



Fosse Green Energy

EN010154

6.1 Environmental Statement

Chapter 14: Other Environmental Topics

VOLUME

6

Planning Act 2008 (as amended)

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

18 July 2025

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulation 2009 (as amended)

Fosse Green Energy
Development Consent Order 202[]

6.1 Environmental Statement

Chapter 14: Other Environmental Topics

Regulation Reference	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	EN010154
Application Document Reference	EN010154/APP/6.1
Author	Fosse Green Energy Limited

Version	Date	Issue Purpose
Rev 1	18 July 2025	DCO Submission

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14. Other Environmental Topics

14.1 Introduction

14.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) of the environmental topics that do not warrant individual technical chapters due to the brevity of the assessment or the limited nature of the potential impacts associated with the Proposed Development.

14.1.2 This chapter describes and assesses the potential effects of the Proposed Development on:

- Air quality – **Section 14.2**;
- Glint and Glare – **Section 14.3**;
- Ground Conditions – **Section 14.4**;
- Materials and Waste – **Section 14.5**;
- Major Accidents and Disasters – **Section 14.6**;
- Telecommunications, Television Reception and Utilities – **Section 14.7**; and
- Electric and Electromagnetic Fields – **Section 14.8**.

14.1.3 For the topics covered in this chapter, the assessments of potential effects do not strictly follow the approach and methodology outlined in **Chapter 5: Environmental Impact Assessment (EIA) Methodology** of this ES [EN010154/APP/6.1], where doing so is not necessary to reach a conclusion that there are no likely significant effects. For example, a detailed overview of current baseline conditions is not necessarily required if the effects can clearly be considered negligible and similarly, it is unnecessary to determine sensitivity of receptors and magnitude of impacts to define significant effects if there are clearly no likely significant effects. The purpose of this chapter is to provide a high-level assessment of other environmental topics where a full chapter adhering to the **Chapter 5: EIA Methodology [EN010154/APP/6.1]** is not considered necessary.

14.1.4 **Chapter 5: EIA Methodology [EN010154/APP/6.1]** signposts to the relevant technical chapters that address potential effects to human health. Within this chapter, potential effects to human health are set out in the following sections:

- Section 14.2: Air Quality**;
- Section 14.4: Ground Conditions and Appendix 14-B: Phase 1 Preliminary Risk Assessment [EN10154/APP/6.3]**;
- Section 14.6 Major Accidents and Disasters**; and
- Section 14.8 Electric and Electromagnetic Fields**.

Development Parameters Assessed

14.1.5 **Chapter 3: The Proposed Development** of this ES [EN010154/APP/6.1] presents a description of the Proposed Development, against which this chapter has been assessed. The assessment has been based on likely worst-case parameters using the Rochdale Envelope approach, therefore the actual impact may be less than anticipated if the Proposed Development is built to a lesser scale or differing design within the worst-case parameters.

14.2 Air Quality

14.2.2 This Section of the Chapter presents the findings of an assessment of the likely significant effects on air quality as a result of the Proposed Development. For more details about the Proposed Development, refer to **Chapter 1: Introduction, Chapter 2: The Site and Surroundings** and **Chapter 3: The Proposed Development** of this ES [EN010154/APP/6.1].

14.2.3 This Section identifies and proposes measures to address the potential impacts and effects of the Proposed Development on air quality during construction, operation, and decommissioning phases of the Proposed Development.

14.2.4 The air quality Section of this ES chapter is supported by **Figure 14-1: Dust Risk Assessment Zones** [EN010154/APP/6.2] and the following appendices:

- Appendix 14-A: Other Environmental Topics Policy and Legislation (Air Quality Section)** [EN010154/APP/6.3]; and,
- Appendix 14-B: Dust Risk Assessment** [EN010154/APP/6.3].

Legislation and Planning Policy

14.2.5 **Appendix 14-A: Other Environmental Topics Policy and Legislation (Air Quality Section)** of this ES [EN010154/APP/6.3] identifies the legislation, policy, and guidance of relevance to the assessment of likely significant air quality effects of the Proposed Development.

Consultation

14.2.6 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion and Applicant responses in relation to the air quality assessment are summarised in **Table 14-1**.

Table 14-1: Scoping Opinion Responses

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	<p>The Scoping Report proposes to scope out construction air quality effects from traffic on the basis that HGV numbers are likely to be below the criteria for large construction sites in published guidance for significant effects (Environmental Protection UK, Institute of Air Quality Management). The inspector noted a lack of detail supporting this conclusion at this stage.</p>	<p>Details of the traffic flows are set out in Table 14.3 in this ES. These forecast traffic movements form the basis of a screening assessment presented in paragraph 14.2.15 - 14.2.17, that concludes that traffic flows are too small to be capable of having a significant effect at any receptor. The margin by which the criteria are met is large enough for the conclusion to not be sensitive to finer details of the construction method such as overhead or buried transmission lines.</p>	<p>A detailed assessment has been screened out of the air quality assessment. This is discussed in Section 14.2.16-14.2.20</p>
Planning Inspectorate	<p>The Scoping Report suggests excluding operational air quality effects due to minimal emissions and vehicle movements. The Inspectorate agrees but requires the Environmental Statement (ES) to detail vehicle movements and confirm they are below relevant thresholds. The ES should also confirm no emissions from operational plants need further assessment</p>	<p>A detailed assessment has been screened out due to the limited potential for the proposed construction activities to generate emissions of air pollutants. The Proposed Development does not include operational plant that will require further assessment works due to the extremely limited use of plant. As explained above, vehicle movements have been considered</p>	<p>A detailed assessment has been screened out. This is discussed in Section 14.2.16-14.2.21 - 14.2.25 14.2.20. The extremely limited use of operational plant is discussed in Chapter 3: the Proposed Development [EN010154/APP/6.1]</p>

alongside the relevant thresholds and the conclusion has been reached that traffic flows are too small to be capable of having a significant effect at any receptor (see paragraph 14.2.15 - 14.2.17).

14.2.7 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. **Table 14-2** outlines the statutory consultation responses relating to the air quality assessment and how these have been addressed through the ES. The **Potential Main Issues for Examination [EN010154/APP/7.11]**, **Consultation Report [EN010154/APP/5.1]** and **Consultation Report Appendices [EN010154/APP/5.2]** provide further detailed responses, as relevant, to the feedback received during statutory consultation.

Table 14-2: Statutory Consultation Responses

Consultee	Summary of comment	How matter has been addressed	Location of response
North Kesteven District Council	15.2.11 states that "as such, the predicted construction flows are well below the criteria and are not expected to adversely affect air quality. It is therefore proposed that construction traffic is scoped out". However, the 'Sources of Baseline Information, Scenarios and Consultation' section of Chapter 14 does not quantify potential flows therefore this conclusion does not appear founded at present.	The traffic flows are set out in Table 14-3 in this ES. These forecast traffic movements form the basis of a screening assessment presented in paragraph 14.2.15 - 14.2.17, that concludes that traffic flows are too small to be capable of having a significant effect at any receptor.	A detailed assessment has been screened out. This is discussed in Section 14.2.21 14.2.16

Assessment Methodology

14.2.8 This section sets out the scope and methodology for the assessment of the air quality impacts of the Proposed Development.

Study Area

14.2.9 The Study Area for the dust risk assessment was defined to include air quality features likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development, termed the Zone of Influence (Zol). The potential Zol is considered to be 250m from the DCO Site Boundary (following IAQM guidance (Ref 14-17), as shown on **Figure 14-1: Dust Risk Assessment Zones [EN010154/APP/6.2]**, and within 50m from the public highway where this is within 250m of the site access points to be used by construction vehicles.

14.2.10 The Proposed Development is adjacent to numerous ecological sites, including the Ancient Woodland of Tunman/Housham Woods, which are potential receptors for impacts on air quality. Additionally, the Proposed Development directly intersects with several Local Wildlife Sites, such as Tunman Wood North, River Witham (Aubourn to Beckingham), Navenby Heath Road Verges, Navenby Green Man Road Verges, and Tunman Wood. These are screened as part of the dust risk assessment (DRA) for sensitivity to construction dust impacts and nitrogen deposition and included as receptors as appropriate (**Appendix 14-B: Dust Risk Assessment [EN010154/APP/6.3]**).

14.2.11 The DRA relates to dust generation and plant emissions during the construction and decommissioning phases of the Proposed Development. The potential for operational dust impacts is also addressed.

14.2.12 The potential impact of the Proposed Development on local air quality has been determined at the sensitive receptors (human and ecological) identified in the defined study area as noted above.

Sources of Information

14.2.13 The following sources of information have been used to inform the baseline presented within this Section:

- a. North Kesteven District Council Annual Status Report (2023) (Ref 14-19);
- b. Defra's MAGIC Map (Ref 14-20); and
- c. Defra Modelled Background Maps (Ref 14-21).

Scope of the Assessment

14.2.14 This section provides a brief overview of the impacts that have been scoped in and out of the Air Quality impact assessment for the Proposed Development.

Construction

14.2.15 The following potential construction impacts have been agreed to be considered as part of the EIA for the Proposed Development, through the EIA

Scoping process, for which an assessment is provided in this air quality Section of this ES chapter:

- a. Dust soiling;
- b. Impact of dust on human health; and
- c. Impact of dust on sensitive ecological habitats.

14.2.16 The Institute of Air Quality Management (IAQM) guidance includes a single screening criteria (Ref 14-15) for an assessment of a site out with an Air Quality Management Area (AQMA). This is a change of annual average daily total (AADT) flows of more than 500 light duty vehicles per day or 100 heavy duty vehicles per day. These criteria have been established based on roads that are already near or exceeding the Air Quality Objectives (AQO), and such locations are therefore sensitive to small additional contributions from road traffic emissions. At locations where baseline concentrations are well below the AQO values the same screening criteria represent an approximate lower limit for a change in traffic flows that would be capable for having a perceptible impact (1% of AQO value) on air pollutant concentrations.

14.2.17 The change in Light Duty Vehicle (LDV) and Heavy Duty Vehicle (HDV) flows on the road network used for access and egress for the 20 site entrances for the Proposed Development have been calculated as part of the transport assessment (Table 14-3). These trips represent flows for a scenario where peak flows last for 1 year, although in practice peak flows would only occur for a small portion of the year. The approach is conservative and will overestimate the actual level of emissions.

Table 14-3: Traffic data

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
L1	A46 west of Halfway House Roundabout	33,265	3,388	36,653	373	106	478	33,638	3,493	37,131
L2	Halfway House Lane	2,974	107	3,080	373	106	478	3,346	212	3,559
L3	The Avenue	117	9	126	373	106	478	490	114	604
L4	A46 east of Halfway House Roundabout	37,765	3,305	41,071	0	106	106	37,765	3,411	41,176
L5	Haddington Lane (between Fosse Lane and Old	3,801	167	3,968	245	84	329	4,046	251	4,297

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
Haddington Lane)										
L6	Fosse Lane (north of Haddington Lane)	2,946	103	3,049	0	0	0	2,946	103	3,049
L7	Old Haddington Lane (between Haddington Lane and A46)	3,044	167	3,212	245	84	329	3,289	251	3,541
L8	A46 east of Fosse Lane	33,190	2,614	35,804	490	125	615	33,680	2,739	36,419
L9	Haddington Lane (south of Old Haddington Lane)	5,806	487	6,294	490	125	615	6,296	612	6,908
L10	Stone Lane	70	2	72	0	0	0	70	2	72
L11	South Hykeham Road	5,087	209	5,296	179	109	288	5,266	317	5,584
L12	Church Road (east of Bassingham Road)	5,749	234	5,982	0	0	0	5,749	234	5,982
L13	Bassingham Road (southwest of Bridge Road)	1,247	20	1,266	179	109	288	1,426	128	1,554
L14	Haddington Lane (south of Stone Lane)	2,073	94	2,167	135	10	144	2,208	104	2,311
L15	Norton Lane	400	9	409	0	0	0	400	9	409
L16	Moor Lane	2,333	179	2,511	373	106	478	2,706	284	2,990
L17	Bassingham Road (between Moor Lane)	1,787	50	1,837	506	0	506	2,293	50	2,344

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
and Clay Lane)										
L18	Clay Lane	117	7	124	506	0	506	624	7	631
L19	Unnamed Road (south of Halfway House Roundabout)	10,577	603	11,180	373	106	478	10,950	708	11,658
L20	Fosse Lane (between A46 and Haddington Lane)	2,283	154	2,437	245	84	329	2,528	238	2,766
L21	Broughton Lane (south of Hill Rise)	2,268	115	2,384	24	36	60	2,292	151	2,444
L22	Hill Rise	181	7	188	24	36	60	205	43	248
L23	Broughton Lane (north of Hill Rise)	1,859	417	2,276	24	36	60	1,883	453	2,336
L24	Blackmoor Road	5,632	1,869	7,502	24	36	60	5,656	1,905	7,562
L25	B1178 Tower Lane	5,120	1,379	6,499	24	36	60	5,144	1,415	6,559
L26	A15 Sleaford Road (between Tower Lane and Heath Lane)	15,008	3,414	18,422	24	36	60	15,032	3,450	18,482
L27	A15 Sleaford Road (between Heath Lane and Green Man Road)	13,845	983	14,828	24	36	60	13,869	1,019	14,888
L28	A15 Sleaford Road (between Green Man Road and Unnamed Road)	12,825	3,221	16,046	24	36	60	12,849	3,257	16,106

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
L29	Green Road Man	2,056	123	2,179	24	36	60	2,080	159	2,239
L30	Unnamed Road between A15 Sleaford Road and High Dike	440	100	540	24	36	60	464	136	600
L31	Heath Lane	2,379	198	2,576	24	36	60	2,403	234	2,636
L32	A607 Grantham Road (south of Coleby)	6,606	349	6,955	24	36	60	6,630	385	7,015
L33	A607 Grantham Road (north of Coleby)	6,330	251	6,581	24	36	60	6,354	287	6,641
L34	Fen Lane	3	1	4	24	36	60	27	37	64
L35	Clay Lane (north of Main Street)	162	42	204	0	0	0	162	42	204
L36	Haddington Lane (Between Butts Lane and Dovecote Lane)	1,176	188	1,364	186	8	195	1,362	197	1,559
J1	Halfway House Roundabout (Halfway House Lane/A46(E)/ Unnamed Road/A46(W))	42,526	3,714	46,239	373	106	478	42,899	3,819	46,718
J2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	4,503	191	4,693	431	137	568	4,934	327	5,262

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
J3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	6,253	315	6,568	490	125	615	6,743	440	7,183
J4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	7,168	439	7,606	386	109	495	7,554	547	8,101
J5	Bridge Road/Church Road/Bassingham Road	6,433	245	6,678	179	109	288	6,613	354	6,966
J6	Haddington Lane/Bassingham Road/Moor Lane	3,568	154	3,722	506	43	506	4,074	197	4,228
J7	Unnamed Road/Moor Lane/Norton Lane	3,118	132	3,250	373	106	478	3,491	237	3,728
J8	North Hykeham Roundabout (A46(N)/Newark Road/A46(S)/Middle Lane)	33,190	2,614	35,804	490	125	615	33,680	2,739	36,419
J9	A607 / White Lane / Church Lane	11,880	450	12,330	24	36	60	11,904	486	12,390
J10	B1178 Tower Lane / A15 Sleaford Road	16,359	1,056	17,415	24	36	60	16,383	1,092	17,475

Link	Description	2032 Future Base			Proposed Development			2032 Future Base + Proposed Development		
		LDV	HDV	Total	LDV	HDV	Total	LDV	HDV	Total
J11	A15 Sleaford Road / Metheringham Lane / Heath Lane / Heath Lane	19,991	1,565	21,556	24	36	60	20,015	1,601	21,616
J12	A15 Sleaford Road / Green Man Road	17,741	1,444	19,186	24	36	60	17,765	1,480	19,246

14.2.18 The HDV flows occur where traffic accesses the A46. The link with the highest HDV flow is the A46 westbound on-slip and off-slip, closest to receptor R1, which will add 137 HDV flows during construction. The addition of 137 HDV flows to a road with a projected 2032 future base flow of 4,693 vehicles is minimal. Consequently, this small increase in traffic is not capable of producing emissions of sufficient magnitude to change the annual mean concentration of NO₂ by more than 1 µg/m³ at 5 m from the road. Adding these additional contributions to baseline concentrations will have no impact on the already good standard of air quality in this area, with or without the development. Other links experiencing smaller changes in flows are located around the A46. Similarly, these additions constitute a minor proportion of overall trips, resulting in a very low increase.

14.2.19 The baseline concentrations during the construction phase would be less than 50% of the annual mean concentrations (19% for NO₂ and 37% for PM₁₀). It can be concluded with confidence that a change of 1 µg/m³ or less at any receptors adjacent to the three links with projected increases in 24-hour AADT flow of greater than 100 HDV would not experience a significant effect, without the need to undertake a quantitative assessment.

14.2.20 There are only three links on the network that would experience an increase above LDV criteria, and only by a marginal amount of 6 trips. Given the very good baseline air quality conditions, these additional trips will not be capable of making a perceptible impact on local air quality at any receptor and air quality would remain at a very good standard during construction. There are no links that would experience an increase in flows above the IAQM screening criteria for LDV and HDV at the same link.

14.2.21 A qualitative assessment of Construction Non-Road Mobile Machinery (NRMM) emissions was undertaken in accordance with IAQM guidance (Ref 14-18).

Operation

14.2.22 The air quality in the area is expected to remain at a good standard, regardless of the Proposed Development. As outlined in the baseline section of this

Chapter, the Proposed Development is not located within an AQMA, and the council does not have any AQMAs within its administrative extents. Background pollutant concentrations are low, with a maximum concentration of 7.4 µg/m³ recorded in 2023. Furthermore, the Proposed Development is not situated near any motorways or significant sources of pollution. The only major roads in proximity are the A46, A607, and A15. As such, traffic is not considered further within this assessment.

14.2.23 As it can be concluded with confidence that emissions from the very small number of operational road traffic movements could not have a perceptible impact on air quality at any receptor, impact upon local air quality is not considered further within this assessment.

14.2.24 The operation of the Proposed Development, including its maintenance, does not require activities that have the potential to generate perceptible emissions of dust or other air pollutants. There would not be any likely significant air quality effects during operation.

Impact Assessment Methodology

14.2.25 There is currently no statutory guidance on the methodology for air quality impact assessments. Several non-statutory bodies have published their own guidance relating to air quality and development control, such as that issued by IAQM (Ref 14-15). This assessment has been undertaken based on this guidance.

14.2.26 The potential for fugitive emissions of particulate matter from construction and decommissioning phase activities has been qualitatively assessed via a DRA (see **Appendix 14-B: Dust Risk Assessment [EN010154/APP/6.3]** and Ref 14-17).

14.2.27 As set out in **Chapter 3: The Proposed Development [EN010154/APP/6.1]**, the duration of, and activities required for, decommissioning are similar to those required for construction and consequently the effects of decommissioning are usually similar to, or of a lesser magnitude than, construction effects. Therefore, the assessment of construction phase effects on air quality also represents the likely significant effects which would be experienced at decommissioning. It should be noted that prior to decommissioning, there will likely be a requirement for a DRA and Dust Management Plan to be agreed with the planning authority (North Kesteven District Council) prior to any works taking place. However, due to the estimated lifespan of the Proposed Development the process may be different at that point in time. This requirement is stipulated in the **Framework Decommissioning Environmental Management Plan (DEMP) ([EN010154/APP/7.9])** submitted alongside the DCO application. The production of a detailed DEMP prior to the commencement of decommissioning of the Proposed Development is secured through the **Draft DCO [EN010154/APP/3.1]**.

14.2.28 The DRA presented in this Section follows IAQM guidance, which does not follow the standard EIA methodology set out in **Chapter 5: EIA Methodology**

[EN010154/APP/6.1]. Instead, the magnitude of emission is combined with the sensitivity of the area to establish the level of risk that an impact may occur. This risk level is used to apply the appropriate level of good practice such that there is no significant effect. These measures are summarised in **Table 14-6** after the appropriate risk level has been determined.

Receptor Sensitivity

14.2.29 Receptors of interest for the air quality assessment are those which represent locations where people are likely to be present, as the assessment is most concerned with human health. For the purposes of the DRA, potentially affected air quality sensitive receptors have been identified through a review of Ordnance Survey (OS) mapping and aerial photography. These include any location where people could reasonably be expected to be present over a time period that aligns with the averaging period for air quality objective values, where that location is not a workplace or the central reservation of a major road. National and local planning policies highlight residential properties, places of worship, education and health care facilities as examples of air quality sensitive receptors.

14.2.30 Following IAQM guidance (Ref 14-17), the presence of sensitive ecological receptors holding a National or Habitat Site designation within 50m of the DCO Site Boundary has also been established. Ecological sites with the following designations have been explicitly considered within the DRA when identifying sensitive receptors – as stated above or within 50m from a route used by construction vehicles on the public highway (up to 250m from the DCO Site access points):

- a. Sites of Special Scientific Interest (SSSI);
- b. Special Protection Areas (SPA);
- c. Special Areas of Conservation (SAC);
- d. Ramsar Sites;
- e. National Nature Reserves (NNR); and
- f. Local Nature Reserves (LNR).

14.2.31 Ecological sites possessing the following designations have also been reviewed; however, explicit consideration as part of the DRA is not required in accordance with the IAQM guidance (Ref 14-17):

- a. Ancient Woodland (AW); and
- b. Local Wildlife Sites (LWS).

14.2.32 Ammonia-emitting developments, such as intensive livestock and poultry units, in close proximity to AW sites can cause nutrient deposition leading to a greater abundance of nitrogen tolerant plant species which out-compete and impact on many characteristic ancient woodland plants. Ammonia can be released in small quantities from engine exhausts; however, because of the low volume of construction traffic, vehicles movements associated with the Proposed Development will not result in significant emissions of ammonia.

There is one AW (Tunman/Housham Wood) adjacent to the Principal Site within the 50m buffer. This receptor has been screened into the DRA.

Significance Criteria

14.2.33 When assessing the significance of dust impacts during the construction phase, IAQM recommends that significance is only assigned to an effect after considering the construction activity with mitigation (Ref 14-17).

14.2.34 Appropriate mitigation measures commensurate with the level of risk identified in the DRA will be defined in and implemented through a detailed Construction Environmental Management Plan (CEMP), see **Table 14-6**. These measures are included within the **Framework CEMP ([EN010154/APP/7.7])** submitted alongside the DCO application. The production of the detailed CEMP prior to the commencement of construction works is secured through the **Draft DCO [EN010154/APP/3.1]**. Implementation of these measures will prevent significant effects on receptors, thereby resulting in a residual effect that can be considered 'not significant'. Where this is not practicable, it is important to consider the specific characteristics of the Proposed Development and the surrounding area to determine whether construction phase dust effects are likely to be significant in the context of the Proposed Development (Ref 14-17).

Methodology for Assessment of Fugitive Emissions of Particulate Matter during Construction and Decommissioning Phases

14.2.35 A qualitative risk-based assessment has been undertaken to assess the significance of any effects on sensitive receptors associated with the construction and decommissioning phase. The assessment is based on IAQM guidance (Ref 14-17) and considers potential sources of emissions from four main activity groupings:

- a. Demolition;
- b. Earthworks;
- c. Construction; and
- d. Track-out.

14.2.36 The emphasis within the IAQM guidance (Ref 14-17) is on clarifying the risk of dust impacts from the Proposed Development, which will allow mitigation measures commensurate with that risk to be identified.

14.2.37 For each activity group, the following steps are applied with respect to identifying the potential effects, before coming to an overall conclusion about the significance of the effects predicted:

- a. Identify the nature, duration and the location of activities being undertaken;
- b. Establish the risk of significant effects occurring as a result of these activities;
- c. Review the embedded mitigation against good site practice;

- d. Identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- e. Summarise the overall effect of the works with respect to fugitive emissions of particulate matter and report the significance of the effects.

14.2.38 A DRA has been undertaken based on the IAQM Guidance (Ref 14-17) and the findings are presented within Appendix 14-B: Dust Risk Assessment [EN010154/APP/6.3]. Construction of the Proposed Development will take place sequentially (as described in Chapter 3: The Proposed Development [EN010154/APP/6.1]). As such, potential fugitive emissions may be lower than expected compared to the size of the DCO Site Boundary (when considering the DCO Site in reference to the IAQM Guidance (Ref 14-17)) as construction will not be occurring across the entire DCO Site at one time. The DRA is therefore likely to overestimate the actual effect during construction. The method is worst case in that it does not depend upon a detailed schedule of works, but instead considers the potential magnitude of impacts for the works as a whole. Emissions from NRMM

14.2.39 Construction NRMM includes construction machinery such as excavators and trucks. Emissions from construction NRMM will have the potential to increase pollutants such as Nitrogen Dioxide (NO₂) and PM₁₀ (i.e., particulate with diameters of 10 micrometres (μm) or less) concentrations locally when in use during construction. The PM₁₀ parameter includes smaller particulates such as PM_{2.5}. However, IAQM guidance (Ref 14-18) states that *“Experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed.”* Emissions from NRMM will be temporary and localised and will be controlled through best-practice measures (such as the embedded measures set out in **Table 14-6** and the **Framework CEMP [EN010154/APP/7.7]**).

14.2.40 The IAQM assessment approach is based on modern ways of working, including the use of NRMM to undertake earthworks and other construction activities. The risk-based approach and distance criteria include consideration of NRMM, and assessment conclusions assume the use of NRMM. As such, NRMM emissions have not been modelled separately nor are required to be considered in isolation within this assessment.

Assessment Assumptions and Limitations

14.2.41 A DRA (**Appendix 14-B: Dust Risk Assessment [EN010154/APP/6.3]**) has been undertaken on a whole-site basis, assuming site preparation and construction works can be undertaken at any location within the DCO Site. A description of the intended works is included in **Chapter 3: The Proposed Development [EN010154/APP/6.1]**. This provides a robust worst-case assessment, ensuring that if works are undertaken in a different location than anticipated, then the assessment has adequately covered this potential in establishing the potential for likely significant air quality effects.

Baseline Conditions

14.2.42 This section describes the baseline environmental characteristics for the Proposed Development and surrounding areas with specific reference to air quality.

14.2.43 North Kesteven District Council undertake routine ongoing monitoring of ambient air quality as part of their Local Air Quality Management responsibilities under Part IV of the Environment Act (1995) (as amended by the Environment Act 2021) and subsequent Regulations (Ref 14-3 and Ref 14-4). In 2023, North Kesteven District Council undertook passive (diffusion tube) monitoring of nitrogen dioxide (NO_2) at 22 sites including monitoring locations at Witham St Hughs, Aubourn and Navenby (Ref 14-19). Baseline concentrations at these locations were all similar to the values predicted in the DEFRA background maps as used in **Table 14-4**.

14.2.44 Baseline dust levels are typical of an agriculture area.

14.2.45 There are no Air Quality Management Areas (AQMAs) within the administrative area of North Kesteven District Council and air quality is generally considered to be good (Ref 14-19). The most recent available monitoring results for 2023 indicate an overall reduction in NO_2 levels between 2018 and 2023.

Background Pollutant Concentrations

14.2.46 The total concentration of a pollutant comprises those contributions from explicit local emission sources such as roads, chimney-stacks, etc, and those that are transported into an area from indeterminate sources by wind from further away. If all the explicit local sources were removed, all that would remain is that which comes from indeterminate sources; it is this component that is called 'background'. A good understanding of background concentrations is important when completing air quality assessments as it allows for a better understanding of local pollutant sources.

14.2.47 Background data for the relevant 1km x 1km grid squares (covering the Study Area) was sourced from Defra's 2021-based Background Maps for the baseline year of 2023; these data are presented in **Table 14-4**. These data represent the most current and up to date data source.

Table 14-4: Background Pollutant Concentrations 2023, $\mu\text{g}/\text{m}^3$

	NO_2	PM_{10}	$\text{PM}_{2.5}$
Min	5.7	13.6	6.1
Mean	6.4	14.0	6.2
Max	7.4	14.9	6.5

Future Baseline

14.2.48 The future baseline scenarios are set out in **Chapter 5: EIA Methodology [EN010154/APP/6.1]**.

14.2.49 In the absence of the Proposed Development, background data for the relevant 1km x 1km grid squares (covering the Study Area) was sourced from Defra's 2021-based Background Maps for 2032 (the expected peak construction year); these data are presented in **Table 14-5**. These data represent the most current and up to date data source.

Table 14-5: Background Pollutant Concentrations 2032, µg/m³

	NO ₂	PM ₁₀	PM _{2.5}
Min	4.4	13.0	5.5
Mean	4.9	13.4	5.7
Max	5.4	14.3	5.9

Embedded Mitigation Measures

14.2.50 This section contains the mitigation measures relevant to this air quality impact assessment that are already incorporated into management plans submitted with the DCO application. These measures will be secured through the **Framework CEMP** [**EN010154/APP/7.7**], the **Framework OEMP** [**EN010154/APP/7.8**] and the **Framework DEMP** (**[EN010154/APP/7.9]**) submitted with the DCO application.

14.2.51 The adoption of good Site practice will be implemented via the detailed CEMP and DEMP through measures to control dust as outlined within the IAQM guidance. It is proposed that the measures from the IAQM "High Risk Site" category are adopted where relevant, regardless of the level of risk identified in the assessment and the construction phase activities for the Proposed Development (Ref 14-17). Whilst the DCO Site is not considered to be a "high risk" site, a precautionary approach has been taken which involves adopting the measures from the "high risk" category. As decommissioning operations are predicted to be similar to construction, the same good practice measures are predicted to apply.

14.2.52 **Table 14-6** shows good practice measures adopted for the Proposed Development where relevant to the activities being undertaken.

Table 14-6: Embedded Mitigation Measures

Activity	Mitigation Measure
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 DCO 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.

Activity	Mitigation Measure
	<p>The desirable measures should be included as appropriate for the DCO Site. The DMP may include monitoring of dust deposition, dust flux, real time PM₁₀ continuous monitoring and/or visual inspections.</p>
Site Management	<p>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.</p> <p>Make the complaints log available to the local authority when asked.</p> <p>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 log book.</p> <p>Hold regular liaison meetings with other high risk construction sites within 500m of the DCO 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.</p>
Monitoring	<p>Undertake daily on-site and off-site visual 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 visual dust soiling checks of surfaces (for example street furniture) within 100m of the DCO Site Boundary.</p> <p>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 asked.</p> <p>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</p>
Preparing and maintaining the site	<p>Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable.</p> <p>Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period where operations are within 100m of receptors.</p> <p>Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.</p> <p>Avoid site runoff of water or mud.</p> <p>Keep site fencing, barriers and scaffolding clean using wet methods.</p> <p>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.</p> <p>Cover, seed or fence stockpiles to prevent wind whipping.</p>

Activity	Mitigation Measure
	<p>Ensure all vehicles switch off engines when stationary - no idling vehicles.</p>
	<p>Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.</p>
	<p>Impose and signpost a maximum-speed-limit of 15mph 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).</p>
	<p>Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.</p>
	<p>Implement a Travel Plan (in the case of the Proposed Development, within the Construction Traffic Management Plan) that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).</p>
	<p>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.</p>
Operations	<p>Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate.</p> <p>Ensure vehicles are inspected and cleaned as required, prior to accessing the public highway.</p> <p>Use enclosed chutes and conveyors and covered skips.</p> <p>Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.</p> <p>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.</p> <p>Avoid bonfires and burning of waste materials.</p>
Waste management	<p>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.</p>
Earthworks	<p>Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.</p> <p>Only remove the cover in small areas during work and not all at once</p> <p>Avoid scabbling (roughening of concrete surfaces) if possible.</p>

Activity	Mitigation Measure
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.
	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.
Trackout	<p>Avoid dry sweeping of large areas.</p> <p>Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport</p> <p>Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.</p> <p>Record all inspections of haul routes and any subsequent action in a site log book.</p> <p>Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.</p> <p>Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).</p> <p>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.</p> <p>Access gates will be located at least 10m from receptors.</p>

Assessment of Effects – Dust Risk Assessment

14.2.53 This DRA considers the potential magnitude of dust emissions at each stage of the Proposed Development in conjunction with the sensitivity of the surrounding area, following IAQM guidance (Ref 14-17). Based on these parameters, the DCO Site will be classified as low, medium or high risk. The DRA is not an impact assessment, but an assessment of the risk of adverse amenity effects being caused by the Proposed Development.

14.2.54 The assessment considers the potential dust risk across a set of predefined zones, up to 250m from the DCO Site.

14.2.55 The chosen representative dust risk receptors are shown in **Figure 14-1 [EN010154/APP/6.2]**. Dust receptor locations were chosen to represent sensitive receptors in proximity of the DCO Site. All these receptors are residential properties located within 250m of the DCO Site Boundary and there is an ecological receptor (ancient woodland) within 50m of the boundary. The

representative dust risk receptors are provided in **Appendix 14-B: Dust Risk Assessment [EN010154/APP/6.3]**.

14.2.56 A summary of the magnitude of emissions and area sensitivity is provided in **Table 14-7** and **Table 14-8**.

Table 14-7: Summary of Potential Dust Emission Magnitudes for Construction Phase Activities

Activity	Potential Dust Emission Magnitude
Demolition	Not applicable
Earthworks	Small
Construction	Small
Trackout	Medium

Table 14-8: Summary of Area Sensitivity to Construction Phase Activities

Potential Effect Type	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Medium	Medium	Medium
Ecology	Medium	Medium	Medium

14.2.57 The magnitude of emissions (**Table 14-7**) and area sensitivity (**Table 14-8**) are combined to determine the risk of effects (prior to accounting for the embedded mitigation) as shown in (**Table 14-8**). The risk level is used to determine the level of mitigation required. IAQM recommends that significance is only assigned to the effect after considering the construction activity with mitigation.

14.2.58 The overall risk level is Medium Risk for Dust Soiling, Medium Risk for Human Health, and Low Risk for Ecology. Using a conservative approach, the site has been assigned an overall Medium Risk for Dust Effects.

Table 14-9: Summary of Risk of Dust Effects for Demolition and Construction Phase Activities (without site specific mitigation applied)

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Low Risk	Medium Risk
Human Health	N/A	Low Risk	Low Risk	Medium Risk
Ecological	N/A	Low Risk	Low Risk	Low Risk

14.2.59 The risk of adverse impacts from earthworks and construction activities has been identified as low and with the IAQM's (Ref 14-17) suggested good practice measures for a Low risk site, significant affects are unlikely to be experienced at any receptor. **Table 14-9** reports a Medium risk of impacts on amenity from dust soiling and human health from trackout. This highlights the importance of frequent inspections and proactive measures to maintain the quality of the road surface or the application of dust control measures such as dampening down. If the inspections and associated actions are applied diligently experience from other construction sites across the UK demonstrates that significant effects on amenity or human health can be avoided.

Residual Effects and Conclusions

14.2.60 **Table 14-10** summarises the residual effects of the Proposed Development on air quality following the implementation of embedded mitigation. With the implementation of the good practice measures, as secured via the **Framework CEMP** ([EN010154/APP/7.7], **Framework OEMP** [EN010154/APP/7.8] and **Framework DEMP** ([EN010154/APP/7.9] submitted with the DCO application, the impact of the construction phase would be negligible. The effects of decommissioning are expected to be similar, if not lesser than construction, and are therefore also assessed as negligible. There will be no activities during operation expected to generate dust or air quality emissions, and therefore these effects are also negligible.

Table 14-10: Assessment of Effects – Air Quality (construction and decommissioning)

Receptor	Potential Impacts, Details and Evidence	Duration	Mitigation	Likely Significance of Effect	Confidence in Prediction
Human Health	Emissions from construction and decommissioning activities affecting human health	Short-term Temporary (During the construction or decommissioning phase only)	As presented in Table 14-6 (IAQM recommended mitigation for high-risk sites).	Not significant	Emissions from road traffic = High - traffic has been assessed in Chapter 13: Traffic and Transport [EN010154/APP/6.1] and scoped out of further assessment. Emissions from demolition and construction activities = High - A DRA for construction activities has been undertaken on a worst-case scenario of activities happening across the entire DCO Site at all times.
Sensitive Ecosystems	Emissions from construction and decommissioning activities affecting sensitive ecosystems	Short-term Temporary (During the construction or decommissioning phase only)	As presented in Table 14-6 (IAQM recommended mitigation for high-risk sites).	Not significant	Emissions from road traffic = High – traffic has been assessed in Chapter 13: Traffic and Transport [EN010154/APP/6.1] and scoped out of further assessment. Emissions from demolition and construction activities = High - DRA for construction activities has been undertaken on a worst-case scenario of activities happening across the entire DCO Site at all times.

Additional Mitigation and Enhancement

14.2.61 No additional mitigation or enhancement measures beyond the good practice measures described in **Table 14-6** are required with respect to air quality effects arising from the Proposed Development, due to no significant adverse effects being identified.

Cumulative Effects

14.2.62 This section presents an assessment of the potential for cumulative effects to arise between the Proposed Development and other proposed and committed plans and projects including other developments (referred to as 'Cumulative Schemes') within the surrounding area as relevant.

14.2.63 Of the shortlisted developments listed in **Chapter 15: Cumulative and Effect Interactions [EN010154/APP/6.1]** and shown on **Figure 15-2 [EN010154/APP/6.2]**, 17 developments were considered to have the potential for cumulative air quality effects when considered alongside the Proposed Development due to being located within the 250m Zol for air quality, shown in **Table 14-11**.

14.2.64 This cumulative effect assessment identifies those receptors where the predicted effects of the Proposed Development could interact with effects arising from other plans and, or projects on the same receptor based on a spatial and, or temporal basis.

Table 14-11 Cumulative schemes within 250m Zol

ID	Application Reference	Description	Distance from DCO Site Boundary (m)
52	22/0899/FUL	Proposed hybrid planning application for the proposed Elsham to Lincoln Pipeline Scheme (potable water supply) with full planning consent sought for a proposed 57 kilometre pipeline between Elsham and Lincoln, a 1.5 kilometre spur at Welton and associated above ground infrastructure at Elsham; and outline consent for associated above ground infrastructure at Welton with all matters reserved except for access.	0 (where pipeline crosses DCO site)
13	18/1560/EIASCO	Development of a 55km potable water pipeline from Lincoln to Grantham with associated infrastructure including partially buried 20 million litre bulk potable water storage tank, 3km connecting pipeline to Anglian Water (AWS) site	0 (where pipeline crosses DCO site)

ID	Application Reference	Description	Distance from DCO Site Boundary (m)
		at Bracebridge Heath (Bracebridge Spur), connecting sections of pipeline to the existing Central Lincs Trunk Main, partially buried 3million litre break tank and the erection of 3 pumping stations (the Grantham Resilience Pipeline Project).	
86	25/0491/FUL	Erection of 400MW Battery Storage Development incorporating 324no. Containerised Battery Storage Units, 54no. transformer/inverter blocks and 8 back up auxiliary transformers, 4no. storage containers for spare parts etc, substation comprising 4-6no. switchgear units, a control room and a HV compound with 2 Step-up Transformers, associated access tracks, inverter, switchgear substations, boundary treatments and CCTV - Request for Scoping Opinion	0 (where cable corridors meet connection point)
95	PL/0087/23	For construction of the North Hykeham Relief Road (NHRR) between the A46 Hykeham Roundabout and the A15 Sleaford Road Roundabout at the end of the Lincoln Eastern Bypass, with junctions at South Hykeham Road, Brant Road and Grantham Road. The Proposed Scheme will comprise 8km of dual all-purpose carriageway with a 70mph speed limit (120kph design speed) and associated structures, earthworks, drainage, street lighting, traffic signals, utility diversions and installations, pipeline diversion, temporary materials processing, landscaping, and highway features	0 (where cable corridors meet connection point)
37	21/1245/FUL	Installation of a 100.3kW ground mounted solar PV installation comprising of 264 solar panels.	0 (where cable corridors meet connection point)
47	22/0285/FUL	Demolition of 9 no. pig rearing/breeding units and 3 no. agricultural storage buildings, with	0 (from cable corridor)

ID	Application Reference	Description	Distance from DCO Site Boundary (m)
		the decommissioning of 4 no. pig unit buildings to be retained for agricultural storage purposes alongside the erection of 1 no. poultry house (meat production - 40,000 bird capacity) with feed silos and hardstanding.	
57	22/1547/FUL	Installation of 12no. LPG fuel storage tanks, hardstanding and landscaping ancillary to feed mill	0 (from cable corridor)
59	23/0159/FUL	Installation of 12no. LPG fuel storage tanks, hardstanding and landscaping ancillary to feed mill	0 (from cable corridor)
63	EN010149	Springwell Solar Farm is a proposed new solar farm with battery storage and supporting grid connection infrastructure in North Kesteven, Lincs.	0 (where cable corridors meet connection point)
97	23/0584/EIASCR	Erection of 400MW Battery Storage Development incorporating 324no. Containerised Battery Storage Units, 54no. transformer/inverter blocks and 8 back up auxiliary transformers, 4no. storage containers for spare parts etc, substation comprising 4-6no. switchgear units, a control room and a HV compound with 2 Step-up Transformers, associated access tracks, inverter, switchgear substations, boundary treatments and CCTV - Request for Scoping Opinion	0 (where cable corridors meet connection point)
18	19/0522/HOUS	Installation of wind turbine.	38
65	NK/WSH/002 Land to the north	Residential allocation with indicative capacity of 1250 dwellings	83.5
55	22/1405/OUT		119.7
96	24/0456/RESM	Reserved matters application for construction of private access road to Sheepwalks Farm pursuant to outline application 15/1347/OUT-Erection of up to 1,100 dwellings and 150 care/retirement units (C2/C3), the	190.5

ID	Application Reference	Description	Distance from DCO Site Boundary (m)
		formation of a roundabout to Camp Road, A46 junction improvement works, public open spaces and associated service infrastructure (outline with means of access)	
56	22/1478/RESM	Application for the approval of reserved matters for 182 dwellings (cells 1a, 1b and 1c) comprising details of appearance, landscaping, layout and scale pursuant to Outline Planning Permission 15/1347/OUT - Erection of up to 1,100 dwellings and 150 care/retirement units (C2/C3), the formation of a roundabout to Camp Road, A46 junction improvement works, public open spaces and associated service infrastructure (outline with means of access)	232.6
5	15/1347/OUT	Residential development of 70 no. affordable dwellings (Cell 2B). Reserved Matters application comprising details of appearance, landscaping, layout and scale pursuant to outline planning permission 15/1347/OUT - Erection of up to 1,100 dwellings and 150 care/retirement units (C2/C3), the formation of a roundabout to Camp Road, A46 junction improvement works, public open spaces and associated service infrastructure (outline with means of access)	233
34	20/1736/RESM	Residential development of 70 no. affordable dwellings (Cell 2B). Reserved Matters application comprising details of appearance, landscaping, layout and scale pursuant to outline planning permission 15/1347/OUT - Erection of up to 1,100 dwellings and 150 care/retirement units (C2/C3), the formation of a roundabout to Camp Road, A46 junction improvement works, public open spaces and	257

ID	Application Reference	Description	Distance from DCO Site Boundary (m)
		associated service infrastructure (outline with means of access)	

Construction and Decommissioning

14.2.65 There is the potential for cumulative effects during construction from fugitive emissions from construction activities, and from the movement of construction vehicles on the road network.

14.2.66 Mitigation measures for managing dust emissions during construction are documented within the **Framework CEMP [EN010154/APP/7.7]** and **Framework DEMP [EN010154/APP/7.9]** submitted with the DCO application. These will ensure that off-site impacts are not significant. It is assumed that nearby construction sites, including the solar DCOs (Springwell Solar Farm and Leoda Solar Farm are within the 250m Zol), will operate to a similar level of good practice in accordance with their own CEMPs and DEMPs. Providing the IAQM good practice measures are implemented, potential dust impacts can be assumed negligible at all sites. The cumulative effects of dust generation during construction would therefore be negligible (not significant) for all Cumulative Schemes.

14.2.67 As the Proposed Development has an estimated design life of 60 years, it is not possible to predict which developments would be being constructed or decommissioned at the same time as the Proposed Development is decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction. Mitigation measures for managing dust emissions during decommissioning would be documented within the **Framework DEMP [EN010154/APP/7.9]** submitted with the DCO application and it is assumed that any nearby construction/decommissioning sites would operate to a similar level of good practice in accordance with their own CEMPs/DEMPs. The cumulative effects of dust generation during decommissioning would therefore be negligible (not significant).

Operation and Maintenance

14.2.68 Following consideration of the Cumulative Schemes within the Zol for air quality, there are two residential Cumulative Schemes within the Zol that are neighbouring to each other and are both introducing new receptors that are sensitive to dust, and also another Cumulative Scheme which is located immediately adjacent to the Proposed Development. These are discussed in **Table 14-12**. All other Cumulative Schemes are considered to be too far away from the Proposed Development, or do not introduce new sources that generate dust that is likely to have an effect beyond their application boundaries and are therefore not considered to have the potential for cumulative effects.

Table 14-12: Considered Cumulative Schemes

ID	Application Reference	Distance from Proposed Development (m)	Assessment of cumulative effects
5	15/1347/OUT Associated applications: 24/0456/RESM / 22/0174/RESM / 21/0276/RESM	123	<p>Construction: No significant effect is anticipated as it is assumed that impacts will be managed within each scheme in line with Condition 23h of the Decision Notice of 15/1347/OUT and Framework Operational Environmental Management Plan (OEMP) [EN010154/APP/7.8].</p> <p>Operation: No contribution from the Cumulative Scheme.</p>
34	20/1736/RESM Associated applications: 15/1347/OUT	257	<p>Construction: No significant effect is anticipated as it is assumed that impacts will be managed within each scheme in line with Condition 23h of the Decision Notice of 15/1347/OUT and Framework CEMP [EN010154/APP/7.7].</p> <p>Operation: No contribution from the Cumulative Scheme.</p>
63	EN010149	0	<p>Construction: No significant effect is anticipated as it is assumed that impacts will be managed within each scheme in line with the Springwell Solar Farm Outline Construction Environmental Management Plan and Framework CEMP [EN010154/APP/7.7].</p> <p>Although the Cable Corridors overlap (distance is 0m) for both ID63 and the Proposed Development, the Principal Site for the Cumulative Scheme is located approximately 3km away.</p> <p>Operation: No contribution from the Cumulative Scheme. Framework OEMP [EN010154/APP/7.8] will secure required operational management measures.</p>

Summary

14.2.69 In summary, with the implementation of the control measures listed in the IAQM guidance (Ref 14-17), the emissions can be minimised at source and managed to prevent significant environmental effects at any receptor beyond the respective Cumulative Scheme application boundary. These control measures are industry standard practice with an established track record of effectively managing construction site emissions to air. The distance between

schemes ensures that no receptors are closer than 50m to more than one scheme, and with each scheme managing the risk of emissions beyond their own scheme boundary, cumulative effects will be not significant.

14.3 Glint and Glare

Introduction

- 14.3.1 This section of the Chapter presents the findings of an assessment of the likely significant effects from Glint and Glare as a result of the Proposed Development.
- 14.3.2 This Section is supported by a Glint and Glare assessment, presented in **Appendix 14-D: Glint and Glare Assessment** of this ES [EN010154/APP/6.3].
- 14.3.3 The definition of Glint and Glare for the purposes of this assessment is the effect of reflected sunlight causing harm or discomfort to a sensitive receptor. A glint is further defined as the momentary receipt of a bright light and a glare as the receipt of a bright light over an extended or continuous period of time. This widely accepted definition is taken from US Federal Aviation Authority (FAA) guidance (Ref 14-26).
- 14.3.4 This ES assumes the solar PV panels will either be fixed south facing or single axis tracker panels, as described in **Chapter 3: The Proposed Development** of this ES [EN010154/APP/6.1]. The fixed south facing solar PV panels are oriented in a southwards direction at an angle of between 5 and 45 degrees to maximise solar gain and will remain in a fixed position throughout the day and during the year (i.e. they will not rotate to track the movement of the sun). The single axis tracker panels will rotate from east to west (+/-60 degrees from horizontal) to track the movement of the sun throughout the day.

Legislation and Planning Policy

- 14.3.5 There is no legislation relevant to Glint and Glare specifically. Planning policy and guidance relating to Glint and Glare which is pertinent to the Proposed Development comprises the documents listed below. More detailed information can be found in **Appendix 14-A: Other Environmental Topics Policy and Legislation** and **Appendix 14-D: Glint and Glare Assessment** [EN010154/APP/6.3].

National Policy – Glint and Glare

- a. Overarching National Policy Statement for Energy (EN-1) (Ref 14-10); and
- b. National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 14-9).

Local Policy – Glint and Glare

- a. Lincolnshire Local Plan (2023) (Ref 14-87).

Guidance – Glint and Glare

- a. National Planning Practice Guidance (NPPG) – Renewable and Low Carbon Energy (**Ref 14-22**);
- b. BRE (2014) Planning guidance for the development of large scale ground mounted solar PV systems (**Ref 14-23**).
- a. Interim Civil Aviation Authority (CAA) guidance – Solar Photovoltaic Systems (**Ref 14-24**);
- b. CAA – CAP738: Safeguarding Aerodromes 3rd Edition (**Ref 14-25**);
- c. US Federal Aviation Authority (FAA) Administration Policy (**Ref 14-26Ref 14-27**);
- d. FAA Policy: Review of Solar Energy Systems projects on Federally Obligated Airports (**Ref 14-27**); and

Consultation

14.3.6 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion (and the Applicant's responses in relation to the Glint and Glare assessment) are presented in **Table 14-13**.

Table 14-13: Scoping Opinion Responses (Glint and Glare)

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	The Scoping Report proposes that as glint and glare effects will be less during construction and as measures within a Construction Environmental Management Plan will be used to avoid possible glint and glare effects during construction, that this matter can be scoped out of the assessment. The Inspectorate agrees that glint and glare during construction is likely to be temporary and localised, and on the basis of specific measures to control effects within a CEMP, that this matter can therefore be scoped out of the assessment.	Noted. Glint and glare during construction has been scoped out of the assessment.	N/A
Planning Inspectorate	The Inspectorate notes the approach within the ES to	Each assessment within Chapter 14: Other	Section Chapter 14: Other

Consultee	Summary of comment	How matter has been addressed	Location response	of
	<p>provide a single chapter supported by technical notes to address Air Quality (dust and vehicle and plant emissions), Glint and Glare, Contaminated Land, Major Accidents and Disasters and Waste effects. The Inspectorate considers that there is insufficient evidence yet available to conclude that these aspects will not give rise to significant effects. Each aspect assessment should nevertheless be supported by proportionate information. Each section should provide a baseline, appropriate figures to allow identification of sensitive receptors and study areas and evidence to support any conclusions with reference to appropriate published aspect – specific guidance where relevant. Where significant effects are likely to occur, an appropriate methodology for the assessments, that refers to the overarching EIA methodology in the ES, should also be provided. This information should all be easy to locate within the ES.</p>	<p>Environmental Topics is supported by proportionate information. Each section of the chapter includes a subsection on the environmental baseline, appropriate figures (where deemed necessary), and methodology in line with the EIA methodology outlined in Chapter 5: EIA Methodology [EN010154/APP/6.1].</p>	<p>Environmental Topics Chapter 5: EIA Methodology [EN010154/APP/6.1]</p>	
Planning Inspectorate	<p>The ES should include a full comparison of impacts of the two potential options considered in the Scoping Report for the deployment of either tracking or fixed solar panels, unless the detailed design has reached a point where the proposed panel type is confirmed. Should tracking solar panels be selected, glint and glare potential in relation to the degree/orientation and any</p>	<p>Section 14.3 of Chapter 14: Other Environmental Topics presents an assessment of glint and glare effects for fixed south facing and tracker panel arrangements. The assessment is carried out based on the maximum parameters defined in Chapter 3: The Proposed</p>	<p>Section 14.3 of Chapter 14: Other Environmental Topics</p>	

Consultee	Summary of comment	How matter has been addressed	Location of response
	pivot of the panel should also be considered within the ES.	Development [EN010154/APP/6.1].	
Aubourn with Haddington Parish Council	There is no mention of RAF Waddington or consultation with the Ministry of Defence within the document on the proposed Fosse Green Solar farm. Aubourn with Haddington Parish Council Lincolnshire would like to see a section on consultation with the Ministry of Defence and whether this project is likely to interfere with flight operations of RAF Waddington.	Appendix 14-D: Glint and Glare Assessment of this ES [EN010154/APP/6.3] concludes that the overall impacts on aviation assets, including RAF Waddington, are acceptable and not significant.	Section 14.2 and 14.7 of Chapter 14: Other Environmental Topics.
Thorpe on the Hill Parish Council	Thorpe on the Hill Parish Council request that a summary of a full consultation with the Ministry of Defence be included in the ES.	A summary of the consultation with the MoD is included in Table 14-15 of this ES chapter.	Table 14-15 of Chapter 14: Other Environmental Topics

14.3.7 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. **Table 14-14** summarises the statutory consultation responses relating to the Glint and Glare assessment and how these have been addressed within the ES. The **Potential Main Issues for Examination [EN010154/APP/7.11]**, **Consultation Report [EN010154/APP/5.1]** and **Consultation Report Appendices [EN010154/APP/5.2]** provide further detailed responses, as relevant, to the feedback received during statutory consultation.

Table 14-14: Statutory Consultation Responses (Glint and Glare)

Consultee	Summary of comment	How matter has been addressed	Location of response
National Highways	Specific effects on the Strategic Road Network include solar reflections originating from the site on nearby receptors, which include roads, rail, residential housing and a nearby airfield. In general, the report appears to provide a robust assessment of potential for glint and glare.	The glint and glare model used in assessment presented within the Environmental Statement has been run at 1.5m in height and it also assesses the visibility at 2.5m in height, this incorporates everything that would be using a road, including HGVs.	Chapter 14: Other Environmental Topics [EN010154/APP/6.1]

Below are a few clarifications that would be required to satisfy our assessment.

Road Receptors

Assumptions on threshold angle of effects based on aviation guidance provides a sound argument for application to ground based travel.

Road receptors were modelled at a single height representative of a car, which will not be sufficient for predicting effects on drivers of HGVs.

If the road use is known to include larger vehicles it is recommended to model two heights, one representative height for cars and the other for HGVs (1.5m and 2.4m for example), as this provides an appropriate indicative range of likely receptors.

Within the assessment presented in **Chapter 14: Other Environmental Topics**

[EN010154/APP/6.1] of the ES, mitigation has been proposed such that there is enough coverage during the times of year where the potential for glare impacts may occur on road users including HGVs.

National Highways	The use of existing vegetation screening as a guarantee for glare and glint impacts reducing to None does not account for the seasonal nature of foliage density and therefore screening capability, without further analysis into the plant species, though it is acknowledged that effects will most likely be reasonably attenuated in this instance.	Where mitigation has been identified as required for residential receptors, road receptors and bridleway receptors in the Glint and Glare assessment, this has been incorporated within the Framework Landscape and Ecological Management Plan (LEMP)	Framework LEMP [EN010154/A PP/7.15]
	There would however be a requirement to ensure screening is retained and maintained and it is accepted that glint and glare is to be reviewed and incorporated within the Landscape and Ecological Management Plan (LEMP).	[EN010154/APP/7.15]. Proposed mitigation measures include native hedgerows to be planted/infilled and maintained to a height at least matching the height of the solar panels (i.e. expected to be 3.5m based on the maximum parameters) along panel boundaries, field boundaries, and bridleway boundaries as shown in Figure 7.15-1: Landscape Mitigation Plan , presented within	

	<p>the Framework LEMP [EN010154/APP/7.15]. This accounts for the final design of the Proposed Development and will be based on the final Glint and Glare Assessment model. The Framework LEMP specifies if and where required, that hedgerows will be infilled and maintained to a sufficient height to effectively screen views of the Proposed Development where Glint and Glare is possible at the identified receptors.</p>	
North Kesteven District Council	<p>It is noted that some receptors will experience high levels of glare that require mitigation by way of hedgerow planting (shown in Figures 7A, B and C of Appendix 14-C).</p> <p>It will be necessary to ensure that robust mechanisms are in place to ensure that implementation of the planting is successfully carried out and thereafter managed to ensure survival over the duration of the development.</p> <p>It does not appear, however, that the locations for proposed glint and glare mitigation planting have been transposed on the site layout plans shown in Figures 3-2A and 3-2B and thus raises questions as to whether they have been included as part of the landscaping assessment in Chapter 10.</p>	<p>The mitigation planting for residential and bridleway receptors is shown in Figure 7.15-1: Landscape Mitigation Plan [EN010154/APP/7.15], presented in within the LEMP [EN010154/APP/7.15]. The planting will be managed to deliver a minimum height at least the same as the upper edge of the panels, which is currently proposed to be a maximum 3.5m. The Framework LEMP [EN010154/APP/7.15] details how the landscape strategy will be delivered, and the successful establishment and management of proposed landscape planting during the operation phase.</p>
Ministry of Defence	<p>The introduction of solar PV development, in the vicinity of RAF Waddington has the potential capacity to have an impact on aviation safety through glint and glare effects.</p> <p>Such glint and glare emissions might affect air traffic using RAF</p>	<p>RAF Waddington has been assessed in detail with the approach path into the two runways, ATCT and two circuit paths (east and west) being assessed for glare impacts.</p>

<p>Waddington and the Air Traffic Control Tower (ATCT). The developer has provided a Preliminary Environmental Information Report Volume 3 Appendix 14-C: Glint and Glare Assessment which identifies potential green glare impact (low potential for after image) on the ATCT at RAF Waddington. This would be a major concern to the MOD.</p>	<p>As detailed within Appendix 14-D [EN011054/APP/6.3], there is a prediction of green glare impacts upon the approach to runway 02 and 20, as well as the ATCT and the eastern circuit path. Impacts upon the ATCT are blocked by a terrain feature which is 10m higher than the ATCT, therefore blocking all views from the ATCT. No significant impairment for pilots along the western circuit at RAF Waddington are anticipated as a result of yellow glare.</p>
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14.3.1 Additional engagement has been undertaken with key stakeholders including the Defence Infrastructure Organisation (DIO). The matters discussed specifically included the Glint and Glare assessment of circuit patterns at RAF Waddington. The outcome of this consultation is presented in **Table 14-15**.

Table 14-15: Additional Engagement (Glint and Glare)

Consultee	Date / Method	Summary of Consultation
Defence Infrastructure Organisation (DIO)	27/01/2025 / Email	The DIO were contacted via email in response to their comments provided during Statutory Consultation. This involved the request to assess circuit patterns at RAF Waddington. It was identified that circuit traffic for runway 02/20 will need to be assessed including visual circuit direction to the East and sufficient information was provided by the DIO. As a result, this has been included in the Glint and Glare Assessment, presented in Appendix 14-D: Glint and Glare Assessment [EN010154/APP/6.3] .

Assessment Methodology

14.3.2 This section sets out the scope and methodology for the assessment of the Glint and Glare impacts of the Proposed Development.

14.3.3 The Glint and Glare assessment methodology is desk-based and has been defined following review of available guidance and studies. The approach has been informed by the legislation and guidance presented in **Appendix 14-D: Glint and Glare Assessment** of this ES **[EN010154/APP/6.3]**. The approach

taken is to determine whether a reflection from the Proposed Development is geometrically possible and then to compare the results against the relevant guidance and studies to determine whether the reflection is significant.

14.3.4 In summary, the assessment methodology is a multi-step process of elimination to determine which receptors have the potential to experience the effects of Glint and Glare, which includes the following:

- Identifying receptors in the Study Area defined below surrounding the Proposed Development.
- Considering direct solar reflections from the Proposed Development towards the identified receptors by undertaking geometric calculations;
- Considering the visibility of the panels from the receptor's location. If the panels are not visible from the receptor, then no reflection can occur;
- Based on the results of the geometric calculations, determining whether a reflection can occur, and if so, at what time it will occur;
- Considering both the solar reflection from the Proposed Development and the location of the direct sunlight with respect to the receptor's position;
- Considering the solar reflection with respect to published studies and guidance – including intensity calculations where appropriate;
- Determining whether a significant detrimental effect is expected in line with the significance criteria set out in **Section 14.3.6**.

Study Area

14.3.5 The Study Area was defined to include Glint and Glare features likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development, termed the Zol. The potential Zol is considered to vary based on the receptor type (ground-based and aviation receptors), as follows:

- Ground-based receptors, including residential receptors, roads, and railways, and PRoW within 1km of the DCO Site; and
- Aviation receptors within 30km, with detailed assessment for international aerodromes within 20km, military aerodromes within 10km and 5km for small aerodromes.

Magnitude of Impact

Static Receptors

14.3.6 Although there is no specific guidance set out to identify the magnitude of impact from solar reflections, the following criteria has been set out for the purposes of this report:

- High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day;
- Medium** – Solar reflections impacts above 20 hours but below 30 hours per year or above 20 minutes but below 30 minutes per day;

- c. **Low** – Solar reflections impacts up to and including 20 hours per year or up to 20 minutes per day; and
- d. **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

Moving Receptors

14.3.7 No specific guidance is available to identify the magnitude of impact from solar reflections on moving receptors except in aviation, however, it is thought that a similar approach should be applied to moving receptors as for aviation, based on the ocular impact and the potential for after-image. The following criteria has been set out for the purposes of this assessment:

- a. **High** – Solar reflections impacts consisting of any amount of yellow glare¹;
- b. **Low** – Solar reflections impacts consisting of any amount of only green glare²; and
- c. **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

Baseline Conditions

14.3.8 The agricultural land use within the Study Area is characterised by large scale regular-shaped arable fields across a number of land-holdings. The landscape is interspersed with individual trees, woodlands, hedgerows, linear tree belts, farm access tracks, and local transport roads. These vegetation patterns are varied across the DCO Site and provide some existing screening for surrounding receptors.

14.3.9 Full details of the baseline conditions, and future baseline can be found in **Chapter 10: Landscape and Visual Amenity** of this ES [EN010154/APP/6.1].

Receptors

Residential Receptors

14.3.10 Residential receptors located within 1km of the Proposed Development have been considered in the assessment. Glint was assumed to be possible if the receptor is located within the ground-based receptor zones outlined in **Appendix 14-D: Glint and Glare Assessment** [EN010154/APP/6.3].

14.3.11 Where there are a number of residential receptors within close proximity, a representative dwelling or dwellings is/are chosen for detailed analysis as the impacts will not vary to any significant degree. Where small groups of receptors are evident, the receptors on either end of the group have been assessed in detail. A total of 238 individual residential receptors have been assessed.

¹ Yellow Glare is defined as "Glint predicted with a potential to cause a temporary after-image".

² Green Glare is defined as "Glint predicted with a low potential for temporary after-image".

Road and Rail Receptors

14.3.12 Roads that are within 1km of the Order limits and have potential views of the panels are considered in the assessment. There are 44 roads within the study area that require a detailed assessment and these are defined in **Appendix 14-D: Glint and Glare Assessment [EN010154/APP/6.3]**. The assessment of these includes 243 receptor points along the 44 assessed roads within the study area; these points are 200m apart to ensure that each road is sufficiently covered within the assessment.

14.3.13 There are some minor roads which serve dwellings that have been screened out as vehicle users of these roads will likely be travelling at low speeds. Therefore, there is a negligible risk of safety impacts resulting from glint and glare of the Proposed Development.

14.3.14 There is one railway line within 1km of the Principal Site which requires assessment, this includes 20 rail receptor points for assessment.

Bridleways

14.3.15 All bridleways within 1km of the Proposed Development have been considered. The assessment included 82 receptor points which are 200m apart. Other Public Rights of Way (PRoWs) have not been considered as the only PRoW with potential safety impacts as a result of glint and glare are bridleways due to the horse riders.

Aviation Receptors

14.3.16 There are 35 aerodromes within 30km of the Proposed Development, however, only RAF Waddington, Peacocks Farm, South Hykeham Airfield, South Scarle Airfield and Blackmoor Farm required a detailed assessment as the Proposed Development is located within their safeguarding buffer zones. The other 30 aerodromes did not require a detailed assessment due to their size and/or orientation in relation to the Principal Site.

Embedded Mitigation Measures

14.3.17 The design of the Proposed Development includes embedded design mitigation for Glint and Glare, including landscaping to screen the Proposed Development from view of receptors to Glint and Glare, as well as landscape and visual impacts. This is described in detail in **Chapter 10: Landscape and Visual Amenity** of this ES **[EN010154/APP/6.1]**.

14.3.18 The embedded mitigation measures include:

- a. Careful siting of the Proposed Development in the landscape with offsets from existing residential areas, vegetation patterns, and road networks;
- b. Conserving existing vegetation patterns; and
- c. Creating new Green Infrastructure (i.e., vegetation planting) within the Principal Site with extensive planting proposals.

Assessment of Likely Impacts and Effects

Residential Receptors

14.3.19 Solar reflections are theoretically possible at 178 of the 238 residential receptors based on the bald-earth model. The initial bald-earth scenario, with no consideration of local vegetation, other obstacles, and cloud cover, identified potential impacts as High at 48 receptors, Medium at 19 receptors, Low at 111 receptors, and None at the remaining 50 receptors. Upon reviewing the actual visibility of receptors when taking into account topography and local screening, glint and glare impacts remained High for 11 receptors, Medium for three receptor, Low for 44 receptors, and reduced to None for all remaining receptors, including 12 residential areas. Taking into account screening, such as field boundary hedgerows, overall impacts would remain Low at 36 receptors, but reduce to None for all remaining receptors. Therefore, overall impacts on residential receptors are considered not significant and therefore acceptable.

Road Receptors

14.3.20 Solar reflections are theoretically possible at 215 of the 217 road receptor points assessed in the 1km Study Area based on the bald-earth model. Upon reviewing the actual visibility of the receptors, glint and glare impacts remain High for 30 receptors, reduce to none all remaining road receptors. Taking into account screening, such as field boundary hedgerows, impacts reduce to None at all receptors. Therefore, overall impacts are not significant.

Rail Receptors

14.3.21 Solar reflections are theoretically possible at all of the 13 rail receptors assessed within the 1km Study Area. Upon reviewing the actual visibility of the receptors when taking into account topography and local screening, glint and glare impacts reduce to None for all rail receptors. Therefore, overall impacts on rail receptors are considered to be none.

Bridleway Receptors

14.3.22 Solar reflections are theoretically possible at all 79 bridleway receptors within the 1km Study Area. Upon reviewing the actual visibility of the receptors when taking into account topography and local screening, glint and glare impacts remain High at 65 receptors and reduce to Low at 14. Taking into account screening such as field boundary hedgerows, impacts reduce to Low at ten receptors and to none at all remaining receptors, and therefore overall impacts are not significant.

Aviation Receptors

14.3.23 Twelve runway approach paths and one Air Traffic Control Towers (ATCT) were assessed in detail at RAF Waddington, Peacocks Farm, South Hykeham Airfield, South Scarle Airfield and Blackmoor Farm. Based on the modelling, without considering existing vegetation and visibility, green glare impacts were predicted for the Runway 20 approach path, eastern circuit path and ATCT at RAF Waddington, the Runway 10 approach path at South Hykeham Airfield and the Runway 06 and 24 approach paths at Blackmoor Farm, based on

bald-earth model. Green glare and yellow glare impacts were predicted for the western circuit path at RAF Waddington Runway 08 and 24 approach paths at Peacocks Farm, the Runway 28 and 31 approach paths at South Hykeham Airfield and the Runway 10 approach path at South Scarle Airfield. Green glare is considered to be an acceptable impact upon runways, according to Federal Aviation Authority (FAA) guidance. Upon reviewing the actual visibility of the receptors, including local obstacles such as hedges, trees, buildings, and ground elevation, the glare impacts are reduced to None and Not Significant. They are adequately mitigated by the existing surroundings. All impacts at Peacocks Farm, South Hykeham Airfield and South Scarle Airfield can be deemed acceptable. Overall impacts on Aviation receptors are acceptable and **Not Significant**.

Mitigation Measures

14.3.24 Where mitigation has been identified as required for residential receptors, road receptors and bridleway receptors in the Glint and Glare assessment, this has been incorporated within the **Framework LEMP [EN010154/APP/7.15]** submitted with the DCO application. Proposed mitigation measures include native hedgerows to be planted/infilled and maintained to a height at least matching the height of the solar panels (i.e. expected to be 3.5m based on the maximum parameters) along panel boundaries, field boundaries, and bridleway boundaries as shown in **Figure 7.15-1: Landscape Mitigation Plan**, presented within the **Framework LEMP [EN010154/APP/7.15]**. This accounts for the final design of the Proposed Development and will be based on the final Glint and Glare Assessment model. The Framework LEMP will specify, if and where required, that hedgerows will be infilled and maintained to a sufficient height to effectively screen views of the Proposed Development where Glint and Glare is possible at the identified receptors.

Residual Effects and Conclusions

14.3.25 With the proposed embedded design mitigation within the **Framework LEMP [EN010154/APP/7.15]**, no significant residual effects are anticipated as a result of the Proposed Development.

14.3.26 The effects of Glint and Glare and their impact on local receptors is predicted to be Low at 37 residential receptors, and Low at nine bridleway receptors, whilst the remaining ground-based receptors are expected to have no impacts once mitigation measures have been considered. Impacts upon aviation receptors are predicted to be Acceptable. Therefore, overall impacts are not significant.

Cumulative Assessment

14.3.27 The short-list of cumulative schemes is presented in **Chapter 15: Cumulative Effects and Interactions** of this ES **[EN010154/APP/6.1]**. The assessment summarised above identified that with the introduction of the additional mitigation, receptors will not be likely to experience significant effects as a result of the Proposed Development, which are judged to be not significant.

14.3.28 In addition, it is anticipated that the other solar developments listed within **Chapter 15: Cumulative Effects and Interactions** of this ES **[EN010154/APP/6.1]** will be designed to ensure that there will be effective screening to prevent Glint and Glare effects from other individually planned solar farms. Therefore, cumulative effects would be unlikely and are not considered to arise for Glint and Glare. Most of the other solar developments listed within **Chapter 15: Cumulative Effects and Interactions** of this ES **[EN010154/APP/6.1]** are also located further than the Glint and Glare Zol of 1km. The overall impact of the Proposed Development is considered not significant.

14.4 Ground Conditions

Introduction

14.4.1 Regarding the assessment of the impact of the Proposed Development on Ground Conditions, a Phase 1 Preliminary Risk Assessment (PRA) has been prepared for the Proposed Development and is provided in **Appendix 14-D** of this ES **[EN010154/APP/6.3]**, the findings of which are summarised in this section.

14.4.2 A Phase 1 PRA is equivalent to a Stage 1 Tier 1 level of assessment, as defined by the Environment Agency's Land Contamination Risk Management (LCRM) (2023) guidance (Ref 14-30). The objective of the PRA is to identify and evaluate potential land quality risks and development constraints associated with the Proposed Development and to prepare an initial conceptual site model that can be used to inform future decision making and the design of future ground investigation which may be required. The Phase 1 PRA covers the land within the DCO Site.

14.4.3 The Phase 1 PRA includes the following:

- A description of the geology, hydrogeology and shallow mining potential;
- A description of the environmental setting/sensitivity and current/historical land use of the DCO Site and surrounding area;
- A description of the findings of a site reconnaissance visit;
- An initial Conceptual Site Model (CSM) for the prevailing ground conditions; and
- A preliminary qualitative risk assessment of potential land contamination risks to human (chronic), environmental, and controlled water receptors from contamination sources on or in the vicinity of the DCO Site using the source-pathway-receptor model.

Legislation and Planning Policy

14.4.4 Legislation, planning policy, and guidance relating to Ground Conditions and pertinent to the Proposed Development comprises the documents listed below. More detailed information can be found in **Appendix 14-A: Other Environmental Topics Policy and Legislation** **[EN010154/APP/6.3]**.

Legislative Framework – Ground Conditions

14.4.5 There are six key legislative drivers for dealing with risks to human health and the environment from ground conditions, namely:

- a. Part 2A of the Environmental Protection Act (EPA) 1990 (the Contaminated Land Regime) (Ref 14-31);
- b. Water Resources Act 1991 (Ref. Ref 14-32);
- c. Water Act 2003 (Ref. Ref 14-33);
- d. Building Act 1984 (Ref. Ref 14-34);
- e. Building Regulations 2010 (Ref 14-35); and
- f. Planning Act 2008 (Ref 14-36).

14.4.6 Other legislation of relevance to this topic includes:

- a. Environmental Permitting (England and Wales) Regulations 2016 (Ref 14-37) (as amended);
- b. Hazardous Waste (England and Wales) Regulations 2005 (Ref 14-38);
- c. Contaminated Land (England) Regulations 2006 (Ref 14-39);
- d. Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref 14-40); and
- e. Anti-Pollution Works Regulations 1999 (Ref 14-41).

National Policy – Ground Conditions

- a. Overarching National Policy Statement (NPS) for Energy (EN-1) (2023) (Ref 14-10);
- b. Overarching National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) (Ref 14-11);
- c. Overarching National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5) (2023) (Ref 14-12); and
- d. National Planning Policy Framework (2025) (Ref 14-14).

Local Policy – Ground Conditions

- e. Central Lincolnshire Adopted Local Plan 2023 (Ref 14-77).

Consultation

14.4.7 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion and Applicant responses in relation to the Ground Conditions assessment are presented in **Table 14-16**.

Table 14-16: Scoping Opinion Responses (Ground Conditions)

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	<p>The Scoping report proposes to scope out effects from accidental spillages from maintenance activities during operation, on the basis of preparing an Operational Environmental Management Plan (OEMP) following grant of any Development Consent Order. The Inspectorate agrees that it is unlikely that the operation of the Proposed Development would generate significant pollutants and that these matters can therefore be scoped out of the assessment. The ES must however provide information on the nature and quantities of the likely chemicals used during maintenance activities and provide an outline of the OEMP. The OEMP should contain information on how adverse effects will be avoided or mitigated.</p>	<p>The operation and maintenance of the Proposed Development will not require the use of any considerable quantities of chemicals. PV panels are cleaned by water. The DCO application is accompanied by a Framework OEMP [EN010154/APP/7.8] which contains pollution prevention measures relevant to the operation and maintenance of the Proposed Development.</p>	N/A
Planning Inspectorate	<p>The scope of the assessment provided in the Scoping Report indicates several pathways to significant effects from contaminants (such as release of drilling fluids from Horizontal Directional Drilling and potential for spillages from hazardous loads) and identifies potential for ground instability from previous quarrying activities. As baseline data have not yet been gathered and no details are available of the nature of the potential contamination sources within the DCO Site boundary, ground stability or the Proposed Development, the Inspectorate considers that significant effects on ground conditions cannot be excluded at this stage. The ES should therefore contain an assessment of potential effects on ground conditions, where significant effects are likely to occur.</p>	<p>A Phase 1 PRA has been prepared for the Proposed Development and is provided as Appendix 14-C of this ES [EN010154/APP/6.3]. A Framework CEMP is included as part of the DCO application [EN010154/APP/7.7]. This presents measures to minimise the risk of release of drilling fluids from Horizontal Directional Drilling and potential for spillages from hazardous loads. An assessment of the potential effects on ground conditions is discussed in Paragraph 14.4.10 of this Chapter of the ES.</p>	Appendix 14-C [EN010154/APP/6.3] and Framework CEMP [EN010154/APP/7.7] .
Environment Agency	<p>This section states that a preliminary risk assessment will be prepared in line with our Land Contamination Risk Management guidance. Information from the Preliminary Risk Assessment (PRA) will be used to inform any pollution prevention measures that may be required during construction and operation, and these will be included in the Construction</p>	<p>A Phase 1 PRA has been prepared for the Proposed Development in line with the Environment Agency's Land Contamination Risk Management (LCRM) guidance; and is provided as Appendix 14-C of this ES [EN010154/APP/6.3].</p>	Appendix 14-C [EN010154/APP/6.3] and

	Environmental Management Plan (CEMP).	<p>We are satisfied with the proposed way forward and assessment methodology. Although not mentioned in this chapter, the report does discuss the construction methods of parts of the scheme. Paragraph 3.2.13 states that, "The frames upon which the solar PV panels will be mounted will be pile driven or screw mounted into the ground to a typical depth of approximately 1.5m, subject to ground conditions."</p> <p>Paragraph 3.2.22 discusses the cable installations which may be in trenches or via the use of horizontal directional drilling. Where the placement of the cables and piles takes place in land affected by contamination the management of the waste material will need to be carefully managed. Their use, and the prevention of mobilisation of contamination as a result, should be included in the CEMP.</p>	<p>The Phase 1 PRA has been used to inform any pollution prevention measures that may be required during construction and operation. These measures are included in the Framework CEMP [EN01054/APP/7.7].</p> <p>Where the placement of the cables and piles takes place in land affected by contamination the management of the waste material will be carefully managed. Their use, and the prevention of mobilisation of contamination as a result, is included in the Framework CEMP [EN01054/APP/7.7]</p>	Framework CEMP [EN01054/APP/7.7].
North Kesteven District Council	Finally paragraph 15.4.3 notes that the tier 1 Preliminary Risk Assessment will assess a number of matters including details of any available site investigation, risk assessment, remediation, and validation reports for land within the Site. For the area around Witham St Hughs/CEMEX quarries we recommend that this include a Unexploded Ordnance (UXO) assessment mindful of the proximity of the former RAF Swinderby.	<p>A Phase 1 PRA has been prepared for the Proposed Development and is provided as Appendix 14-C of this ES [EN01054/APP/6.3].</p> <p>The DCO Site lies within areas formerly occupied by the Swinderby Airfield, which is considered a wartime site of interest. The commissioning of a detailed Unexploded Ordnance (UXO) Assessment will occur prior to the commencement of any intrusive works to assess and potentially zone the UXO hazard level at the DCO Site</p>	Appendix 14-C of this ES [EN01054/APP/6.3].	

14.4.8 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. **Table 14-17** summarises the statutory consultation responses relating to the Ground Conditions assessment and how these have been addressed through the ES. The **Potential Main Issues for Examination** [EN010154/APP/7.11], **Consultation Report** [EN010154/APP/5.1] and **Consultation Report Appendices** [EN010154/APP/5.2] provide further detailed responses, as relevant, to the feedback received during statutory consultation.

Table 14-17: Statutory Consultation Responses (Ground Conditions)

Consultee	Summary of comment	How matter has been addressed	Location of response
Environment Agency	<p>The discovery strategy for potentially contaminated land encountered during works does not explicitly mention stopping works in the affected area while further investigation is carried out.</p> <p>If works in the affected area continue while the potential contamination is investigated, there is a potential for contamination to be spread further before its extent and severity is identified, and appropriate remediation is agreed. As such, there is a potential for pollutants to be mobilised which could impact controlled waters. Please provide further information to address this point and include an adequately worded Requirement in the DCO.</p>	<p>Table 10: Ground Conditions of the Framework CEMP [EN010154/APP/7.7] includes a mitigation requirement to stop works in an affected area while further investigation is carried out) in line with the response provided by the Environment Agency. A requirement of the Draft DCO [EN010154/APP/3.1] secures the Framework CEMP and requires that a detailed CEMP which is to be in accordance with the Framework CEMP is to be submitted and approved prior to the commencement of the authorised development</p>	<p>Framework [EN010154/APP/7.7] submitted with this DCO application.</p>
Environment Agency	<p>There is a discrepancy with the location of the proposed cable connection to the grid, between the Groundsure search reports and the relevant Figures (e.g. Figure 1-2). If the Groundsure search does not cover the whole site area, it is possible that sensitive land uses or potential sources of contamination will be missed</p>	<p>This comment is noted and a new Groundsure data and map search has been commissioned with the resultant information used to update the PRA Report.</p>	<p>Section 14.4 of this Chapter and Appendix 14-C: Phase 1 Preliminary Risk Assessment [EN010154/APP/6.3].</p>

Baseline Conditions

14.4.9 A summary of the baseline conditions is described within Sections 2 and 3 of **Appendix 14-C: Preliminary Phase 1 Risk Assessment [EN010154/APP/6.3]**.

Embedded Mitigation Measures

14.4.10 A number of environmental design and management measures will be employed as standard best practice to minimise impacts to human health, controlled waters, sensitive ecological receptors, buildings/infrastructures, and property during the construction and decommissioning phases of the Proposed Development. These are outlined in the **Framework CEMP [EN010154/APP/7.7]**. Similarly, a **Framework DEMP [EN010154/APP/7.9]** is included with the DCO application. Delivery of a detailed version of these plans prior to construction/decommissioning and implementation of the measures they contain will be secured through the Requirements in the **Draft DCO [EN010154/APP/3.1]**.

14.4.11 During construction, the Proposed Development works will be undertaken in compliance with Construction Design and Management (CDM) 2015 Regulations. Mitigation to prevent surface runoff, discharge into watercourses and dust generation will form part of the construction phase obligations and requirements. These measures are outlined within the **Framework CEMP [EN010154/APP/7.7]**. On-site activities when the Proposed Development is complete and operational will be limited to the maintenance of the infrastructure. During maintenance activities, there may be the need to use oils, grease, fuels, lubricants and cleaning agents on-site. There is a small risk of chemical pollution arising from accidental spillages during these operations.

14.4.12 An Operational Environmental Management Plan (OEMP) will be prepared following grant of DCO and prior to the date of final commissioning of any part of the Proposed Development to address all operational related issues, building on the **Framework OEMP [EN010154/APP/7.8]** that is submitted with the DCO application, which sets out a number of best practice measures for implementation during the operation of the Proposed Development. This will include the provision of a spillage Emergency Response Plan (ERP) (specified within Paragraph 2.8.1 of the **Framework OEMP [EN010154/APP/7.8]**), which maintenance staff will be required to have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material. Operational activities are scoped out of the assessment.

Assessment of Effects

14.4.13 The principle of risk assessment for land contamination is outlined in the Environmental Protection Act 1990 (Part 2A) (Ref 14-1) and LCRM (Ref 14-30). The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- a. Source: hazardous substance that has the potential to cause adverse impacts;
- b. Pathway: route whereby a hazardous substance may come into contact with the receptor. Examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- c. Receptor: target that may be affected by contamination. Examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

14.4.14 For a risk to be present, there must be a relevant/viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

14.4.15 The following sources, pathways and receptors in **Table 14-18** have been identified for the Proposed Development.

Table 14-18: Sources, Pathways and Receptors (Ground Conditions)

Sources	Pathways	Receptors
1: On Site, current farm buildings and yards where fuel and agricultural materials were/are stored. Made Ground (infilled pits/quarries/former ponds). Former corn mill. Current digestate holding lagoon (slurry tanks). <i>(relevant to the Principal Site)</i>	1: Direct Pathway: direct contact, dermal absorption or ingestion of soil. 2: Indirect Pathway: inhalation of soil particulates or vapour derived from soils. 3: Indirect Pathway: migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/explosion).	1: Current DCO Site Users: residents/farmers/site visitors/general public on the DCO Site using the Public Rights of Way (PRoW) network and permissive paths. 2: Future DCO Site Users: farmers/site visitors/trespassers/general public on the DCO Site using the PRoW network and permissive paths.
2: On Site, former Swinderby Airfield. <i>(relevant to the Principal Site)</i>	4: Indirect Pathway: leaching of chemicals and vertical migration via permeable unsaturated strata to shallow groundwater.	3: Secondary A aquifers of the Alluvium, River Terrace Deposits and Trent Valley Formation; Secondary B aquifers of the Scunthorpe Mudstone Formation and Charmouth Mudstone Formation; and Principal aquifer of the Lincolnshire Limestone Formation.
3: Off Site; current and former farm buildings and yards where fuel and agricultural materials were/are stored. <i>(relevant to the Principal Site)</i>	5: Indirect Pathway: lateral migration in groundwater and baseflow into surface waters.	4: Surface waters: River Witham, River Brant, drains and ponds.
4: Off Site waste management facility. <i>(relevant to the Principal Site)</i>	6: Indirect Pathway: uptake via root system and ingestion.	

Sources	Pathways	Receptors
5: Off Site former and current sewage works. Former pump house. Current pumping station. <i>(relevant to the Principal Site)</i>	7: Direct Pathway: direct contact of buried concrete with contaminated soils (i.e., hydrocarbons) and aggressive ground conditions (pH and sulphate).	5: Sensitive ecological receptors: Tunman/Housham Woods designated ancient woodland.
6: Made Ground (infilled pit/infilled land/quarries) <i>(relevant to the Cable Corridor)</i>	8: Direct Pathway: direct contact of services and supply pipes with contaminated soils. 9: Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches.	6: Future proposed infrastructures (PV Mounting Structure and cables). 7: Proposed structures. 8: Potable water supply pipes and other services 9: Property: crops and livestock.

14.4.16 Using criteria broadly based³ on those presented in section 6.3 of the CIRIA Report “Contaminated Land Risk Assessment: A Guide to Good Practice” (CIRIA Report C552) (**Ref 14-44**), the magnitude of the risk associated with potential contamination at the DCO Site has been assessed. To do this, an estimate was made of:

- The magnitude of the potential consequence (i.e. severity); and
- The magnitude of probability (i.e. likelihood).

14.4.17 The classifications of severity and likelihood, and the risk rating based on the comparison of severity and likelihood, are presented in Section 10 of the Phase 1 PRA (**Appendix 14-C [EN010154/APP/6.3]**).

14.4.18 The key findings of the risk assessment are detailed below. Full details outlining all the source-pathway-receptor linkages for all of the sources, pathways, and receptors detailed above are provided in Section 10 of the Phase 1 PRA (**Appendix 14-C [EN010154/APP/6.3]**).

14.4.19 The potential risks that have been identified from potential contaminated land have been assessed by the PRA as being very low to moderate / low for human health, controlled waters and other sensitive receptors. The highest risks have been identified in the areas formerly occupied by Swinderby Airfield.

14.4.20 Taking into account that the embedded mitigation (termed in the PRA as “Construction Embedded/Standard Environmental Mitigation Measures”) and the additional mitigation measures are implemented as indicated in Section 11, 12, 13, 14 and 15 of the Phase 1 PRA (**Appendix 14-C**

³ CIRIA Report C552 was used to create the assessment criteria, however the terminology has been altered slightly for example through the use of likelihood rather than probability.

[EN010154/APP/6.3]), and as summarised in **Table 10: Ground Conditions** of the **Framework CEMP [EN010154/APP/7.7]**), no likely significant effects are anticipated.

Cumulative Effects

14.4.21 This section presents an assessment of cumulative effects between the Proposed Development and other proposed and committed plans and projects including other developments.

14.4.22 This assessment has been made with reference to the methodology and guidance set out in **Chapter 5: EIA Methodology** and shortlist of cumulative schemes identified in **Chapter 15: Cumulative Effects and Interactions [EN010154/APP/6.1]**.

14.4.23 This cumulative effects assessment identified, for each receptor, impacts where the predicted effects of the Proposed Development could interact with effects arising from other plans and, or projects on the same receptor based on a spatial and, or temporal basis.

14.4.24 The shortlisted cumulative schemes identified in **Chapter 15: Cumulative Effects and Interactions [EN010154/APP/6.1]** have been screened for spatial and temporal overlaps with the Proposed Development.

14.4.25 There are 14 cumulative schemes within the Zone of Influence for Ground Conditions (within 500m) of the Proposed Development. The developments comprise mixed residential, care/retirement units, water supply pipelines installation of solar panels and a new road.

14.4.26 Provided that the requirements of relevant policy and legislation relating to land contamination and remediation are adopted in design and that appropriate mitigation measures are applied during the demolition and construction phases of each cumulative development, it is considered that the residual cumulative effects of the identified developments on ground conditions will be of negligible significance (not significant).

14.4.27 Other schemes are not likely to contribute to the effects on Ground Conditions receptors identified, and therefore the effects are not significant.

14.5 Materials and Waste

Introduction

14.5.1 This section of the Other Environmental Topics Chapter presents the findings of an assessment of the likely significant effects on materials and waste as a result of the Proposed Development. For more details about the Proposed Development, refer to **Chapter 3: The Proposed Development [EN010154/APP/6.1]**.

14.5.2 This assessment has been undertaken in accordance with the requirements of the Overarching National Policy Statement for Energy (EN-1) (**Ref 14-45**), the Planning Inspectorate's Scoping Opinion, and the Institute of Environmental Management and Assessment (IEMA) Guide to: Materials and

Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach (**Ref 14-46**) (referred to herein as the 'IEMA Guidance').

14.5.3 For the purposes of this assessment, materials and waste comprise:

- The consumption of materials (key construction materials only); and
- The generation and management of waste.

14.5.4 Materials are defined in the IEMA Guidance (**Ref 14-46**) as "*physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt and steel*". Other material assets considered include built assets such as landfill capacity and allocated/safeguarded mineral and waste sites.

14.5.5 Waste is defined as per the Waste Framework Directive (**Ref 14-52**) as "*any substance or object which the holder discards or intends or is required to discard*". The legal definition of waste covers substances or objects which fall outside of the commercial cycle or out of the chain facility. In particular, most items that are sold or taken off-site for recycling are wastes, as they require treatment before they are reused or resold. In practical terms, wastes include surplus spoil, scrap, recovered spills, unwanted surplus materials, packaging, office waste, and broken, worn-out, contaminated or otherwise spoiled plant, equipment, and materials.

14.5.6 This Chapter is supported by the following appendices [**EN010154/APP/6.3**]:

- Appendix 14-A: Other Environmental Topics Legislation and Policy**; and
- Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline**.

Consultation

14.5.7 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in July 2023. Comments received in the EIA Scoping Opinion (**Appendix 1-B [EN010154/APP/6.3]**) and the Applicant's responses in relation to the Materials and Waste assessment are summarised in **Table 14-19**.

Table 14-19 Scoping Opinion Responses (Materials and Waste)

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	<p>Disposal of redundant infrastructure - A description of the potential streams and volumes of construction and operational waste disposal are proposed to be covered within the ES description of development chapter.</p> <p>Impacts are proposed to be addressed through an outline Decommissioning Environmental Management Plan, and a Site Waste Management Plan within a CEMP.</p> <p>The Scoping Report states that solar panels would be disposed of or recycled in the decommissioning phase and that operational waste will be negligible.</p> <p>The ES should include an assessment of waste impacts for the decommissioning phase. This should outline what measures, if any, are in place to ensure that components (e.g. from batteries and/or panels) are able to be diverted from the waste chain and disposed of safely given that some types of solar panels can contain hazardous materials. Waste should be managed in line with the waste hierarchy based on available technology at the time.</p> <p>The ES should also consider the requirement for cumulative impacts to be assessed at decommissioning due to a number of solar farms in the local area also likely to be decommissioning in a similar timescale.</p>	<p>Chapter 14: Environmental Topics [EN010154/APP/6.1] provides potential waste streams and volumes of construction, operational and decommissioning waste.</p> <p>A Framework DEMP [EN010154/APP/7.9] accompanies the DCO application and sets out the general principles to be followed in the decommissioning of the Proposed Development including for waste. A DEMP based on the Framework DEMP will be prepared and agreed with the relevant authorities at that time of decommissioning, in advance of the commencement of decommissioning works. This is secured through a DCO requirement.</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>Construction: Table 14-24 Estimated Construction Waste</p> <p>Operation: Paragraph 14.5.84.</p> <p>Decommissioning: Table 14-25 Estimated Decommissioning Waste</p> <p>Framework CEMP [EN010154/APP/7.7]</p> <p>Framework OEMP [EN010154/APP/7.8]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
		<p>A Framework CEMP [EN010154/APP/7.7] accompanies the DCO application and sets out the general principles to be followed in the construction of the Proposed Development including for waste. A CEMP based on the Framework CEMP will be prepared and agreed with the relevant authorities at that time of construction, in advance of the commencement of construction works. This is secured through a DCO requirement.</p> <p>A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor as part of the detailed CEMP to be produced (as above). This will provide a waste estimate and specify key responsibilities, reporting and auditing requirements and waste recovery targets.</p>	Framework DEMP [EN010154/APP/7.9]
Chapter 14: Other Environmental Topics			

Consultee	Summary of comment	How matter has been addressed	Location of response
		<p>[EN010154/APP/6.1] includes an assessment of waste impacts for the decommissioning phase.</p> <p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1] considers cumulative impacts at decommissioning due to other solar farms in the local area that are likely to be decommissioning in a similar timescale.</p>	
	<p>Approach to Other Environmental Topics - The Inspectorate notes the approach within the ES to provide a single chapter supported by technical notes to address Air Quality (dust and vehicle and plant emissions), Glint and Glare, Contaminated Land, Major Accidents and Disasters and Waste effects. The Inspectorate considers that there is insufficient evidence yet available to conclude that these aspects will not give rise to significant effects. Each aspect assessment should nevertheless be supported by proportionate information. Each section should provide a baseline, appropriate figures to allow identification of sensitive receptors and study areas and evidence to support any conclusions with reference to appropriate published aspect – specific guidance where relevant. Where significant effects are likely to occur, an appropriate methodology for the assessments, that refers to the overarching EIA methodology in the ES, should</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1] includes a materials and waste assessment which includes a baseline and study areas and evidence to support conclusions in reference to the IEMA Guidance which is the appropriate methodology for the assessment of materials and waste. The assessment result is that no significant effects are anticipated for materials and waste.</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	also be provided. This information should all be easy to locate within the ES.		
Environment Agency	<p>Hazardous waste – solar panels</p> <p>We have specific concerns regarding the manufacture and design specification of the solar panels. Some types currently coming to the end of their working life are classified as hazardous waste, and are considerably more expensive, and difficult, to dispose of. This should be taken into consideration and we would recommend that the developer uses fully recyclable non-hazardous panels.</p>	<p>Manufacture and design specification of the solar PV panels are not yet confirmed. This detail will be determined post consent, during detailed design.</p>	N/A
	<p>Waste management</p> <p>The developer must apply the waste hierarchy as a priority order of prevention, re-use, recycling before considering other recovery or disposal options. Government guidance on the waste hierarchy in England can be found at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb_13530-waste-hierarchy-guidance.pdf</p> <p>Site Waste Management Plans (SWMP) are no longer a legal requirement, however, in terms of meeting the objectives of the waste hierarchy and your duty of care, they are a useful tool and considered to be best practice.</p> <p>In order to meet the applicant's objectives for the waste hierarchy and obligations under the duty of care, it is important that waste is properly classified. Some waste (e.g. wood and wood based products) may be either a hazardous or non-hazardous waste</p>	<p>A Framework CEMP covering these aspects accompanies the DCO application. A CEMP, based on the Framework CEMP, will be prepared and agreed with the relevant authorities at that time of construction, in advance of the commencement of construction works. This is secured through a DCO requirement.</p> <p>A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor as part of the detailed CEMP to be produced (as above). This will provide a</p>	<p>Framework CEMP [EN010154/APP/7.7]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>dependent upon whether or not they have had preservative treatments.</p> <p>Proper classification of the waste both ensures compliance and enables the correct onward handling and treatment to be applied. In the case of treated wood, it may require high temperature incineration in a directive compliant facility. More information on this can be found here: https://www.gov.uk/how-to-classify-different-types-of-waste</p> <p>The circular economy is a concept designed to keep materials in use as long as possible, thus promoting resource efficient practice and deriving economic benefits.</p> <p>Adherence to the waste hierarchy and adoption of best practice in relation to site waste management planning will help you deliver against circular economy objectives.</p> <p>Observance of the waste hierarchy objectives and principles of the circular economy will depend upon the selection of the most sustainable option at every phase of a development project, from reduction through design and architecture, to the selection of the most efficient recovery process for the treatment and use of waste.</p> <p>Where a development involves any significant construction or related activities, we would recommend using a management and reporting system to minimise and track the fate of construction wastes, such as that set out in PAS402: 2013, or an appropriate equivalent assurance methodology. This should ensure that any</p>	<p>waste estimate and specify key responsibilities (e.g. applying the waste hierarchy, waste classification and waste duty of care), reporting and auditing requirements and waste recovery targets.</p>	

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>waste contractors employed are suitably responsible in ensuring waste only goes to legitimate destinations.</p>		
	<p>Waste to be taken off site</p> <p>Contaminated soil that is, or must be disposed of, is waste. Therefore, its handling, transport, treatment and disposal is subject to waste management legislation, which includes:</p> <ul style="list-style-type: none">• Duty of Care Regulations 1991• Hazardous Waste (England and Wales) Regulations 2005• Environmental Permitting (England and Wales) Regulations 2010• The Waste (England and Wales) Regulations 2011 <p>Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standards BS EN 14899:2005 'Characterisation of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.</p> <p>If the total quantity of waste material to be produced at or taken off site is hazardous waste and is 500kg or greater in any 12 month period the developer will need to register with us as a hazardous waste producer. Refer to our website at</p>	<p>A Framework CEMP covering these aspects accompanies the DCO application. A CEMP, based on the Framework CEMP, will be prepared and agreed with the relevant authorities at that time of construction, in advance of the commencement of construction works. This is secured through a DCO requirement.</p> <p>A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor as part of the detailed CEMP to be produced (as above). This will provide a waste estimate and specify key responsibilities (e.g. waste duty of care, waste classification, hazardous waste producers), reporting and auditing requirements and waste recovery targets.</p>	<p>Framework CEMP [EN010154/APP/7. 7]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>www.gov.uk/government/organisations/environment-agency for more information.</p> <p>Waste on site</p> <p>Excavated materials that are recovered via a treatment operation can be re-used on-site under the CL:AIRE Definition of Waste: Development Industry Code of Practice. This voluntary Code of Practice provides a framework for determining whether or not excavated material arising from site during remediation and/or land development works are waste.</p> <p>Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.</p> <p>The Environment Agency recommends that developers should refer to our:</p> <ul style="list-style-type: none">• Position statement on the Definition of Waste: Development Industry Code of Practice and;• website https://www.gov.uk/government/organisations/environment-agency for further guidance <p>If materials that are potentially waste are to be used on-site, the applicant will need to ensure they can comply with the exclusion from the Waste Framework Directive (WFD) (article 2(1) (c)) for</p>	<p>A Framework CEMP covering these aspects accompanies the DCO application.</p> <p>A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor as part of the detailed CEMP to be produced (as above). This will provide a waste estimate and specify key responsibilities (e.g. waste classification), reporting and auditing requirements and waste recovery targets. The Principal Contractor will determine whether excavated material use will be undertaken via a WFD exclusion, exemption, CL:AIRE DoW CoP MMP or Environmental Permit.</p> <p>An Environmental Permit is not anticipated, if required a permit would be obtained prior to commencing the activity.</p>	<p>Framework CEMP [EN010154/APP/7.7]</p>

Consultee	Summary of comment	How matter has been addressed	Location response
	<p>the use of, 'uncontaminated soil and other naturally occurring material excavated in the course of construction activities, etc...' in order for the material not to be considered as waste. Meeting these criteria will mean waste permitting requirements do not apply.</p> <p>Where the applicant cannot meet the criteria, they will be required to obtain the appropriate waste permit or exemption from us. A deposit of waste to land will either be a disposal or a recovery activity. The legal test for recovery is set out in Article 3(15) of WFD as:</p> <ul style="list-style-type: none">any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.We have produced guidance on the recovery test which can be viewed at https://www.gov.uk/guidance/waste-recovery-plans-and-permits#waste-recoveryactivities <p>You can find more information on the Waste Framework Directive here: https://www.gov.uk/government/publications/environmental-permitting-guidance-the-waste-framework-directive</p>	<p>If required, a Materials Management Plan (MMP) would be developed by the Principal Contractor as part of the CEMP at detailed design stage, post consent.</p>	of

Consultee	Summary of comment	How matter has been addressed	Location response	of
	<p>More information on the definition of waste can be found here: https://www.gov.uk/government/publications/legal-definition-of-waste-guidance</p> <p>More information on the use of waste in exempt activities can be found here: https://www.gov.uk/government/collections/waste-exemptions-using-waste</p> <p>Non-waste activities are not regulated by us (i.e. activities carried out under the CL:ARE Code of Practice), however you will need to decide if materials meet End of Waste or By-products criteria (as defined by the WFD). The 'Is it waste' tool, allows you to make an assessment and can be found here: https://www.gov.uk/government/publications/isitwaste-tool-for-advice-on-the-byproducts-and-end-of-waste-tests</p> <p>Please also see further waste permit information below.</p>			
	<p>Any development using waste or other material for engineering works may require an Environmental Permit, unless it is exempt from the need for a permit. If a permit is required, it must be obtained prior to commencing the activity and the applicant should allow three months for the determination of a standard rules permit and four months for the determination of a bespoke permit. For further advice please visit GOV.UK (https://www.gov.uk/topic/environmental-management/waste).</p>	<p>An Environment Permit is not anticipated, if required a permit would be obtained prior to 7] commencing the activity.</p>	<p>Framework CEMP [EN010154/APP/7.</p>	
Lincolnshire County Council	<p>When reviewing the submitted scoping report, it is noted that in Para 13.7 the impacts upon Minerals Safeguarding Areas have been scoped out. It appears that the consideration of</p>	<p>The Materials and Waste assessment IEMA Guidance (Ref 14-46) methodology only takes</p>	<p>Appendix Minerals Safeguarding</p>	<p>12-C:</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>safeguarding has been limited to potential effects upon sites allocated in the Lincolnshire Minerals and Waste local Plan: Site Locations document (2017), namely MS04-LT: Swinderby Airfield, Witham St Hughs and MS05 LT Norton Bottoms Quarry Stapleford. The report fails to take account of Policy M11 of the Core Strategy and Development Management Polices document 2016.</p>	<p>into account safeguarded mineral sites. Mineral Safeguarding Areas are covered in Appendix 12-C: Minerals Safeguarding Assessment [EN010154/APP/6.3].</p>	Assessment [EN010154/APP/6.3]
Lincolnshire County Council	<p>More detail and justification is required to substantiate the assertion that the amount of waste to be generated during the operation phase is minimal. The longevity of projects such as this are 40 years yet this is proposed for an unlimited time and consequently it can reasonably be assumed that most of the infrastructure necessary for this project will need to be replaced at least once during the operational phase. Currently there are 11 other large solar projects in the County at various stage of the Development Consent Process creating a potential 5000MW of energy. All the infrastructure required for these projects, if approved, would be constructed during a similar timescale and is expected to be replaced at least once during the operational phase putting significant pressure on the County's waste facilities and consequently this topic should be scoped in to set out how this will be addressed. The Council therefore disagrees that the topic of waste is 'scoped out' and a standalone topic on waste should be included to consider the disposal methos of the solar infrastructure that becomes unviable during the operational phase which is particularly important when considered with the significant number of other solar projects that are emerging in the</p>	<p>Chapter 14: Environmental Topics [EN010154/APP/6.1] includes a waste assessment for construction, operation and decommissioning.</p> <p>The operational life of the Proposed Development is 60 years with decommissioning to start 60 years after commercial operation date.</p> <p>The ES considers cumulative impacts at decommissioning due to other solar farms in the local area which are also likely to be decommissioning in a similar timescale.</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>Construction: Table 14-24 Estimated Construction Waste</p> <p>Operation: Paragraph 14.5.84.</p> <p>Decommissioning: Table 14-25 Estimated Decommissioning Waste</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	County both NSIPs and Town and Country Planning Act applications.		
North Kesteven	We agree that 'waste' can be scoped out as long as there is reference to within reports/assessments to the likely volume and disposal methods of replacement panels and components throughout the operational lifetime.	Likely volume and disposal methods of replacement panels and components throughout the operational lifetime are included in Chapter 14: Other Environmental Topics [EN010154/APP/6.1].	Paragraph 14.5.84.

14.5.8 Further consultation in response to formal pre-application engagement was undertaken through statutory consultation between 21 October and 2 December 2024, inviting comments on the Proposed Development, including the Preliminary Environmental Information (PEI) Report. **Table 14-20** outlines the statutory consultation responses relating to the Materials and Waste assessment and how these have been addressed through this ES. The **Potential Main Issues for Examination [EN010154/APP/7.11]**, **Consultation Report [EN010154/APP/5.1]** and **Consultation Report Appendices [EN010154/APP/5.2]** provide further detailed responses, as relevant, to the feedback received during statutory consultation.

Table 14-20 Statutory Consultation Responses (Materials and Waste)

Consultee	Summary of comment	How matter has been addressed	Location of response
LCC	<p>LCC notes the proposed project timeline of 60 years and the intention for solar PV panels to be replaced twice during this time period. There is limited information regarding waste in the current documents, however the commitment to comply with legislation and production of documents including Framework CEMP, Framework Site Waste Management Plan, Framework OEMP and Framework DEMP is welcomed. LCC would expect the ES to also be accompanied by a Waste Management Strategy (WMS). This WMS should encompass all stages of the proposed project (construction, operational and decommissioning) as well as and potential cumulative impacts. LCC would expect ongoing updates to any WMS produced as the project progresses, the WMS should state waste types, quantity (year by year forecasts) and final destination for all waste produced on site.</p> <p>LCC notes the applicant's conclusion that no significant effects are anticipated during the construction phase. However, there is currently very little information so far to support this, LCC considers this to be too strong of a statement without having sight of the detailed analysis to support this conclusion.</p> <p>LCC also considers further details regarding the operational phase are also necessary, particularly due to the substantial timeframe of 60 years. It is considered that due to the longevity of the operation consideration should be given to the likely higher failure rate of solar PV panels later in the project, and</p>	<p>The overarching waste management strategy is covered in Chapter 14: Other Environmental Topics [EN010154/APP/6.1] and the Framework CEMP, OEMP and DEMP.</p> <p>A separate Waste Management Strategy is not anticipated to be required as the waste strategy is included within the Framework CEMP, OEMP and DEMP which accompanies the DCO application and sets out the general principles to be followed in the construction of the</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>Framework CEMP [EN010154/APP/7.7]</p> <p>Framework OEMP [EN010154/APP/7.8]</p> <p>Framework DEMP [EN010154/APP/7.9]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>management of the subsequent waste, such details be included in any Operational Environmental Management Plan (OEMP).</p> <p>LCC notes that paragraph 3.4.3 indicates that "the ES will include an assessment of the likely impact of component replacement... and outline what measures will be put in place to ensure that these components are able to be diverted from the waste chain." LCC is pleased to see the intended compliance with the waste hierarchy.</p> <p>It is also noted that the applicant has stated that no significant effects are expected during the operation of the proposed development. However, given that it is also stated the solar PV panel waste generated by the proposed development would be managed by specialist regional or national recycling facilities, which would be developed over the operation and maintenance phase of the development LCC considers this statement to be premature. Until such recycling facilities are operational and capable of dealing with the waste produced by this development. Operational waste could be a significant waste stream and as such needs careful consideration.</p> <p>Currently there are 11 other proposed NSIPs for solar development located within Lincolnshire at various stages within the DCO process. All the infrastructure required for these projects, if approved, would be constructed during a similar timescale which would put significant pressure on the County's waste facilities. LCC would highlight that local facilities for recycling solar waste do not exist at present, and there is no certainty that they will in 60 years' time. This has the potential to become a significant issue as a result of the cumulative solar waste quantities that might arise from solar projects in the county and region. These</p>	<p>Proposed Development including for waste. A CEMP, OEMP and DEMP based on the Framework CEMP, OEMP and DEMP will be prepared and agreed with the relevant authorities at that time of construction, in advance of the commencement of construction works, operation and decommissioning as relevant. This is secured through DCO requirements.</p> <p>A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor as part of the detailed CEMP to be produced</p>	

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>factors need to be taken into account as part of any decommissioning and potentially operational management plans.</p> <p>Further consideration and more detailed assessment of the likely waste streams and how they will be managed will be required in respect of construction and operation waste particularly in light of:</p> <ul style="list-style-type: none">• the panel turnover forecasted for other sites,• the current lack of facilities locally for processing end of life panels, and• the cumulative arising from all solar NSIPs <p>LCC welcomes the principles of the Waste Hierarchy and proximity principle, this should be elaborated upon further within the ES and WMS. The developer should aim to minimise and reuse waste wherever possible in accordance with the Waste Hierarchy. The waste management proposals need to ensure that the Waste Hierarchy principles are followed, and more detailed plans should demonstrate how this will be achieved.</p>	<p>(as above). This will provide a waste estimate and specify key responsibilities, reporting and auditing requirements and waste recovery targets. Final destinations of all waste produced on site would be confirmed by the Principal Contractor .</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>includes a waste assessment that concludes no significant effects are anticipated during the construction phase</p> <p>This ES considers cumulative impacts at decommissioning due</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
		<p>to other solar farms in the local area also being likely to be decommissioned within a similar timescale.</p>	
NKDC	<p>Comments on materials and waste will be made by LCC, however, we would like to see further explanation on the recycling and waste minimisation as part of the requested information on the programme for replacement of key equipment listed in Table 3.10.</p> <p>CLLP policy S10 'Supporting a Circular Economy' states that the policy aims to support development proposals which will contribute to the delivery of circular economy principles, including reducing material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life, along with the incorporating of sustainable waste management onsite.</p>	<p>The overarching waste management strategy, including applying the waste hierarchy and designing out waste as per circular principles, is covered in: Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>and the Framework CEMP, OEMP and DEMP.</p> <p>Replacement of key equipment is covered in Paragraph 14.1.56 of</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>Framework CEMP [EN010154/APP/7.7]</p> <p>Framework OEMP [EN010154/APP/7.8]</p> <p>Framework DEMP [EN010154/APP/7.9]</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
Environment Agency	<p>G1 – Design life and replacement frequency for key components</p> <p>Provide further explanation on how the key components will be recycled / waste will be managed.</p> <p>Solar panels are recyclable, however the percentage recoverable depends very much on the manner of construction, with 'cheaper' panels having a lower recovery rate. Thin film panel recovery is about 95% of the semiconductor and 90% of the glass. Silicon panel recovery is 100% of the aluminium, 95% of the glass, 80% of the cell modules and 85% of the silicon. (the ecoexperts.co.uk) – 99% overall is an over estimation. Currently the company quoted in the report, Recycle Solar, are the only industrial scale panel recycler in the UK. They operate on waste exemptions only so have a limited capacity. Quite a large percentage are exported to France by Veolia. The fact that such a large company has not invested in UK facilities brings the assumption at 14.5.81 into question. Studies in the USA suggest a cost per panel to recycle at \$10-20. This is a considerable financial burden to have at the end of the project. We recommend that the applicant, and other energy companies, consider investing in the processes required to fully recycle the large number of panels in this and other schemes.</p>	<p>The overarching waste management strategy is covered in Chapter 14: Other Environmental Topics [EN010154/APP/6.1].</p>	<p>Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p> <p>Framework CEMP [EN010154/APP/7.7]</p> <p>Framework OEMP [EN010154/APP/7.8]</p> <p>Framework DEMP [EN010154/APP/7.9]</p>
		<p>It is not proposed to store waste batteries on-site. They will be removed from the containers and taken away straightaway, following the waste duty of care as outlined in the Framework CEMP, OEMP and DEMP.</p>	

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>Dependent on the type of solar panel used, it is possible that materials with hazardous properties could be used in their construction, such as cadmium telluride or copper indium gallium selenide. Panels broken on site may leach this material. All waste must be assessed following WM3 waste assessment guidance and transported and disposed of following duty of care and hazardous waste regulations.</p>		
	<p>Provide further details on how waste batteries will be stored and disposed of and the risk of pollution to the environment managed/mitigated.</p>		
	<p>Presumably waste batteries will be stored on site briefly after being swopped out. These should be separated and ideally stored within a bund. Li-ion batteries contain a lot of energy and burn ferociously, water alone is unlikely to extinguish them. We have experience of battery fires on waste sites that encapsulating the burning batteries in soil is very effective. Li-ion batteries can be recycled in the UK; however, it is an expensive operation to set up, including the permitting and regulatory aspect. Battery recycling operations generally are high risk with fires regularly reported. The risks are sometimes greater than the rewards, depending on the price of materials in the metals sector, so plants are frequently shut down if prices drop, leading to the bulking up of batteries at storage sites. There is a finite amount of storage for waste batteries of this and other battery types in the UK currently.</p>		

14.5.9 Additional engagement has been undertaken with key stakeholders including Lincolnshire County Council and the Environment Agency.

14.5.10 A summary of this additional engagement is presented in **Table 14-21**.

Table 14-21 Additional Consultation Events (Materials and Waste)

Consultee	Date / Method	Summary of Consultation
Lincolnshire Council	County 24 February 2025 - Virtual meeting	Discussion of statutory consultation responses.
Environment Agency	28 February 2025 - Virtual meeting	Discussion of statutory consultation responses.

Legislation and Planning Policy

14.5.11 Legislation, planning policy, and guidance relating to Materials and Waste and pertinent to the Proposed Development comprises the documents listed below. More detailed information can be found in **Appendix 14-A: Other Environmental Topics Legislation and Policy [EN010154/APP/6.3]**.

14.5.12 Applicable legislation to inform the Materials and Waste assessment includes:

- a. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) (2017 No. 572) (**Ref 14-53**);
- b. The Waste Framework Directive 2008 (**Ref 14-52**);
- c. The Waste (England and Wales) Regulations 2011 (**Ref 14-54**);
- d. Environmental Protection Act 1990 (**Ref 14-55**);
- e. The Environmental Permitting (England and Wales) Regulations 2016 (**Ref 14-56**);
- f. The Hazardous Waste (England and Wales) Regulations 2005 (amended in 2016) (**Ref 14-57**);
- g. Environment Act 2021 (**Ref 14-58**).
- h. The Waste Electrical and Electronic Equipment (WEEE) Regulations (**Ref 14-59**); and
- i. The Waste Batteries and Accumulators (Amendment) Regulations 2015 (**Ref 14-60**).

14.5.13 Applicable national planning policy informing the Materials and Waste assessment includes:

- a. National Planning Policy for Waste (Ref 14-61);
- b. The Waste Management Plan for England 2021 (Ref 14-62);

- c. A Green Future: Our 25 Year Plan to Improve the Environment 2018 (Ref 14-63);
- d. Environmental Improvement Plan 2023 (Ref 14-64);
- e. Our Waste, Our Resources, A Strategy for England 2018 (Ref 14-65);
- f. The Waste Prevention Programme for England: Maximising Resources, Minimising Waste 2023 (Ref 14-66);
- g. Overarching National Policy Statement for Energy (EN-1) (Ref 14-67); and
- h. National Planning Policy Framework (NPPF) (Ref 14-67).

14.5.14 Guidance documents relevant to the assessment of the impacts of the Proposed Development on Materials and Waste include:

- a. National Planning Policy Guidance (NPPG) for Minerals and Waste (Ref 14-69);
- b. IEMA Guide to: Materials and Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach (Ref 14-46);
- c. Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoW CoP) (Ref 14-70);
- d. Waste and Resources Action Programme (WRAP) Designing Out Waste: A Design Team Guide for Civil Engineering (Ref 14-71);
- e. Waste Duty of Care Code of Practice (Ref 14-72);
- f. Applying the Waste Hierarchy (Ref 14-73);
- g. Solar Power Lifecycle Quality Best Practice Guidance (Ref 14-74);
- h. The UK Battery Strategy (Ref 14-75); and
- i. Solar Supply Chains: Sustainability Issues and Action (Ref 14-76).

14.5.15 Local planning policies that are relevant to the Proposed Development and Materials and Waste are:

- a. Central Lincolnshire Local Plan (Adopted April 2023) (Ref 14-77); and
- b. Lincolnshire Minerals and Waste Local Plan (adopted June 2016) (Ref 14-48).

Assessment Assumptions and Limitations

14.5.16 The Materials and Waste Assessment has been undertaken on the basis of information available at the time of the assessment. Any assumptions made for the assessment, and the limitations this presents, are reported below:

- a. The future baseline (for landfill capacity) is assumed to be the same as the current baseline, as outlined in **Paragraphs 14.5.50-14.5.53**.
- b. Materials and waste estimates are based upon project-specific information provided by the design team and other similar Nationally Significant Infrastructure Project (NSIP) solar developments extrapolated for the Proposed Development megawatt (MW);

- c. The solar photovoltaic (PV) panels, Battery Energy Storage System (BESS), and supporting infrastructure would be manufactured off-site to specified sizes; and
- d. The national waste recovery target is 70% and was exceeded in 2022 in England at 94.3% (Ref 14-79) (most recent year for which data is available) Standard, good and best practice recovery rates for key construction materials are outlined in Waste Targets of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**, Therefore, a recovery rate of 70% is assumed be achievable for the purpose of the waste assessment.

Study Area

14.5.17 The study areas for the assessment of impacts related to Materials and Waste have been defined in line with the IEMA Guidance (Ref 14-46).

14.5.18 Two study areas are defined: a Proposed Development Study Area (within which waste associated with the Proposed Development is generated, construction materials are used and allocated/safeguarded mineral and waste sites are present), and an Expansive Study Area (within which landfills and other waste management facilities that manage waste generated by the Proposed Development are likely to be located and construction materials are available). Together the Proposed Development Study Area and Expansive Study Area are referred to as 'the Study Areas'.

Proposed Development Study Area

14.5.19 The Proposed Development Study Area for construction, operational (including maintenance) and decommissioning waste generation, and for use of construction materials (key construction materials only), comprises the DCO Site (i.e. the Principal Site and Cable Corridor). This includes temporary offices, compounds and storage areas.

14.5.20 The Proposed Development Study Area for impacts on allocated/safeguarded mineral and waste sites during construction, operation and decommissioning is aligned to the DCO Site.

Expansive Study Area

14.5.21 The Expansive Study Area (within which landfills and other waste management facilities that manage waste generated by the Proposed Development are likely to be located and construction materials are available) for non-hazardous and inert waste management is the East Midlands region. The Expansive Study Area and regions include the following sub-regions, as outlined in the Environment Agency's 2023 Waste Summary Tables for England - Version 1 (Ref 14-80):

- a. Derbyshire;
- b. Leicestershire;
- c. Lincolnshire;
- d. Northamptonshire; and

- e. Nottinghamshire.

14.5.22 The Expansive Study Area for hazardous waste management is England.

14.5.23 The Expansive Study Area for waste management is defined based on professional judgement and informed by consideration of the proximity principle.

14.5.24 The proximity principle for hazardous waste in England is outlined in Principle 2 - Infrastructure Provision in the Strategy for Hazardous Waste Management in England (Ref 14-81), and states: *"we look to the market for the development of hazardous waste infrastructure, which implements the hierarchy for the management of hazardous waste and meets the needs of the UK to ensure that the country as a whole is self-sufficient in hazardous waste disposal, facilities are put in place for hazardous waste recovery in England, and the proximity principle is met"*. Planning for hazardous waste management is also undertaken at a national level.

14.5.25 The Expansive Study Areas for the availability of key construction materials (aggregates, asphalt, concrete and steel) are national (United Kingdom (UK) or Great Britain (GB)) for steel, and the East Midlands region for aggregates, asphalt and concrete.

Assessment Methodology

Scope of Assessment

14.5.26 The assessment of materials and waste considers the following:

- a. Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal;
- b. Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a licence, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves;
- c. As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas; and
- d. Mineral Planning Authorities are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

14.5.27 **Table 14-22** provides the outline scope of the materials and waste assessment presented in this Chapter Section.

Table 14-22 Outline Scope of Materials and Waste Assessment

Proposed Development Phase	Potential Effects	Scope In / Out
Construction, Operation (including maintenance) and Decommissioning	Waste arising from extraction, processing and manufacture of construction components and products.	Scoped out – This assumes that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed as they relate to procurement decisions that cannot be assured.
	Other environmental impacts associated with the management of waste from the Proposed Development.	Scoped out – Other environmental impacts associated with the management of waste from the Proposed Development (e.g. on water resources, air quality, noise or traffic resulting from the generation, handling, on-site temporary storage or off-site transport of materials and waste) are not included in this assessment, as they are addressed separately in other relevant chapters of the ES [EN010154/APP/6.1].
	Changes allocated/safeguarded mineral site	to Scoped out – There are no allocated/safeguarded mineral sites within the Proposed Development Boundary.
	Changes allocated/safeguarded waste site	to Scoped out – There are no allocated/safeguarded waste sites within the Proposed Development Boundary.

Proposed Development Phase	Potential Effects	Scope In / Out
Construction	Changes in the availability of materials	Scoped in.
	Changes in available landfill capacity	Scoped in.
Operation (including maintenance)	Changes in the availability of materials	Scoped out – Effects on the availability of materials during the operation of the Proposed Development. Forecast materials are (using professional judgement) considered negligible in relation to the scale and nature of the Proposed Development and less than construction.
	Changes in available landfill capacity	Scoped in.
Decommissioning	Changes in the availability of materials	Scoped out – Effects on the availability of materials during the decommissioning of the Proposed Development. Forecast materials are (using professional judgement) considered negligible in relation to the scale and nature of the Proposed Development and less than construction.
	Changes in available landfill capacity	Scoped in.

Impact Assessment Methodology

Receptor Sensitivity

14.5.28 The sensitive receptors for the assessment of materials and waste impacts are:

- a. Landfill capacity in the Expansive Study Area of the East Midlands (non-hazardous and inert landfill capacity) – as defined in the IEMA Guidance (Ref 14-46) “*landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities, This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.*”; and
- b. Materials, national and regional availability of key construction materials – as outlined in the IEMA Guidance (Ref 14-46) “*materials are, in their own*

right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.”

Materials

14.5.29 The sensitivity of materials relates to the availability and type of construction materials to be consumed by the Proposed Development. The IEMA Guidance (Ref 14-46) criteria described within Table 1 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]** is used to determine the sensitivity of materials.

14.5.30 Material receptor sensitivity is determined as “low”. On balance, the key construction materials required for the construction of the Proposed Development are forecast (through trend analysis and other information e.g. material sales) to be generally free from known issues regarding supply and stock. Key materials required for construction and operation (including maintenance) are likely to be available comprising a high proportion of sustainable features and benefits (e.g. recycled content).

14.5.31 Potential recycled content for the main construction materials is outlined in Table 11 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

Waste

14.5.32 The sensitivity of waste relates to availability of landfill capacity in the absence of the Proposed Development as outlined in the IEMA Guidance (Ref 14-46) *“landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste.”* The sensitivity of landfill capacity is assessed based on a review of historic landfill capacity trends where available and information from relevant policy documents.

14.5.33 The criteria used to determine the sensitivity of landfill capacity is described within Table 2 and Table 3 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

14.5.34 Waste receptor sensitivity is determined as “very high”. There is no publicly available information on any potential changes to landfill capacity by the time of the construction, operation and decommissioning of the Proposed Development, therefore a worst-case scenario for sensitivity is considered (e.g. landfill capacity is assumed to remain the same but a very considerable reduction in capacity cannot be excluded). A scenario in which no landfill void space is available is deemed to be unrealistic as outlined in the future baseline in paragraphs 14.5.50-14.5.53.

Magnitude of Impacts

14.5.35 The IEMA Guidance (Ref 14-46) for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of construction materials’ use on the baseline national demand from the construction of the Proposed Development. The criteria used to assess the magnitude of impact for materials are provided in **Table 4 of Appendix 14-**

E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3].

14.5.36 The IEMA Guidance (Ref 14-46) offers two methods to assess waste effects methods, of which Method W1 has been selected for this assessment:

- a. W1 – Void Capacity, a detailed methodology, most appropriate for larger and more complex developments and recommended for statutory EIAs. The magnitude of impact from waste is assessed by determining the percentage of the remaining landfill void capacity that will be depleted by waste produced during construction and/or operation. In a worst case, where landfill sensitivity is very high, a significant effect would occur at a magnitude of minor, which for non-hazardous and inert waste generated by the Proposed Development is more than 1% of landfill capacity and for hazardous waste is more than 0.1% of landfill capacity. The criteria used to assess the magnitude of impact for inert and non-hazardous and hazardous waste is provided within Tables 5, 6 and Table 7 respectively of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.
- b. W2 – Landfill Diversion, a simpler approach, appropriate for smaller and less complex developments, and non-statutory EIAs where developments are compared to a good practice landfill diversion rate (waste recovery rate) of 90%.

Significance Criteria

14.5.37 The effect thresholds and the associated significance of effects are described within Table 7 and Table 8 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]** respectively. Materials and Waste specific criteria in the IEMA Guidance (Ref 14-46) are used for the assessment.

14.5.38 Where a significance of effect could fall into two categories (i.e. neutral or slight, slight or moderate), professional judgement has been used to justify and determine which category a receptor falls into, to arrive at a single rating. Where professional judgement has been used in these cases, a justification has also been provided.

Sources of Information/Data

14.5.39 The following sources of information have been reviewed and have informed the assessment of Materials and Waste:

- a. Environment Agency's 2023 Waste Summary Tables for England - Version 1 - Remaining Land Capacity (Ref 14-80);
- b. Environment Agency's Permitted Waste Sites - Authorised Landfill Site Boundaries (Ref 14-83);
- c. Environment Agency's Historic Landfill Sites (Ref 14-82);
- d. Environment Agency's Environmental Permitting Regulations - Waste Sites (Ref 14-84);
- e. UK Steel's Key Statistics Guide May 2024, 2023 data (Ref 14-85);

- f. Mineral Products Association's Profile of the UK Mineral Products Industry, UK production of minerals and mineral products 2023, 2022 regional data (Ref 14-86);
- g. Waste recovery targets (Ref 14-79);
- h. Project-specific information provided by the design team; and
- i. Relevant legislation and national policy, as detailed in **Appendix 14-A Other Environmental Topics Legislation and Policy [EN010154/APP/6.3]**.

Baseline Conditions

Existing Baseline

Regional and National Availability of Key Construction Materials

14.5.40 The national requirement (providing an indication of availability) in steel (in 2023) and regional sales of aggregates and concrete (in 2022) is provided within Table 9 and Table 10 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**. These are expected to be the key materials used during the Proposed Development's construction. In summary, baseline availability is:

- a. National steel, 15 million tonnes (Ref 14-85);
- b. Regional aggregates (crushed rock and sand and gravel), 36.7 million tonnes (Ref 14-86); and
- c. Regional concrete, 1.3 million tonnes (Ref 14-86).

Allocated/Safeguarded Mineral and Waste Sites

14.5.41 There are no safeguarded mineral and waste sites identified within the Proposed Development boundary in the Central Lincolnshire Local Plan Policies Map (**Ref 14-87**), Lincolnshire Minerals and Waste Local Plan, Core Strategy and Development Management Policies (Ref 14-48) or Lincolnshire Minerals and Waste Local Plan, Site Locations (Ref 14-88).

Landfill Capacity

14.5.42 The Environment Agency's Waste Management Information includes information about remaining landfill capacity. Remaining landfill capacities at the end of 2023 are outlined within the Environment Agency's 2023 Waste Summary Tables for England – Version 1 (Ref 14-80) for the non-hazardous and inert waste Expansive Study Area (East Midlands) and the hazardous waste Expansive Study Area (England) are shown in Table 12 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**. In summary the landfill capacity used in the assessment is:

- a. East Midlands total non-hazardous and inert landfill capacity, approximately 49.7 million m³, and
- b. England hazardous landfill capacity, approximately 9.7 million m³.

Waste Management Infrastructure

14.5.43 There are no permitted waste sites or waste site applications within the Proposed Development boundary, as outlined in the Environmental Permitting Regulations – Waste Sites and Waste Site Applications (**Ref 14-84**).

Historic and Authorised Landfills

14.5.44 There are no authorised landfills recorded within the Proposed Development boundary, as outlined in the Environment Agency's Permitted Waste Sites – Authorised Landfill Site Boundaries (**Ref 14-83**).

14.5.45 There are no historic landfill sites located within the Proposed Development boundary, as outlined in the Environment Agency's Historic Landfill Sites (**Ref 14-84**).

Waste Recovery Targets

14.5.46 The national target for recovery of construction and demolition (C&D) waste is 70% by weight, as set out in the Waste Framework Directive (Ref 14-52) and the Waste Management Plan for England (Ref 14-62). The target specifically excludes naturally occurring materials with EWC Code 17 05 04 (17 05 04 soil and stones other than those mentioned in 17 05 03* (soils and stone containing dangerous substances)). Recovery is deemed to include reuse, recycling, and other recovery (e.g. energy recovery).

14.5.47 A good practice landfill diversion target of 90% has been achieved and exceeded by major UK developments as outlined in the IEMA Guidance (Ref 14-46). In 2022, the most recent year for which data is available, England achieved a recovery rate of 94.3% (Ref 14-79).

14.5.48 A recovery rate of 70% is assumed be achievable for the purpose of the waste assessment. This is a conservative assumption, since the UK has achieved 94.3% recovery for C&D waste and a UK company SolRecycle reports a recovery rate of 95% for solar PV panels (Ref 14-89).

14.5.49 Standard, good and best practice recovery rates by material are provided by WRAP (Ref 14-90). Recovery rates for key construction materials and other construction wastes relevant to the Proposed Development are provided in Table 14 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

Future Baseline

14.5.50 There is no publicly available information on any potential changes to national or regional material availability by the time of the construction of the Proposed Development. Construction material demand, such as ready mixed concrete, is closely aligned to both the quantity of construction taking place and the general economy. On the basis of professional judgement, it is deemed inappropriate to forecast future availability as the demand is unlikely to be linear and it is not possible to set a future baseline for material resources. As such, future availability is assumed to remain the same as the current baseline as outlined in Table 9 and Table 10 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

14.5.51 There is no publicly available information regarding any potential changes to landfill capacity by the time of the Proposed Development's construction.

14.5.52 Due to the cyclic nature of inert landfill capacity (e.g. landfill capacity decreasing, and then new sites or landfill cells being opened with landfill capacity increasing), it is not realistic to forecast future landfill capacity, based on professional judgement. Therefore, inert and hazardous landfill capacity is assumed to remain the same as the current baseline, as outlined in Table 12 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

14.5.53 For non-hazardous waste, using the current rate of decline of landfill capacity and forecasting into the future would lead to the inevitable conclusion that there would be no void space remaining. However, this is not a credible scenario as if there is still a need for landfill, then the waste planning authority will need to consent new landfill capacity to replace that which has been used up. Therefore, non-hazardous and hazardous landfill capacity is assumed to remain the same as the current baseline, as outlined in Table 12 of **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

Embedded Mitigation

14.5.54 Where possible, mitigation measures have been incorporated into the Proposed Development's design so that waste can be minimised.. Embedded mitigation is also represented by implementation of the waste hierarchy. Through iterative assessment, potential impacts have been assessed and opportunities to mitigate them identified with the aim of preventing or reducing impacts as much as possible. This approach provides the opportunity to prevent or reduce potential adverse impacts from the outset. This embedded mitigation/mitigation by design approach has been taken into account when evaluating the significance of the potential impacts of the Proposed Development in terms of materials and waste.

14.5.55 The Proposed Development will aim to prioritise waste prevention, followed by preparing for reuse, recycling and recovery and lastly disposal to landfill as per the waste hierarchy, illustrated in **Plate 1** below.

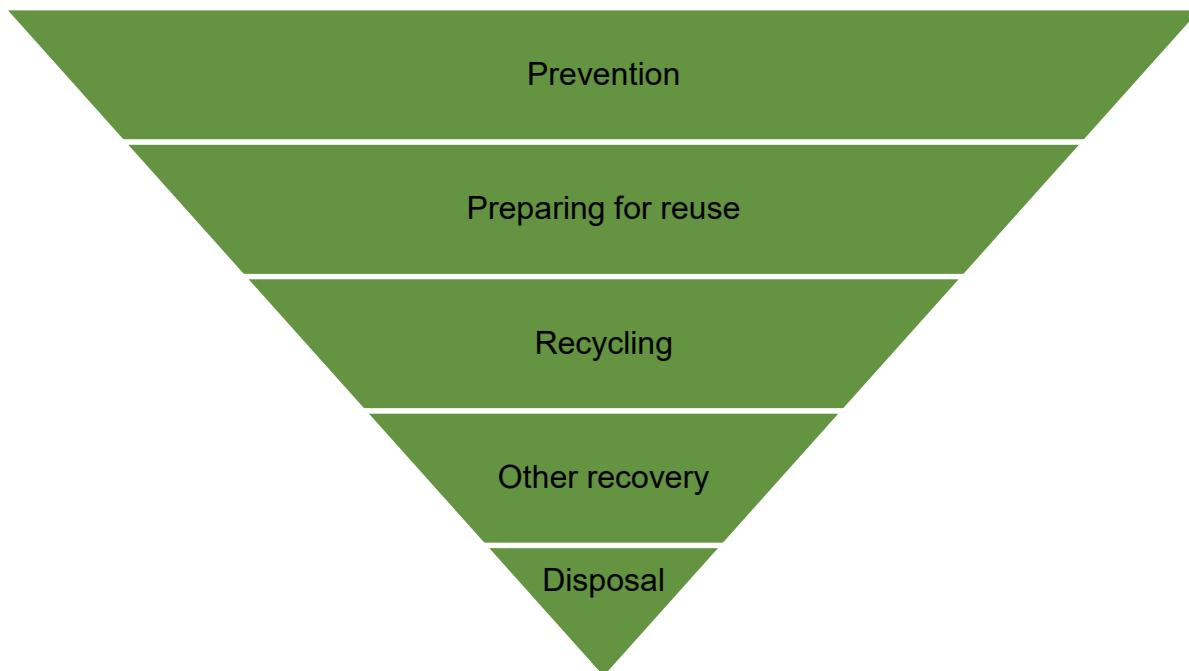


Plate 1: Waste Hierarchy (Ref 14-73)

14.5.56 All management of waste will be in accordance with the relevant regulations (as outlined in **Appendix 14-A: Other Environmental Topics Legislation and Policy [EN010154/APP/6.3]**) and waste will be transported by licensed waste hauliers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.

14.5.57 The Principal Contractor will separate the main waste streams on-site, prior to transport to an approved, licensed third party waste management facility for recovery, recycling or disposal.

14.5.58 The construction of the Proposed Development will be subject to measures and procedures defined within a CEMP and SWMP. The CEMP is secured by a requirements in the DCO, and the SWMP is secured through the CEMP, and they will include the implementation of industry standard and best practice measures and control measures for environmental impacts arising during construction, including the approach for materials and waste management on-site. These measures are set out in the **Framework CEMP [EN010154/APP/7.7]** submitted with the DCO application. The construction contractor will use the Framework CEMP as the basis for producing their CEMP and SWMP respectively, prior to works commencing on-site.

14.5.59 The SWMP prepared by the Principal Contractor, will provide a waste estimate and specify key responsibilities, reporting and auditing requirements and waste recovery targets. The SWMP will be finalised with specific measures to be implemented prior to the start of construction.

14.5.60 Any excavated material reuse would be implemented via a Materials Management Plan (if required) in accordance with the CL:AIRE DoW CoP (Ref 14-70), exemption or Environmental Permit. All waste to be removed from the DCO Site will be undertaken by fully licensed waste carriers and taken to

licensed waste facilities and managed in line with the requirements of the Waste (England and Wales) Regulations (2011) (Ref 14-54) and the Hazardous Waste (England and Wales) Regulations (2005) (Ref 14-38).

14.5.61 If required, a Materials Management Plan (MMP) would be developed by the Principal Contractor to support the reuse of excavated materials, minimise off-site disposal; and to demonstrate the necessary lines of evidence to support the proper reuse/offsite disposal of materials and ensure compliance with regulatory guidance.

14.5.62 To reduce the potential impacts from materials and waste, and to achieve high levels of sustainability in the Proposed Development as a whole, the Principal Contractor will apply the principles of the waste hierarchy and adopt best practice measures (BPM) which go beyond statutory compliance. This may include BPMs set out in construction industry guidance for example, guidance from the Considerate Constructors Scheme (CCS), Waste & Resources Action Programme (WRAP) and Construction Industry Research and Information Association (CIRIA). The following approaches will be implemented, where practicable, to minimise the quantity of waste arising and requiring disposal:

- a. Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- b. Implementation of a 'just-in-time' material delivery system where practicable to avoid materials being stockpiled, which can increase the risk of damage and subsequent disposal as waste;
- c. Attention to material quantity requirements to avoid overordering and the generation of waste materials due to surplus;
- d. Reuse of materials on-site wherever feasible, e.g. reuse of excavated soil for landscaping;
- e. Off-site prefabrication, where practical, including the use of prefabricated structural elements;
- f. Segregation of waste at source, where practical, to facilitate a high proportion and high-quality recycling; and
- g. Off-site reuse, recycling and recovery of materials and waste where reuse on-site is not practical, e.g. through use of an off-site waste segregation or treatment facility or for direct reuse or reprocessing off-site.

14.5.63 It is not proposed to store waste batteries on site. They will be removed from the containers and taken away straight away, following waste duty of care.

14.5.64 The following designing out waste principles have been considered and will continue to be considered in the Proposed Development design:

- a. design for reuse and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects (e.g. reuse of excavated soil);
- b. design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill,

maximising the use of renewable materials and materials with recycled content;

- c. design for off-site construction: maximising the use of prefabricated structure and components, encouraging a process of assembly rather than construction where practicable;
- d. design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how de-constructability of elements can be maximised at end of first life; and
- e. design for materials and waste efficient procurement.

14.5.65 The operation of the Proposed Development will be subject to measures and procedures defined within an OEMP secured by a requirement in the DCO. The OEMP will include the implementation of industry standard practice and control measures for environmental impacts arising during operation, such as the approach for materials and waste management on-site. These measures are set out in the **Framework OEMP [EN010154/APP/7.8]** submitted with the DCO application. The Applicant will use the **Framework OEMP** as the basis for producing an OEMP prior to the operation of the Proposed Development.

14.5.66 The decommissioning of the Proposed Development will be subject to measures and procedures defined within a DEMP secured by a Requirement in the DCO. A **Framework DEMP [EN010154/APP/7.9]** is submitted with the DCO application which includes the approach for materials and waste management on-site. The decommissioning contractor will use the **Framework DEMP** as the basis for producing a DEMP prior to decommissioning works on-site.

Assessment of Likely Effects

14.5.67 The Proposed Development has the potential to affect Materials and Waste during construction, operation and decommissioning, in the following ways:

- a. Changes in demand for construction materials (construction only); and
- b. Changes in available landfill capacity.

14.5.68 This section considers the potential impacts, taking into account the committed mitigation measures as detailed in Section 14.5.54, assesses the potential for the Proposed Development to generate effects using the methodology as detailed in **Appendix 14-E: Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3]**.

Construction Effects

Materials

14.5.69 The estimated main construction material types and their associated quantities to be used for the Proposed Development's construction are shown within **Table 14-23** below.

14.5.70 Material receptor sensitivity is determined as "low" as outlined in paragraph 14.5.29-14.5.30. At "low" material receptor sensitivity, the point of significance is a major magnitude of impact, defined within Table 4 of **Appendix 14-E**:

Materials and Waste Impact Assessment Methodology and Baseline [EN010154/APP/6.3] as the “consumption of one or more materials is >10% by volume of the baseline availability”.

14.5.71 For steel, concrete and aggregates the magnitude of impact is considered to be ‘negligible’, given the Proposed Development’s estimated construction material requirements (<1% of national for steel and regional availability for concrete and aggregates respectively) (see **Table 14-23**).

Table 14-23 Estimated Construction Materials

Material type	Quantity (tonnes)	National material availability (tonnes)	% national material availability	Regional material availability (tonnes)	% regional material availability	Sensitivity	Magnitude	Effect	Significance
Steel	15,754	15,000,000	0.11	Not applicable, assessed at national level only		Low	Negligible	Slight	Not Significant
Concrete	2,318	Not applicable, assessed at regional level only		3,120,000	0.07	Low	Negligible	Slight	Not Significant
Aggregate	143,300			36,700,000	0.39	Low	Negligible	Slight	Not Significant

Waste

14.5.72 The type of waste generated during construction is likely to comprise:

- a. General waste from site offices and welfare facilities;
- b. Small quantities of waste from the maintenance of construction vehicles;
- c. Packaging waste from incoming materials (e.g. cardboard, wood and plastic);
- d. Other waste from construction of fencing, internal tracks, substations, construction compounds and other supporting infrastructure; and
- e. The solar PV panels, BESS and supporting infrastructure, would be manufactured off-site to specified sizes therefore, wastage during installation is expected to be minimal.

14.5.73 Anticipated waste streams and quantities are based on Proposed Development-specific information provided by the design team and the application documents for other similar NSIP solar developments extrapolated down for wood, plastic and paper and cardboard (**Table 14-24**).

Table 14-24 Estimated Construction Waste

Waste Type	Estimated Waste Quantity	Recyclable / Recoverable
General waste from site offices and welfare facilities	Minimal e.g. <100 tonnes	Yes
Waste from the maintenance of construction vehicles	Minimal e.g. <100 tonnes	Yes
Hazardous waste (e.g. chemicals, batteries, solvents, oils, oily rags aerosols etc.)	Minimal e.g. <100 tonnes	Yes
Wood (e.g. pallets and cable drums)	21,656 m ³	Yes
Plastic (e.g. packaging and protective foam layers)	2,166 m ³	Yes
Paper and cardboard (e.g. packaging)	16,242 m ³	Yes
Construction material wastage	Assumed as a 5% wastage rate for non-assembled components including concrete, aggregates. 3,406 m ³	Yes
Total hazardous waste	Minimal	
Total inert and non-hazardous waste	43,470 m³ (excluding minimal wastes)	

14.5.74 With embedded mitigation measures e.g. applying the waste hierarchy, designing out waste, in place, the overall quantities of construction waste anticipated to be sent to landfill are below 1% of regional inert and non-hazardous landfill capacity and less than 0.1% of national hazardous landfill capacity. Therefore, the magnitude of impact is negligible, and the effect is slight, which is considered to be not significant. The impact is direct and the duration of the impact is temporary (construction phase).

14.5.75 Excavated material (topsoil and subsoils) is not included in the construction waste estimates or when calculating the overall waste recovery rate since, where possible, the material would be reused on-site and hence will not be categorised as a waste. Waste recovery targets do not include excavated material (uncontaminated excavated soil and stones, European Waste Catalogue (EWC) code 17 05 04). This approach is consistent with the waste hierarchy and the objectives of minimising waste generation and reusing materials.

14.5.76 As the Proposed Development site is relatively flat, large-scale bulk earthworks are not expected to be required for the purposes of site formation and therefore there is not expected to be either a large surplus or shortfall of fill material requiring either export or import from/to the Principal Site. It is expected that all materials removed by cable trenching operations or in the creation of working or laydown/compound areas will be reinstated again with no import or export of materials being required.

14.5.77 At this stage the potential for generation of some surplus excavated material cannot be ruled out, but the quantities involved would not be significant in the context of regional inert and non-hazardous landfill capacity and national hazardous landfill capacity. Any surplus excavated material would only be disposed of to landfill as a last resort, with reuse or deposit for recovery being the preferred options.

14.5.78 Any excavated material reuse would be implemented via a Materials Management Plan (if required) in accordance with the CL:AIRE DoW CoP (Ref 14-70), exemption or environmental permit.

14.5.79 Considering the above, it is concluded that significant waste effects are not expected during construction of the Proposed Development.

Operational Effects

Operational Waste

14.5.80 During operation, the Proposed Development will be serviced by a nominal number of staff (up to four permanent staff per day), predominantly undertaking day-to-day maintenance tasks. In addition, there is expected to be around two visitors per week. Waste arisings from this day-to-day operation will include:

- a. Welfare facility waste; and
- b. General waste (paper, cardboard, wooden pallets etc).

14.5.81 All management of waste will be in accordance with the relevant regulations and waste will be transported by licensed waste hauliers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.

14.5.82 During operation, waste generation activity within the solar PV sites would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components (i.e. that fail or reach the end of their lifespan), periodic fence inspections, and monitoring activity to ensure the continued effective operation and maintenance of the Proposed Development.

14.5.83 During operation, waste generation is expected to be negligible, as solar PV panels do not generate any direct waste as part of the energy production process.

Component Replacement Waste

14.5.84 During the anticipated 60-year design life of the Proposed Development, it is expected that there will be requirement for the periodic replacement of some or all of the electrical infrastructure. Details regarding the replacement of solar PV panels and BESS area within the Proposed Development is presented in **Chapter 3: The Proposed Development [EN010154/APP/6.1]**. The following assumptions have been made for the programme of replacement activities:

- a. Ad hoc replacement of solar PV panels based on a failure rate of 0.05%, 316 solar PV panels per year (39 m³) and a minimal quantity of associated wooden pallets, plastic and cardboard packaging waste;
- b. It is expected all the solar PV panels will be replaced once during the Proposed Development's operational life. The solar PV panels are anticipated to be replaced over a maximum 12-to-24-month period, this would equate to 77,190 m³ of solar PV panel waste and associated wooden pallets and packaging waste. Wooden pallets and packaging waste would be less than construction outlined in **Table 14-24**;
- c. It is expected that the batteries within the BESS could be replaced up to five times (i.e. every 10 years) during the Proposed Development's operational life; this would equate to 7,613 m³ of BESS waste at each replacement; and
- d. Proposed Development components, such as the PV mounting structures, cabling, the substation, and the BESS area buildings, are not anticipated to be replaced during the Proposed Development's operational life. No intrusive ground works are anticipated to replace solar PV panels or the BESS.

14.5.85 Recycling routes are generally available for component replacement waste at present, and it is likely that there will be even greater opportunities for recycling in the future, not least because the recycling market will have expanded to meet demand as solar PV installations increase. A recovery rate of 70% is assumed be achievable for the purpose of the waste assessment.

14.5.86 It is likely that the solar PV panels and battery waste generated by the Proposed Development, during operation and maintenance and decommissioning phases, would be managed by specialist regional or national facilities; these facilities would be developed over the operation and maintenance phase of the Proposed Development in response to demand generated by the UK-wide solar energy industry. The capacity of such facilities is not expected to be influenced by other non-solar farm projects in the surrounding area; this is because the facilities will only be managing specific solar PV panel waste.

14.5.87 In addition, private sector waste companies will develop these facilities to respond to market demands. At present, solar PV panel waste generation is low, therefore there is a limited demand for facilities and their associated limited available capacity. It is therefore expected that the facilities which reuse, recycle, or recover end of-life solar PV panels will be developed as the quantities of this waste stream increase. The Waste Electrical and Electronic Equipment (WEEE) Regulations (Ref 14-59) and The Waste Batteries and Accumulators (Amendment) Regulations (Ref 14-60) place obligations on those who place solar PV panels and batteries on the market to finance the costs of collection, treatment, recovery and environmentally sound disposal; and the landfill tax strongly incentivise reuse, recycling and recovery.

14.5.88 The UK company SolRecycle reports a recovery rate of 95% for solar PV panels (Ref 14-89).

14.5.89 The UK market for lithium-ion battery recycling is under development, as the fleet of electric vehicles and other lithium-ion battery users rapidly increases. A number of new investments have been announced, and an 80% recovery rate is reported (Ref 14-91).

14.5.90 There are already organisations around the UK and Europe specialising in solar recycling, such as PV Cycle (Ref 14-92) and the European Recycling Platform (Ref 14-93). They are working with solar developers to minimise electrical waste and recycling old panels in line with the Waste Electrical and Electronic Equipment (WEEE) Regulations (Ref 14-59). In addition, companies such as SECONDSOL (Ref 14-94) offer a marketplace service for the purchase and selling of second-hand PV panels and equipment, where there is still a good level of life in the equipment remaining. Panels that have developed faults or damage can also be refurbished and repowered by specialist companies and the manufacturers and resold or reinstalled.

14.5.91 It is assumed that specialist regional or national facilities would be in place at the time of component replacement and decommissioning, and these would be developed in response to demand generated by the UK-wide solar PV panel industry and waste components would be reused, recycled, or recovered and not disposed of to landfill.

14.5.92 The **Framework OEMP [EN010154/APP/7.8]**, submitted with the DCO application, sets out the commitment of the Applicant to maximise recycling and reuse of the Proposed Development components at the end of their life.

14.5.93 Waste receptor sensitivity is determined as 'very high'. With the embedded mitigation measures in place e.g. applying the waste hierarchy, the overall quantities of operational waste to be disposed of to landfill are anticipated to be below 1% of regional inert and non-hazardous landfill capacity, and less than 0.1% of national hazardous landfill capacity. Therefore, the magnitude of impact is negligible, and the effect is slight, which is considered to be not significant.

14.5.94 Considering the above, it is concluded that significant waste effects are not expected during operation of the Proposed Development.

Decommissioning

14.5.95 As outlined in **Chapter 3: The Proposed Development [EN010154/APP/6.1]**, decommissioning is expected to take 12 to 24 months and be undertaken in phases. For the purposes of the assessment, it is expected to occur after 60-year design life of the Proposed Development.

14.5.96 At the end of the Proposed Development's operational phase, it is expected that the solar PV sites would be decommissioned and the associated land would be restored to its original use and condition, as far as practicable. During this time, it is expected that all associated solar PV panels, mounting structure, cabling, conversion units, BESS area, and substations would be removed from within the Development Area. Subsequently, these Proposed Development components will be recycled and/or disposed of in accordance with industry good practice and the market conditions at that time of decommissioning.

14.5.97 The anticipated Proposed Development decommissioning waste streams, and their associated quantities, are based on Proposed Development -specific information provided by the design team and other similar NSIP solar developments (**Table 14-25**).

Table 14-25 Estimated Decommissioning Waste

Waste Type	Estimated Waste Quantity	Recyclable / Recoverable
General waste from site offices and welfare facilities	Minimal e.g. <100 tonnes	Yes
Waste from the maintenance of construction vehicles	Minimal e.g. <100 tonnes	Yes
Hazardous waste (e.g. chemicals, batteries, solvents, oils, oily rags aerosols etc.)	Minimal e.g. <100 tonnes	Yes
Concrete and aggregates	966 m ³	Yes
Steel	1,969 m ³	Yes
Solar PV panels	77,190 m ³	Yes
BESS	7,613 m ³	Yes

Other e.g. supporting infrastructure, cables etc. 10,022 m³ Yes

Total hazardous waste	Minimal
Total inert and non-hazardous waste	97,760 m³ (excluding minimal wastes)

14.5.98 The assumptions outlined in Paragraphs 14.5.85-14.5.91 will also apply to decommissioning.

14.5.99 Waste receptor sensitivity is determined as 'very high'. With the embedded mitigation measures in place e.g. applying the waste hierarchy, the overall quantities of decommissioning waste to be disposed of to landfill are anticipated to be below 1% of regional inert and non-hazardous landfill capacity and less than 0.1% of national hazardous landfill capacity. Therefore, the magnitude of impact is negligible, and the effect is slight, which is considered to be not significant.

14.5.100 The **Framework DEMP [EN010154/APP/7.9]** submitted with the DCO application will set out the commitment of the Applicant to maximise reuse and recycling of Proposed Development components at the end of their life.

14.5.101 Considering the above, it is concluded that significant waste effects are not expected during decommissioning of the Proposed Development.

Additional Mitigation

14.5.102 As no potential significant effects have been identified in this Materials and Waste assessment, no additional mitigation is proposed.

Monitoring

14.5.103 As no potential significant effects have been identified for materials and waste, no monitoring of significant effects is proposed.

Residual Effects and Conclusions

14.5.104 No residual significant effects have been identified for materials and waste.

Cumulative Assessment

Cumulative Effects

14.5.105 This section assesses the potential effects of the Proposed Development in combination with the potential effects of other proposed and committed plans and projects including other developments (referred to as 'cumulative Proposed Developments') within the surrounding area.

14.5.106 This assessment has been made with reference to the methodology and guidance set out in **Chapter 5: EIA Methodology** of the ES **[EN010154/APP/6.1]** and considers all solar PV Proposed Development in Lincolnshire above 1MW.

Study Areas

14.5.107 The East Midlands is used for the non-hazardous waste study area (rather than Nottinghamshire and Lincolnshire alone) recognising the fact that waste may not always be managed within the Waste Planning Authority area where it is generated and may instead be managed at the regional level.

14.5.108 England is used for the hazardous waste study area.

14.5.109 The cumulative developments to be considered in combination with the Proposed Development for waste are proposed solar farms located in Lincolnshire.

Recovery and Recovery Assumptions

14.5.110 Two assessments have been carried out, with different assumptions around recovery rates:

- a. A “realistic worst case” of a 70% recovery rate, based on current and likely future recovery rates. Recovery is defined as reuse, recycling and recovery e.g. (energy from waste).
- b. An “absolute worst case” based on the assumption that all C&D waste goes to landfill.

14.5.111 The “absolute worst case” is considered to be extremely unlikely to occur, and the “realistic worst case” is considered appropriately conservative for the following reasons:

- a. The 2022 C&D recovery rate for England was approximately 94.3% (Ref 14-79), exceeding the national target of 70% recovery and has remained at a similar level since 2010. A 70% recovery rate is therefore considerably lower than this rate.
- b. Waste generated by the Proposed Development comprises readily recyclable materials, with existing high recovery rates:
 - i. Concrete and aggregates are widely recycled for use in construction.
 - ii. Metals have a very high recovery rate with a well-developed market, historically driven by economics but increasingly also by the need for decarbonisation of the metal production sector.
 - iii. PV panels are recyclable and there are numerous examples of companies recycling them. Capacity for PV panel recycling in the UK is relatively low at present, due to small volumes of waste being generated (since most PV panels that have been installed are still operating). There are strong economic and regulatory drivers for recycling, and it is technically proven, and hence it is realistic to expect a high recovery rate.
 - iv. Legislation (The Waste Electrical and Electronic Equipment Regulations 2013 (Ref 14-59) and The Waste Batteries and Accumulators (Amendment) Regulations 2015 (Ref 14-60) places an obligation on producers (manufacturers and importers) of electrical

and electronic equipment (which includes PV panels) and batteries to finance the collection and recycling of their products. Producers of PV panels and batteries are obligated to join a Producer Compliance Scheme (PCS), which then ensures their legal obligations are met.

14.5.112 The assessment assumes that current policy, regulatory and fiscal incentives for recycling and otherwise diverting waste from landfill will be maintained. The Applicant considers this is a realistic worst case for assessment since:

- a. Any move away from the current policy framework would be inconsistent with the underlying principles of waste management that have been progressively implemented over the past 20+ years, as well as being inconsistent with the policy objectives of Net Zero (since recycling and recovery have a significant role to play in achieving Net Zero); and
- b. If at any point the policy framework were to move away from favouring recycling and recovery, then there would need to be a large expansion in landfill capacity to accommodate the waste that was no longer recovered or recycled; in which case landfill capacity would no longer be considered a sensitive receptor. A move away from favouring recycling/recovery without an associated increase in landfill capacity would not be a tenable policy.

Cumulative Impacts

14.5.113 The cumulative assessment follows the same approach as for the assessment of the Proposed Development presented in Section 14.5 of this Chapter, and considers the waste generated from the following other solar PV developments in Lincolnshire as outlined in **Table 14-26**.

14.5.114 Waste estimates are not available for all of these projects, and hence estimates have been generated specifically for this cumulative assessment by:

- a. Estimating PV module waste based on a nominal module capacity of 0.65 kW and weight of 37.9 kg;
- b. Assuming that the ratio of 'other waste' to 'PV module waste' for developments is the average of four developments for which decommissioning waste estimates are available (Tillbridge Solar Project, Gate Burton Energy Park, Longfield Solar Farm, and East Yorkshire Solar Farm) where 35% of total waste by mass comprises PV modules, and the remaining 65% is other waste.

14.5.115 This approach has been taken across all cumulative developments, including Fosse Green Energy (rather than using the estimates provided for individual projects), to enable a clear and consistent approach for the purpose of this assessment.

14.5.116 The cumulative assessment focuses on decommissioning waste since:

- a. the peak of waste generation would be during decommissioning and this is therefore the worst case in terms of waste generation – the

decommissioning scenario would also cover any large-scale interim replacement of PV modules and other components; and

- b. operational waste generation is not expected to be concurrent for all projects, given that their PV modules and other components would have different operating periods, and it is very unlikely that all facilities would replace their equipment at the same time.

14.5.117 For the purposes of this cumulative assessment, it is assumed that all developments are decommissioned over a single five year period and that all waste is non-hazardous (although in practice a proportion may be hazardous – this is considered further below).

14.5.118 For the cumulative developments that fall under the Town and Country Planning Act and are without a MW stated, it is assumed these have a size of 49.9MW as a worst-case scenario (current maximum size for a local authority application).

14.5.119 The cumulative impact assessment is presented in **Table 14-26**.

Table 14-26 Cumulative Assessment

Solar PV Developments	Planning Application Reference	Size (MW)	PV Waste (tonnes)	Panel	Other Waste (tonnes)	Total Waste (tonnes)
Beacon Fen Energy Park	EN010151	400	23,323		43,197	66,520
Heckington Fen Solar Park	EN010123	500	29,154		53,996	83,150
Mallard Pass Solar Project	EN010127	350	20,408		37,797	58,205
Temple Oaks Renewable Energy Park	EN010126	250	14,577		26,998	41,575
Springwell Solar Farm	EN010149	800	46,646		86,394	133,040
West Burton Solar Project	EN010132	480	27,988		51,836	79,824
Tillbridge Solar Project	EN010142	500	29,154		53,996	83,150
Gate Burton Energy Park	EN010131	500	29,154		53,996	83,150
Cottam Solar Project	EN010133	600	34,985		64,795	99,780
Fosse Green Energy (the Proposed Development)	EN010154	385	22,448		41,577	64,026
One Earth Solar Farm	EN010159	740	43,148		79,914	123,062
Great North Road Solar	EN010162	800	46,646		86,394	133,040
Meridian Solar Farm	EN010169	750	43,731		80,994	124,725
Leoda Solar Farm	EN0110016	600	34,985		64,795	99,780
Limes Farm Solar Park, Bourne	S24/2191	20	1,166		2,160	3,326
Home Farm Solar Farm (Home Farm, Dyke Drove, Bourne)	S24/2100	28	1,633		3,024	4,656
Welby Solar Farm	S24/1040	46	2,682		4,968	7,650
Solar Farm South Of A1 By Pass Farm, Great North Road	S24/0673	49.9	2,910		5,389	8,298
Church Lane Solar Farm, Welby	S24/0360	24	1,399		2,592	3,991
Land Off Green Lane Gonerby Moor Grantham	S23/1934	23	1,341		2,484	3,825
Washdyke Solar Farm, Folkingham	S23/0511	27	1,574		2,916	4,490

Solar PV Developments	Planning Application Reference	Size (MW)	PV Waste (tonnes)	Panel	Other Waste (tonnes)	Total Waste (tonnes)
Land At Gonerby Moor Great, Gonerby	S21/1018	49.9	2,910		5,389	8,298
Ash Tree Solar Farm (Land at High Dike Road, Londonthorpe)	S23/2199	49.9	2,910		5,389	8,298
Mareham Lane Solar	23/1419/FUL	49.9	2,910		5,389	8,298
Grange Energy Park (Land West Of A1173, Stallingborough and East of Stallingborough Road, Keelby NE Lincolnshire)	DM/0898/24/SC R	49.9	2,910		5,389	8,298
The Old Airfield Reepham Road Fiskerton Lincoln	142117	49.9	2,910		5,389	8,298
Highgate Lane Solar Farm	WL/2024/00415	11	641		1,188	1,829
Stow Park Solar Farm (Land at Barker Farm Stow Park Road)	WL/2024/00395	35	2,041		3,780	5,821
Fen Farm Solar Park, Conisholme	N/036/00565/24	14	816		1,512	2,328
Canwick Water Recycling Centre	2023/0687/CCC	4.86	283		525	808
Mallows Solar Farm (Land West of Mallows Lane and North of Pymoor Lane, Main Road, Sibsey)	S/152/01297/22	10	583		1,080	1,663
Gauntlet Solar Farm, Land at nr Bicker Fen, Bicker	B/25/0054	38	2,216		4,104	6,319
Bicker Fen Solar Array	B/22/0356	49.9	2,910		5,389	8,298
Land North West Of Bicker, Vicarage Drove Solar Farm	B/21/0443	49.9	2,910		5,389	8,298
Fendyke Solar Farm, Sutton St James, Spalding	H20-1007-24	20	1,166		2,160	3,326
Caudwell Solar, Holbeach St. Matthew	H09-0699-23	49.9	2,910		5,389	8,298
Swinderby Quarry	PL/0055/23	1.2	70		130	200
Whisby Quarry	EIA/02/04	16.7	974		1,803	2,777
Boston Landfill	B/21/0309	9.7	566		1,048	1,613
Gunthorpe Road Solar Farm, Land South of Gunthorpe Road, Walpole Marsh, Wisbech	H18-0741-21	49.9	2,910		5,389	8,298
TOTAL:		8,482	494,593		916,040	1,410,633
Cumulative Waste (assuming all developments decommissioned within 5-year window)						

Solar PV Developments	Planning Application Reference	Size (MW)	PV Waste (tonnes)	Panel Waste (tonnes)	Other Waste (tonnes)	Total Waste (tonnes)
Total waste from cumulative developments (tonnes)		98,919	183,208		282,127	
Total waste from cumulative developments (m ³) (assuming density of 0.31 t/m ³ for solar PV panels and 1.6 t/m ³ for other waste)		319,092	293,133		612,225	
Waste to landfill, m ³ (realistic worst case estimate)		95,728	87,940		183,667	
Waste to landfill, m ³ (assuming zero recycling/recovery)		319,092	293,133		612,225	
Baseline						
Regional landfill capacity (m ³)					49,686,000	
Comparison Against Baseline						
% of regional landfill capacity required for developments (realistic worst case estimate)		0.2%	0.2%		0.4%	
% of regional landfill capacity required for developments (assuming zero recycling/recovery)		0.6%	0.6%		1.2%	
Assessment						
Receptor Sensitivity					Very High	
Realistic Worst Case						
Magnitude of Impact					Negligible	
Effect					Slight adverse	
Significance					Not significant	
Absolute Worst Case						
Magnitude of Impact					Minor	
Effect					Moderate or large adverse	
Significance					Significant	

14.5.120 The assessment shows that under the realistic worst case (with 70% waste recovery), cumulative impacts would not be significant.

14.5.121 The threshold of significance for an effect on hazardous landfill capacity is 0.1% of national capacity, equivalent to 9,680 m³. If it is assumed as a worst case that all of the hazardous fraction of waste solar PV panels is sent to hazardous waste landfill, then a significant effect would occur if this hazardous fraction represented more than 3.03% of the mass of solar PV panels. However, the majority of solar PV panel components would not be considered to be hazardous waste, e.g. approximately 76-89% glass, 4-10% plastic and 6-8% aluminium frame (Ref 14-95).

14.6 Major Accidents and Disasters

Introduction

- 14.6.1 This section of the ES provides a description of the potential effects of the Proposed Development on the risk of major accidents and disasters occurring.
- 14.6.2 'Accidents' are defined as an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g. major emission, fire or explosion).
- 14.6.3 'Disasters' are defined as naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).

Legislation, Planning Policy and Guidance

- 14.6.4 Key legislation, planning policy and guidance relating to the assessment of Major Accidents and Disasters and pertinent to the Proposed Development comprises the documents listed below. More detail regarding these policies can be found in **Appendix 14-A: Other Environmental Topics Policy and Legislation [EN010154/APP/6.3]**.
- 14.6.5 The EIA Regulations (Ref 14-96) require consideration to be given to the risks of major accidents and disasters that are relevant to the proposed development.
- 14.6.6 Paragraph 4.13.3 of NPS EN-1 (Ref 14-9) provides the following commentary in relation to the assessment of Major Accidents and Disasters: "*Some energy infrastructure will be subject to the Control of Major Accident Hazards (COMAH) Regulations 2015.*" These regulations apply where, in one or more installation of a development, significant quantities of dangerous substances that could cause major accidents and pose a risk to human health or the environment are present. Due to the nature of the Proposed Development, it is not subject to the Control of Major Accident Hazards (COMAH) Regulations 2015.
- 14.6.7 There is no national or local guidance relating to the assessment of major accidents and disasters.

14.6.8 This assessment has been carried out with reference to the IEMA guidance document 'Major Accidents and Disasters in EIA: A Primer' (Ref 14-102).

Consultation

14.6.9 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion and Applicant responses in relation to the Major Accidents and Disasters assessment are presented in **Table 14-13**.

Table 14-27: Scoping Opinion Responses (Major Accidents and Disasters)

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	<p>The Scoping Report identifies potential for pollution of surface or groundwater to occur from soil, sediments, oils, fuels and other chemicals from construction activities. The Inspectorate notes that in the absence of a separate chapter for the assessment of major accidents or disasters, that consideration for spillages from hazardous roads as a result of traffic accidents will be considered within existing technical assessments. The water environment assessment should therefore include an assessment of these potential risks, where there is potential for significant effects to occur</p>	<p>Chapter 9: Water Environment [EN010154/APP/6.1] considers all potential water quality risks to watercourses, including the risk of spillages from construction and operational access tracks or roads across or around the site. An assessment of major accidents and disasters is presented within Section 14.6 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1] with other ES chapters signposted where relevant. Impacts are assessed and signposted along with appropriate mitigation measures either within relevant chapters or within a separate section of the Other Environmental Topics chapter, as presented in the ES.</p>	<p>Chapter 9: Water Environment and Section 14.6 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1]</p>
Planning Inspectorate	<p>Based on the information provided within the Scoping Report, the Inspectorate is in agreement that an assessment of the following major accidents or disasters, in relation to both the risk of the Proposed Development causing, and the Proposed Development's vulnerability to, can be scoped out:</p> <ul style="list-style-type: none"> • geological disasters – landslides, earthquakes, sinkholes; • hydrological disasters – limnic eruptions, tsunamis / storm surge 	<p>This point is noted and an assessment of project specific major accidents and disasters is presented in Section 14.6 of Chapter 14: Other Environmental Topics of this ES [EN010154/APP/6.1].</p>	<p>Section 14.6 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1].</p>

- meteorological disasters – blizzards, cyclonic storms, droughts,
- thunderstorms, hailstorms, heat waves, tornadoes, air quality events (emissions);
- transport – rail accidents;
- engineering accidents – bridge failure, tunnel failure or fire,
- tunnel failure, dam failure, mast and tower collapse, building failure or fire;
- industrial accidents – defence industry, energy industry (fossil fuel), nuclear power, oil and gas refinery / storage, food industry, chemical industry, manufacturing industry, mining/extractive industry;
- terrorism / civil unrest;
- war; and
- disease – human disease, animal disease

Planning Inspectorate	<p>The Inspectorate notes the approach to considering the identified short list of major accidents or disaster risks in existing technical assessments rather than as a specific aspect chapter. Not all shortlisted effects in Table 15-1, however, appear as part of the scope of the assessment presented in the stated technical chapters of the Scoping Report. The ES should contain appropriate signposting so that it is possible to locate these assessments and to ensure that all identified effects are appropriately considered in the relevant aspect chapters</p>	<p>Chapter 14: Other Environmental Topics Section 14.6 Major Accidents and Disasters signposts to relevant chapters or appendices of the ES where these matters are addressed.</p>	<p>Section 14.6 of Chapter 14: Other Environmental Topics [EN01054/APP/6.1]</p>
	<p>The ES should also consider the effects from failure of the proposed battery storage systems.</p>	<p>A Framework Battery Safety Management Plan has been prepared and is submitted as</p>	<p>Framework Battery Safety Management</p>

	<p>This should include consideration of the risks from overheating, or explosion. Mitigation measures to control or eliminate potential adverse effects should also be described.</p>	<p>part of the DCO application [EN010154/APP/7.17] which covers the safety measures designed for the BESS and demonstrates alignment with the relevant fire safety guidelines.</p>	<p>Plan [EN010154/APP/7.17].</p>
Lincolnshire County Council	<p>Accidents and disasters should be scoped in due to the potential for battery fires from developments of this nature. Therefore consider that there should be a specific chapter on this topic in the ES. In addition include details of crime prevention in respect of major accidents such as sabotage, criminal activity should be assessed as pre-planned damage to the scheme could leave it vulnerable to a major accident.</p>	<p>A Framework Battery Safety Management Plan has been prepared and is submitted as part of the DCO application [EN010154/APP/7.17], with the preparation of and implementation of a detailed version of the plan secured through DCO Requirement. The ES assesses the risk of battery fire/explosion. This is considered as embedded mitigation within the major accident and disasters assessment.</p>	<p>Section 14.6 of Chapter 14: Other Environmental Topics [EN01054/APP/6.1] And Framework Battery Safety Management Plan [EN010154/APP/7.17].</p>
North Kesteven District Council	<p>Paragraph 15.5.9 suggests that it is considered highly likely that as the design of the Proposed Development evolves in preparation of the DCO application, it will become clear that there is no real risk or serious possibility of major accidents or disasters, such that this matter will be scoped out. Whilst the Planning Inspectorate agreed to scope out a standalone ES Chapter for major accidents and disasters in consideration of the Heckington Fen Solar Farm, this was on the basis that the nature, scale, and location of that development was not considered to be vulnerable to or give rise to significant impacts in relation to the risk of accidents and major disasters.</p>	<p>This comment is noted.</p>	<p>N/A</p>

14.6.10 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. **Table 14-14** outlines the statutory consultation responses relating to the Major Accidents and Disasters assessment and how these have been addressed through the ES. The **Potential Main Issues for Examination [EN010154/APP/7.11]**, **Consultation Report [EN010154/APP/5.1]** and **Consultation Report Appendices [EN010154/APP/5.2]** provide further detailed responses, as relevant, to the feedback received during statutory consultation.

Table 14-28: Statutory Consultation Responses (Major Accidents and Disasters)

Consultee	Summary of comment	How matter has been addressed	Location of response
Health and Safety Executive	<p>Within the PEIR Chapter 14: "Other Environmental Topics" Section 14.6 Major Accidents and Disasters, contains discussion of events emanating from the new development, e.g. fire or external events impacting the new development e.g. flood. Reference is made to Volume 3 Appendix 3-A "Framework Construction Environmental Management Plan" which makes some mention of 'major accidents' during construction under Section 3.14. There are none related to chemical substances. HSE would advise these matters are considered further in line with Advice Note 11 Annex G taking account of the following: "it may be beneficial for applicants to undertake a risk assessment as early as possible to satisfy themselves that their design and operation will meet the requirements of relevant health and safety legislation as design of the Proposed Development progresses.".</p>	<p>The Proposed Development does not require the use and storage of chemical or hazardous substances above the thresholds set out within the Control of Major Accident Hazards (COMAH) Regulations.</p>	<p>This has been considered in the Assessment Methodology of Section 14.6 of this Chapter.</p>
Carlton Le Moorland Parish Council	<p>Safety concerns have not been fully addressed, there have been instances of large-scale uncontrollable fires from storage batteries and the large number of big storage batteries poses a potential risk.</p> <p>Although the individual risk from one battery unit is small, this is multiplied by the number of proposed storage containers and the potential impact from a fire is large.</p>	<p>The risk of Major Accidents and Disasters has been assessed in Section 14.6 (Major Accidents and Disasters) of Chapter 14: Other Environmental Topics of the ES [EN010154/APP/6.1]. All works will be undertaken in accordance with relevant Health and Safety legislation and guidance and plans will be put in place. The strategy taken to avoid the risk of major accidents during construction,</p>	<p>Section 14.6 (Major Accidents and Disasters) of Chapter 14: Other Environmental Topics of the ES [EN010154/APP/6.1].</p> <p>Framework CEMP [EN010154/APP/7.7],</p> <p>Framework OEMP</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
		<p>operation and decommissioning has been addressed through appropriate risk assessments and measures as required in the Framework CEMP [EN010154/APP/7.7], Framework OEMP [EN010154/APP/7.8] and Framework DEMP [EN010154/APP/7.9].</p> <p>A Framework Battery Safety Management Plan has been prepared and is submitted as part of the DCO application [EN010154/APP/7.17] which covers the safety measures designed for the BESS and demonstrates alignment with the relevant fire safety guidelines.</p>	<p>[EN010154/APP/7.8] and Framework DEMP [EN010154/APP/7.9].</p> <p>Framework Battery Safety Management Plan [EN010154/APP/7.17]</p>
Lincolnshire County Council	<p>LCC has consulted with Lincolnshire Fire and Rescue (LFR). Recognising that LFR are statutory consultees as a result of the Planning Act 2008 and applications that involve NSIPs, LFR will work and engage with the developer as the project evolves, to ensure it complies with the statutory responsibilities that we enforce. Recognising that LFR are statutory consultees as a result of the Planning Act 2008 and applications that involve NSIPs, we will work and engage with the developer as the project evolves, to ensure it complies with the statutory responsibilities that we enforce. The developer should produce a risk reduction strategy (Regulation 38 of the Building Regulations) as the responsible person for the scheme as stated in the Regulatory Reform (Fire</p>	<p>The Lincolnshire Fire and Rescue Services have been consulted in relation to the Proposed Development, as set out in the Framework Battery Safety Management Plan [EN010154/APP/7.17]. Consultation included a meeting with the Lincolnshire Fire and Rescue Services to share preliminary site plans, including discussion around emergency site accesses, which has informed the final design. Close consultation will continue with the Lincolnshire Fire and Rescue Services throughout the planning process.</p>	<p>Framework Battery Safety Management Plan [EN010154/APP/7.17].</p>

Consultee	Summary of comment	How matter has been addressed	Location of response
	<p>Safety) Order 2005. We would also expect that safety measures and risk mitigation is developed in collaboration with LFR. The strategy should cover the construction, operational and decommissioning phases of the project.</p>		
Lincolnshire County Council	<p>LCC is very concerned about the effect a fire in the BESS facility would have on the Lincoln Heath aquifer which is a source of drinking water for 1,000's of local residents.</p>	<p>As detailed in the Framework BSMP [EN010154/APP/7.17], the BESS will integrate an external firefighting water capture drainage system. In the event of a fire, prior to applying the fire water, the outfalls for the BESS areas will be closed by penstock valves (or similar system), isolating the BESS areas drainage from the wider environment. Fire water runoff will be tested and released, if necessary, removed by tanker and treated offsite (in consultation with the relevant consultees at the time). Pollution analysis will always be conducted before release to drainage systems or removal from site.</p> <p>The local fire and rescue service (LFR) has been consulted during the pre-application process and as part of the Section 42 Statutory Consultation for the Proposed Development, and the Applicant will continue to engage with LFR throughout the planning process to ensure any subsequent revisions to National Fire Chiefs Council guidelines are included.</p>	<p>Framework BSMP [EN010154/APP/7.17]</p>

Assessment Methodology

14.6.11 The following methodology has been adopted to assess major accidents or disasters. In general, major accidents or disasters, as they relate to the Proposed Development, fall into three categories:

- a. Events that could not realistically occur, due to the nature of the Proposed Development or its location;
- b. Events that could realistically occur, but for which the Proposed Development, and associated receptors, are no more vulnerable than any other development; and
- c. Events that could occur, and to which the Proposed Development is particularly vulnerable, or which the Proposed Development has a particular capacity to exacerbate.

14.6.12 An exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Proposed Development. This list was drawn from several sources, including the UK Government's Risk Register of Civil Emergencies (Ref 14-100) and Lincolnshire Community Risk Management Plan (Ref 14-97). Major accidents or disasters with little relevance in the UK were not included, such as volcanic eruptions for example. Those scoped in for further assessment are summarised in **Table 14-29**.

14.6.13 The IEMA guidance note on the assessment of major accidents and disasters in EIA (Ref 14-102) states "*Not all potential events will fall into the scope of a major accidents and/or disasters assessment*" and suggests that "*the assessment will typically focus on low likelihood but potentially high consequence events*". This is supported by the fact that events with a high likelihood and high consequence would be unacceptable for any development and would therefore be managed or designed out and low risk and low consequence events would not have the potential to result in a major accident. On this basis the assessment focusses on low likelihood but potentially high consequence events.

Table 14-29: Major Accidents or Disasters Shortlisted for Further Consideration

Major Accident or Potential Receptor Disaster	Comments	Relevant Chapter or Appendix of the Environmental Statement	
Malicious criminal damage	The Proposed Development and employees	If the Proposed Development were to be damaged through pre-planned criminal activity, the risk of a major accident occurring on-site may increase. Security measures will be implemented on Site to minimise the potential for damage to occur through criminal activity.	Section 14.6 of this Chapter (this section) and Chapter 3: Proposed Development of this ES [EN010154/APP/6.1] .
Floods	Property and people in areas of increased flood risk, including the Proposed Development	Both the vulnerability of the Proposed Development to flooding and its potential to exacerbate flooding, are addressed in the Flood Risk Assessment, reported in the ES, both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development.	Chapter 9: Water Environment [EN010154/APP/6.1] and Appendix 9-C: Flood Risk Assessment of this ES [EN010154/APP/6.] .
Fire	Local residents, habitats, and species	There may be some potential for fire as a result of the battery storage element of the Proposed Development. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. The layout of the Proposed Development has been designed in consultation with the local fire and rescue service and is compliant with National Fire Chiefs Council (NFCC) guidance. A Framework Battery Safety Management Plan (BSMP) is included as part of the DCO application.	Section 14.6 of this Chapter (this section).
Road accidents	Aquatic environment Road users	The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning is considered in the Water Environment Chapter of this ES. The potential for glint and glare to affect road users is considered within a	Chapter 9: Water Environment , Chapter 13: Traffic and Transport of this ES [EN010154/APP/6.1] and Appendix 14-D: Glint and Glare Assessment [EN010154/APP/6.3] .

Major Accident or Potential Receptor Disaster	Comments	Relevant Chapter or Appendix of the Environmental Statement
	technical appendix. Mitigation has been considered and, where necessary, incorporated into the Proposed Development design.	
Rail accidents	Rail users	No rail lines pass through the DCO Site, with the nearest railway line being 500m to the north west. Given the distance, adverse effects on rail users are not expected. Section 14.6 of this Chapter (this section)
Aircraft disasters	Pilots and aircraft	The glint and glare assessment has demonstrated there is no potential for glint and glare to pose a significant risk to aircraft. Appendix 14-D: Glint and Glare Assessment [EN010154/APP/6.3].
Flood defence failure	Employees	This is covered in the Flood Risk Assessment, both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development. Chapter 9: Water Environment [EN010154/APP/6.1] and 9-C: Flood Risk Assessment [EN010154/APP/6.3].
Utilities failure (gas, electricity, water, sewage, oil, communications)	Employees and local residents.	The Proposed Development has the potential to affect existing utility infrastructure below ground. To identify any existing infrastructure constraints, both consultation and a desk-based study has been undertaken. Section 14.7 Telecommunications, Television Reception and Utilities of this Chapter.
Mining / extractive industry	Employees	There is the potential for current or past quarrying activity in the vicinity to lead to unstable ground conditions. However, the risk will be considered as part of the geotechnical design ensuring that the risk is designed out. Section 14.4 Ground Conditions of this Chapter.
Plant disease	Habitats and species	New planting may be susceptible to biosecurity issues such as the increased prevalence of pests and diseases. The planting design takes account of biosecurity risks through a wider mix of species including some non-natives. Chapter 9: Ecology and Nature Conservation of this ES [EN010154/APP/6.1] and the Framework Landscape and

Major Accident or Potential Receptor Disaster	Comments	Relevant Chapter or Appendix of the Environmental Statement
Ecological submitted	Management	Plan
		alongside this DCO application [EN010154/APP/7.15].

14.6.14 Those major accidents and disasters listed in **Table 14-29** that are not being considered within another technical assessment have been reviewed and considered by the Applicant to ensure risks have been addressed through the design as necessary. These events are assessed in the Assessment of Effects section below.

14.6.15 An effect is considered significant if there is a significantly increased risk of an accident or a disaster occurring as a result of the Proposed Development. Details on appropriate prevention measures and mitigation for significant effects on the environment from such events are either provided in the sections below or within the referenced environmental topic chapters.

Study Area

14.6.16 The Study Area for the assessment of major accidents and disasters is 10km from the DCO Site which is based on the largest Zone of Influence shown in **Figure 15-1** of this ES [**EN010154/APP/6.2**].

Baseline Conditions

14.6.17 A number of receptors are present in the vicinity of the Proposed Development which could be vulnerable to major accidents or disasters, either because of their proximity to the Proposed Development or their importance to the surrounding area. These include:

- a. Towns, villages, farms and residential homes;
- b. Commercial sites (including quarry sites) and buildings;
- c. Roads;
- d. Railways;
- e. Airports and runways;
- f. Designated ecological sites, woodland, farmland and waterbodies; and
- g. Overhead and underground infrastructure services including electricity, water, communications and gas.

14.6.18 Details of the specific receptors that fall into the above categories are provided in **Chapter 2: The Site and Surroundings** [**EN010154/APP/6.1**]. These receptors have been considered in this assessment.

Assessment of Effects

14.6.19 Risks of major accidents and disasters occurring during construction and decommissioning are assessed in this section and the relevant chapters outlined in **Table 14-29**. All works will be subject to risk assessments as required by the **Framework CEMP** [**EN010154/APP/7.7**], **Framework OEMP** [**EN010154/APP/7.8**] and **Framework DEMP** [**EN010154/APP/7.9**] submitted with the DCO application. Mitigation measures will be listed within the detailed CEMP, which are secured in the DCO.

Construction and Decommissioning Phase

Malicious Activity

14.6.20 The DCO Site Boundary would be managed by the contractor during construction and decommissioning to mitigate the risk of criminal and malicious activity. The design includes fencing, CCTV cameras and temporary lighting in critical areas to prevent/deter criminal activity. Therefore, the Proposed Development is not expected to have an effect on the environment or employees due to the risk of a major accident occurring as a result of criminal damage from malicious activity during construction and decommissioning.

Flooding

14.6.21 Both the vulnerability of the Proposed Development to flooding, and its potential to exacerbate flooding has been addressed in **Appendix 9-C: Flood Risk Assessment** of this ES [**EN01054/APP/6.3**], both in terms of the risk to the Proposed Development and increased risk caused by it.

14.6.22 The Flood Risk Assessment includes commitments for mitigation required during construction which is captured within the **Framework CEMP** [**EN010154/APP/7.7**].

14.6.23 The **Framework CEMP** [**EN010154/APP/7.7**] includes a requirement for contractors to monitor weather forecasts and receive the Environment Agency's flood alerts and plan works accordingly with internal methodologies to manage workers and resources in extreme weather conditions such as storms, flooding. Health and safety plans are to be in place in accordance with policy and legislative requirements.

14.6.24 Consideration has also been given to the presence of flood defences along western bank of the River Witham, both banks of the River Brant, and the northern side of Fen Lane within the Principal Site. The Proposed Development also crosses a significant flood storage area associated with the Lincoln Flood Alleviation Scheme (Witham Washlands Flood Storage Area). Construction methods will be developed to ensure that there are no effects to the structural integrity of these defences and the flood storage area.

Fire

14.6.25 Measures relating to the suppression of fires on site during construction and health and safety on Site would be managed by the contractor during construction and decommissioning to mitigate the risk of fire in accordance with the relevant legislation and guidance. This is set out within the Section 3.14 of the **Framework CEMP** [**EN010154/APP/7.7**] and Section 3.15 **Framework DEMP** [**EN010154/APP/7.9**].

14.6.26 Measures relating to the management of Unexploded Ordnance (UXO) during construction are presented in Section **14.4** of this Chapter.

14.6.27 With the implementation of measures within the **Framework CEMP** [**EN010154/APP/7.7**] and **Framework DEMP** [**EN010154/APP/7.9**], the risk

of a fire occurring during construction and decommissioning of the Proposed Development is considered to be not significant.

Road Accidents

14.6.28 The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning has been considered in Section 9.6 of **Chapter 9: Water Environment** of this ES [EN010154/APP/6.1]. The measures outlined in Section 9.6 of **Chapter 9: Water Environment** will be implemented to manage the risk of accidental spillages within the DCO Site. These measures are secured in the **Framework CEMP** [EN010154/APP/7.7] and will be adopted during the construction works.

14.6.29 The potential for glint and glare to affect road users has been considered within the glint and glare assessment, which is presented in Section 14.3 of this chapter and **Appendix 14-C** [EN010154/APP/6.3].

Rail Accidents

14.6.30 No operational rail lines pass through the DCO Site Boundary, with the nearest operational rail line located 500m to the north west. The glint and glare assessment (**Appendix 14-D** of this ES [EN010154/APP/6.3]) concludes that there is no potential for glint and glare impacts on rail receptors.

Aircraft Disasters

14.6.31 There are four aerodromes located within 5km of the Principal Site, these are as follows:

- a. Peacocks Farm airfield, which is located approximately 0.23km east of the Principal Site;
- b. South Hykeham Airfield, which is located approximately 1.79km east of the Principal Site;
- c. South Scarle Airfield, which is located approximately 2.76km west of the Principal Site; and
- d. Blackmoor Farm, which is located approximately 3.47km east of the Principal Site.

14.6.32 Royal Air Force (RAF) Waddington Station is located approximately 5.93km north west of the Principal Site.

14.6.33 The potential for glint and glare to affect aircraft has been considered within the glint and glare assessment (presented in **Appendix 14-D** of this ES [EN010154/APP/6.3]).

14.6.34 Mitigation has been considered, and where necessary, incorporated into the Proposed Development design.

Utilities Failure (gas, electricity, water, sewage, oil, communications)

14.6.35 The Proposed Development has the potential to affect existing utility infrastructure due to the location of overhead lines and buried water and waste

water pipes within the DCO Site Boundary. Impacts to or failure of this infrastructure could potentially lead to a major accident. To identify any existing infrastructure constraints, both consultation and a desk-based study will be undertaken prior to construction so that appropriate mitigation such as buffers can be incorporated into the design. Cable Avoidance Tool (CAT) scans will also be used by Contractors to check for buried utilities prior to earth breaking site activities, as secured within the **Framework CEMP [EN010154/APP/7.7]**. The Applicant will endeavour to engage with utilities providers as appropriate.

14.6.36 Further information on Utilities, including embedded mitigation measures, is provided in **Section 14.7** of this Chapter.

Mining / Extractive Industry

14.6.37 There is the potential for current or past quarrying activity in the vicinity to lead to unstable ground conditions due to nearby active quarries. The risk will be considered as part of geotechnical design following post consent geotechnical investigations, ensuring that the risk is designed out. A Mineral Safeguarding Assessment has been undertaken and is submitted as part of the DCO application (presented in **Appendix 12-C [EN010154/APP/6.3]**).

Plant Disease

14.6.38 There is the potential for disease and pathogen transfer (including undesirable weed species) between different areas of land during construction. The loss of soil resource is considered as the main cause of disease and pathogen transfer, due to the transfer of soil (and incorporated seed/spore bank) from infected to uninfected areas. The Soil Management Plan (SMP) to be prepared prior to construction (and secured through the DCO) will set out appropriate measures to minimise soil loss and hence biosecurity risk. A **Framework Soil Management Plan** is submitted as part of the DCO application **[EN010154/APP/7.10]**.

14.6.39 A Biosecurity Management Plan will be prepared prior to construction, secured through the detailed CEMP. This may include measures such as appropriate cleaning and/or disinfection of machinery and equipment in areas considered to be at high risk.

14.6.40 The UK Government's website advertising current occurrences and imposed restrictions with regards to animal and plant diseases would be checked both pre-construction and at regular intervals throughout construction.

Operational Phase

Criminal Damage

14.6.41 If the Proposed Development were to be damaged through pre-planned criminal activity, the risk of a major accident occurring on-site may increase. However, the Proposed Development design will ensure that the compounds (including BESS), and solar equipment are secure to minimise the potential for damage to occur through criminal activity. Embedded mitigation include fencing, CCTV cameras, and lighting in critical areas. These measures are

described in further detail in **Chapter 3: The Proposed Development [EN010154/APP/6.1]**.

14.6.42 Furthermore, the Proposed Development does not process or include large quantities of chemicals, and criminal damage to the infrastructure is unlikely to lead to a large-scale leak, explosion, or other major event. Therefore, the Proposed Development is not expected to have an effect on the risk of a major accident occurring as a result of criminal activity during operation.

Flooding

14.6.43 Both the vulnerability of the Proposed Development to flooding, and its potential to exacerbate flooding are addressed in **Appendix 9-C: Flood Risk Assessment [EN010154/APP/6.3]**, both in terms of the risk to the Proposed Development and increased risk caused by it.

14.6.44 Mitigation has been considered, and where necessary, incorporated in the Proposed Development's design through the preparation of the drainage strategy.

Fire

14.6.45 The potential for fire as a result of the battery energy storage system (BESS) has been considered. The BESS will include automatic cooling and fire suppression systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. Further details are included within the **Framework Battery Safety Management Plan (BSMP) [EN010154/APP/7.17]** submitted with the DCO application.

14.6.46 The BESS layout has been developed in consultation with the local fire and rescue service and is compliant with National Fire Chiefs Council (NFCC) guidance. The provision of a detailed BSMP will be secured via a requirement in the DCO.

14.6.47 The anticipated safety provisions provided in the **Framework BSMP [EN010154/APP/7.17]** include:

- a. The BESS will be designed, selected, and installed in accordance with international guidance, good practice, and related standards;
- b. Risk assessments will be carried out for the entire system and elements across the project lifecycle;
- c. The location of the centralised and distributed BESS areas will be located to minimise impacts on offsite receptors (albeit this is inherent in the DCO application as it has been factored into the design process to date);
- d. Separation distances between components will be selected to minimise the chance of fire spread;
- e. Equipment will, where possible, be selected to be fire limiting. The BESS facility will be designed with multiple layers of protection to mitigate and minimise the probability of a fire or thermal runaway incident;

- f. In the case of the BESS design, it will integrate multiple layers of prevention and mitigation features to minimise the chances of a BESS failure incident;
- g. All equipment will be monitored, maintained, and operated in accordance with manufacturer instructions and be compliant with requisite safety standards;
- h. The BESS design will include integrated fire and explosion prevention and protection systems. Following key industry safety standards and based on comprehensive UL 9540A (2025, 5th Edition) and / or 3rd party full scale destruction testing. A BESS system and site-specific Emergency Response Plan (ERP) will be developed at the detailed design stage, based on national and international best practice measures;
- i. 24/7 monitoring of the system via a dedicated control facility. The control facility will have the capability to shut the system down should the need arise and will also be responsible for implementing the emergency plan and acting as a point of contact for the emergency services; and
- j. Communication with the Local Fire and Rescue (LFR) with engagement early in the project and continuing across design and construction phases. This will ensure robust emergency response planning, risk management planning and ensure all safety materials and equipment is available in an emergency for first responders.

14.6.48 An assessment on the potential for unplanned atmospheric emissions from BESS in the event of a fire has been undertaken and is provided in **Appendix 14-G: Unplanned Emissions Assessment** of this ES [**EN010154/APP/6.3**]. This study reviews the potential emissions to air from out-gassing and from fire and considers the potential magnitude of emissions and the likely consequences of emissions to air from BESS.

14.6.49 The battery technologies proposed for the Proposed Development are based on sealed cells with no excess electrolyte and secured through the **Framework BSMP** submitted with the DCO application [**EN010142/APP/7.17**]. This removes the potential for venting or out-gassing of gaseous substances during normal operational use. If the battery cells become damaged by heat or are burnt within a fire affecting a single module, a rack of modules, or multiple racks, then the combustible materials consumed in the fire could give rise to a range of organic and inorganic air pollutants.

14.6.50 Dispersion modelling was undertaken to understand the minimum rates of dilution likely to occur to pollutant concentrations as they disperse from the source of the emission to receptor locations. Public Health England identifies acute exposure guideline level (AEGL) values, which start at AEGL-1 and increase in severity of health outcome to AEGL-3. The AEGL-1 criteria define the *“level of the chemical in air or above which the general population could experience notable discomfort”*.

14.6.51 The assessment concluded that emissions of hydrogen fluoride could cause concentrations over time periods of 10 minutes, 1 hour, or up to 6 hours, which are below the AEGL-1 value at all locations further than 200m of the fire. Given

that containers will be sited a minimum of 150 m from residential receptors, concentrations will be below AEGL-1 at any existing residential receptor location. Any workers on agricultural land within 250 m of the fire would be able to move back to a safer distance.

14.6.52 The detailed design for the Proposed Development will ensure that the parameters assessed in this study are met (i.e. 1 kg to 3 kg of hydrogen fluoride from a single cabinet fire). The potential consequence at actual receptor locations surrounding the BESS (located within the relevant work areas as shown within the Work Plans **[EN0101042/APP/2.2]**) would be exposure to hydrogen fluoride at concentrations below the AEGL-1 value.

14.6.53 The design of the BESS includes a number of elements to both prevent, detect and control a fire should one occur. These include:

- a. The use of batteries that are sealed by design so do not vent when in normal use and have no free electrolyte.
- b. The battery modules will contain cells separated by a thermal barrier to prevent one cell affecting the temperature of the adjacent one, with the modules themselves also separated from one another by another thermal barrier or an air gap. The thermal barrier is intended to ensure that should one cell/module heat up it will not impact on the adjacent cell/module so as to prevent a thermal cascade.
- c. The batteries will be controlled by charging management systems that will detect if a cell or battery is not operating correctly and the whole BESS will be fitted with a fire monitoring system so if one cell or module were to catch fire, the fire suppression system will automatically be triggered to reduce the temperate and ensure that the burning cell/module does not affect the other cells/modules in the BESS.

14.6.54 These details for the battery design are secured through the **Framework BSMP** submitted with the DCO application **[EN010142/APP/7.17]**.

14.6.55 Therefore, in the unlikely event that a fire was to break out in a single module, it is very unlikely, given the control measures, that the fire would spread to the rest of the modules in a cabinet. Even if all the systems should fail, and a large-scale fire break out within a cabinet then the resultant hydrogen fluoride concentration at the closest receptors would be below the level that UKHSA has identified as resulting in notable discomfort to members of the general population.

14.6.56 The expected hydrogen fluoride emissions will be checked against the assumptions in **Appendix 14-G: Unplanned Emissions Assessment** **[EN010154/APP/6.3]** once the make, model and layout of the BESS is known and confirmed, and, if necessary, consequence modelling will be undertaken to demonstrate that the impacts associated with an unplanned fire would not exceed the effects outlined in this report or cause any significance adverse health effects to the local community. This is described in **Section 5** of the **Framework BSMP** **[EN010154/APP/7.17]**.

14.6.57 As the above measures limit the risk of fire spreading, they also provide mitigation for fire spreading to the DCO Site from off-site sources.

14.6.58 With the above embedded mitigation, significant effects on the risk of fire would be unlikely as a result of the Proposed Development. The above measures are secured through the **Framework BSMP [EN010142/APP/7.17]** and **Work Plans [EN0101042/APP/2.2]** with regards to the design of the BESS.

Road Accidents

14.6.59 The risk posed by spillage from hazardous loads as a result of a road traffic accidents during operation and maintenance of the Proposed Development is considered minimal due to limited road traffic movements being required during operation.

14.6.60 The potential for glint and glare to affect road users during operation has been considered within the glint and glare assessment, which is presented in Section 14.3 of this chapter and **Appendix 14-D** of this ES [EN010154/APP/6.3].

Rail Accidents

14.6.61 No rail lines pass through the DCO Site, with the nearest railway line being 500m to the north west. The glint and glare assessment (**Appendix 14-D [EN010154/APP/6.1]**) concludes that there is no potential for glint and glare impacts on rail receptors.

Aircraft Disasters

14.6.62 Waddington RAF Station is located approximately 4.6km north west of the Principal Site. There are no other active runways within 5km of the Principal Site.

14.6.63 The potential for glint and glare to affect aircraft during operation has been considered within **Appendix 14-D** of this ES [EN010154/APP/6.3]. It has concluded that glint and glare risk to aircraft is 'acceptable' and therefore not significant so does not pose a risk to aircraft.

Plant Disease

14.6.64 New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change. New planting would be managed in accordance with the **Framework LEMP [EN010154/APP/7.15]** which is submitted as part of the DCO application which includes measures to minimise such risks.

14.6.65 The Biosecurity Management Plan prepared for the construction phase will be revised for the operational phase, in advance of start of operation (secured through the OEMP, see Section 3.14 of the **Framework OEMP [EN010154/APP/7.9]**).

Mitigation Measures

14.6.66 Minimising the risk of major accidents during construction and decommissioning will be addressed through appropriate risk assessments, as required in the detailed CEMP.

Cumulative Effects

14.6.67 The shortlisted cumulative schemes (**Chapter 15: Cumulative Effects and Interactions** of this ES [EN010154/APP/6.1]) located in close proximity to the Proposed Development comprise predominantly residential developments and ground mounted solar and battery storage schemes.

14.6.68 Increased traffic during construction and decommissioning phases of the Proposed Development in combination with other developments could result in a greater risk of road accidents. This is assessed in **Chapter 13: Traffic and Transport** [EN010154/APP/6.1], with appropriate mitigation presented where applicable.

14.6.69 The possibility of a major accident or disaster from the Proposed Development is low, and any such disaster (in the unlikely event that one did occur) would be short term and infrequent. As such, the likelihood for concurrent events on other cumulative schemes is very low. For these reasons, it is concluded that no significant cumulative effects would arise from the Proposed Development in terms of increased risk of a major accident or disaster occurring.

14.7 Telecommunications, Television Reception and Utilities

Introduction

14.7.1 This section evaluates the effects of the Proposed Development on telecommunication infrastructure, television reception and existing utilities.

Legislation and Policy

14.7.2 Effects relating to existing infrastructure are not environmental effects and there is no requirement to include an assessment of these effects under the EIA Regulations (Ref 14-96). However, given the nature of solar farm developments, they have the potential to affect existing utility infrastructure above and below ground.

14.7.3 There is no other legislation, policy or guidance specifically related to Telecommunications, Television Reception, and Utilities.

Consultation

14.7.4 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion (**Appendix 1-B** of this

ES [EN010154/APP/6.3]), and the Applicant's responses in relation to the Telecommunications, Television Reception and Utilities assessment are presented in **Table 14-30**.

Table 14-30: Scoping Opinion Responses (Telecommunications, Television Reception and Utilities)

Consultee	Summary of comment	How matter has been addressed	Location of response
Planning Inspectorate	<p>The Scoping Report proposes to scope out these matters on the basis that a standalone desk-based assessment will be carried out. The Inspectorate considers that insufficient evidence has been supplied to confirm the potential effects of the Proposed Development on telecommunications, utilities and television reception, particularly given the stage of the design for the Proposed Development. The Inspectorate does not therefore agree that these matters can be scoped out of the assessment at this stage.</p>	<p>This point is noted and an assessment of the effects of the Proposed Development on telecommunications, television reception and utilities is presented in Section 14.7 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1].</p>	Section 14.7 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1].
Aubourn with Haddington Parish Council Lincolnshire	<p>As the site is approx. 7.42 km (4.61 mi) wide (East to West) and 6.22 km (3.87 mi) long (North to South) there is a likelihood of interference with Terrestrial TV services due to the large footprint of the site. TV reception from the North is via the Belmont transmitter located at grid ref: 53.33573290463092, -0.17174527912535179 which is 36.38 km (22.61 mi) from the centre of the solar farm. To the south the transmitting station is at Waltham in Leicestershire, at grid ref: 52.80137303388154, -0.8008068956311353, is 39.52 km (24.56 mi) from the centre of the solar farm. Aubourn with Haddington Parish Council Lincolnshire would like to see mitigation statements of how these high frequency TV signals will be measured in the surrounding villages and the City of Lincoln and what effect they will have due to the large footprint of the solar farm.</p>	<p>The Proposed Development consists of fixed low-lying infrastructure and is therefore unlikely to interfere with terrestrial TV services. No further mitigation is considered necessary.</p>	N/A

Aubourn with Haddington Parish Council Lincolnshire	Mobile communications around the Proposed Development are in places very weak due to the topology of the area. There is a Mobile Cellular radio Telecommunications tower located on the A46, grid ref: 53.16189955172792, -0.6591644912399385, providing services around the area of the Proposed Development. Due the earthing of the solar panel support frames there is a likelihood of interference with the line of sight communications to the east of the solar farm due to the large footprint of the solar farm.	The Proposed Development consists of fixed low-lying infrastructure and is therefore unlikely to interfere with mobile communications. No further mitigation is considered necessary.	N/A
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14.7.5 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. Responses to this statutory consultation are presented in the Consultation Report **[EN010154/APP/5.1]**. **Table 14-31** summarises the statutory consultation responses relating to the Telecommunications, Television Reception and Utilities assessment and how these have been addressed through the ES.

Table 14-31: Statutory Consultation Responses (Telecommunications, Television Reception and Utilities)

Consultee	Summary of comment	How matter has been addressed	Location response	of
North Kesteven District Council	Other matters in relation to major accidents and disasters; telecommunications, television reception and utilities; and electric and electromagnetic fields lie outwith the expertise of the Council.	This comment is noted.	N/A	
National Grid Electricity Transmission	The Applicant must consider the hazards identified in the National Grid Electricity Transmission document provided following the Statutory Consultation when working near electrical equipment.	Telecommunications and utilities have been considered within Section 14.7 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1] .	Section 14.7 of Chapter 14: Other Environmental Topics [EN010154/APP/6.1] .	

Assessment Methodology

14.7.6 To identify any existing infrastructure constraints, both consultation and a desk-based study have been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development and has continued during the course of the DCO application preparation and will continue over the course of the examination process.

14.7.7 Consultees include water, gas and electricity providers, and telecommunications providers. Telecommunications and television providers are unlikely to be affected by Electromagnetic Interference (EMI) unless

transmitters are near electrical infrastructure associated with the Principal Site (see also Section 14.8 Electric and Electromagnetic Fields below).

14.7.8 A desk-based search has been undertaken for the presence of telecommunications, television reception and utilities infrastructure within the Proposed Development Site and within the vicinity. A qualitative approach undertaken by competent experts has been used to assess the likelihood of significant effects on telecommunications, television reception and utilities.

Study Area

14.7.9 The Study Area for telecommunications and utilities comprises the DCO Site (see **Figure 1-2** of this ES [**EN010154/APP/6.2**]), as potential interactions with existing infrastructure are limited to the location of Proposed Development activities only.

Baseline Conditions

14.7.10 Existing infrastructure constraints identified during a desk study within and adjacent to the Proposed Development include the following:

- a. Overhead lines:
 - i. 4ZM ROUTE TWR (448 - 630) 400kV Overhead Transmission Line route Bicker Fen - Spalding North - West Burton (Circuit 1) and Bicker Fen - Walpole - West Burton (Circuit 2) running to the north of the Principal Site and passing within the south eastern Section of the Cable Corridor;
 - ii. Overhead line towers are located within the central section of the Site between Thurlby and Witham St Hughs, running parallel to Moor Lane, within the north eastern section of the Site, south of Thorpe on the Hill and located within the south western section of the Site, between Bassingham and the Norton Disney Fishing Lakes.
- b. The Bassingham Sewage Treatment Works, operated by Anglian Water, is located west of Bassingham, immediately adjacent to the Principal Site, off Clay Lane;
- c. The Swinderby Sewage Treatment Works, operated by Anglian Water, is located east of Witham St Hughs, immediately adjacent to the west of the Principal Site.
- d. The Sand Syke Pumping Station, operated by the Upper Witham Internal Drainage Board, is located immediately adjacent to the south of the Cable Corridor;
- e. A disused Ministry of Defence (MoD) pipeline is located east of Witham St Hughs, assumed to be associated with the Swinderby Sewage Treatment Works and may extend east within the Principal Site;
- f. The Lincoln to Grantham Pipeline, operated by Anglian Water, is located within the eastern extent of the Cable Corridor, between Coleby and Boothby Graffoe; and

g. The Finaline Killingholme to Buncefield underground fuel pipeline, operated by TotalEnergies, is located within the eastern extent of the Cable Corridor.

Assessment of Effects

Telecommunications

14.7.11 The Proposed Development is unlikely to interfere with telecommunications infrastructure due to the relatively low height (under 5m from the ground level) of the solar PV panels, BESS, and supporting infrastructure, which will not provide an obstacle for telecommunication waves. Therefore, no such effects are anticipated in the construction, operation and decommissioning phases.

Television Reception

14.7.12 The Proposed Development consists of fixed low-lying infrastructure and is therefore unlikely to interfere with digital television signals, and therefore no effects are anticipated in the construction, operation and decommissioning phases.

Utilities

14.7.13 The potential exists for utilities to be affected during the construction and decommissioning of the Proposed Development through inadvertent damage caused as a result of excavation and engineering operations. Without any precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect. However, with embedded mitigation in place to identify, avoid and manage utilities interactions, it is not expected that there would be any adverse effects.

14.7.14 Precautionary measures are included as part of embedded mitigation for the Proposed Development to prevent such damage from occurring, including:

- a. Locating the Proposed Development outside of utilities protected zones;
- b. The use of ground penetrating radar before excavation to identify any unknown utilities; and
- c. Consultation and agreement with relevant utility operators regarding construction/demobilising methods prior to works commencing.

14.7.15 Engagement is also ongoing with all statutory undertakers with apparatus that has the potential to be affected by the Proposed Development in order to agree protective provisions to be included in the DCO.

14.7.16 These measures, along with those listed within the **Framework CEMP [EN010154/APP/7.7]** will reduce the likelihood of effects on utilities during construction and decommissioning. Therefore, no adverse effects are expected during construction and decommissioning.

14.7.17 No effects on utilities are predicted as a result of the operational phase of the Proposed Development because no below-ground works are required during operation and maintenance. Embedded mitigation measures in relation to safe working beneath overhead lines would be in place (as they would during all

phases of the Proposed Development). This includes, for example, ensuring adequate clearances are in place when plant and equipment are being moved beneath overhead lines and limiting any planting beneath overhead lines to low growing species.

Mitigation Measures

14.7.18 The risk of damage to utilities during construction would be minimised through embedded mitigation, which would involve the implementation of the measures listed within **Paragraph 14.7.14** and the mapping of infrastructure that crosses the Proposed Development, therefore avoiding it through the design. No further mitigation would be required for telecommunications, television reception and utilities.

Cumulative Effects

14.7.19 The Proposed Development has been assessed to have no effect on telecommunication, television, or utilities. It is expected that the other developments included within the cumulative schemes shortlist within **Chapter 15: Cumulative and Effect Interactions** of this ES [EN010154/APP/6.1] would also have no effect on telecommunications and television reception and would adhere to the same mitigation as set out above to reduce the risk of damaging utilities. It is assumed that all other developments will conform to good practice measures and their environmental impacts will be managed through a CEMP (or similar) and would include mitigation measures to reduce the risk of damaging utilities during construction. Therefore, no cumulative effects are expected on telecommunications, television reception, or utilities.

14.8 Electric and Electromagnetic Fields

Introduction

14.8.1 The Electromagnetic Fields Assessment presented within **Appendix 14-F** of this ES [**EN010154/APP/6.3**] presents the findings of an assessment of the likely effects of the Proposed Development on Electric and Electromagnetic Fields (EMF). This section of Chapter 14 summarises this assessment.

14.8.2 Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, shrubs, and buildings easily block electric fields. Electromagnetic fields are produced by the flow of electric current; however, unlike electric fields, most materials do not readily block electromagnetic fields. The intensity of both electric fields and electromagnetic fields diminishes with increasing distance from the source.

14.8.3 With the exception of relatively short lengths of cables connecting solar PV panels to string inverters, all cables associated with the Proposed Development would be buried underground. The dimension of the trenches will vary depending on the number of cables or ducts they contain as is further described in **Chapter 3: The Proposed Development** [**EN010154/APP.6.1**]. EMF associated with the Proposed Development is considered a minor risk and therefore an assessment has been included on a precautionary basis.

Legislation and Policy

14.8.4 Key legislation, planning policy and guidance relating to the assessment of Electric and Electromagnetic Fields and pertinent to the Proposed Development is listed within **Appendix 14-F: Electromagnetic Fields Assessment** [**EN010154/APP/6.3**]. Further detail regarding these policies can be found in **Appendix 14-A: Other Environmental Topics Policy and Legislation** of this ES [**EN010154/APP/6.3**].

Consultation

14.8.5 A scoping exercise was undertaken in June 2023 to establish the content, approach and method of the EIA. A request for an EIA Scoping Opinion was issued to the Secretary of State through the Planning Inspectorate in June 2023. Comments received in the EIA Scoping Opinion (**Appendix 1-B** [**EN010154/APP/6.3**]), and the Applicant's responses in relation to the Electric and Electromagnetic Fields assessment are presented in **Table 14-32**.

Table 14-32: Scoping Opinion Responses (Electric and Electromagnetic Fields)

Consultee	Summary of comment	How matter has been addressed	Location response	of
Planning Inspectorate	The Scoping Report indicates that the electricity to be generated by the Proposed Development is expected to be exported via a 400kV connection either	400kV electricity transmission lines are no longer	overhead lines	N/A

	underground or overhead to a new National Grid substation. Where a 400kV overhead line option is progressed, the ES should consider the potential for effects on human health from possible EMF, taking into account relevant guidance, where significant effects are likely to occur	proposed as part of the project.
14.8.6	Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information (PEI) Report, issued in October 2024. Table 14-33 outlines the statutory consultation responses relating to the Electric and Electromagnetic Fields assessment and how these have been addressed through the ES. The Potential Main Issues for Examination [EN010154/APP/7.11] , Consultation Report [EN010154/APP/5.1] and Consultation Report Appendices [EN010154/APP/5.2] provide further detailed responses, as relevant, to the feedback received during statutory consultation.	

Table 14-33: Statutory Consultation Responses (Electric and Electromagnetic Fields)

Consultee	Summary comment	How matter has been addressed	Location of response
Lincolnshire County Council	The PEIR and associated documents seem to give little consideration to potential health impacts of a substation, e.g. emissions, cooling noise, the impact of electromagnetic fields (EMF). This applies to both adverse physical and mental health impacts.	Human health and wellbeing has been considered within the Landscape and Visual Amenity, Noise and Vibration, Traffic and Transport, and Air Quality assessments in the ES [EN010154/APP/6.1]. All electric appliances emit electric and magnetic fields (EMF). Solar panel arrays emit EMF in the same extremely low frequency ranges as electrical appliances and wiring found in most houses and buildings. The Proposed Development would	Chapter 11: Noise and Vibration, Chapter 13: Traffic and Transport and Chapter 14: Other Environmental Topics of the ES [EN010154/APP/6.1]

be fully compliant with relevant Government policy and all the EMFs produced would be below the relevant exposure limits and therefore no significant effects are anticipated as a result of the Proposed Development.

Appendix 14-F: Electromagnetic Fields Assessment [EN010154/APP/6.3] provides an assessment of the potential for EMF effects as a result of the Proposed Development

Assessment Methodology

- 14.8.7 This section summarises the scope of methodology for the assessment of the impacts of the Proposed Development on EMF. Further detail is provided in **Appendix 14-F** of this ES [**EN010154/APP/6.3**].
- 14.8.8 Underground cables eliminate the electric field altogether as it is screened out by the sheath around the cable, but they still produce electromagnetic fields. In accordance with National Grid guidance (Ref 14-104), EMF effects from underground cables would not exceed the International Commission on Non-Ionizing Radiation Protection (ICNIRP) reference levels and have therefore been scoped out of this assessment.
- 14.8.9 The Interconnecting Cables between Solar PV areas are not considered in the assessment as they would have a very low voltage of less than 1kV and therefore would not significantly contribute to any increase in electromagnetic fields should they overlap with other infrastructure.
- 14.8.10 The ICNIRP 'reference levels' for the public are 100 microteslas for magnetic fields and 5,000 volts per metre for electric fields (Ref 14-109). These are the levels above which more investigation is needed if this level of exposure is likely to occur; the permitted levels of exposure are somewhat higher, 360 microteslas and 9,000 volts per metre. They apply where the time of exposure is significant, for instance in a residence. As a worst-case, the lower 'reference level' of 100 microteslas and 5,000 volts per metre is used in the assessment, as the threshold at which potentially significant effects could occur.

Study Area

14.8.11 The EMFs produced by the electrical assets of the Proposed Development would have a given magnitude at a given distance from the asset. Therefore, the Study Area of the assessment includes all areas around the assets where the EMFs could potentially be. The Study Area for the assessment is therefore the DCO Site, as shown in **Figure 1-2: DCO Site [EN010154/APP/6.2]**.

Baseline Conditions

14.8.12 The DCO Site is located within a mixture of primarily rural and semi-rural areas, which accommodate existing electrical assets. Electric and magnetic fields both occur naturally. The Earth's magnetic field, which is caused mainly by currents circulating in the outer layer of the Earth's core, is roughly 50 microteslas in the UK. This field may be distorted locally by ferrous minerals or by steelwork such as in buildings. The Earth's natural fields are static, and the power system produces alternating fields. Further information on Baseline Conditions is contained within **Appendix 14-F** of this ES [EN010154/APP/6.3].

Assessment of Effects

14.8.13 DECC guidance (Ref 14-105) states that underground cables at voltages up to and including 132kV are considered not capable of exceeding the ICNIRP exposure guidelines for electromagnetic fields (Ref 14-109) and that compliance with exposure guidelines for such equipment can be assumed unless evidence is brought to the contrary in specific cases. However, there is potential for exceedances of 132kV where infrastructure overlaps.

14.8.14 The National Grid document 'Undergrounding high voltage electricity transmission lines' (Ref 14-104) states that for a 400kV cable buried at 0.9 m depth, the typical magnetic field is 24 microteslas when on top of the cable and 3 microteslas at 5m from the centreline, with the maximum level known by National Grid being 96 microteslas on top of the cable at 0.9 m depth, and 13 microteslas at 5m. Taking into account this guidance and the UK limits set for safety of members of the public, the maximum reported electromagnetic field for HV cables buried at a minimum depth of 1.4m would comply with the ICNIRP limits even if the cabling were directly under a human receptor. Given that the maximum electromagnetic field for HV cables will comply with safety limits directly on top of the cable, and noting the set back between residences and the cabling (and any users of PRoW or permissive paths will only cross the cabling temporarily), no significant impacts are expected to arise from electromagnetic fields as result of the underground cables that form part of the Proposed Development.

14.8.15 Cables between solar PV panels and the inverters would typically be required to be above ground level (along a row of racks fixed to the solar PV mounting structure or fixed to other parts of nearby components) and then underground if required (between racks and in the inverter's input). All other on-site cabling would be underground.

14.8.16 As stated in **Paragraph 14.8.9**, the Interconnecting Cables would have a voltage of less than 1kV and therefore would not significantly contribute to any increase in electromagnetic fields should they overlap with other infrastructure.

14.8.17 There are no permanent receptors within 10m of the DCO Site. The electricity export cable will be located at least 10m from permanent receptors due to the need for construction vehicles to manoeuvre both sides of the trench within the working width. Therefore, no significant effects to receptors are predicted to occur.

14.8.18 Some PRoW and permissive paths do cross over the Cable Corridor and may also pass over the Interconnecting and Cable Corridor where they are routed within the Principal Site. PRoWs are shown on **Figure 2-2** of this ES [**EN010154/APP/6.2**]. The presence of the public either directly above or adjacent to underground cables associated with the Proposed Development would be transient, with the individuals using the PRoW exposed to electromagnetic fields from the cables for only very short periods of time. It is considered that the level of exposure to users of PRoW would be lower than that associated with general household appliances. Therefore, no significant effects to users of PRoW are predicted to occur.

14.8.19 Where the cables associated with the Proposed Development are proposed to cross watercourses, the cables will be installed a minimum of 2m below minor/ordinary watercourses (except where minor/ordinary watercourses have minimal or no water flow and water management is easily managed) and 5m beneath main rivers, which will provide sufficient distance to attenuate EMF and avoid impacts on river species such as fish (as set out in the **Framework CEMP [EN010154/APP/7.7]**). EMF levels at this distance would be almost imperceptible (around 3 microteslas, or lower if the cables are installed in bedrock), with any fish also being directly above the buried cables for only a very short duration. The effect on river fauna is therefore considered to be negligible.

14.8.20 The assets associated with the Proposed Development would be fully compliant with the relevant Government policy. Specifically, all the EMFs produced would be below the relevant exposure limits. Therefore, no significant EMF effects are anticipated as a result of the Proposed Development.

Cumulative Effects

14.8.21 EMF associated with the Proposed Development has been assessed to have no significant effect on receptors. It is expected that the EMF associated with other developments included within the cumulative developments shortlist (as discussed in **Chapter 15: Cumulative Effects and Interactions** of the ES [**EN010154/APP/6.1**]) would also have no significant effect on receptors and would adhere to the same relevant Government policy as set out above to ensure all EMF is below the relevant exposure limits. Therefore, no cumulative effects are expected due to EMFs.

14.9 References

Ref 14-1 H.M. Government (1990). Environmental Protection Act 1990. Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>

Ref 14-2 HM Government (2016). The Air Quality Standards (Amendment) Regulations (2016). SI 2016 No. 1184, His Majesty's Stationery Office. Available at: <https://www.legislation.gov.uk/ksi/2016/1184/contents/made>

Ref 14-3 HM Government (1995). The Environment Act. Available at: <https://www.legislation.gov.uk/ukpga/1995/25/contents>

Ref 14-4 HM Government (2021). The Environment Act. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

Ref 14-5 HM Government (2023). The Environmental Targets (Fine Particulate Matter) (England) Regulations. Available at: <https://www.legislation.gov.uk/ksi/2023/96/contents/made>

Ref 14-6 Department for Environment, Food and Rural Affairs (2000). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Available at: <http://www.gov.scot/resource/doc/1052/0051687.pdf>

Ref 14-7 Department for Environment, Food and Rural Affairs (Defra) (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 1 available at: <https://webarchive.nationalarchives.gov.uk/20090810105142/http://www.defra.gov.uk/environment/airquality/strategy/pdf/air-qualitystrategy-vol1.pdf> Volume 2 available at: <https://webarchive.nationalarchives.gov.uk/20090810105136/http://www.defra.gov.uk/environment/airquality/strategy/pdf/air-qualitystrategy-vol2.pdf>

Ref 14-8 Defra (2019). UK Clean Air Strategy 2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

Ref 14-9 Department for Energy and Climate Change (DECC) (2011) National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Ref 14-10 Department for Energy Security & Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS EN-1.pdf

Ref 14-11 National Policy Statement for Renewable Energy Infrastructure EN-3 (2011). Available at: [1940-nps-renewable-energy-en3.pdf \(publishing.service.gov.uk\)](https://assets.publishing.service.gov.uk/publishing/service.gov.uk/1940-nps-renewable-energy-en3.pdf)

Ref 14-12 National Policy Statement for Renewable Energy Infrastructure EN-3 (2023). Available at: <https://assets.publishing.service.gov.uk/media/655dc352d03a8d001207fe37/nps-renewable-energy-infrastructure-en3.pdf>

Ref 14-13 DLUHC (2019) National Planning Policy Guidance. Available at: <https://www.gov.uk/guidance/air-quality--3#how-detailed-does-an-air-quality-assessment-need-to-be>

Ref 14-14 Ministry of Housing, Communities & Local Government (MHCLG) (2023) National Planning Policy Framework. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Ref 14-15 EPUK & IAQM. (2017). Land-Use Planning & Development Control: Planning for Air Quality.

Ref 14-16 HM Government (2023). Environmental Improvement Plan 2023. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1133967/environmental-improvement-plan-2023.pdf

Ref 14-17 Institute of Air Quality Management (2023) Guidance on the assessment of dust from demolition and construction.

Ref 14-18 Department for Environment, Food and Rural Affairs (2022), Local Air Quality Management Technical Guidance (TG22). Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

Ref 14-19 North Kesteven District Council (2023) North Kesteven district council Annual status Report. 2022 Annual Status report available at: [https://www.n-kesteven.gov.uk/sites/default/files/2023-01/air quality annual status report 2022.pdf](https://www.n-kesteven.gov.uk/sites/default/files/2023-01/air%20quality%20annual%20status%20report%202022.pdf)

Ref 14-20 Defra (2023) Magic. Available at: <https://magic.defra.gov.uk/MagicMap.aspx>

Ref 14-21 Defra (2023) Modelled background pollution data. Available at: <https://uk-air.defra.gov.uk/data/pcm-data>

Ref 14-22 NPPG Renewable and Low Carbon Energy. (2015) Available at: http://planningguidance.communities.gov.uk/blog/guidance/renewable-and-low-carbon-energy/particular-planning-considerations-for-hydropower-active-solar-technology-solar-farms-and-wind-turbines/#paragraph_012

Ref 14-23 BRE (2013) Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems.

Ref 14-24 CAA (2010) Interim CAA Guidance – Solar Photovoltaic Systems.

Ref 14-25 Civil Aviation Authority (2020). CAP738 – Safeguarding of Aerodromes 3rd Edition.

Ref 14-26 Federal Aviation Administration (FAA), Policy and Guidance. Available at: https://www.faa.gov/regulations_policies/policy_guidance.

Ref 14-27 FAA (2021). FAA Policy: Review of Solar Energy Systems Projects on Federally – Obligated Airports. Available at: <https://www.federalregister.gov/documents/2021/05/11/2021-09862/federal-aviation-administration-policy-review-of-solar-energy-system-projects-on-federally-obligated>

Ref 14-28 BRE (2013) Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems.

Ref 14-29 Rail Industry (2022), Rail Industry Standard for Signal Sighting Assessment Requirements (RIS-0737-CCS Iss 1).

Ref 14-30 Environment Agency (2020). Land Contamination Risk Management (LC:RM) Guidance. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Ref 14-31 Department for Environment Food & Rural Affairs Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance 2012. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223705/pb13735cont-land-guidance.pdf

Ref 14-32 HM Government (1991) The Water Resources Act. Available at: https://www.legislation.gov.uk/ukpga/1991/57/pdfs/ukpga_19910057_en.pdf

Ref 14-33 HM Government (2003) The Water Act. Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents>

Ref 14-34 HM Government (1984) Building Act. Available at: https://www.legislation.gov.uk/ukpga/1984/55/pdfs/ukpga_19840055_en.pdf

Ref 14-35 HM Government (2015) The Building Regulations and c. (Amendment) Regulations. Available at: https://www.legislation.gov.uk/ksi/2015/767/pdfs/ksi_20150767_en.pdf

Ref 14-36 HM Government (2008) The Planning Act. Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf

Ref 14-37 HM Government (2016) The Environmental Permitting Regulations. Available at: https://www.legislation.gov.uk/ukdsi/2016/9780111150184/pdfs/ukdsi_9780111150184_en.pdf

Ref 14-38 HM Government (2005) The Hazardous Waste Regulations. Available at: The Hazardous Waste (England and Wales) Regulations 2005

Ref 14-39 HM Government (2006) The Contaminated Land Regulations. Available at: <https://www.legislation.gov.uk/ksi/2006/1380/contents/made>

Ref 14-40 HM Government (2015) The Environmental Damage (Prevention and Remediation) (England) Regulations 2015. Available at: https://www.legislation.gov.uk/ksi/2015/810/pdfs/ksi_20150810_en.pdf

Ref 14-41 HM Government The Anti-Pollution Works Regulations 1999. Available at: <https://www.legislation.gov.uk/ksi/1999/1006/made>

Ref 14-42 Department for Energy Security & Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf

Ref 14-43 Central Lincolnshire Adopted Local Plan 2023. Available at: <https://www.n-kesteven.gov.uk/central-lincolnshire/adopted-local-plan-2023>

Ref 14-44 CIRIA (2001). Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA Report C552). Not available online.

Ref 14-45 Department for Energy Security & Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf

Ref 14-46 IEMA (2020). IEMA Guide to: Materials and Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach. Available at: <https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment>

Ref 14-47 Central Lincolnshire (2023). Central Lincolnshire Local Plan Policies Map. Available at: <https://www.n-kesteven.gov.uk/central-lincolnshire/adopted-policies-map-interactive-map>

Ref 14-48 Lincolnshire County Council (2016). Lincolnshire Minerals and Waste Local Plan. Available at: <https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies>

Ref 14-49 Environment Agency (2023). Historic Landfill Sites. Available at: <https://www.data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites>

Ref 14-50 Environment Agency (2023). Permitted Waste Sites – Authorised Landfill Site Boundaries. Available at: <https://www.data.gov.uk/dataset/ad695596-d71d-4ccb-8e32-99108371c0ee/permited-waste-sites-authorised-landfill-site-boundaries>

Ref 14-51 Environment Agency (2023). Environmental Permitting Regulations - Waste Sites. Available at: <https://www.data.gov.uk/dataset/e2cc8101-d8b7-434d-a26a-9115061bb57c/environmental-permitting-regulations-waste-sites>

Ref 14-52 European Union (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008/98/EC). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705>

Ref 14-53 His Majesty's Government (H.M. Government) (2017). 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). Available at: http://www.legislation.gov.uk/ksi/2017/572/pdfs/ksi_20170572_en.pdf and http://www.legislation.gov.uk/ksi/2018/695/pdfs/ksi_20180695_en.pdf

Ref 14-54 H.M. Government (2011). The Waste (England and Wales) Regulations. Available at: <https://www.legislation.gov.uk/ksi/2011/988/contents/made>

Ref 14-55 H.M. Government (1990). Environmental Protection Act. Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>

Ref 14-56 H.M. Government (2016). The Environmental Permitting (England and Wales) Regulations 2016. Available at: <https://www.legislation.gov.uk/ksi/2016/1154/contents/made>

Ref 14-57 H.M. Government (2005). The Hazardous Waste Regulations (England and Wales) (amended in 2016). Available at: <https://www.legislation.gov.uk/ksi/2016/336/contents/made>

Ref 14-58 H.M. Government (2021). Environment Act 2021. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

Ref 14-59 H.M. Government (2013). The Waste Electrical and Electronic Equipment (WEEE) Regulations 2013. Available at: <https://www.legislation.gov.uk/ksi/2013/3113/contents>

Ref 14-60 H.M. Government (2015). The Waste Batteries and Accumulators (Amendment) Regulations 2015. Available at: <https://www.legislation.gov.uk/ksi/2015/1935/contents>

Ref 14-61 Department for Levelling Up, Housing and Communities (DLUHC) and Ministry of Housing, Communities & Local Government (MHCLG) (2014). National Planning Policy for Waste. Available at: <https://www.gov.uk/government/publications/national-planning-policy-for-waste>

Ref 14-62 Department for Environment, Food & Rural Affairs (DEFRA) (2021). Waste Management Plan for England. Available at: <https://www.gov.uk/government/publications/waste-management-plan-for-england-2021>

Ref 14-63 DEFRA (2018). A Green Future: Our 25 Year Plan to Improve the Environment. Available at: 25 Year Environment Plan. Available at: <https://www.gov.uk/government/publications/25-year-environment-plan>

Ref 14-64 DEFRA (2023). Environmental Improvement Plan 2023. Available at: <https://www.gov.uk/government/publications/environmental-improvement-plan>.

Ref 14-65 DEFRA and Environment Agency (2018). Our Waste, Our Resources: A Strategy for England. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765914/resources-waste-strategy-dec-2018.pdf

Ref 14-66 DEFRA (2023). The Waste Prevention Programme for England: Maximising Resources, Minimising Waste 2023. Available at: <https://www.gov.uk/government/publications/waste-prevention-programme-for-england-maximising-resources-minimising-waste>

Ref 14-67 Department for Energy Security and Net Zero (DESNZ), 2024. Overarching National Policy Statement for Energy (EN-1). Available at: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>

Ref 14-68 MHCLG and DLUHC (2024). National Planning Policy Framework (NPPF). Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Ref 14-69 DLUHC (2014 and 2015). National Planning Policy Guidance (NPPG) For Minerals and Waste. Available at: <https://www.gov.uk/government/collections/planning-practice-guidance>

Ref 14-70 Contaminated Land: Applications in Real Environments (CL:AIRE) (2011). Definition of Waste: Development Industry Code of Practice (DoW CoP). Available at: <https://www.claire.co.uk/projects-and-initiatives/dow-cop/28-framework-and-guidance/111-dow-cop-main-document>

Ref 14-71 Waste and Resources Action Programme (WRAP) Designing Out Waste: A Design Team Guide for Civil Engineering. No longer available online.

Ref 14-72 DEFRA and Environment Agency (2016). Waste Duty of Care Code of Practice. Available at: <https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice>

Ref 14-73 DEFRA (2011) Guidance on Applying the Waste Hierarchy. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf

Ref 14-74 Solar Power Europe (2015). Lifecycle Quality Best Practice Guidelines Version 1.0. Available at: <https://www.solarpowereurope.org/insights/thematic-reports/lifecycle-quality-best-practice-guidelines-version-1-0>

Ref 14-75 Department for Business and Trade (2023). UK Battery Strategy. Available at: <https://www.gov.uk/government/publications/uk-battery-strategy>

Ref 14-76 Solar Energy UK (2025). Solar Supply Chains: Sustainability Issues and Action. Available at: <https://solarenergyuk.org/wp-content/uploads/2025/03/Supply-Chain-Briefing-2.pdf>

Ref 14-77 Central Lincolnshire (2023). Central Lincolnshire Local Plan. Available at: <https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf>

Ref 14-78 Lincolnshire County Council (2016). Lincolnshire Minerals and Waste Local Plan Core Strategy. Available at: <https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies>

Ref 14-79 DEFRA (2024). UK Statistics on Waste. Available at: <https://www.gov.uk/government/statistics/uk-waste-data/uk-statistics-on-waste#recovery-rate-from-non-hazardous-construction-and-demolition-cd-waste>

Ref 14-80 Environment Agency (2023). 2023 Waste Data Interrogator, 2023 Waste Summary Tables for England - Version 1. Available at: <https://environment.data.gov.uk/dataset/134f7ce9-5123-4813-b4e5-c4fdf621200d>

Ref 14-81 DEFRA, 2010. Strategy for Hazardous Waste Management in England. Available at: https://www2.richmond.gov.uk/docs/arlington/CDE10_hazardous_waste_strategy_england_2010.pdf

Ref 14-82 Environment Agency (2023). Historic Landfill Sites. Available at: <https://www.data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites>

Ref 14-83 Environment Agency (2023). Permitted Waste Sites – Authorised Landfill Site Boundaries. Available at: <https://www.data.gov.uk/dataset/ad695596-d71d-4ccb-8e32-99108371c0ee/permited-waste-sites-authorised-landfill-site-boundaries>

Ref 14-84 Environment Agency (2023). Environmental Permitting Regulations - Waste Sites. Available at: <https://www.data.gov.uk/dataset/e2cc8101-d8b7-434d-a26a-9115061bb57c/environmental-permitting-regulations-waste-sites>

Ref 14-85 UK Steel (2023). UK Steel Stats Guide 2023. Available at: https://www.uksteel.org/versions/2/wizard/modules/fileManager/downloadDigitalFile.php?url=https%3A%2F%2Ffiles.cdn-files-a.com%2Fuploads%2F8346772%2Fnormal_64d3974279292.pdf

Ref 14-86 Mineral Products Association (2023). Profile of the UK Mineral Products Industry: 2023 Edition. Available at:

[https://www.mineralproducts.org/MPA/media/root/Publications/2023/Profile of the UK Mineral Products Industry 2023.pdf](https://www.mineralproducts.org/MPA/media/root/Publications/2023/Profile%20of%20the%20UK%20Mineral%20Products%20Industry%202023.pdf)

Ref 14-87 Central Lincolnshire (2023). Central Lincolnshire Local Plan Policies Map. Available at: <https://www.n-kesteven.gov.uk/central-lincolnshire/adopted-policies-map-interactive-map>

Ref 14-88 Lincolnshire County Council (2017). Lincolnshire Minerals and Waste Local Plan Site Locations. Available at: <https://www.lincolnshire.gov.uk/downloads/file/2274/adopted-site-locations-pdfa>

Ref 14-89 SolRecycle (2024). Our Mission. Available at: <https://www.solrecycle.co.uk/>

Ref 14-90 WRAP (2007). Waste Recovery Quick Wins. Improving Recovery Rates without Increasing Costs. No longer available online.

Ref 14-91 RS Bruce Metals and Machinery Ltd (2023). Battery Recycling. Available at: <https://www.rsbruce.com/battery-recycling>

Ref 14-92 PV Cycle (2025). PV Cycle. Available at: <https://www.pvcycle.org.uk/>

Ref 14-93 European Recycling Platform (2025). Compliance Solutions for the Solar Industry. Available: <https://erp-recycling.org/services/solar-industry-solutions/>

Ref 14-94 SECONDSOL, 2024. Products for your PV system. Available at: <https://www.secondsol.com/en/index.htm>

Ref 14-95 Vekony, A.T, 2024. Recycling: A Solar Panel's Life after Death. Available at: <https://www.greenmatch.co.uk/blog/2017/10/the-opportunities-of-solar-panel-recycling>.

Ref 14-96 HMSO (2017). 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). Available at: http://www.legislation.gov.uk/ksi/2017/572/pdfs/ksi_20170572_en.pdf and http://www.legislation.gov.uk/ksi/2018/695/pdfs/ksi_20180695_en.pdf

Ref 14-97 Lincolnshire County Council (2024) Community Risk Management Plan 2024-28. Available at: <https://www.lincolnshire.gov.uk/lincolnshire-fire-rescue/community-risk-management-plan/6>

Ref 14-98 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.

Ref 14-99 OJEU (2009) Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations

Ref 14-100 HMSO (2020). National Risk Register of Civil Emergencies, 2020 Edition.

Ref 14-101 Natural England (2017). Evidence review of the impact of solar farms on birds, bats and general ecology. DOI 10.13140/RG.2.2.24726.96325

Ref 14-102 IEMA (2020) Major Accidents and Disasters in EIA: An IEMA Primer.

Ref 14-103 HMSO (2016). The Control of Electromagnetic Fields at Work Regulations. Available at: <https://www.legislation.gov.uk/ksi/2016/588/contents/made>

Ref 14-104 National Grid (2015). Undergrounding high voltage electricity transmission lines.

Ref 14-105 DECC (2012). Power Lines: Demonstrating Compliance with EMF public exposure guidelines. A voluntary Code of Practice. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48308/1256-code-practice-emf-public-expguidelines.pdf

Ref 14-106 Energy Networks Association (2012). Electric and Magnetic Fields, The Facts.

Ref 14-107 Energy Networks Association (2017). Electric and Magnetic Fields. Available at: <https://www.energynetworks.org/industry-hub/resourcelibrary/electric-and-magnetic-fields-facts.pdf> [Accessed 20 December 2023].

Ref 14-108 International Commission on Non-Ionizing Radiation Protection (ICNIRP). (1998). Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). *Health Phys*, 74(4), 494-522.

Ref 14-109 ICNIRP (2020). Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz). Available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPrgdI2020.pdf>.

Ref 14-110 Department of Transport (2002). The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas). Direction (updated 2016). Available at: <https://www.gov.uk/government/publications/safeguarding-aerodromes-technical-sites-and-military-explosives-storage-areas/the-town-and-country-planning-safeguarded-aerodromes-technical-sites-and-military-explosives-storage-areas-direction-2002>