction air quality modelling and assessment can be scoped out. Based on the nature of the development and subject to confirmation of the type and number of maintenance vehicles, the Inspectorate considers that operational traffic movements will be limited and that operational traffic air quality modelling may be scoped out."*

17.9.4 However, the cumulative traffic air quality effects has been re-assessed by considering other NSIP projects in this locality for similar developments along with planning applications for the same. It is noted that there are a number of other NSIPs in this locality that are at a similar stage to this application; these have not yet

attained permission but will be considered within the heading of cumulative impacts. Details of the closest cumulative developments are provided in **Appendix 2.3 and Figure 2.1** of the ES. The anticipated, worst-case, vehicle movements associated with the Scheme, on any single road during the construction phase are forecast to be approximately 115 HGV AAWT movements, and 466 car and LGV AAWT movements. Following conversion from AAWT to AADT for the purposes of air quality assessment criteria consideration, the worst-case flows are anticipated to be 99 HGV movements, and 399 car and LGV movements. Additionally, it should be noted that these numbers do not account for further dispersion of vehicles along different sections of the A15. It can be assumed that these vehicle movements would be split, with some travelling to/from the north and other to/from the south. As such, it is anticipated that the cumulative vehicle numbers would not exceed the 'Indicative criteria for requiring an air quality assessment' detailed within IAQM Guidance on 'Land-use planning & development control: Planning for air quality', January 2017 and, therefore, air quality modelling for cumulative traffic assessment will be not required.

17.10 Residual Effects

- 17.10.1 Following the implementation of the appropriate site-specific mitigation measures identified during construction, operational and decommissioning phases and during an occurrence of fire incident, the residual effects on both human receptors and ecological receptors are determined to be negligible.

17.11 References

- ¹ The Air Quality Standards (Amendment) Regulations 2016
- ² The Air Quality Standards Regulations (2010)
- ³ Defra (2019) The Air Quality Strategy.
- ⁴ UK Legislation (1990). Environment Protection Act.
- ⁵ Department of Energy & Climate Change (2011), Overarching National Policy Statement for Energy (EN-1); & Department for Business, Energy & Industrial Strategy (2021), Draft Overarching National Policy Statement for Energy (EN-1)
- ⁶ Department of Energy & Climate Change (2011), National Policy Statement for Renewable Energy Infrastructure (EN-3); & Department for Business, Energy & Industrial Strategy (2021), Draft National Policy Statement for Renewable Energy Infrastructure (EN-3).
- ⁷ Department of Energy & Climate Change (2011), National Policy Statement for Electricity Networks Infrastructure (EN-5); & Department for Business, Energy & Industrial Strategy (2021), Draft National Policy Statement for Electricity Networks Infrastructure (EN-5).
- ⁸ CLG (2019) National Planning Policy Framework.
- ⁹ CLG (2019) Planning Practice Guide
- ¹⁰ Defra (2019). Clean Air Strategy.
- ¹¹ Institute of Air Quality Management (2014). Guidance on the assessment of dust from demolition and construction.
- ¹² Institute of Air Quality Management, (2017). Land-Use Planning & Development Control: Planning for Air Quality v1.2.
- ¹³ Her Majesty's Stationery Office (HMSO) (2011) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended by The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018).
- ¹⁴ Official Journal of the European Communities (1985) Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.
- ¹⁵ OJEU (2012) Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.
- ¹⁶ Manitoba Health (2012). Smoke Exposure from Wildland Fires, Interim Guidelines for Protecting Community Health and Wellbeing.
- ¹⁷ Highways Agency et al. (2019) Design Manual for Roads and Bridges LA 105 Air Quality.