Rosefield Solar Farm

Environmental Statement

Volume 2
Chapter 12: Soil
(Clean)

EN010158/APP/6.2.3
Revision 3
Deadline 4
June 2026
Rosefield Energyfarm Limited

APFP Regulation 5(2)(a)

Planning Act 2008

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

Table of Contents

12. Soil

12.1. Introduction

12.1.1. This document has been updated at Deadline 4 in response to Buckinghamshire Council's response received at Deadline 3. This includes amendments to formatting in Table 12.4 and updating 'soil ecosystem' to 'soil structure' throughout this chapter. The document references have not been updated from the original submission. Please refer to the **Guide to the Application [EN010158/APP/1.2.10]** for the list of current versions of documents.

12.1.2. This chapter presents an assessment of likely significant effects arising from the construction, operation (including maintenance), and decommissioning of the Proposed Development upon soil (including agricultural land). The full description of the Proposed Development is provided within **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**. Soil contamination is covered by **ES Volume 2, Chapter 11: Land and Groundwater [EN010158/APP/6.2]**and economics related to agricultural business are covered within **ES Volume 2, Chapter 14: Population [EN010158/APP/6.2]**.

12.1.3. This chapter is supported by the following figures presented in **ES Volume 3 [EN010158/APP/6.3]**:

- **Figure 12.1: Agricultural Land Classification**; and
- **Figure 12.2: Soil Association Map**.

12.1.4. This chapter is further supported by the following technical appendices presented in **ES Volume 4 [EN010158/APP/6.4]**:

- **Appendix 12.1: Agricultural Land Classification Report**.

12.1.5. This chapter is also supported by the following documents:

- **Outline Soil Management Plan (Outline SMP) [EN010158/APP/7.7]**;
- **Outline Construction Environmental Management Plan (Outline CEMP) [EN010158/APP/7.2]**;
- **Outline Operation Environmental Management Plan (Outline OEMP) [EN010158/APP/7.3]**;
- **Outline Decommissioning Environmental Management Plan (Outline DEMP) [EN010158/APP/7.4]**; and
- **Outline Construction Traffic Management Plan (Outline CTMP) [EN010158/APP/7.5]**.

12.1.6. This chapter should also be read in conjunction with the following assessment chapter(s):

- **Chapter 7: Biodiversity [EN010158/APP/6.2]**;
- **Chapter 11: Land and Groundwater [EN010158/APP/6.2]**;
- **Chapter 14: Population [EN010158/APP/6.2]**;
- **Chapter 16: Water [EN010158/APP/6.2]**; and
- **Chapter 17: Cumulative Effects [EN010158/APP/6.2]**.

12.2. Legislative framework, planning policy and guidance

12.2.1. This assessment has been undertaken with regard to the following legislation, planning policy and guidance.

12.2.2. It should be noted that this chapter does not assess the compliance of the Proposed Development against relevant planning policy. Such an assessment is presented in the **Planning Statement [EN010158/APP/5.7]**.

Legislation

12.2.3. There is no legislation of relevance to the soil assessment.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023) – Section 5.11 relates to soil and agricultural land **[Ref. 12-1]**;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) – Section 2.10 contains details relating to soil quality for solar development **[Ref. 12-2]**;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023) – details issues relating to underground cables, in connection with soil, although predominantly dealing with overhead cables **[Ref. 12-3]**; and
- National Planning Policy Framework (NPPF) (2024) – Section 15 ‘Conserving and enhancing the natural environment’ **[Ref. 12-4]**.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 (adopted September 2021), specifically paragraphs 9.50, 9.51 and Policy ‘NE7 Best and most versatile agricultural land’ **[Ref. 12-5]**. The plan and policies outline how the Council aims to protect ‘best and most versatile’ (BMV) land (Grades 1, 2, and 3a) by minimising development on these areas to prevent significant agricultural loss.

- The Buckinghamshire Minerals and Waste Local Plan 2016-2036 (Adopted July 2019), specifically paragraphs 7.16-7.19 and Policy 16: 'Managing Impacts on Amenity and Natural Resources' **[Ref. 12-6]**. The policy and paragraphs outline how soil is a finite resource which must be protected, especially during development. Lower quality land should be prioritised and the impact on BMV should be minimised.

Guidance

- Natural England (2017) Likelihood of Best and Most Versatile Agricultural Land. **[Ref. 12-7]**;
- Ministry of Agriculture, Fisheries and Food (1988) Agricultural Land Classification for England and Wales: Revised Criteria for Grading the Quality of Agricultural Land (ALC011). **[Ref. 12-8]**;
- Institute of Environmental Management and Assessment (IEMA) (2022) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment. **[Ref. 12-9]**;
- Natural England (2012) Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land (TIN049). **[Ref. 12-10]**;
- Institute of Quarrying (2021) Good Practice Guide for Handling Soils. **[Ref. 12-11]**; and
- UK Parliament (2023) A Green Future: Our 25 Year Plan to Improve the Environment. **[Ref. 12-12]**.

12.3. Stakeholder engagement

12.3.1. **Table 12.1** provides a summary of the stakeholder engagement activities undertaken separate from the Environmental Impact Assessment (EIA) scoping, Phase One Consultation, Phase Two Consultation and Targeted Consultation process. This table also details the matters raised, how such matters have been addressed, and where they have been addressed within the Development Consent Order (DCO) Application documentation.

12.3.2. **ES Volume 4, Appendix 5.3: EIA Scoping Opinion Response Matrix [EN010158/APP/6.4]** presents the responses received in the EIA Scoping Opinion and the Applicant's response to each matter that has been raised.

12.3.3. **Appendices A4, J1, J2 and K3** of the **Consultation Report Appendices [EN010158/APP/5.2]**, which is submitted in support of the DCO Application, sets out the feedback received during Phase One Consultation, Phase Two Consultation and Targeted Consultation and how regard has been afforded by the Applicant to each matter raised.

Table 12.1: Summary of stakeholder engagement

Consultee	Date of engagement	Summary of matters raised	Outcome of engagement	Where this matter is addressed in the DCO Application documentation
Natural England	15 March 2024	Email from Natural England confirming agreement with a semi-detailed survey (1 auger per 2 hectares (ha) plus representative pits) where the Site is expected to comprise non-BMV land and a detailed survey (1 auger per ha) where the Site is expected to comprise BMV land.	The Applicant confirms that surveys have been undertaken in accordance with the agreed methodology and survey densities for the BMV and non-BMV land.	**ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**.
Natural England	27 June 2025	Confirmation sought via email from Natural England that it agrees with the approach of assuming that the 54.45ha of land that was not subject to Agricultural Land Classification (ALC) survey (due to access restrictions) can be classified as Grade 3b for the agricultural land and non-agricultural for the East Claydon Substation.	A meeting was arranged to discuss the subject.	**ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**.

Consultee	Date of engagement	Summary of matters raised	Outcome of engagement	Where this matter is addressed in the DCO Application documentation
Natural England	04 August 2025	Confirmation sought via email from Natural England that it agrees with the approach of assuming that the 54.45ha of land that was not subject to ALC survey (due to access restrictions) can be classified as Grade 3b for the agricultural land and non-agricultural for the East Claydon Substation.	The Applicant will continue to try to gain access for the remanding agricultural land to complete a detailed survey however Natural England do not oppose the assumed ALC Grade of 3b and are happy to accept the Grade if access cannot be granted.	**ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**

12.4. Approach to identifying the scope of the assessment

Study area

12.4.1. The study area is defined as the Order Limits, as shown in **ES Volume 3, Figure 12.1: Agricultural Land Classification [EN010158/APP/6.3]**. This study area was chosen as it is the area in which the agricultural land quality will be affected due to the Proposed Development.

Scope of the assessment

12.4.2. The scope of this assessment has been established throughout the EIA process and design of the Proposed Development. Further information can be found in **ES Volume 1, Chapter 5: Approach to the EIA [EN010158/APP/6.1]**.

12.4.3. This section provides an update to the scope of the assessment from that presented in **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and re-iterates/updates the evidence base for scoping receptors/matters in or out following further iterative assessment.

Receptors/matters scoped into the assessment

12.4.4. **Table 12.2** presents the receptors/matters that are scoped into the assessment reported within this ES, together with appropriate justification.

Table 12.2: Receptors/matters scoped into the assessment

Receptor/matter	Phase	Justification
Agricultural land quality	Construction, operation (including maintenance) and decommissioning	This receptor was proposed to be scoped out of the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]**. However, as set out in **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**, the Planning Inspectorate advocated its inclusion on the basis that the Planning Inspectorate did not have sufficient information to exclude the possibility of significant effects to BMV land at that stage. The Planning Inspectorate also stated that the ES should quantify the total amount of agricultural land that would be lost and/or temporarily unusable (and over what duration of time), particularly any BMV land, and

Receptor/matter	Phase	Justification
		consider this loss within a regional context. Cumulative loss should be considered within the cumulative effects assessment. There is potential for the Proposed Development to impact agricultural land quality due to the location of infrastructure restricting access to the soils for agricultural usage. Therefore, this receptor is scoped into the assessment.
Soil structure	Construction, operation (including maintenance) and decommissioning	This receptor was proposed to be scoped out of the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]**. However, as set out in **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**, the Planning Inspectorate advocated its inclusion on the basis that the Planning Inspectorate did not have sufficient information to exclude the possibility of significant effects at that stage. The Planning Inspectorate also stated that the ES should include consideration of changes to the hydrogeological regime and how this might affect soil quality. Soils are a key resource in the area of the Proposed Development and require appropriate handling in order to prevent physical damage to the resource. Therefore, this receptor is scoped into the assessment.

Receptors/matters scoped out of the assessment

12.4.5. Agricultural land quality and soil structure are assessed at all phases; therefore, no receptors/matters have been scoped out of the assessment.

12.5. Environmental baseline

Establishing baseline conditions

Data sources to inform the EIA baseline characterisation

12.5.1. The following data sources have been used to understand the existing soil baseline conditions:

- Magic Map available online by Defra **[Ref. 12-13]**;
- British Geological Survey (BGS) mapping **[Ref. 12-14]**; and
- SoilScapes mapping **[Ref. 12-15]**.

Site visits/surveys

12.5.2. The following site visits/surveys have been undertaken to understand the existing soil baseline conditions:

- ALC surveys have been completed at the Site in October 2022, January 2023, June 2023, June 2024 and March 2025. The surveys have been undertaken in accordance with the Soil Survey Field Handbook **[Ref. 12-16]**. A total of 613ha has been surveyed at a minimum survey density of one observation per two ha and nine soil description pits. Where BMV land was identified, the survey density was increased to 1 auger per ha. This methodology was agreed with Natural England to conserve resources and increase survey efficiency (see **Table 12.1** above). During the surveys, soils were examined via a combination of auger borings and soil description pits to a maximum depth of 1.2m. The results of this survey are presented in **ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**. There is a total of 54.45ha which could not be surveyed due to access restrictions; within this area, the ALC grades have been predicted through interpolating the ALC survey results as well as assessing the desk based information available. Agricultural land has been classified in line with the Natural England 'Technical Information Note TIN049: Agricultural Land Classification: protecting the best and most versatile land', 2nd edition (2012) **[Ref. 12-10]** and Agricultural Land Classification for England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land **[Ref. 12-8]**.

Existing baseline

12.5.3. The following section presents a summary of the baseline conditions for the receptors/matters scoped into the assessment, as detailed within the **Table 12.2** above. The full details of the baseline conditions are presented in **ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**.

Land use

12.5.4. The land within the Order Limits is predominantly in agricultural use, comprising a mixture of arable farmland and pastures.

12.5.5. In addition to conventional agricultural activities, part of the land is also associated with the supply of biological materials for research and pharmaceutical purposes. Land use within this area therefore extends beyond conventional agricultural productivity, and forms part of a wider specialist supply chain linked to biomedical and research uses.

12.5.6. Existing energy infrastructure is also part of baseline land use, with the National Grid East Claydon Substation constituting 27.48 ha of land to the northwest of the Order Limits.

Soils

12.5.7. The National Soils Map, published at 1:250,000 scale, records soils at the Site as belonging to the Denchworth, Evesham 2, Ragdale, Wickham 2, and Fladbury 1 soil associations. These soils are all described as typically slowly permeable and are presented on **ES Volume 3, Figure 12.2: Soil Association Map [EN010158/APP/6.3]**.

12.5.8. The soils vary little in characteristics across the Site. Almost all soil profiles are clayey, with gleyed[1] and poorly structured, slowly permeable clayey subsoil recorded within 15-45cm of the soil surface – directly below the topsoil.

Agricultural land quality

12.5.9. The ALC is based on the long-term physical limitations of land for agricultural use and factors affecting the grade can include climate and the soil characteristics. The combination of climate and soil factors determines the soil wetness and droughtiness. The current agricultural use, or intensity of use, does not affect the grading.

[1] Gleying is a soil colouring indicative of periodic or permanent waterlogging.

12.5.10. The ALC system classifies land into five grades, with Grade 3 subdivided into Subgrades 3a and 3b. BMV land is defined as Grades 1, 2 and 3a.

12.5.11. Within the Order Limits, there were no previously published ALC surveys post 1988 and the Site is provisionally mapped as Grade 3.

12.5.12. 594.91ha of the total 675.05 ha Site was graded as Grade 3b (88.13% of the Site). There was an additional 42.45ha of unsurveyed land also graded as 3b, which brings the total area for Grade 3b land within the Site to 637.36ha (94.42%). These soils are heavy clay loam or clay topsoils over clay subsoils with impeded drainage. A further 7.19ha (1.07%) was graded as Grade 3a and 3.01ha (0.44%) as Grade 2; these soils are loamy topsoils over clay subsoils as observed during the ALC survey. Additionally, there was 27.48ha (4.07%) of non-agricultural land where the National Grid East Claydon Substation is located (12 ha of which was unsurveyed), which supports the expected soil type as presented in **ES Volume 3, Figure 12.2: Soil Association Map [EN010158/APP/6.3]**.

12.5.13. A total of 10.2ha (1.51%) of the Site is therefore classified as BMV land. The location and extent of the BMV is shown in **ES Volume 3, Figure 12.1: Agricultural Land Classification [EN010158/APP/6.3]**. The principal limitation to the agricultural land use across the Site is soil wetness.

12.5.14. 42.45ha of the unsurveyed land is assumed to be Grade 3b due to the homogeneous soil identified across the Site. The desk study indicates that the unsurveyed land is expected to be very similar soil to the surveyed area classified as Grade 3b; therefore, for the purposes of this assessment, it has been assumed that the same soil identified is present within these areas as agreed with Natural England (see **Table 12.1**). When including the unsurveyed area within the baseline assessment, the total area of BMV remains as 10.2ha (1.51% of the Site).

12.5.15. It should be noted that several fields within the Order Limits that will be required for the installation of cabling will be retained for agricultural use once the cables have been installed.

12.5.16. **Table 12.3** presents the percentages of the ALC grades from surveys within the Order Limits.

Table 12.3: ALC grades within the Order Limits

ALC grade	Area (ha)	Percentage
Grade 2	3.01	0.44
Grade 3a	7.19	1.07
Grade 3b (surveyed)	594.91	88.13

ALC grade	Area (ha)	Percentage
Unsurveyed area (Grade 3b)	42.45	6.29
Non agricultural	27.48	4.07
Total BMV	10.20	1.51
Total non-BMV	664.84	98.49
Total	675.05	100

Note: any discrepancies are attributable to rounding of the calculated values.

12.5.17. The Proposed Development includes a number of semi-permanent elements of hard infrastructure. These areas (those included in **Table 12.4**) represent areas of land that will be used for key infrastructure and will therefore be unavailable for agricultural use for the operational lifetime of the Proposed Development.

12.5.18. **Table 12.4** presents a breakdown of the key infrastructure components within the Order Limits, classified by ALC Grade. This breakdown provides context for the assessment of effects on agricultural land quality reported in **Sections 12.8 - 12.10.**

Table 12.4: Agricultural Land Classification of Key Infrastructure within the Order Limits*

	Key infrastructure component areas (ha)				
ALC grade	**Rosefield Substation**	**Satellite collector compounds**	**BESS**	Main Collector Compound	Solar PV development
Grade 1	0	0	0	0	0
Grade 2	0	0	0	0	2.4
Grade 3a	0	0	0	0	3.5
Grade 3b	11.6	18.2	7.8	17.5	274.3
Total BMV	0	0	0	0	5.9
Total Area	11.6	18.2	7.8	17.5	280.2

* The data in this table has been calculated based on an overlay of the **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and outputs of the ALC survey (detailed in **ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4.2]**). It should be noted that some of the key infrastructure components detailed within **Table 12.4** (namely the Rosefield Substation, Satellite Collector Compounds, BESS and Main Collector Compound) overlap within the **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**, secured by the **Works Plans [EN010158/APP/2.3.].** Therefore, the total combined area for these Key Infrastructure components in **Table 12.4** have been omitted.

Future baseline in the absence of the Proposed Development

12.5.19. In the short term, it is considered that the baseline conditions for ALC Grades will remain unchanged from those described above. While there may be potential changes in relation to climate change, including an increase in heavy rainfall events which can increase surface erosion and

runoff, as soils would be covered by vegetation (mainly grassland), they would be protected and undergo less overall erosion and runoff. Effects of climate change that could affect land grade and farming practices would likely only become apparent over longer time frames. Climate change is assessed in detail in **ES Volume 4, Appendix 8.2: Climate Change Resilience Assessment [EN010158/APP/6.4].**

12.5.20. There could potentially be future changes to land management practices and business approaches across the landowners/land managers irrespective of whether the Proposed Development goes ahead; these cannot be known or assessed currently as any future changes would be driven by a third party.

12.6. Approach to the assessment

Approach to design flexibility

12.6.1. The parameters, as outlined in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**, and the parameter plans presented in **ES Volume 3, Figure 3.1: Height Parameters [EN010158/APP/6.3]** and secured in **Appendix 1: Green and Blue Infrastructure Parameters** and **Appendix 3: Vegetation Removal Parameters** of the **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010158/APP/7.6]**, **Design Commitments [EN010158/APP/5.11]** and **Works Plans [EN010158/APP/2.3]**, set out the reasonable 'worst-case' parameters for the Proposed Development.

12.6.2. **ES Volume 1, Chapter 5: Approach to the EIA [EN010158/APP/6.1]** sets out those elements of the Proposed Development for which optionality is present within the design. The reasonable 'worst-case' scenario that has been assessed in this soil chapter for each element of the Proposed Development where optionality is present within the design is outlined within **Table 12.5**.

Table 12.5: Reasonable worst-case scenario assessed for soil

Project element	Reasonable worst-case scenario that has been assessed
Solar PV modules	The mounting structure for the Solar PV modules will include foundations to a maximum depth of 3m below ground level (bgl), constructed of galvanised steel. This use of foundations to the maximum 3m bgl depth is taken as the worst-case scenario with respect to this assessment.
Battery Energy Storage System (BESS)	This assessment has considered the field location of the BESS as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the

Project element	Reasonable worst-case scenario that has been assessed
	Works Plans [EN010158/APP/2.3], to ensure a worst-case has been assessed.
Rosefield Substation	This assessment assumes that the Rosefield Substation would be located within Parcel 3 across Fields E11 and E20, as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**, with a maximum area occupied by the Substation being 60,000m^2, to ensure a worst-case has been assessed. Worst case for Solar PV modules will be the entire siting zone, except for the areas where Rosefield Substation, the Collector Compounds and BESS are located.
Main Collector Compound	The maximum envelope of the Main Collector Compound is 25,000m² in plan, with equipment and buildings expected to sit on shallow concrete pad foundations or (where loading and ground conditions allow) screw piles. The 'worst case' associated with the Main Collector Compound is taken to be the use of screw piles, as these will extend into the soil and cause disturbance.
Satellite Collector Compounds	This assessment has considered the maximum parameters for the location of the Satellite Collector Compounds as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**, to ensure a worst-case has been assessed.
Interconnecting Cable Corridor(s)	Below ground Interconnecting Cabling has been taken as the worst-case scenario, with a maximum trench width of 35m and expected depths of 1.5m bgl, except where utility, road or ditch crossings are required (when depths would be at least 1.5m below roads, 0.5m below utilities and 2m below the bed of watercourses and ditches). The worst-case scenario in terms of construction techniques is open-cut trenching, as an open excavation is potentially more likely to result in soil disturbance and degradation.
Grid Connection Cable Corridor	The options presented for this project element have no impact on the outcome of the assessment, regardless of which optionality is chosen. Meaning, there is no specific 'worst-case' associated.
AIL Access Corridor	The options presented for this project element have no impact on the outcome of the assessment, regardless of

Project element	Reasonable worst-case scenario that has been assessed
	which optionality is chosen. Meaning, there is no specific 'worst-case' associated.
Internal Access Corridor(s)	The options presented for this project element have no impact on the outcome of the assessment, regardless of which optionality is chosen. Meaning, there is no specific 'worst-case' associated.
Indicative site access locations	The options presented for this project element have no impact on the outcome of the assessment, regardless of which optionality is chosen. Meaning, there is no specific 'worst-case' associated.
Construction Compounds	This assessment has considered the field location of the Construction Compounds, with a maximum area to be occupied of 25,000m^2. Indicative Fields B3, B6, B7, B10, D7-D9, D27, E10, E11 and E20-E22.

Assessment assumptions

12.6.3. There was a total of 54.45 ha that was not surveyed due to access restrictions, of which 12 ha was the East Claydon Substation, which has been classified as Non-Agricultural. **ES Volume 3, Figure 12.2: Soil Association Map [EN010158/APP/6.3]** indicates that the remaining 42.45 ha of this unsurveyed area is the same soil as the surveyed land on either side of it, which suggests it is reasonable to assume that this land is classified the same as the proximal points. Therefore, it has been assumed that this land is classified as Grade 3b (as agreed with Natural England (see **Table 12.1**)), limited by wetness due to the location and proximal observation points. The soil is largely homogenous across the Site as it is a deep clay with waterlogging.

12.6.4. Areas of Green and Blue Infrastructure are assumed to be temporary, as following decommissioning the land would be returned to the landowners, with all areas returned to their pre-construction ALC grade for potential agricultural production.

12.6.5. All blue infrastructure is pre-existing or within field margins, and would therefore not contribute to a decrease in agricultural production.

Assessment methodology and criteria

12.6.6. This section summarises the methodology adopted to assess the likely significant effects, including significance criteria (sensitivity, magnitude of impact and significance of effect, where relevant).

12.6.7. The IEMA Guide **[Ref. 12-9]** has been used to assess the impact on agriculture and soils. **Tables 12.6** to **12.9** set out the criteria used to determine the sensitivity of and the magnitude of impact on soils and agricultural land.

Sensitivity of agricultural land quality and soil structure

12.6.8. Sensitivity criteria for agricultural land quality and soil structure, derived from the IEMA Guide **[Ref. 12-9]**, are presented in **Table 12.6** and **Table 12.7** respectively. For the Proposed Development, the ALC grades have been used as the determining factor for receptor sensitivity for agricultural land quality.

12.6.9. The other factors mentioned within the IEMA Guide **[Ref. 12-9]** (ecological habitat, soil biodiversity, platform for landscape, soil carbon, soil hydrology, cultural heritage, community benefits, geodiversity and source of materials) are considered as part of the soil resource survey required to calculate the ALC grades. During the ALC survey, anything that can become a potential limitation to grading is flagged by the surveyor and used to gain a full description of the soil characteristics across the Site. These factors are also directly assessed in **ES Volume 2, Chapter 7: Biodiversity [EN010158/APP/6.2.5]**, **ES Volume 2, Chapter 9: Cultural Heritage [EN010158/APP/6.2.3]**, **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2.3], ES Volume 2, Chapter 11: Land and Groundwater [EN010158/APP/6.2.2] [REP1-038]** and **ES Volume 2, Chapter 16: Water [EN010158/APP/6.2.3]**. Texture, colour and bulk density are used to measure soil carbon storage within the soil survey. Likewise, soil ecological habitats are directly correlated to soil health, so by understanding the soil profile as a whole and the soil limitations, we are able to understand soil function.

12.6.10. The ALC survey undertaken has provided sufficient information to accurately describe the soil's physical characteristics across the Site and ALC is the industry standard classification to describe soil function within UK. Therefore, although there is no direct data for the other factors mentioned within the IEMA Guide **[Ref. 12-9]**, the assessment provides an accurate representation of soil function which is reflected through ALC grade as all soil factors are interlinked.

Table 12.6: Receptor sensitivity relating to agricultural land quality

Sensitivity (in-situ soils)	Soil resource and soil functions
Very high	**Biomass production:** ALC Grades 1 & 2. **Ecological habitat, soil biodiversity and platform for landscape:** Soils supporting protected features within a European site (e.g., Special Area of Conservation (SAC), Special Protection Area (SPA),

Sensitivity (in-situ soils)	Soil resource and soil functions
	Ramsar); Peat soils; Soils supporting a National Park, or Ancient Woodland. **Soil carbon:** Peat soils. Soils with potential for ecological/landscape restoration. **Soil hydrology:** Very important catchment pathway for water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** Scheduled Monuments and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/ educational access to land covered by National Park designation. **Source of materials:** Important surface mineral reserves that would be sterilised (i.e., without future access).
High	**Biomass production:** ALC Grade 3a. **Ecological habitat, soil biodiversity and platform for landscape:** Soils supporting protected features within a UK designated site (e.g., United Nations Educational, Scientific and Cultural Organisation (UNESCO) Geoparks, Site of Special Scientific Interest (SSSI) or Protected Landscapes, Special Landscape Area, and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation (including priority habitats). **Soil carbon:** Organo-mineral soils (e.g., peaty soils). **Soil hydrology:** Important catchment pathway for water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens; Regionally Important Geological and Geomorphological Sites (RIGS); Soils supporting community/recreational/educational access to RIGS and Protected Landscapes.

Sensitivity (in-situ soils)	Soil resource and soil functions
	Source of materials: Surface mineral reserves that would be sterilised (i.e. without future access).
Medium	**Biomass production:** ALC Grade 3b. **Ecological habitat, soil biodiversity and platform for landscape:** Soils supporting protected or valued features within non-statutory designated sites (e.g., Local Nature Reserves, Local Geological Sites, Sites of Nature Conservation Importance, Special Landscape Areas; Non-Native Forest and woodland soils. **Soil carbon:** Mineral soils. **Soil hydrology:** Important minor catchment pathway for water flows and flood risk management. **Archaeology, Cultural heritage, community benefits and geodiversity:** Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land. **Source of materials:** Surface mineral reserves that would remain accessible for extraction.
Low	**Biomass production:** ALC Grades 4 and 5 or Urban soils. **Ecological habitat, soil biodiversity and platform for landscape:** Soils supporting valued features within non-designated notable or priority habitats/landscapes; Agricultural soils. **Soil carbon:** Mineral soils. **Soil hydrology:** Pathway for local water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/educational access to land. **Source of materials:** Surface mineral reserves that would remain accessible for extraction.

Sensitivity (in-situ soils)	Soil resource and soil functions
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions.

Table 12.7: Receptor sensitivity relating to soil structure

Sensitivity of topsoil and subsoil	Soil texture, field capacity days (FCD) and wetness class
High (low resilience to structural damage)	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the FCD are 150 or greater; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater; and All soils in wetness class 5 and 6 (WCV and WCVI).
Medium (medium resilience to structural damage)	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225; and Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes 3 and 4 (WCIII and WCIV).
Low (high resilience to structural damage)	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes 1 and 2 (WCI and WCII).

Magnitude of impact relating to agricultural land quality and soil structure

12.6.11. Where an impact is considered to be likely to occur as a result of the Proposed Development being constructed, operated and/or decommissioned, the magnitude of impact is classified using the criteria presented in **Table 12.8**, which are derived from the IEMA Guide **[Ref. 12-9]**.

Table 12.8: Magnitude of impact criteria relating to agricultural land quality and soil structure

Magnitude of impact (change)	Description of impacts restricting proposed land use
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20ha; or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*). or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha; or gain in soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*).
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5ha and 20ha; or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*). or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5ha and 20ha; or gain in soil related features, as advised by other factor specialists in EIA team.
Minor	Permanent, irreversible loss over an area of less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes; or temporary, reversible loss of soil-related features, as advised by other factor specialists in EIA team. or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha; or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement; or temporary gain in soil-related features, as advised by other factor specialists in EIA team.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

* Temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.

Significance of effect relating to agricultural land quality and soil structure

12.6.12. The significance of effect is based on the sensitivity of the receptor and the magnitude of impact, as outlined in **Table 12.9**, which is derived from the IEMA Guide **[Ref. 12-9]**. The significance of effect can be either adverse or beneficial.

12.6.13. The significance of an effect is reported as either '**significant**' or '**not significant**'. Any effects that have been determined as '**moderate**' or above are considered to be **significant**. Any effects that have been determined as '**low**' or below are considered **not significant**. Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'slight or moderate', this would be considered significant unless further information could be provided to downgrade the significance effect to 'slight'.

12.6.14. With reference to **Table 12.7** above, it should be noted that for soil structure, only the sensitivity categories of 'high', 'medium' and 'low' apply within **Table 12.9**. The sensitivity categories of 'very high' and 'negligible' do not apply.

Table 12.9: Significance of effect criteria relating to agricultural land quality and soil structure

Sensitivity	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No Change
Very High	Very Large	Large or Very Large	Moderate or Large	Slight	Neutral
High	Large or Very Large	Moderate or Large	Slight or Moderate	Slight	Neutral
Medium	Moderate or Large	Moderate	Slight	Neutral or Slight	Neutral
Low	Slight or Moderate	Slight	Neutral or Slight	Neutral or Slight	Neutral

Sensitivity	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No Change
Negligible	Slight	Neutral or Slight	Neutral or Slight	Neutral	Neutral

12.7. Mitigation embedded into the design

12.7.1. This assessment has been based on the principle that measures have been 'embedded' into the design of the Proposed Development to avoid or reduce potential significant effects as far as practicable, for example by the considered placement of infrastructure. The embedded mitigation relevant to this assessment is detailed in **Table 12.10** below.

12.7.2. The potential use of BMV land has been a key consideration in the development of the design and site selection, as discussed in the **Site Selection Report** at **Appendix 1** to the **Planning Statement [EN010158/APP/5.7]** and **Design Approach Document [EN010158/APP/5.8]**. The small proportion of BMV land shown on the publicly available maps was used in considering the site selection. Additionally, the ALC survey results were used to inform all infrastructure with foundation locations to avoid Grades 1 and 2 land.

12.7.3. The area of land underneath the Solar PV modules and within the field margins would be used for ecological mitigation and enhancements, which would include planting (including establishment of grassland and wildflowers), which would help to reduce soil degradation and erosion during the operation (including maintenance) phase, which could lead to potential benefits. The nature of the Proposed Development is such that it provides potential for the land beneath and around the Solar PV modules to continue in, albeit altered, agricultural use during the operational lifetime of the Proposed Development, with potential for agricultural grazing.

Table 12.10: Embedded mitigation relevant to soil

Embedded mitigation measures relevant to soil	Function	Securing mechanism
Rosefield Substation, BESS, Collector Compounds and Construction Compounds will avoid Best and Most Versatile (BMV) land and new access tracks will avoid	To minimise requirements for use of BMV land for new access tracks, keeping disturbance to a minimum.	**Design Commitments [EN010158/APP/5.9]**

Embedded mitigation measures relevant to soil	Function	Securing mechanism
BMV land as far as reasonably practicable.		

12.8. Assessment of likely effects (without additional mitigation)

Construction

12.8.1. Effects on soil and agricultural land during the construction phase could include compaction and deterioration of soils and agricultural land. Construction activities, including trafficking of agricultural land by construction vehicles, formation of Construction Compounds, installation of the cable route and earthworks may lead to compaction and deterioration of soil and agricultural land.

12.8.2. Access tracks and steep slopes within the Site are likely to be most susceptible to deterioration through erosion. Some soils are more susceptible to damage when handled during construction. Handling and moving of soil is expected to be avoided, where reasonably practicable.

12.8.3. Some soils are, however, more susceptible to structural damage from the use of machinery and vehicular activity, depending upon soil type, climate and wetness class. It should also be noted that the soils are currently predominantly in agricultural use so are frequently driven over by farm machinery.

12.8.4. During the construction phase, the land designated for development will be temporarily removed from agricultural use. As a result, there will be a direct loss of arable land, leading to a decline in overall agricultural productivity and crop yields. This disruption may reduce the availability of locally grown produce and potentially impact the broader agricultural supply chain in the region.

12.8.5. The construction process will involve soil stripping, excavation, and temporary storage of topsoil and subsoil. These activities can lead to significant soil disturbance, including the loss of soil structure, compaction, and mixing of soil horizons. Improper handling and storage may degrade the quality of the soil, reducing its fertility and biological activity. Additionally, exposed soils are more vulnerable to erosion by wind and water, which can result in sediment runoff and potential contamination of nearby watercourses.

Operation (including maintenance)

12.8.6. With respect to soils and agricultural land, there is anticipated to be limited ground disturbance or trafficking over the soils, apart from periodic

maintenance requirements, including replacement of damaged parts or cleaning and maintenance of the Solar PV modules, as described in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**.

12.8.7. The Proposed Development would lead to temporary impacts to soil structure and agricultural land for the duration of the operation (including maintenance) phase (assumed to be 40 years). In particular, the areas in which the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and operational internal access tracks would be located.

12.8.8. It is anticipated that the operation (including maintenance) phase would lead to a temporary change of land use of agricultural land for the duration of the operation (including maintenance) phase (assumed 40 years). Based on the ALC surveys undertaken, 0.44% (3.01ha) of this agricultural land is classified as Grade 2 BMV land and 1.07% (7.19ha) is classified as Grade 3a BMV land.

Decommissioning

12.8.9. With respect to soils and agricultural land, the decommissioning phase would involve the dismantling and removal of infrastructure. Following decommissioning, it is intended that this land would be returned to the landowner(s). By following good practice, the agricultural land will be returned to its previous quality prior to the commencement of the Proposed Development.

12.8.10. The decommissioning phase would involve the removal of all the above ground infrastructure and any infrastructure up to a depth of 1m bgl.

12.8.11. All concrete, hardstanding areas, foundations for the infrastructure and internal tracks would be removed to a depth of up to 1m bgl. All the below-ground cables which are at a depth greater than 1m bgl would be left in situ. All mounting structures (being helical or driven piled vertical posts or screw piles) to which the Solar PV modules would be fixed would be removed.

12.8.12. The locations of the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and internal access tracks will be restored using soil retained on-site, which will be retained in managed bunds; or with new topsoil that would be brought to the Site. The trafficking of soil when conditions are unsuitable (e.g., when soils are wet) could damage soil structure, necessitating remedial activity to restore quality.

12.8.13. For the purposes of this assessment, it has been assumed that Green Infrastructure is temporary and potentially reversible. This is because areas subject to Green and Blue Infrastructure would be handed back to landowners post-decommissioning, and affected soils capable of

reinstatement to their original condition with no permanent degradation in quality. Green and Blue Infrastructure, recreation and amenity works comprise: landscaping; habitat management; biodiversity enhancement; the creation of three permissive footpaths; and works to permanently divert four public rights of way in five instances. The anticipated land take for Green Infrastructure affects an assumed total area of 8.7ha, none of which is classified as BMV land and is assumed to be temporary for the purposes of this assessment. The total area of Blue Infrastructure will be determined post consent as it is being designed at the detailed design stage. However, it is assumed that taking a conservative approach, the total area of Green and Blue Infrastructure will come to a total of just over 10ha, none of which will be classified as BMV land.

12.8.14. Further detail on the decommissioning phase is detailed in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**.

12.9. Additional mitigation

12.9.1. **Table 12.11** outlines the additional mitigation measures that are proposed to mitigate against soil and agriculture quality degradation. The **Outline SMP [EN010158/APP/7.7]** details the requirements for the development of a site-specific Soil Management Plan. The **Outline SMP [EN010158/APP/7.7]** is in line with industry best practice measures, following the guidance of Institute of Quarry (2021) **[Ref. 12-11]**.

Table 12.11: Additional mitigation relevant to soil and agricultural land quality

Additional mitigation measures relevant to soil	Function	Securing mechanism
Stripping of topsoil at start of construction and track matting laid	Minimise the damage to topsoil	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**
Spreading of stone on compound locations	Prevent intermixing of soils	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**
Storage of topsoil within bunds and seeded for periods greater than six months	Allow reuse of soils and prevent anaerobic soil conditions	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**

Additional mitigation measures relevant to soil	Function	Securing mechanism
		Outline OEMP [EN010158/APP/7.3]
Management of vehicle movement	Prevent compaction and damage to soil structure	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]** **Outline OEMP [EN010158/APP/7.3]** **Outline DEMP [EN010158/APP/7.4]**
Established tracks used for vehicle movement during operation	Prevent compaction and damage to soil structure	**Outline SMP [EN010158/APP/7.7]** **Outline OEMP [EN010158/APP/7.3]**
Avoidance of activities during wet weather	Minimise damage and disturbance to soil	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]** **Outline OEMP [EN010158/APP/7.3]** **Outline DEMP [EN010158/APP/7.4]**
Monitoring of soil stockpiles	Minimise damage to soils and prevent anaerobic soil conditions	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]** **Outline DEMP [EN010158/APP/7.4]**
Removal of infrastructure up to 1m depth below ground level.	Return the land back to its prior ALC grade and soil condition	**Outline SMP [EN010158/APP/7.7]** **Outline DEMP [EN010158/APP/7.4]**

Construction

12.9.2. The **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP [EN010158/APP/7.2]** sets out the measures to avoid and manage any potential impacts to the soil and agricultural land during the construction phase and are secured by a requirement in the **Draft DCO [EN010158/APP/3.1]**. The **Outline SMP [EN010158/APP/7.7]** identifies those areas within the Site which may be more susceptible to damage, and it advises on when soils are suitable for being handled or trafficked. The **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP [EN010158/APP/7.2]** also detail measures for soil management and follows the principles of best practice to maintain the physical properties of the soil, with the aim of restoring the land to its pre-construction condition following the temporary construction use and at the end of the lifetime of the Proposed Development.

12.9.3. At the start of the construction phase, the areas of agricultural land required for the three temporary Primary and three Secondary Construction Compounds and access tracks will be stripped of topsoil to avoid any damage to field drains. A suitable membrane will be spread, and temporary matting will be laid, onto which stone will be spread. This prevents intermixing of soil with the temporary stone surface.

12.9.4. The topsoil removed during the construction process will be placed temporarily in a low-level bund or bunds on land outside the compounds on-site. These bunds are short-term storage areas for the topsoil, which will be used in restoration of these areas once construction is complete. If they will be in place for more than 6 months, they will be sown with a low maintenance grass seed mix, in accordance with the measures set out in the **Outline SMP [EN010158/APP/7.7]**.

12.9.5. Where vehicle movements are required over soils, these will be managed by the **Outline SMP [EN010158/APP/7.7]** to prevent damage to soil structure e.g. through matting. This will control the timing of works (to avoid periods when soil is more susceptible to damage) and will take into account variables such as soil saturation (with the **Outline SMP [EN010158/APP/7.7]** defining acceptable saturation levels for trafficking). Although construction of the Proposed Development will not adversely affect soils if the **Outline SMP [EN010158/APP/7.7]** is followed, it is worth noting that although soil quality can be reduced due to works being undertaken in wet conditions, it is possible to return soils to their former condition after they have dried out, preventing medium or long-term effects.

12.9.6. Access routes for the importation of construction materials, plant and equipment will be determined in advance to avoid inappropriate trafficking of soil. Measures contained within the **Outline CTMP [EN010158/APP/7.5]** will be adhered to, to ensure construction vehicle movements are monitored.

12.9.7. The activities undertaken during the construction phase will be audited against the requirements of the **Outline SMP [EN010158/APP/7.7]** by the Principal Contractor.

Operation (including maintenance)

12.9.8. The **Outline SMP [EN010158/APP/7.7]** and **Outline OEMP [EN010158/APP/7.3]** set out the measures to manage any potential impacts to the soil and agricultural land during the operation (including maintenance) phase and are secured by a requirement to the **Draft DCO [EN/010158/APP/3.1]**. As detailed above for the construction phase, the **Outline SMP [EN010158/APP/7.7]** identifies areas that may be more susceptible to damage and advises on when soils are suitable for being handled or trafficked. The **Outline SMP [EN010158/APP/7.7]** also provides details for managing soil and maintaining the physical properties of the soil.

12.9.9. There will be limited ground disturbance or trafficking over the soil during the operation (including maintenance) phase in comparison to the construction phase. Maintenance will be subject to periodic visits, including replacement of damaged parts or cleaning and maintenance of the Solar PV modules. Established access tracks will be used during these activities and therefore any impacts will be minimised.

12.9.10. Wherever possible, the timing of works will be managed carefully to consider weather conditions, particularly heavy and persistent rain to minimise vehicles travelling across the Site when soil conditions are wet. Movement of maintenance vehicles during the operation (including maintenance) phase will be limited and will follow access tracks that have been established during the construction phase.

12.9.11. The operation (including maintenance) phase of works will be audited against the requirements of the **Outline SMP [EN010158/APP/7.7]** by the Principal Contractor to ensure adherence.

12.9.12. There is the potential to use the open spaces between the infrastructure and the land beneath the Solar PV modules for grazing during the operation (including maintenance) phase, and therefore some agricultural use of the Site can occur during the lifespan of the Proposed Development. Conditions suitable for grazing can be maintained and managed. The land put forward for this Proposed Development has been agreed with the landowners, and the design and layout has evolved to allow continued agricultural use, including grazing and full agricultural use within the Grid Connection Cable Corridor.

12.9.13. As noted for the construction phase, there will continue to be storage of soil in managed, segregated stockpiles. The stockpiles will continue to be managed in accordance with the **Outline SMP [EN010158/APP/7.7]** during the operation (including maintenance) phase.

Decommissioning

12.9.14. The **Outline SMP [EN010158/APP/7.7]** and **Outline DEMP [EN010158/APP/7.4]** set out the measures to manage any potential impacts to the soil and agricultural land during the decommissioning phase and a detailed Soil Management Plan will be secured by a requirement to the **Draft DCO [EN/010158/APP/3.1]**. The **Outline SMP [EN010158/APP/7.7]** identifies those areas within the Site which may be more susceptible to damage, and it advises on when soils are suitable for being handled or trafficked. The **Outline SMP [EN010158/APP/7.7]** also details measures for soil management and follows the principles of best practice to maintain the physical properties of the soil, with the aim of restoring the land to its pre-construction condition at the end of the lifetime of the Proposed Development. Established access tracks will be used during the decommissioning phase and therefore impacts on soil due to vehicle movements will be limited.

12.9.15. As for the construction and operation (including maintenance) phases, the timing of works will be managed carefully to consider weather conditions, particularly heavy and persistent rain to minimise vehicles travelling across the Site when soil conditions are wet. Movement of vehicles will follow access tracks that have been established and utilised in the construction and operation (including maintenance) phases.

12.9.16. The decommissioning phase of works will be audited against the requirements of the **Outline SMP [EN010158/APP/7.7]** by the Principal Contractor to ensure adherence.

12.9.17. During the decommissioning phase, all concrete, hardstanding areas, foundations for the infrastructure and any internal tracks will be removed to a depth of up to 1m (as indicated in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**). It is assumed that all the below ground cables will be left in situ as these are likely to be located at a depth greater than 1m. This will limit the disturbance and impact to soil quality.

12.9.18. The location of the BESS, Rosefield Substation, Main Collector Compound, Balance of Solar System (BoSS), Satellite Collector Compounds, and Internal Access tracks will be restored using soil retained on-site, which will be retained in managed bunds; or with new topsoil that will be brought to the Site. Following decommissioning, the agricultural land will be returned to its previous quality prior to the commencement of the Proposed Development.

12.10. Assessment of residual effects (with additional mitigation)

Construction

12.10.1. With respect to soil and agricultural land, adverse effects could potentially occur during construction as a result of activities such as topsoil stripping, earthworks, piling, stockpiling of material and larger vehicle movements occurring during this phase.

12.10.2. In terms of adverse impacts to the ALC grade of the soil and soil structure resistance, it should be noted that construction works would not have sufficiently great impacts on the soil structure to result in a downgrade to the ALC grade. Correct soil management techniques will ensure that soil compaction is minimised, and any impacts could be reversed by techniques that are common in normal agricultural land management. Given that the additional mitigation for the Proposed Development includes an **Outline CEMP [EN010158/APP/7.2]** and **Outline SMP [EN010158/APP/7.7]** which will protect soil structure in terms of physical and chemical characteristics, it is considered that a change to existing ALC grades as a result of the construction of the Proposed Development is highly unlikely to occur.

12.10.3. Most machinery that is used in the construction process will be of similar size, or smaller/lighter, than plant used in standard agricultural processes. Therefore, the construction works will not result in additional loads on the soil compared to the current agricultural use in many parts of the Site.

12.10.4. Damage to soils and agricultural quality during construction will be limited, and there is the potential to restore soils if accidental damage did occur.

12.10.5. The approach outlined for the construction works for the Proposed Development has been approved in principle for other recent large solar developments, including Little Crow Solar Development [EN010101], for which the following comments were provided by the Secretary of State:

The effect on soils would be:

short term, reversible, local in extent and of negligible significance during the construction and decommissioning phases; and

medium term, reversible, local in extent and of negligible significance during the operational (including maintenance) phase, with a moderate beneficial effect for the quality of soils within the Order Limits, because intensive cropping would be replaced by the growing of grass.

12.10.6. It has therefore been assessed that changes to the land used for the Solar PV modules and other temporary facilities will be reversible, and the soil will be managed and reinstated to the pre-existing soil quality and ALC grade.

12.10.7. During construction, all the land across the Site will not be available for agricultural use; therefore, there is a potential loss of BMV land (described as ALC Grades 1, 2 and 3a). The results obtained from the ALC survey (presented in **ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**) have been used to inform this assessment. There is 3.01ha of Grade 2 land which is considered **very high** sensitivity due to its very high agricultural productivity. There is 7.19ha of Grade 3a land which is considered **high** sensitivity due to its agricultural productivity. Grade 3b covers the majority of the Site and is non-BMV land; therefore, the majority of the Site is classified as **medium** sensitivity.

12.10.8. The Grade 2 land take is 3.01ha, and there is no loss or reduction in soil function or soil volumes, as all Grade 2 land is either untouched, under a grass sward in the areas of Solar PV development, or hosting ecological mitigation/enhancement. Furthermore, all construction will take place in dry conditions when soils are least susceptible to damage, and construction activities are subject to committed mitigation in the **Outline SMP [EN010158/APP/7.7.3]**. The magnitude of impact is therefore **negligible**; the significance of the residual effect on Grade 2 land is assessed as **slight adverse** and **not significant**.

12.10.9. The Grade 3a land take is 7.19ha. However, as the land take is only temporary, the magnitude of impact is assessed as **minor,** and the significance of residual effect is slight or moderate adverse. As per **Paragraph 12.6.12**, the overall significance of residual effect is considered to be **slight adverse** and **not significant** due to the temporary nature of the impact and the application of soil handling measures outlined within the **Outline SMP [EN010158/APP/7.7]**. The temporary availability of this land is also not considered to be significant in the regional context.

12.10.10. As the land take is only temporary, the magnitude of impact for Grade 3b land take will also be **minor**. Therefore, the significance of the residual effect on Grade 3b land will be **slight adverse** and **not significant**.

12.10.11. As all the soils identified across the Site are either a fine loamy or clayey topsoil with clayey subsoils and field capacity days are below 150, all soils within the Order Limits have a medium resilience to damage during handling and are therefore of **medium** sensitivity. The magnitude of impact for soil structure will also be **minor**. Therefore, the significance of the residual effect on soil structure will be **slight adverse** and **not significant**.

Operation (including maintenance)

12.10.12. Maintenance or repair works required which would result in disturbance to soils during the operation (including maintenance) of the Proposed Development would be undertaken in accordance with good practice soil handling methods outlined in the **Outline SMP [EN010158/APP/7.7]**. It is

unlikely any significant effects on agricultural land during operation, maintenance, or repair activities will occur as the activities are likely to be limited in scale and temporary.

12.10.13. The sensitivity of agricultural land quality is **very high**, **high** or **medium** depending on the ALC grade. The magnitude of impact for effects to agricultural land quality will be **negligible**, as the agricultural land has already been taken out of production and these impacts have been assessed during the construction phase. Therefore, the significance of the residual effect on agricultural land quality during operation (including maintenance) will be **slight adverse** for BMV land (Grades 2 and 3a), and **neutral or slight adverse** for Grade 3b land, both classified as **not significant**.

12.10.14. Soil structure remains as **medium** for the duration of the operation (including maintenance) phase due to the texture and field capacity days across the Site. During operation (including maintenance), the soil will be available for grazing and some limited agricultural production. Due to the reduced disturbance from farming activities and nutrient input from grazing, there is a **minor** benefit to soil structure during operation (including maintenance), resulting in an effect of **slight beneficial** significance that is **not significant**.

12.10.15. Green and Blue Infrastructure will be fully within Grade 3b land which is of **medium** sensitivity (i.e. no BMV land affected). The Green and Blue Infrastructure is considered temporary for the duration of the operation (including maintenance) phase (as well as the decommissioning phase – see **Paragraph 12.10.22** below). The magnitude of impact is therefore **minor,** and the significance of the residual effect is **slight adverse** which is **not significant**.

12.10.16. The Green and Blue Infrastructure will have improved soil quality as the soil biodiversity and overall soil health is improved from being removed from agricultural production and kept in Green or Blue Infrastructure. As there is a potential improvement of soil function, the magnitude of impact is **minor** to soil structure. As soil structure remains as **medium** across the Site, the overall significance of the residual effect of Green and Blue Infrastructure on soil structure is **slight beneficial** which is **not significant**.

Decommissioning

12.10.17. As in the earlier phases, where vehicle movements are required over soils for decommissioning activities, these will be managed by the **Outline SMP [EN010158/APP/7.7]** to prevent damage to soil structure, as well as potential damage to field drains (and subsequent effects on drainage of agricultural land). This will control the timing of works and take into account soil saturation. Although the decommissioning phase will not adversely affect soils if the **Outline SMP [EN010158/APP/7.7]** is followed,

as above, it is worth noting that a reduction in soil quality can be reversed, preventing medium or long-term effects.

12.10.18. As for the construction phase, machinery that is used in the decommissioning phase is expected to be of similar size, or smaller/lighter, than plant used in standard agricultural processes, so the works will not result in additional loads on the soil compared to the prior agricultural use. Damage to soils during decommissioning will be limited, and there is the potential to restore soils if accidental damage did occur.

12.10.19. Changes to the land used for the Solar PV modules and other temporary facilities will be reversible, and the soil will be managed and reinstated to retain the soil quality and existing ALC grade. Decommissioning work to remove the Proposed Development will ensure that the agricultural land will be returned to its previous quality prior to the commencement of the Proposed Development.

12.10.20. The sensitivity of agricultural land quality is **very high**, **high** or **medium** depending on the ALC grade. The magnitude of impact from decommissioning activities to agricultural land quality will be **negligible**, as the agricultural land has already been taken out of production and these impacts have been assessed during the construction phase. Therefore, the significance of the residual effect on agricultural land quality during decommissioning will be **slight adverse/neutral or slight adverse** and **not significant**.

12.10.21. Soil structure remains as **medium** for the duration of decommissioning due to the texture and field capacity days across the Site. During decommissioning, there is a potential for soil damage due to vehicle movement; however, the magnitude of impact is **minor** with the implementation of the **Outline SMP [EN010158/APP/7.7]**. Therefore, the significance of the residual effect on soil structure is **slight adverse**, which is **not significant**.

12.10.22. Following the completion of decommissioning activities, areas of Green and Blue Infrastructure would be handed over to the relevant landowners, unless agreed otherwise. Consultation with appropriate stakeholders and landowners would be undertaken in advance of the decommissioning phase to discuss opportunities to maintain and manage the Green and Blue Infrastructure beyond the lifespan of the Proposed Development, as appropriate. Therefore, Green and Blue Infrastructure is considered temporary and potentially reversible. The impacts and effects during decommissioning would therefore be the same as reported in **Paragraphs 12.10.15** and **12.10.16** above for the operation (including maintenance) phase i.e. **slight adverse** effects on agricultural land quality (**not significant**) and **slight beneficial** effects on soil structure (**not significant**).

12.11. Opportunities for enhancement

12.11.1. The cessation of agricultural activity on some parts of the Site during construction and operation (including maintenance) could lead to the stabilisation of soil and may reduce soil-laden runoff into ditches and watercourses within and adjacent to the Site. A reduction in the application of herbicides, pesticides or fertilizers as a result of changes in land management from agricultural producer to solar farm will result in a reduction of surface water runoff from the Site.

12.11.2. There is potential that soil health could be enhanced over the 40 year period of operation of the Proposed Development (facilitated through the implementation of a detailed Soil Management Plan), due to the proposed planting of grassland and wildflowers, which would reduce the impact of soil erosion. However, there are very few studies on the long term impact of soil quality as a result of solar farms.

12.12. Monitoring requirements

12.12.1. To ensure that the impact on agricultural land is minimised during construction, operation (including maintenance) and decommissioning, activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** to ensure adherence.

12.13. Difficulties and uncertainties

12.13.1. The following difficulties and uncertainties have been encountered in undertaking the soil assessment:

- 54.45ha of land within the Site has not been surveyed due to lack of access. This land has assumed to be Grade 3b and Non-agricultural land based on the desk-based study and expected similarity to the other soils observed at the Site as agreed with Natural England (see **Table 12.1**), details of which can be found in **ES Volume 4, Appendix 12.1: Agricultural Land Classification Report [EN010158/APP/6.4]**.
- The total hectares of the permanent land take due to Green and Blue Infrastructure is currently not known as it is up to the discretion of the landowner following the decommissioning of the Proposed Development. Therefore, a reasonable worst-case scenario approach has been used for the assessment.

12.14. Summary

12.14.1. A summary of this assessment is presented in **Table 12.12**. The sensitivity of each receptor is identified alongside any relevant embedded mitigation and the likely effects that could arise on those receptors. Any proposed additional mitigation measures are stated and the residual effects then assessed. Finally, any monitoring requirements are stated where applicable.

12.14.2. There are no significant residual effects during the construction, operation (including maintenance) and/or decommissioning phases.

Table 12.12: Summary of the soil and agriculture assessment

Receptor/matter	Phase	Sensitivity of the receptor	Embedded mitigation	Likely effect (without additional mitigation)	Additional mitigation	Magnitude of impact	Residual effect (with additional mitigation)	Monitoring requirement
Agricultural land quality (Grade 2)	Construction	Very high	Use of Grade 2 (BMV) land minimised by design, use of existing tracks where possible, minimising effect on surface water and groundwater regime, and foundation design	Temporary reduction in availability of agricultural land	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**	Negligible	**Slight adverse** **(-) (D) (ST) or (MT) (T)** **Not significant**	Construction activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP [EN010158/APP/7.2]** to ensure adherence.
Agricultural land quality (Grade 3a)	Construction	High	Impact on Grade 3a (BMV) land minimised by use of existing tracks where possible, minimising effect on surface water and groundwater regime, and foundation design	Temporary reduction in availability of agricultural land	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**	Minor	**Slight adverse** **(-) (D) (ST) or (MT) (T)** **Not significant**	Construction activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP [EN010158/APP/7.2]** to ensure adherence.
Agricultural land quality (Grade 3b)	Construction	Medium	Impact on Grade 3b (non-BMV) land minimised by use of existing tracks where possible, minimising effect on surface water and groundwater regime, and foundation design	Temporary reduction in availability of agricultural land	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**	Minor	**Slight adverse** **(-) (D) (ST) or (MT) (T)** **Not significant**	Construction activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP [EN010158/APP/7.2]** to ensure adherence.
Soil structure	Construction	Medium	None	Temporary loss or damage to soil quality	**Outline SMP [EN010158/APP/7.7]** **Outline CEMP [EN010158/APP/7.2]**	Minor	**Slight adverse** **(-) (D) (ST) or (MT) (T)** **Not significant**	Construction activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline CEMP**

Receptor/matter	Phase	Sensitivity of the receptor	Embedded mitigation	Likely effect (without additional mitigation)	Additional mitigation	Magnitude of impact	Residual effect (with additional mitigation)	Monitoring requirement
								[EN010158/APP/7.2] to ensure adherence.
Agricultural land quality (Grades 2, 3a and 3b)	Operation (including maintenance)	Very high, high and medium	None	Temporary reduction in availability of agricultural land	**Outline SMP [EN010158/APP/7.7]** **Outline OEMP [EN010158/APP/7.3]**	Negligible	**Slight adverse/neutral or slight adverse** **(-) (D) or (I) (ST) or (MT) (T)** **Not significant**	Operation (including maintenance) activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline OEMP [EN010158/APP/7.3]** to ensure adherence.
Soil structure	Operation (including maintenance)	Medium	None	Soil is left undisturbed without significant agricultural pressures, as well as grazing adding nutrient input into the soil.	**Outline SMP [EN010158/APP/7.7]** **Outline OEMP [EN010158/APP/7.3]**	Minor	**Slight beneficial** **(+) (D) or (I) (ST) or (MT) (T)** **Not significant**	Operation (including maintenance) activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline OEMP [EN010158/APP/7.3]** to ensure adherence.
Agricultural land quality in Green and Blue Infrastructure	Operation (including maintenance) and decommissioning	Medium	None	Temporary reduction in availability of Grade 3b (non-BMV) agricultural land due to Green and Blue Infrastructure	N/A	Minor	**Slight adverse** **(-) (D) or (I) (MT) or (LT) (T)** **Not significant**	N/A
Soil structure in Green and Blue Infrastructure	Operation (including maintenance) and decommissioning	Medium	None	Improvements to soil quality due to Green and Blue Infrastructure	N/A	Minor	**Slight beneficial** **(+) (D) or (I) (MT) or (LT) (T)** **Not significant**	N/A

Receptor/matter	Phase	Sensitivity of the receptor	Embedded mitigation	Likely effect (without additional mitigation)	Additional mitigation	Magnitude of impact	Residual effect (with additional mitigation)	Monitoring requirement
Agricultural land quality (Grades 2, 3a and 3b)	Decommissioning	Very high, high and medium	None	Temporary reduction in availability of agricultural land	**Outline SMP [EN010158/APP/7.7]** **Outline DEMP [EN010158/APP/7.4]**	Negligible	**Slight adverse/neutral or slight adverse** **(-) (D) or (I) (ST) or (MT) (T)** **Not significant**	Decommissioning activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline DEMP [EN010158/APP/7.4]** to ensure adherence.
Soil structure	Decommissioning	Medium	None	Temporary loss or damage to soil quality	**Outline SMP [EN010158/APP/7.7]** **Outline DEMP [EN010158/APP/7.4]**	Minor	**Slight adverse** **(-) (D) or (I) (ST) or (MT) (T)** **Not significant**	Decommissioning activities will be audited by the Principal Contractor against the requirements of the **Outline SMP [EN010158/APP/7.7]** and **Outline DEMP [EN010158/APP/7.4]** to ensure adherence.

Key:

+ = positive or - = negative; D = direct or I = indirect; S T = short-term, MT = medium-term or LT = long-term; P = permanent or T = temporary

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12.15. References

- **Ref. 12-1:** Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
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- **Ref. 12-3:** Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
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- **Ref. 12-7:** Natural England (2017). Likelihood of Best and Most Versatile Agricultural Land. Available online: https://publications.naturalengland.org.uk/category/5208993007403008
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- **Ref. 12-11:** Institute of Quarry (2021). Good Practice Guide for Handling Soils. Available online: https://www.quarrying.org/soils-guidance
- **Ref. 12-12:** UK Parliament (2023). A Green Future: Our 25 year plan to improve the environment. Available online: https://www.gov.uk/government/publications/25-year-environment-plan
- **Ref. 12-13:** Department for Environment, Food and Rural Affairs (2025). MAGIC map. Available online: https://magic.defra.gov.uk/
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- **Ref. 12-15:** Landis (2025). Soilscape mapping. Available online: https://www.landis.org.uk/soilscapes/
- **Ref. 12-16:** Avery, BW (1997). Soil Survey Field Handbook. Hodgson, JM (ed).

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