BEACON FEN ENERGY PARK

Planning Inspectorate Reference: EN010151

Chapter 14 – Soils and Agricultural Land
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January 2024

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(q)

Revision History

Revision	Revision date	Details	Authorized	Name	Position

List of Outstanding Issues and Information

Outstanding issue/info.	Section/Paragraph	Responsibility	Action

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14. Soils and Agricultural Land

14.1 Introduction

14.1.1 This Chapter reports the preliminary assessment of the likely effects of the Proposed Development on Soils and Agricultural Land in the context of the Site and surrounding area. In particular it considers the potential for likely significant effects of the Proposed Development on agricultural land (in terms of land lost from agricultural production) and soil resource (in terms of damage, degradation, and loss of soil resource) during the construction, operational and decommissioning phases of the Proposed Development.

14.1.2 This Chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment and reference should be made to the front end of this PEIR (Chapters 1 – 5) and particularly to the description of the Proposed Development in Chapter 2 which includes details about the Site, the design parameters and construction methodology, as well as the final chapter, 'Summary of Environmental Effects' (Chapter 17).

14.1.3 This chapter is accompanied by the following Appendices and Figures:

- Appendix 14.1: Agricultural Quality of Land at Beacon Fen North, Lincolnshire Report (Land Research Associates, 2023)
- Appendix 14.2: Agricultural Land Classification Report, Beacon Fen (Wardell Armstrong, 2023)

14.1.4 As set out within Chapter 1, the information set out within this Chapter is preliminary and intended to inform consultees (both specialist and non-specialist) about the likely environmental effects of the Proposed Development, helping to inform their consultation responses.

14.2 Legislation and Policy

14.2.1 The legislation and policy considered relevant to the assessment of soils and agricultural land are listed below.

Planning Policy

14.2.2 The applicable planning policy includes:

- National Planning Policy Framework (NPPF) September 2023[1]
- Emerging Overarching National Policy Statement for Energy (EN-1) (Published November 2023)[2]

[1] Department for Levelling Up, Housing and Communities. (2023) National Planning Policy Framework. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2. Accessed September 2023

[2] Department for Energy Security and Net Zero (2023) Overarching National Policy Statement for Energy (EN-1) November 2023. Available at: https://assets.publishing.service.gov.uk/media/655dc190d03a8d001207fe33/overarching-nps-for-energy-en1.pdf

- Emerging National Policy Statement for Renewable Energy Infrastructure (EN-3) (Published November 2023) [3]
- Central Lincolnshire Local Plan (Adopted 2023)[4]
- South East Lincolnshire Local Plan 2011-36 (Adopted 2019)[5]

Emerging Overarching National Policy Statement for Energy (EN-1) (Published November 2023)[2]

14.2.3 Paragraph 5.11.4 states that "*Development of land will affect soil resources, including physical loss of and damage to soil resources, through land contamination and structural damage. Indirect impacts may also arise from changes in the local water regime, organic matter content, soil biodiversity and soil process.*"

14.2.4 Paragraph 5.11.13 states that applicants should seek to minimise impacts on soil health and protect and improve soil quality. Paragraph 5.11.14 outlines that the sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soil are surplus to requirements.

Emerging National Policy Statement for Renewable Energy Infrastructure (EN-3) (Published November 2023)[3]

14.2.5 Section 2.10 considers the development of Solar Photovoltaic Generation.

14.2.6 Paragraph 2.10.29 states that where the proposed use of any agricultural land has been shown to be necessary, poorer quality land should be preferred to higher quality land (avoiding the use of "Best and Most Versatile" agricultural land where possible). Paragraph 2.10.30 states that whilst the development of ground mounted solar arrays is not prohibited on Best and Most Versatile agricultural land, the impacts of such are expected to be considered.

14.2.7 Paragraph 2.10.31 states that at this scale it is likely that applicants' developments may use some agricultural land therefore applicants should explain their choice of site, noting the preference for development to be on suitable brownfield, industrial and low and medium grade agricultural land. Paragraph 2.10.32 discusses that where sited on agricultural land, consideration may be given as to whether the proposal allows for continued agricultural use and/or can be co-located with other functions (for example, storage, hydrogen electrolysers) to maximise the efficiency of land use.

14.2.8 Paragraph 2.10.33 discusses the Agricultural Land Classification system and states that field surveys should be used to establish the ALC grades in accordance with the current, or any successor to it, grading criteria and identify

[3] Department for Energy Security and Net Zero (2023) National Policy Statement for Renewable Energy Infrastructure (EN-3) November 2023. Available at: https://assets.publishing.service.gov.uk/media/655dc352d03a8d001207fe37/nps-renewable-energy-infrastructure-en3.pdf
[4] Central Lincolnshire Local Plan Team and North Kesteven District Council (2023) Central Lincolnshire Local Plan (Adopted 2023). Available at: https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf
[5] South East Lincolnshire Joint Strategic Planning Committee (2019) South East Lincolnshire Local Plan 2011 – 2036. Available at: http://www.southeastlincslocalplan.org/wp-content/uploads/2019/02/Local-Plan-text-March-2019.pdf. Accessed October 2023

the soil types to inform soil management at the construction, operation, and decommissioning phases in line with the Defra Construction Code.

14.2.9 Additionally, Paragraph 2.10.34 states that applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination and that this should be in line with the ambition set out in the Environmental Improvement Plan to bring 40% of England's agricultural soils into sustainable management by 2028 and increase this to up to 60% by 2030.

14.2.10 Paragraph 2.10.81 states that where soil stripping occurs topsoil and subsoil should be stripped, stored, and replaced separately to minimise soil damage and to provide optimal conditions for site restoration.

14.2.11 Paragraph 2.10.127 refers to the DEFRA Construction code of practice for the sustainable use of soils on construction sites and discusses that mitigation measures should focus on minimising damage to soil that remains in place, and minimising damage to soil being excavated and stockpiled. It also states that mitigation measures should aim to preserve soil health and soil structure to minimise soil carbon loss and maintain water infiltration and soil biodiversity. Mitigation measures for agricultural soils include use of green cover, multispecies cover crops - especially during the winter - minimising compaction and adding soil organic matter.

14.2.12 Paragraph 2.10.145 states that the Secretary of State should take into account the economic and other benefits of the best and most versatile agricultural land and that the Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to minimise impacts on soils or soil resources.

National Planning Policy Framework (NPPF) September 2023[1]

14.2.13 Under Section 15 of the NPPF[1] (2023): Conserving and enhancing the natural environment, Paragraph 174 states that *'planning policies and decisions should contribute to and enhance the natural and local environment by:*

- *a) "protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- *b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

- *f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate*."

14.2.14 The footnote to Paragraph 175 states that *"where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality*".

Central Lincolnshire Local Plan (Adopted 2023)[4]

14.2.15 The Central Lincolnshire Local Plan was adopted in April 2023 and includes the following relevant policies:

- Policy S14: Renewable Energy
- Policy S17: Carbon Sinks
- Policy S67: Best and Most Versatile Agricultural Land

14.2.16 One of the objectives of the local plan is "to protect and enhance soil and land resources and quality in Central Lincolnshire".

14.2.17 Policy S14 states that for solar thermal or photovoltaics panels and associated infrastructure to be installed on existing property, there will be under a presumption in favour of permission unless there is clear and demonstrable significant harm arising. Proposals for ground-based photovoltaics and associated infrastructure, including commercial large-scale proposals, will be under a presumption in favour unless:

- there is clear and demonstrable significant harm arising; or
- the proposal is (following a site-specific soil assessment) to take place on Best and Most Versatile (BMV) agricultural land and does not meet the requirements of Policy S67; or
- the land is allocated for another purpose in this Local Plan or other statutory based document (such as a nature recovery strategy or a Local Transport Plan), and the proposal is not compatible with such other allocation.

14.2.18 Policy S14 also states that proposals for ground-based photovoltaics should be accompanied by evidence demonstrating how opportunities for delivering biodiversity net gain will be maximised in the scheme taking account of soil, natural features, existing habitats, and planting proposals accompanying the scheme to create new habitats linking into the nature recovery strategy.

14.2.19 Policy S17 states that existing carbon sinks, such as peat soils, must be protected, and where opportunities exist, they should be enhanced in order to continue to act as a carbon sink. Where development is proposed on land containing peat soils or other identified carbon sinks, the applicant must submit a proportionate evaluation of the impact of the proposal on either the peat soil's carbon content or any other form of identified carbon sink as relevant and in all cases an appropriate management plan must be submitted. There will be a presumption in favour of preservation of peat and other carbon sinks in-situ. Proposals that will result in unavoidable harm to, or loss of, peat soils or other identified carbon sinks will only be permitted if it is demonstrated that:

- a) the site is allocated for development; or

- b) there is not a less harmful viable option to development of that site. In any such case, the harm caused must be shown to have been reduced to the minimum possible and appropriate, satisfactory provision will be made for the evaluation, recording and interpretation of the peat soils or other form of carbon sink before commencement of development. For peat soils that are to be removed, the soils must be temporarily stored and then used in a way that will limit carbon loss to the atmosphere. Proposals to enhance peat soils and protect its qualities will be supported.

14.2.20 Policy S67 states that proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy. With the exception of allocated sites, significant development resulting in the loss and the best and most versatile agricultural land will only be supported if:

- a) The need for the proposed development has been clearly established and there is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations); and

- b) The benefits and/or sustainability considerations outweigh the need to protect such land, when taking into account the economic and other benefits of the best and most versatile agricultural land; and

- c) The impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and

- d) Where feasible, once any development which is supported has ceased its useful life the land will be restored to its former use (this condition will be secured by planning condition where appropriate).

14.2.21 Additionally, Policy S67 states that where proposals are for sites of 1 hectare of larger, which would result in the loss of best and most versatile agricultural land, an agricultural land classification report should be submitted, setting out the justification for such a loss and how criterion b has been met.

14.2.22 One of the objectives of the local plan is "*to protect and enhance soil and land resources and quality in Central Lincolnshire*".

South East Lincolnshire Local Plan 2011-36 (Adopted March 2019)[5]

14.2.23 The South East Lincolnshire Local Plan was adopted in March 2019 and includes the following relevant policies:

- Policy 3: Design of New Development
- Policy 31: Climate Change and Renewable and Low Carbon Energy

14.2.24 Policy 3 (Design of New Development) states that development proposals should demonstrate how issues where they are relevant to the proposal including "the use of locally sourced building materials, minimising the use of

water and minimising land take, to protect best and most versatile soils" will be secured.

14.2.25 Policy 31 (Climate Change and Renewable and Low Carbon Energy) on renewable energy states that "with the exception of Wind Energy the development of renewable energy facilities, associated infrastructure and the integration of decentralised technologies on existing or proposed structures will be permitted provided, individually, or cumulatively, there would be no significant harm to agricultural land take".

14.3 Consultation & Scope of Assessment

Consultation Undertaken to Date

14.3.1 Consultation will be ongoing throughout the preparation of the DCO application; to date, it can broadly be divided into the following key stages:

- EIA Scoping;
- Early Non-Statutory Consultation; and
- Direct Topic-Specific Consultation.

14.3.2 Table 14.1 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 14.1 – Summary of Consultation Undertaken to Date

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTATION RESPONSE	SUMMARY OF OUTCOMES AND IMPLEMENTATION WITHIN THE PEIR
EIA Scoping				
Natural England	18/05/2023	Scoping Opinion	The ES should set out details of how any adverse impacts on BMV agricultural land can be minimized through Site design/masterplan. In order to fully assess the impacts to BMV, a detailed ALC survey may be necessary, e.g. one auger boring per hectare supported by pits dug in each main soil type. The ES should include details of the decommissioning and after use of the Site, which should include details on how this will avoid impacts on soils and ensure the agricultural land can be restored to its former condition.	The evaluated survey approach is based upon scoping opinion and engaged in further correspondence with Natural England regarding survey methodology (see Direct Topic-Specific Consultation section for further information). A full ALC survey has been conducted across the solar array area to support the PEIR and detailed ALC will be conducted across the cable and access route corridors. Initial design of the solar array area was informed by the LRA report (Appendix 14.1: Agricultural Quality of Land at Beacon Fen North, Lincolnshire Report - Land Research Associates, 2023). The detailed ALC survey for the Array area is now being considered. Land restoration and soil protection are considered within the PEIR. Soil management over the operational phase has been considered and the land management strategies will prioritise supporting ecological benefits and improvements in soil quality.

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTATION RESPONSE	SUMMARY OF OUTCOMES AND IMPLEMENTATION WITHIN THE PEIR
North Kesteven District Council (Landscope Land & Property)	18/05/2023	Scoping Opinion	Inclusion of other Lincolnshire Solar Energy NSIP schemes in the cumulative effects. Either the Land Soils and Groundwater chapter or the Ecology and Biodiversity chapter should consider the interplay between agricultural and ecological/BNG impacts and therefore the degree to which effects are temporary/ reversible. Additionally, NKDC raises grazing management at solar panels as a potential issue as it will not deliver the level of biodiversity that the Site could achieve if biodiversity gains were prioritised over agricultural production. NKDC refer to the 2023 Draft NPS EN-3 which states that where use of agricultural land is necessary, poorer quality should be used preferred to higher quality land. Avoidance of effects and alternatives including the scope to avoid use of BMV through scheme design should be justified and made clear in the ES. NKDC highlighted the concerns on the lack of detailed survey information and refers to the 2021 Natural England 'Guide to assessing development proposals on agricultural land' document which requires augering every hectare on a regular grid on agricultural land.	Other Lincolnshire Solar Energy NSIP schemes have been assessed within the Cumulative Effects. Following a review of the scoping opinion, a detailed ALC was completed for the Solar Array area and a detailed ALC survey is now scheduled for January 2024 for the cable route corridor and planning is in place for a detailed ALC survey for the access route corridor. Initial design of the solar array area was informed by the LRA report (Appendix 14.1: Agricultural Quality of Land at Beacon Fen North, Lincolnshire Report - Land Research Associates, 2023). The detailed ALC survey for the Array area is now being considered. Land restoration and soil protection are considered within the PEIR. Soil management over the operational phase has been considered and the land management strategies will prioritise supporting ecological benefits and improvements in soil quality.
Lincolnshire County Council	16/05/2023	Scoping Opinion	Due consideration required to the alternative of keeping the land in agricultural use and its current contribution to food production in the region. Council agrees this matter should be 'scoped in' and appropriate assessments included as part of the ES.	Following a review of the scoping opinion, a full detailed ALC was completed for the Solar Array Area, and this will also be done for the

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTATION RESPONSE	SUMMARY OF OUTCOMES AND IMPLEMENTATION WITHIN THE PEIR
			The ES and ALC assessment should clearly identify how much of the Site comprises of agricultural land and identify its ALC grade and current use. The ES should identify what (if any) measures would be taken to retain the agricultural land in productive use. The ES should consider the economic effects of the loss or change to the use of the agricultural land as well as a consideration of the potential carbon footprint created through the displacement or removal of this land from productive use (calculated to ensure that the full carbon gains or benefits of this proposal are accurate). The 'alternatives' exercise needs to consider alternative Site layouts and potentially a reduction in MW generating capacity in order to demonstrate avoidance or minimisation of agricultural land impacts.	access route corridor and cable route corridor. Soil management over the operational phase has been considered and the land management strategies will prioritise supporting ecological benefits and improvements in soil quality. This may include agricultural usage but the opportunity to focus on soil quality and biodiversity outcomes over the operational phase are of equal value as continuing in agricultural production.
Planning Inspectorate	26/05/2023	Scoping Opinion	Disagree with scoping out agricultural land drainage on the basis that it will not directly impact the assessment of soils and agricultural land but instead will impact on "the potential economic and hydrological effects of the land management". The ES should provide an assessment of agricultural land drainage where there is potential for likely significant effects to occur on soils and agricultural land or demonstrate that no likely significant effects would occur with agreement from relevant statutory consultees. Where there are inter-related effects, these should be appropriately cross-referenced within the ES. Agrees that the potential impact on land holdings and farm business/viability may be scoped out from the Soils and Agricultural Land aspect chapter providing this is addressed within the socioeconomics chapter of the ES and that the appropriate cross-referencing between aspects is included to ensure a comprehensive assessment has been undertaken.	Following a review of the scoping opinion, a full detailed ALC was completed for the Solar Array Area and a detailed ALC survey will also be done for the access route corridor and cable route corridor. Agricultural land drainage has been reconsidered and it is agreed the initial assessment was limited to only the important factor for ALC assessment. A reassessment has been provided detailing the factors that can be considered. The conclusion remains that it be scoped out as ALC capacity and soil protection are dependent on effective

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			The Applicant should ensure that a sufficient number of auger locations are used across the Site to accurately inform the assessment in line with relevant guidance and standards. It is also noted (in paragraph 12.6.2) that ALC surveys have not yet been conducted for the Cable Route Corridor. However, it is not clear whether surveys of Cable Route Corridor will be conducted to inform the baseline. If ALC surveys are not proposed to be conducted for the Cable Route Corridor the ES should clearly justify this with reference to guidance. The Scoping Report states that a site-specific Soil Management Plan (SMP) will be prepared and that with the implementation of this, significant effects on soil resources would not occur. The Inspectorate would expect to see an outline version of the SMP provided alongside the application documents.	Site Drainage Planning to support the operation phase.
Direct Topic-Specific Consultation				
Natural England	24/07/2023	Meeting between Wardell Armstrong and Natural England to discuss survey methodology	The main point of discussion was the ALC survey requirements for the solar array element. A review of the existing reconnaissance levels survey was conducted, and NE raised concerns over its accuracy and how BMV land was identified in the report. A method of appending further targets survey points into the reconnaissance survey was discussed and if there was any precedence that would support a lower density ALC survey. There was a separate discussion on the best approach for assessing the cable route corridor and several options proposed to NE for consideration.	Full detailed ALC approach agreed to establish baseline for the array area following email response from Natural England (02/08/2023) after the meeting between Wardell Armstrong and Natural England (24/07/2023). There was a general discussion on the survey requirements for the cable route corridor, and this has been superseded by the decision to conduct a full survey. ALC survey across this area.
	02/08/2023	Email response regarding outcome of meeting	NE considers this a major development and therefore it should be informed by detailed survey data. An approach to integrating targeted detailed surveys into the reconnaissance results for the array area was outlined that would ensure that areas of BMV land are accurately identified. A separate response on the cable route survey requirements was provided. NE emphasised that detailed soil survey information is required to inform the cable installation process and linked this with ALC survey which can provided this as part of the same survey. They stated a preference for a detailed ALC for the	

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTATION RESPONSE	SUMMARY OF OUTCOMES AND IMPLEMENTATION WITHIN THE PEIR
			cable route and outlines where a semi detailed survey may be suitable for area where predictive mapping indicates that the land in non BMV. .	
Landscope Land & Property		Meeting between Wardell Armstrong and Natural England to discuss assessment methodology	The baseline for ALC and soil information solar array and cable route where reviewed and approached proposed for the assessment discussed. For the PV panel area, a general agreement was reached on the approach for assessing soils and ALC and the proposal to adopt the IEMA guidance for the assessment was accepted. Landscope expects NE to provide a final decision on the survey requirements for all other elements of the project. Landscope raised the need for an effective Soil Management Planning for all elements that meets industry standards and is sufficiently detailed to avoid or address impacts to ensure the land can be returned to agriculture.	They stated that they were content with the proposed ALC survey methodology for the panel area. He impressed the importance of ensuring the team conducting the survey was suitably qualified and meet relevant expertise criteria. For the Cable Route, they impressed the importance of considering and avoiding impacts on existing field drainage schemes, since the cable will be buried to a depth beyond that of the drains. He noted that this needs to be done on a localised basis as some drains will cut across an individual fields. Sam stated that the protection of such drainage will be of particular importance to landowners, NFU, and CAAV. General points of agreement were. : • agreed that they are happy with the scope and methodology of the soil / ALC surveys being conducted for the PV panel area. • Agree that the IEMA guidance on soil and ALC in the planning process is appropriate. • Have agreed to review and comment on the refined cable route

ORGANISATION	DATE	FORM OF CONSULTATION	SUMMARY OF CONSULTATION RESPONSE	SUMMARY OF OUTCOMES AND IMPLEMENTATION WITHIN THE PEIR
				and was not sure if a full ALC for the other elements was needed. • Accept the need for a Soil Management Plan which follows industry standards for soil management, IEMA guidance, and includes for a schedule of condition to ensure any damage during construction can be identified and 'put right'.

Scope of the Assessment

14.3.3 The Proposed Development will occupy agricultural land (arable) and will result in a change in its agricultural potential over the lifespan of the project. Associated works such as the creation of permanent access tracks, substation, and BESS will have a more direct and potentially permanent impact on the agricultural potential of the land. These elements of the design have been referred to as 'long term temporary' development with the potential to cause a permanent impact in the worst-case scenario as they will involve soil sealing for the duration of the Proposed Development's lifetime.

14.3.4 The potential impact resulting from activities associated with the construction of the Proposed Development upon the agricultural land and soil resources present has, therefore, been considered. This has been done via an assessment of the quantity and quality of the agricultural land that may be affected, as well as the sensitivity of the soil receptor (i.e., resistance and resilience of the soil environment in terms of susceptibility to erosion and/or presence of organic soils/peat and the degree of loss of soil resource) that may be affected.

Effects not considered within the Scope

14.3.5 The following effects have been scoped out of the assessment:

Land Holdings

14.3.6 Justification: Land holdings have been scoped out of the assessment as the size of the land holding and the potential impact on farm business/viability is a socioeconomic assessment. Please refer to Chapter 15 for further information on this aspect.

Assessment of effects for the operational phase (for the Access Route Corridor and Cable Route Corridor) and decommissioning phase (for the Access Route Corridor)

14.3.7 Justification: The Proposed Development will result in a temporary disruption to agriculture during the construction phase within the cable route corridor and access route corridor, however all agricultural land within the boundary of the cable route corridor and access route corridor areas will be reinstated and restored to agricultural use following construction. Across these two elements, there would be no potential for further loss of agricultural land during the operational phase. During the decommissioning phase of the Proposed Development, for the access route corridor area there would be no potential for further loss of agricultural land. In the worst-case scenario, for the cable route corridor element of the Proposed Development there would be a temporary disruption to agricultural land during the decommissioning phase to facilitate the removal of the cable, however it is anticipated that any effects would be the same as those identified during the construction phase for the cable route corridor.

Agricultural Land Drainage

14.3.8 Justification: Agricultural land drainage is considered within the assessment of ALC to ensure that the ALC grade can be accurately considered and to assess if the disruption of an agricultural drainage system will have an impact on soil

and ALC quality locally. Accurate ALC assessments require the surveyor to base their classification on the assumption that all reasonable efforts will be made to optimize agricultural drainage. This is done to ensure that recent land management, which may have neglected land drainage, does not influence the ALC classification. For the solar array area it was shown during the ALC survey that the land drainage is fully optimised and no assumption regarding land drainage was required. As the access route corridor and cable route corridor will be impacting functional agricultural land it can be assumed that the land has also been suitably drained, and this will be confirmed during the ALC and soils survey that will be conducted across these areas. This aspect of agricultural drainage has therefore been scoped out this assessment.

14.3.9 The ALC capacity of the land across the access route corridor, solar array area and the cable route corridor are reliant on the effective management of surface and groundwater by the local Internal Drainage boards (IDB). The IDB maintains and operates a primary system of drainage channels and pumping stations that have been designed to prevent or reduce the impact of flooding.

14.3.10 The ALC capacity of the land under consideration is wholly dependent on the effective operation and maintenance of this system. In its absence the ALC capacity of the land under consideration would by definition be reduced to Subgrade 3b or lower due to flood risk. While these primary drainage systems support ALC they are not agricultural drains and have not been constructed nor are they maintained by individual landowners.

14.3.11 Individual landowners can supplement this primary drainage system with secondary systems (agricultural drainage) that will improve drainage condition of the upper soil profile to support seasonal establishment (spring crops) and to expand the range of crops that are grown. Ditches, tile drains, and mole drains are used locally for this purpose and were evident during the detailed ALC and soil survey that has been completed.

14.3.12 There will be no disruption to the primary drainage infrastructure managed by the local IDB because of the proposed development and this secures a core aspect of ALC capacity for the land base. The primary drainage scheme also fragments and isolates the land drainage patterns at the field scale meaning that there is no inter dependence between the fields in terms of drainage.

14.3.13 As part of the embedded measures any agricultural land drainage systems that will be impacted as part of the cable route and access route will be fully restored following construction and restoration. With embedded measures this impact is assessed as negligible.

14.3.14 The maximum lifespan of the agricultural drains (secondary drainage system) is ~ 40 years and these require semiannual maintenance and renewal to remain effective. This maintenance and renewal cannot be conducted across the solar array area during the 40 years operational phase. Secondary Land drainage across the array area will therefore rely upon the land drainage scheme that is outlined in Chapter 11 (Water Resources and Flood Risk Par: 11.8.6) as the capacity of current agricultural land drainage systems become redundant. Following decommissioning a suitable agricultural land drainage scheme will need to be established to restore the full ALC capacity across the solar array area.

14.3.15 Due to the reasons discussed above the consideration of agricultural land drainage within the assessment of Soils and ALC has been scoped out. Those agricultural drains disrupted by the access track and cable route construction will be fully restored and the current agricultural land drainage system across the solar array area will be redundant during the operation lifespan. The primary land drainage system managed by the local IDB have ensured that there is no interdependence between individual agricultural land drainage schemes.

Limitations & Exclusions

Limitations

14.3.16 At this current stage of the planning process, the following matters are still ongoing and present a limitation to the baseline data informing the preliminary assessment of effects:

- For this preliminary chapter, the assessment of effects relating to the Access Route Corridor and Cable Route Corridor has been based upon the available desk-based information as no detailed survey data is available at this stage in the planning process.
- Detailed ALC Soil surveys of the Cable Route Corridor and Access Route Corridor will be conducted. The PEIR assessment for both these areas have been based upon high level desk-based information with interpolation of soils and ALC data. The survey methodology for the Cable Route Corridor (once refined) would be confirmed with Natural England following further consultation. Any survey methodology for the Access Route Corridor would be confirmed with Natural England following further consultation.

14.3.17 The above matters will be completed in advance of submission of the Environmental Statement and will be incorporated within the Environmental Statement, which will be consulted upon as part of the determination process.

Assumptions

14.3.18 The information within this Chapter is preliminary and intended to inform consultees. As such, this PEIR has been prepared at a point in the design process when parameters of the design are certain enough for an assessment to be based upon, but there is still sufficient flexibility to incorporate feedback from consultees.

14.3.19 At this current stage, within the PEIR assumptions for the baseline conditions of the following design elements of the project have been based upon the following:

- **Solar Array Area:** The baseline conditions for the soil characteristics and agricultural land classification for the Solar Array Area are based upon a detailed ALC survey conducted by Wardell Armstrong in August and September 2023 (see appendix 14.2). This survey provided detailed baseline information sufficient to inform the Soils and Agricultural Land PEIR and ES Chapter.
- **Cable Route Corridor:** The boundary for the Cable Route Corridor at this stage is preliminary and is to be refined. Any soil surveys would be agreed upon following the refinement of this boundary. The desk

study for the Cable Route Corridor at present has collated the publicly available information from the Provisional ALC Data, Natural England's BMV likelihood maps, and the Soil Survey of England and Wales in order to provide a preliminary assessment of the potential effects. For the Cable Route Corridor, it is assumed that for the operational phase, the cable will remain in-situ and thus no further disruption to soil or agricultural land would occur during this phase. As a worst-case scenario case scenario, it has been assumed that the cable will be removed during decommissioning.

- **Access Route Corridor:** The desk study for the Access Route Corridor at present has collated the publicly available information from the Provisional ALC Data, Natural England's BMV likelihood maps, and the Soil Survey of England and Wales in order to provide a preliminary assessment of the potential effects. For the Access Route Corridor, it is not yet confirmed whether the access route will be removed following construction or remain in place during operation, however it has been assumed as a worst-case scenario that the access route will be removed at the end of the construction phase and therefore for the operational and decommissioning phases there would be no further disruption to soil or agricultural land.

14.3.20 At this current stage, the following design assumptions have been made in relation to the Solar Array Area, Cable Route Corridor, and Access Route Corridor in order to inform the preliminary assessment of effects:

- **Solar Array Area**
  - Solar array foundations would be driven 1m to 2.5m directly into the ground without prior soil removal and this is expected to pose a minimal risk to soil quality and soil loss.
  - The only potential requirement for the stripping, temporary stockpiling or storage of topsoil would be associated with the construction of any required access tracks, substation, Battery Energy storage System (BESS), compounds, storage buildings and cabins (collectively these are referred to here as 'built infrastructure').
  - The construction of the solar panel arrays will involve removal of all the land from agricultural production. However, it must be acknowledged that there is the possibility for the land to be used for agriculture in some capacity (e.g., grazing) during the operational phase of the Solar Array Area.
  - During the operational phase of the Solar Array Area element of the Proposed Development, it is assumed that there is no further development of built infrastructure and therefore no further impacts on the soils or ALC capacity of the land resulting from construction activities.
  - The foundations that support the panels can be removed with minimal disturbance at the end of the operational life of the Proposed Development, hence loss of agricultural land beneath the solar arrays have been assessed as a temporary disturbance.

- All built infrastructure (substations, BESS, access roads, storage areas) can be removed at the end of the operational life of the Proposed Development however this will require restoration to the baseline standard and such long-term temporary impacts for these areas will be assessed as a permanent loss as a worst-case scenario.

- **Cable Route Corridor**

- The requirement for the stripping and storage of soils during the construction stage is expected, as well as temporary trackways for vehicle access to the working areas.

- Vehicle access tracks would be required at either end of any underground section which will result in permanent land loss.

- Following cable instalment, soil would be reinstated above the cable trench and working areas, any temporary access tracks would be removed.

- At decommissioning as a worst-case scenario, it is assumed that the cable will be removed. It is assumed that any effects arising from the decommissioning phase of the cable route corridor would be the same as those identified during the construction phase of the cable route corridor.

- **Access Route Corridor**

- The requirement for the stripping and storage of soils during the construction stage is expected.

- As a worst-case scenario, following construction of the solar array, the access route would be removed, and the soils would be reinstated, and the land returned to agricultural production.

14.4 Assessment Methodology & Significance Criteria

Extent of the Study Area

14.4.1 The redline boundary of the proposed Solar Array Area and Cable Route Corridor consists of approximately 512 ha and 903 ha of land respectively. The Access Route Corridor covers approximately 125.4 ha of land. The majority of the land for all elements is under agricultural management for arable production.

Assessment Methodology

Guidance

- Natural England (2021), Guide to assessing development proposals on agricultural land[6]

[6] Natural England (2021) Guide to assessing development proposals on agricultural land. Available at: https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land.

- Natural England (2012), Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'[7]
- Institute of Quarrying (2021), Good Practice Guide for Handling Soils in Mineral Workings [8]
- DEFRA (2009), Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[9]
- IEMA (2022) A New Perspective on Land and Soil in Environmental Impact Assessment.[10]
- British Society of Soil Science (BSSS) (2022) Working with Soil Guidance Note on 'Benefitting from Soil Management in Development and Construction'[11]

14.4.2 The aim of the Institute of Quarrying's 2021 guidance 'Good Practice Guide for Handling Soil in Mineral Workings'[8] is to contribute to achieving sustainable soil based after uses and to minimise impacts on the soil resources and enhance soil functions wherever possible. Amongst other things this document sets out protocols for the stripping and storage of soils and successful soil reinstatement and restoration methods. Defra's 2009 guidance document[9] which is referenced in the Planning Practice Guidance for the Natural Environment[12], relates to construction sites and contains good practice guidance on the handling and storage of soil resources to ensure the sustainable management of soils.

14.4.3 The Institute of Environmental Management and Assessment (IEMA) issued their new guidance document 'A New Perspective on Land and Soil in Environmental Impact Assessment'[10] on 17 February 2022. This document comprises the first published guidance on the consideration of soils and land in EIA but does not include a methodology for how such assessment should be undertaken. The guidance aims to advocate *'a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils'* and is used to inform the assessment methodology to assess the impacts of soil resources. The assessment methodology draws upon this guidance and reflects the most up to date industry guidance on assessing the impacts on land and soils in Environmental Impact Assessment.

Baseline Data

14.4.4 For the Solar Array area, a 'semi-detailed' Agricultural Land Classification (ALC) was completed by Land Research Associates. The survey was done at

[7] Natural England, (2012) Technical Information Note 049 (TIN049): Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land. Available at: https://www.iow.gov.uk/azservices/documents/2782-FE14-Natural-England-TIN049-Agricultural-Land-Classification.pdf
[8] Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings. Available at: https://www.quarrying.org/soils-guidance
[9] Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf
[10] Institute of Environmental Management & Assessment (IEMA) (2022) A New Perspective on Land and Soil in Environmental Impact Assessment. Available to access through: https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils
[11] BSSS (2022) Benefitting from Soil Management in Development and Construction. Available at: https://soils.org.uk/wp-content/uploads/2022/02/WWS3-Benefitting-from-Soil-Management-in-Development-and-Construction-Jan-2022.pdf
[12] UK Government (2019) Planning Practice Guidance Natural Environment. Available at: https://www.gov.uk/guidance/natural-environment. Accessed October 2023.

an average density of 1 point per 5 hectares using a mixture of hand auger borings and small pits. This survey report can be found in Appendix 14.1.

14.4.5 Following consultation with Natural England and to address consultee comments (Lincolnshire County Council and North Kesteven District Council), a second, full detailed ALC survey, was conducted on the Solar Array Area by Wardell Armstrong at a density of 1 point per hectare as per guidance provided in Natural England's Technical Information Note 049[7] and Natural England's 2021 Guide to Assessing Development Proposals on Agricultural Land[6], with the collection of laboratory samples in line with the 2022 IEMA guidance[10] which states that *"where sampled soils are of a clay loam and silty clay loam texture, additional laboratory testing is required to determine the soils' clay content for the accurate determination of ALC".* This survey report can be found in Appendix 14.2.

14.4.6 Other desk-based sources of information used to inform the baseline are:

- 1:250,000 'Provisional Agricultural Land Classification Maps'[13].
- Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales[14].
- Soil Survey of England and Wales (1984) Soils and their Use in Eastern England, with accompanying 1: 250,000 map, Sheet 4.
- Multi-Agency Geographical Information for the Countryside (MAGIC)[15].
- Cranfield University (2015). Research to develop the evidence base on soil erosion and water use in agriculture[16].
- Cranfield University (2023) The Soils Guide. Available at LandIS – Land Information System – Soils guide Accessed July 2023.[17]
- Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land – Strategic scale map East Midlands region[18].

Significance Criteria

14.4.7 Effects that are deemed to be significant for the purposes of this assessment are those that are described as being of Moderate or Major nature and thus significant. The assessment methodology draws upon the IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment'[10] which was published on 17 February 2022.

[13] DEFRA (2020) Provisional Agricultural Land Classification Maps and Data. Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc Accessed September 2023.
[14] Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales. Available at: https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification Accessed September 2023.
[15] HM Government. Multi-Agency Geographical Information for the Countryside (MAGIC). Available at: www.magic.gov.uk
[16] Knox *et al*. (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147' Available at https://www.theccc.org.uk/wp-content/uploads/2015/06/Cranfield-University-for-the-ASC.pdf Accessed September 2023.
[17] Cranfield University (2023) The Soils Guide. Available at LandIS - Land Information System - Soils guide Accessed September 2023.
[18] Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map East midlands region (ALC017) Available at: http://publications.naturalengland.org.uk/category/5208993007403008. Accessed September 2023.

14.4.8 The construction of the Proposed Development would result in the direct loss of land within the Site due to the 'built infrastructure' component of the development and would change agricultural land use potential across the whole Site during the construction and operational phase. There is also the potential for damage and loss of the soil resources present within the Site as a result of unsuitable handling, storage, and management practices during construction.

14.4.9 Subsequently, the potential impact upon the land surface and soil resources arising as a result of activities associated with the construction of the Proposed Development has been considered.

14.4.10 In the following section, the sensitivity criteria, and factors for magnitude of change are discussed separately for the two receptors (1: Land and 2: Soil Resources). The effects matrix is then detailed and can be used for all identified receptors.

14.4.11 In the following sections the terms 'temporary' or 'permanent' have been used to describe the Proposed Development. The Proposed Development has been classed as long-term temporary as there is the potential for return to its former land use following decommissioning. However, where areas of built development involving soil sealing are proposed (e.g., substation, BESS, access tracks), these areas been referred to as 'long-term temporary (permanent as a worst-case scenario)'. Therefore, for areas of built development, a worst-case scenario has been applied and a permanent impact is assumed.

Receptor: Land

14.4.12 Table 2 of the IEMA guidance[10] covers a wide range of soil functions and most cannot be appropriately placed into discrete categories for the assessment process. Therefore, assigning sensitivity involves consideration of all the available information and an element of professional judgement.

14.4.13 A primary land use within the Site is currently agriculture and the available baseline shows that the soils under consideration are mineral. Based on the IEMA system the sensitivity of soils will therefore be based on the land's ability to provide food and fuel. This has been assessed using the ALC system, with higher grades assigned higher sensitivities. The receptor sensitivity criteria for 'Land' are outlined in Table 14.2.

Table 14.2 – Receptor Sensitivity (Land)

RECEPTOR	SENSITIVITY	JUSTIFICATION
Soils supporting agricultural land quality of grades 1 and 2	Very high	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown (commonly including top fruit, soft fruit, salad crops and winter harvested vegetables). Yields are high and less variable than on land of lower quality. Land with minor limitations that affect crop yield, cultivations or harvesting. Grade 2 may comprise soils that show difficulties with the production of more demanding crops (e.g., winter harvested vegetables and arable root crops). The level of yield is generally high but may be lower or more variable than Grade 1.
Soils supporting	High	Land capable of consistently producing moderate to high yields of a narrow range of arable crops (especially

RECEPTOR	SENSITIVITY	JUSTIFICATION
agricultural land quality of subgrade 3a		cereals) or moderate yields of a wide range of crops (including cereals, grass, oilseed rape, potatoes, sugar beet) and the less demanding horticultural crops.
Soils supporting agricultural land quality of subgrade 3b	Medium	Land capable of producing moderate yields of a narrow range of crops (principally cereals and grass) or lower yields of a wider range of crops or high yields of grass that can be grazed or harvested over most of the year.
Soils supporting agricultural land quality of grades 4 and 5	Low	Land with severe limitations that significantly restrict the range of crops and / or level of yields. Is mainly suited to grass with occasional arable crops (e.g., cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high, but there may be difficulties in utilisation.
Other soils	Negligible	As per 'Low' sensitivity, but with indirect, tenuous, and unproven links between sources of impact and soil functions (i.e., non-agricultural, or urban). Built-up or 'hard' uses with relatively little potential for a return to agriculture.

14.4.14 The magnitude of change criteria for the receptor 'Land' is shown in Table 14.3, which has been adapted from Chapter 9: Table 3 of the IEMA guidance.

Table 14.3 – Magnitude of Change (Land)

MAGNITUDE	LAND TAKE
High	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 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Low	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features.
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 result in permanent damage to soils.*

Receptor: Soil Resources

14.4.15 The effect of permanent and temporary development resulting from the Proposed Development will be assessed in terms of the identified soil resources, their sensitivity, and the degree of damage and loss of soil resource. The assessment criteria combine standard industry approaches, the IEMA guidance and professional judgement.

14.4.16 The sensitivity of soil resources to disturbance is based on how susceptible the soils are to damage when disturbed and includes the assumption that good working practice, such as that set out in 2009 DEFRA guidance[9] is followed. The sensitivity criteria also explore how soils with different inherent properties will have differing resilience to disturbance, and the impacts from construction may be more severe in certain situations. The proposed sensitivity criteria are detailed in Table 14.4.

Soil Resources: Structural Damage

Table 14.4 – Receptor Sensitivity (Soil Resources – Structural Damage)

RECEPTOR	SENSITIVITY	JUSTIFICATION
Soils with low resilience to structural damage	High	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 Field Capacity Days (FCDs) 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. All soils in wetness class (WC) WCV or WCVI.
Soils with medium resilience to structural damage	Medium	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. Sands, loamy sands, sandy loams, and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Soils with high resilience to structural damage	Low	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 WCI to WCII.

Soil Resources: Loss

14.4.17 Where soils are left exposed, the sensitivity of soil resources to loss is considered in relation with impacts of environmental factors such as wind and water. In this assessment the soil erodibility, which is a measure of the susceptibility of soils to loss both in-situ (i.e., as an undisturbed soil profile) and during soil stockpiling, due to wind or water erosion (natural erosion potential) will be used. The sensitivity levels on erosion used for this assessment stem from the sensitivity classification compiled by Cranfield University[16] and is detailed in Table 14.5.

Table 14.5 – Receptor Sensitivity (Soil Resources – Loss)

RECEPTOR	SENSITIVITY	JUSTIFICATION
Soils with high risk of erosion and organic soils (peat)	High	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g., use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion (organo-mineral soils: i.e., peaty soils	Medium	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g., when above their plastic limit – the moisture state where soil begins to behave as a plastic material).

RECEPTOR	SENSITIVITY	JUSTIFICATION
or peaty gleys, peat < 50 cm)		The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	Low	These soils are generally more resistant to damage and may be appropriately managed by standard good practice construction measures.

14.4.18 Soils of differing texture and structural development may be subject to a range of potential impacts during and following reinstatement.

14.4.19 For example, the incorrect handling/reinstatement of a heavy textured (clay rich) soil whilst in a plastic state may cause permanent or semi-permanent soil compaction. The resulting soil profile will have a reduced natural drainage compared to the undisturbed soil profiles and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Whereas sandy soils are more resistant to compaction pressures and have a greater capacity to recover from compaction without intervention or management. Sandy soils will also remain more permeable if compaction does occur and the drainage potential of these soils is therefore more easily maintained upon reinstatement.

14.4.20 It is assumed that soils currently designated to non-agricultural classes, including urban and non-agricultural land, are not exposed to loss and damage, as standard best practice is already in place to maintain and secure their soil function. Therefore, the area considered for impact on receptors of soil resources only concerns soils currently under agricultural use. For 'Damage to Soil Resources' the footprint of proposed hardstanding (damage through soil handling) under the Proposed Development is considered, whereas the area of soils left in-situ is considered for the potential for 'Loss of Soil Resources'. The ratio between the two receptors constitutes a single magnitude of change that will be applied to both analyses. The area that is affected by the respective receptor category is expressed in the percentage of agricultural land onsite.

14.4.21 The magnitude of change criteria for soil resources (damage to soil resources and loss of soil resources) is shown in Table 14.6, which has been adapted from Chapter 9: Table 3 of the IEMA guidance[10].

Table 14.6 – Magnitude of Change (Soil Resources)

MAGNITUDE	DAMAGE TO SOIL RESOURCES	LOSS OF SOIL RESOURCES
High	Permanent change to soil quality of > 75 % of the soil resource.	< 25 % of soil resources retained in-situ.
Medium	Permanent change to soil quality of 25 – 50 % of the soil resource.	25 – 75 % of soil resources retained in-situ.
Low	Permanent change to soil quality of 5 – 25 % of the soil resource.	75 – 95 % of soil resources retained in-situ.
Negligible	Permanent change to soil quality of < 5 % of the soil resource.	> 95 % of soil resources retained in-situ

Level of effects

14.4.22 The classification of effects for loss of land (agricultural), and loss and damage of soil resources, has been assessed using Table 14.7. Where effects are determined as Major or Moderate, the effect will be considered as Significant in EIA terms. Where effects are determined as Minor or Negligible, the effect will be considered Not Significant in EIA terms. Where effects are Minor to Moderate they may be significant in EIA terms and professional judgement and sound reasoning will be used to determine the significance.

Table 14.7 – Level of Effects

		MAGNITUDE OF CHANGE				
		High	**Medium**	**Low**	**Negligible**	**No Change**
SENSITIVITY/ VALUE OF RECEPTOR	**Very High**	Major (Significant)	Major (Significant)	Major or Moderate (Significant)	Minor (Not Significant)	Neutral (Not Significant)
	High	Major (Significant)	Major or Moderate (Significant)	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Neutral (Not Significant)
	Medium	Major or Moderate (Significant)	Moderate (Significant*)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
	Low	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
	Negligible	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)

*Professional judgement will be used to determine the significance of the effect in the particular circumstances.
Note: Major, Moderate or Minor effects have the potential to be adverse or beneficial.

14.5 Baseline Conditions

Current Baseline Conditions

14.5.1 The Site is comprised of three areas: the Solar Array Area, and the Cable Route Corridor, and the Access Route Corridor.

Agricultural Land Classification

Solar Array Site

14.5.2 The provisional ALC data maps the Solar Array Site as Grade 3 agricultural land and it falls within the High likelihood of BMV land (>60 % area BMV) category towards the centre, east and northeast areas of the Site and Moderate likelihood of BMV land (20-60 % area BMV) category towards the southwest end of the Site.

14.5.3 The detailed ALC assessment carried out by Wardell Armstrong found the Site is ~ 49.5% Subgrade 3b, 44.6% Subgrade 3a and 2.8 % Grade 2 agricultural

land. Subgrade 3b land occupies most of the Northwest, North and large proportions of the central areas of the site. The northeast of the site is predominantly Subgrade 3a as well as areas to the south and southwest. Within these areas of Subgrade 3a there are pockets of Grade 2 land. The site also contains non-agricultural land including woodland, reservoirs, and drainage ditches.

14.5.4 There are no climatic limitations to the agricultural land classification grade for the area and the main limitation reported in the reconnaissance survey was wetness. Field capacity days at the Solar Array Area Site is 106 days.

Cable Route Corridor

14.5.5 The current boundary of the Cable Route Corridor is 903.2 ha and provisional ALC data shows that this is comprised predominantly of Grade 2 (656 ha, 73%) agricultural land, with portions of Grade 1 (141.9 ha, 16 %) and Grade 3 (39.7 ha, 4 %). The Cable Route Corridor shows a High and Moderate BMV likelihood.

14.5.6 The provisional ALC breakdown, along with the identified soil association are summarised in Table 14.8.

Table 14.8 – Provisional ALC grading and associated soil association for the proposed Cable Route Corridor

SOIL ASSOCIATION	GRADE 1	GRADE 2	GRADE 3	NON-AGRICULTURAL	TOTAL
512c		38.16 ha	16.63 ha	1.44 ha	56.23 ha
711t		244.44 ha	19.07 ha	10.90 ha	274.41 ha
812c				0.74 ha	0.74 ha
813g	141.91 ha	373.41 ha	4.01 ha	52.54 ha	571.88 ha
Total (% of Cable Route Corridor)	141.91 ha (16%)	656.00 ha (73%)	39.72 ha (4%)	65.62 ha (7%)	903.25 ha

Access Route Corridor

14.5.7 The current boundary of the Access Route Corridor Area is 125.4 ha and provisional ALC data shows that this is comprised entirely of Grade 3 agricultural land. The Access Route Corridor Area shows a Moderate Likelihood of BMV with a small area of High Likelihood of BMV in the southwest of the Access Route Corridor Area.

Table 14.9 – Provisional ALC grading and associated soil association for the proposed Access Route Corridor Area

SOIL ASSOCIATION	GRADE 3	TOTAL
512c	12.3 ha	12.3 ha (9.8%)
711t	113.1 ha	113.1 ha (90.2%)
Total (% of Access Route Corridor Area)	125.4 ha (100%)	125.4 ha

Provisional and Post 1988 ALC Data within Lincolnshire County Council and North Kesteven District Boundaries

14.5.8 Table 14.10 displays the total agricultural land within Lincolnshire County Council boundary and is calculated based upon the provisional ALC data and post 1988 ALC data. For the purpose of assessing the amount of Subgrade 3a and Subgrade 3b land within the administrative boundary, the Grade 3 provisional calculations assume a 50/50 split between Subgrade 3a and Subgrade 3b.

Table 14.10 Provisional ALC Data and Post 1988 Data Combined with Administrative Boundaries

ALC GRADE	LINCOLNSHIRE COUNTY COUNCIL BOUNDARY (HECTARES OF LAND)
Grade 1	75568.28 ha
Grade 2	186336.8 ha
Sub 3a	148602.9 ha
Sub 3b	148345.9 ha
Grade 4	14762.45 ha
Non-agricultural	25655.91 ha
Total	599272.2 ha

Soil Resources

14.5.9 Table 14.11 describes the range of soil associations found on the Site.

Table 14.11: The Soil Associations found with the Solar Array Area, Cable Route Corridor and Access Route Corridor Area based on the Soil Survey of England and Wales (1984) and LandIS.

SOIL ASSOCIATION	WALLASEA 2 (813G)	BECCLES 3 (711T)	RUSKINGTON (512C)	AGNEY (812C)
Soil Series	Wallasea, Newchurch, Blacktoft, Wisbech	Beccles, Ashley, Hanslope	Ruskington, Ickford, Newsleaford	Agney, Wisbech
Geology	Marine alluvium	Chalky till	Glaciofluvial sand and gravel	Marine Alluvium
Soil characteristics	Stoneless clayey soils, calcareous in places. Some calcareous silty soils. Flat land often with low ridges giving a complex soil pattern. Groundwater controlled by	Slowly permeable seasonally waterlogged fine loamy over clayey soils, associated with similar clayey soils.	Deep permeable calcareous coarse and fine loamy and sandy soils affected by groundwater. Flat land.	Deep stoneless calcareous fine and coarse silty soils. Groundwater usually controlled by ditches and pumps. Flat land.

SOIL ASSOCIATION	WALLASEA 2 (813G)	BECCLES 3 (711T)	RUSKINGTON (512C)	AGNEY (812C)
	ditches and pumps.			
Soil Water Regime (WC = Wetness Class)	Most of the land is pump-drained and the more permeable Blacktoft and Wisbech soils are well drained (WC I). Wallasea and Newchurch soils are less permeable but respond to underdrainage; drained soils are occasionally waterlogged (WC II) but undrained soils are waterlogged for long periods in winter (WC III or IV).	All the soils have slowly permeable subsoils which cause waterlogging for much of the winter (WC III and IV) and a limited winter rainfall acceptance potential. Surplus water is shed laterally as surface run-off.	Most of the soils have been artificially drained so are only occasionally waterlogged in winter (WC II) as they respond well to drainage. Locally, however, where there is hard ironpan or an undulating, slowly permeable clay substratum the soils lie wet for longer.	The land is mostly drained by ditches and pumps and the soils are rarely waterlogged (Wetness Class I).
Erodibility	Very small risk from water	Very small risk from water	Very small risk from water	Very small risk from water
Area found	Solar Panel Array Area and Cable Route Corridor	Solar Panel Array Area, Cable Route Corridor, and Access Route Corridor	Solar Panel Array Area, Cable Route Corridor, and Access Route Corridor	Cable Route Corridor

Soil Characteristics within Solar Array Area

14.5.10 The soil characteristics described below are based upon the Detailed ALC report produced by Wardell Armstrong (Appendix 14.2).

14.5.11 The survey identified three main soil profile types, and these are consistent with the characteristics of the Beccles 3 711t, Wallasea 2 813g and Ruskington 512c soil associations.

14.5.12 Topsoil of the Beccles 711t characteristics were typically heavy clay loam to clay texture (sandy clay loam was also recorded) with depth ranging between 20cm and 50 cm. Topsoil with Wallasea 813g characteristics had silty clay to clay textures with depth ranging between 30 and 45cm. Topsoil with Ruskington 512c characteristics were typically sandy loam to sandy clay loam

(some Ickford soils with heavy clay loam and clay topsoil also found) with depths ranging from 26cm to 60cm.

14.5.13 Upper subsoil for Beccles 711t type soils was typically a clay texture (sandy clay loam, heavy clay loam, were also recorded) with depths ranging between 35cm and 120 cm. >2% ochreous mottling was common. The upper subsoil for Wallasea 813g type soils were typically silty clays with depth ranging between 50 to 80cm. The upper subsoil for Ruskington 512c type soils was typically loamy sand or sandy loam (heavy clay loam or clay for Ickford soils) with depths ranging between 35 and 100cm.

14.5.14 For Beccles type soils the lower subsoil was typically a clay texture with chalk stones present. Depths ranging between 50 and 120cm. Wallasea type soils typically had clay lower subsoils with depths between 80 and 110cm. The lower subsoils for Ruskington type soils had varying textures of sand, loamy sand, sandy loams, sandy clay loams and some occurrence of clay, with depth ranging between 40cm and 120cm. >2% ochreous mottling was common in all lower subsoils.

14.5.15 The detailed survey confirms the main limitation for the Solar Array Site is Wetness with 58% of the points having Wetness Class (WC) III. The majority of these were found within soils identified as either having Beccles 711t or Wallasea 813g soil associations characteristics which have heavy textured topsoil and heavy textured slowly permeable subsoils. These soils were either classed as Subgrade 3b or Subgrade 3a (where there were medium textured or calcareous topsoil). Approximately 30% of the surveyed points are WC II and were typically present at points within transition areas between soil types where there were more permeable, better structured subsoils or within soils identified with Ruskington soil association characteristics (sandier more permeable soils). These soils were typically Subgrade 3a with occurrences of Grade 2 where there were medium textured/calcareous topsoils. Only 12% of the land had WC I and was typically found where there were well-structured lighter textured subsoils with good drainage. The majority of these had droughtiness as the main limitation due to the reduced available water content of the lighter textured subsoils and the relatively low rainfall for the area.

Soil Characteristics within Cable Route Corridor (Based on Survey of England and Wales (1984) and LandIS

14.5.16 The majority of the mapped soils association in the Cable Route Corridor are the same as those found within the Solar Array Area. The notable differences are that the Cable Route Corridor encompasses a wider range of soil types although in terms of soil texture they are likely to be very similar to those across the Solar Array Area and will be comprised primarily of clay textured soils with isolated area of lighter textured sandy loams.

14.5.17 The provisional ALC data is indicating that despite the occurrence of similar soil types to those found within the Solar Array Area, the land within the Cable Route Corridor has a higher overall potential to be BMV. It is expected that this will be due to the occurrence of more Wetness Class II and III conditions across the Cable Route Corridor due to better drainage.

Soil Characteristics within Access Route Corridor Area (Based on Survey of England and Wales (1984) and LandIS

14.5.18 The Access Route Corridor Area is made up predominantly of the Beccles 3 (711t) soil association with a smaller area of the Ruskington (512c) soil associations and it is expected that the soil characteristics will be similar to the Solar Array Area.

Sensitive Receptors

14.5.19 In summary, the key sensitive receptors, and the potential impacts upon them within the study area comprise:

- Agricultural land may be subject to loss as a result of the Proposed Development. This land consists of Grade 1, 2, Subgrade 3a, and Subgrade 3b agricultural land of which Grade 1, 2 and Subgrade 3a land is classed as BMV land.
- Loss of soil resource as a result of the Proposed Development due to soil erosion from water or wind. The Soil involved are predominantly of a clay texture (low risk of erosion), but sandier textures (high risk of erosion) were recorded in some areas.
- Damage to soil resource (soil structural damage) as a result of the Proposed Development due to soil handling. Soils on the Solar Array Site are typically heavy clay loam/clay textured and are of Wetness Class III and have 106 FCD and therefore have a medium resilience to structural damage. Where sandy loam textures were present, and soils were of Wetness Class II soils have a high resilience to structural damage.

Agricultural Land

14.5.20 Based upon Table 2 ‘Guidance on Proposed Receptor Sensitivity and Typical Soil Resource / Functions Description’ of the IEMA guidance, the following potential sensitive receptors have been identified for the Site:

- Agricultural Land of Grade 1 and 2, being of **very high sensitivity**
- Agricultural Land of Subgrade 3a, being of **high sensitivity**
- Agricultural Land of Subgrade 3b, being of **medium sensitivity**

14.5.21 The change in land use will include the temporary disruption of soil functions through cable installation within what will be the Cable Route Corridor, and the change in agricultural management of the Solar Array Area during the operational phase. The Access Route Corridor will involve a temporary change in land use during the construction phase.

Loss of Soil Resources

14.5.22 The majority of the soil present within the Solar Array Area are clays with a very small risk of erosion from water and they therefore have a **low sensitivity** to loss. Smaller areas of soils with higher sand contents were recorded and where these occurred the soils have a high risk of erosion and a **high sensitivity**.

14.5.23 For the purposes of this assessment, a **medium sensitivity** for soil loss within the Solar Array Area has been applied as a worst-case scenario to account for the presence of both clay textured and sandy textured soils.

14.5.24 Based on the mapped soil associations the soils within the Cable Route Corridor include a range of soil textures with the majority being clays belonging to the Wallasea and Beccles 3 associations. Based on information available the sensitivity of the soil within the Cable Route Corridor to loss is considered as **low**. Soils of the Ruskington association were also present in the Cable Route Corridor, and where these sandier soils are mapped, there is expected to be a **high sensitivity** for soil loss. For the purposes of this assessment, a **medium sensitivity** for soil loss within the Cable Route Corridor has been applied as a worst-case scenario to account for the presence of both clay textured and sandy textured soils.

14.5.25 Based on the mapped soil associations the soils within the Access Route Corridor Area fell predominantly within the Beccles 3 association with "seasonally waterlogged fine loamy over clayey soils". Soils of the Ruskington association were present in the southwest of the Access Route Corridor Area where soils are described as "calcareous coarse and fine loamy and sandy soils". The clayey soils of the Beccles 3 association will likely have a low sensitivity to loss and areas of sandier soils associated with the Ruskington association will have a high sensitivity. For the purposes of this assessment, a **medium sensitivity** for soil loss within the Access Route Corridor Area has been applied as a worst-case scenario to account for the presence of both clay textured and sandy textured soils.

Damage to Soil Resources

14.5.26 Based upon 'Table 4: Sensitivity of Soil Receptors' of the IEMA guidance, it is likely that the majority of soils present on the Site have a **medium sensitivity** and, thus, medium resilience to structural damage based upon the estimate of < 150 Field Capacity days and the presence of heavy clay loams, clay, sandy clay loams, and medium clay loams present in the topsoil and subsoils. These soils were also Wetness Class III.

14.5.27 Where medium sandy loam or medium sand are present in the topsoil or subsoil and where Wetness Class II is assumed, the soils are likely to have a **Low sensitivity** and, thus, has a high resilience to structural damage.

Future Baseline Conditions

14.5.28 In the absence of the Proposed Development, it is expected that the future baseline for the land would remain as it is with land retaining in its current agricultural land capacity and being managed for arable production.

14.5.29 It is expected that the future baseline of soil resources on the Site would remain as per the current baseline in the absence of the Proposed Development.

14.6 Assessment of Effects

Embedded Mitigation

14.6.1 Embedded mitigation measures will be supported by the preparation of an Outline Soil Management Plan (OSMP), which will be based upon the findings of the site-specific soil surveys of the Solar Array Area and those to be undertaken for the Cable Route Corridor, and Access Route Corridor Area. The OSMP will be included as part of the DCO Application.

14.6.2 The OSMP will detail the requirements for the development of site-specific SMP which will required as part of the construction phase. These will be informed by site-specific soil surveys of the Solar Array Area, Cable Route Corridor and Access Route Corridor. By following best practice guidance and implementing a site-specific SMP, it is anticipated that the impacts to soil resources would be minimal and that the Proposed Development will not result in a significant effect on soil resources.

14.6.3 Industry best practice guidance relating to soil handling include the Institute of Quarrying's 2021 'Good Practice Guide for Handling Soils in Mineral Workings'[8] and DEFRA's 2009 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'[9] which both provide guidance on soil management, handling, storage, replacement and mitigation for soil works.

14.6.4 Effective land drainage is central to the maintenance of ALC quality. Pre entry assessments of agricultural land drainage systems will be required and considered as part of the Construction and Environmental Management Plan.

14.6.5 Reference in the Construction and Environmental Management Plan to site-specific strategies to minimise the impact on ALC production locally during construction and operation will be required.

14.6.6 The measures and strategies the OSMP would include but are not limited to the following general principles of soil handling and soil stripping and ALC protection:

- No trafficking of vehicles / plant or material storage to occur upon unprotected topsoil (traffic on subsoil should be minimised and localised, with the use of temporary running surfaces recommended).
- No trafficking of vehicles / plant on reinstated soil unless for cultivation and then only in suitable soil moisture and weather conditions.
- All plant and machinery must always be maintained in a safe and efficient working condition.
- No soil handling to be carried out when the soil moisture content is above the lower plastic limit.
- No mixing of topsoil with subsoil, or soil resources from different units (soil types) or mixing of soil with other materials.
- Soil is only to be stored in pre-planned, marked, and mapped soil storage areas away from potential sources of contamination.
- A daily record of the Site and soil conditions, and operations undertaken to be maintained.
- Soils should only be moved under the driest practicable conditions, and this must take account of prevailing weather conditions.

- Local drainage required as part the Proposed Development will be integrated to support local drainage conditions and will be detailed along with ALC restoration planning in the Construction Management Plan.

14.6.7 The separately identifiable topsoils and subsoils encountered (and stripped for storage) are to be stored separately in stockpiles. Soils must be kept free of contamination.

14.6.8 Low ground pressure (LGP) models or tracked vehicles should be used where possible. This will greatly minimise the extent and/or intensity of the soil loosening required after restoration. Consequently, it will reduce the costs and potential delays due to the need for additional soil cultivation.

14.6.9 Solar Array Area: The installation of the solar arrays and cable on the sections of Grade 1, 2 and Subgrade 3a BMV land within the Site may pose a risk if soils are mishandled. As such, best practice methodology, including the Institute of Quarrying 2021 'Good Practice Guide for Handling Soils'[8] and DEFRA's 2009 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'[9] will be adopted as part of the embedded measures and a sustainable soil management strategy will be implemented to secure and promote soil quality during the operational phase.

14.6.10 Cable Route Corridor: Providing the implementation of best practice soil handling and management guidance such as the Institute of Quarrying's 2021 Guide to Handling Soils[8] and that the Soil Management Plan is adhered to there would be minimal impact on the soil resource and agricultural land capacity following reinstatement of the land above the Cable Route Corridor. During the decommissioning phase, as a worst-case scenario it has been assumed the cable route will be removed. Any impacts arising from this would be mitigated via the implementation of a Soil Management Plan as part of the decommissioning of the Decommissioning Environmental Management Plan as part of the embedded mitigation measures.

14.6.11 Access Route Corridor: Providing the implementation of best practice soil handling and management guidance such as the Institute of Quarrying's 2021 Guide to Handling Soils and that the Soil Management Plan is adhered to there would be minimal impact on the soil resource and agricultural land capacity following reinstatement of the land above the Access Route Corridor.

14.6.12 Any agricultural land drainage systems that will be impacted as part of the cable route and access track construction will be fully restored following construction and will be detailed in the Soil Management Plan.

14.6.13 Following decommissioning a suitable agricultural land drainage scheme will need to be established to restore the full ALC capacity across the solar array area.

Assessment of Effects - Solar Array Area

Construction Phase

Land

14.6.14 The Solar Array Area comprises BMV land (Grade 2 and Subgrade 3a) and Subgrade 3b (non-BMV) agricultural land. The combination of these grades

translates to a **medium to very high sensitivity** for the receptor 'Land' (assessed as **high sensitivity**).

14.6.15 The temporary nature of the Solar Array Area of the Proposed Development allows reversible loss of one or more soil functions during the construction phase. The total land take that is considered as long-term temporary (permanent in worst case) is up to 10.6 ha in total for the BESS and Substation, and it is assumed that less than 10 ha of land will be required to support the access tracks and construction compounds. As there is less than 20 ha of long-term temporary (permanent in worst case) land take associated with the construction phase, **the magnitude of this change** compared to the baseline for the receptor 'Land' is considered to be **medium**.

14.6.16 The initial effect on receptor 'Land' is assessed considering the presence of medium, high, and very highly sensitive agricultural land (Subgrade 3b, Subgrade 3a and Grade 2 agricultural land) in combination with a proportionally medium long-term temporary land take (permanent in worst-case scenario). With embedded mitigation in place, the resulting effect on the receptor 'Land' is considered **Moderate or Major** and thus **significant** in EIA terms.

Soil resources - Loss of Soils

14.6.17 Table 14.5 presents the sensitivity of different soil types to loss based upon their susceptibility to erosion. The soils on the Site are typically heavy textured (clays or heavy clay loams) and therefore, the sensitivity of the soil resource with respect to soil loss is considered to be Low. Where soils were recorded within the Solar Array Area with higher sand contents (medium sandy loam, medium sand, loamy sand textures) soils are likely to have a high sensitivity and a high risk of erosion.

14.6.18 For the purposes of this assessment, a **medium sensitivity** for soil loss within the Solar Array Area has been applied as a worst-case scenario to account for the presence of both clay textured and sandy textured soils.

14.6.19 It is expected that the majority of soils onsite would remain in-situ. As a worst-case scenario, it is assumed that only 75% to 95% of soil resource would remain in-situ which would be associated with a **low magnitude of change** compared to the baseline.

14.6.20 With embedded mitigation in place, the resulting effect on the receptor 'loss of soil' is therefore considered to be **Minor and Not Significant** in EIA terms.

Soil resources - Damage to Soils

14.6.21 The main threats to soils during construction works are trafficking of vehicles / plant and incorrect soil handling, which can cause damage to soil structure through compaction and smearing (both effects are sometimes referred to as 'deformation').

14.6.22 These effects compromise the ability of the soil to perform its functions (such as providing adequate amounts of water, air, and nutrients to plant roots), and its suitability for reuse within the Site without costly and time-consuming remediation. The risk of soil compaction increases with soil wetness and works involving soil handling pose a greater risk if conducted when the soil is saturated. Activities associated with the construction phase of the Proposed

Development may result in the disturbance and damage to the soil present, which could result in a long-term impact to the onsite soil resource due to reduced quality.

14.6.23 The requirement for the stripping, temporary stockpiling or storage of topsoil would be associated with the construction of the substation, BESS, and road construction. Incorrect handling and storage of soils has the potential to damage soil. The traffic movements required during these construction works may also cause short-term damage to the soil through compaction or erosion.

14.6.24 Damage to soils which occurs through disturbance, handling, and trafficking soils, is a main concern during the construction phase. Clay soils are susceptible to compaction and structural damage during both the construction and operations phase when handled in wet conditions, however standard mitigation measures will provide appropriate protection.

14.6.25 Any potential disturbance during the operational phase will be localised and small scale (e.g., general access for servicing substation and BESS).

14.6.26 The ALC survey (see Appendix 14.2) found that the majority of soils on the Solar Array Area are ranged between heavy clay loam, clay, heavy silty clay loam and sandy clay loam soils which combined with 106 Field Capacity Days would have a medium resilience to structural damage. Therefore, the **sensitivity** of the soil resource with respect to damage to soil structure is **Medium**.

14.6.27 Soils of a sandy loam, and loamy sand of Wetness Class II were also recorded and where this soil occurred, the sensitivity of soil resource to structural damage would be considered low.

14.6.28 In the worst-case scenario, the proportion of the Solar Array Area affected by soil sealing and associated built infrastructure would change the soil quality of between 5-25% of the soil resource and therefore have a **low magnitude of change** compared to the baseline.

14.6.29 With embedded mitigation in place, the resulting effect on the receptor 'damage to soil' is therefore considered to be **Minor and Not Significant in EIA terms**.

14.6.30 Table 14.12 summarises the potential impacts from construction with the embedded mitigation measures in place discussed in the section above.

Table 14.12: Construction Effects for Solar Pannel Array Site

RECEPTOR	LAND	SOIL RESOURCES	SOIL RESOURCES
Impact	Permanent loss of land (including BMV agricultural land)	Damage to soils	Loss of soil resources
Element	Footprint of Proposed Development on land which has been classed as Permanent	All soils onsite prone to damage on agricultural land	All soils retained in-situ on agricultural land

RECEPTOR	LAND	SOIL RESOURCES	SOIL RESOURCES
Receptor Sensitivity	Assessed as High Very High: Grade 2 High: Subgrade 3a Medium: Subgrade 3b	Medium (proportional average): 106FCD and clay/clay loam textures Low: 106 FCD and sandy loams texture	Predominantly low (very small risk of water erosion, small risk) where clay soils are present. High in smaller areas where sandier soils are present. Reassessed as Medium as a worst-case scenario to account for the presence of sandier soils
Magnitude of change	Medium (Between 5 and 20 ha long-term temporal disturbance (permanent in worst case)	Low (Between 5% and 25% long-term temporal disturbance (permanent in worst case)	Low (Between 75% and 95% of soils to remain in-situ)
Effect	**Moderate or Major (Significant)**	**Minor (Not Significant)**	**Minor (Not Significant)**

Operational Phase

14.6.31 There will be change in agricultural production from arable to a grass-based system. It is assumed that there will be a reduction in agricultural land capacity, however the land will remain in agricultural use (e.g., grazing) following the sustainable soil management strategy as stated in Paragraph 14.6.9 (Embedded Measures).

14.6.32 There will be no further development of built infrastructure (and detailed in Paragraph 14.3.20) and therefore no further impacts on the soils or ALC capacity of the land resulting from construction activities.

14.6.33 During the operational phase there would not be any substantial change to the soils remaining in-situ within the Site. There is the potential for soils to provide other ecosystem services during the operational phase including for biodiversity and carbon storage due to lower intensity agricultural land management strategies that will be adopted during operation.

14.6.34 For the receptor ‘Land’ there is a high sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Moderate or Minor (Potentially Significant) impact.

14.6.35 For the receptor 'Loss of Soil Resource' there is a medium sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Minor (Not Significant) impact.

14.6.36 For the receptor 'Damage to Soil Resource' there is a medium sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Minor (Not Significant) impact.

Decommissioning Phase

14.6.37 As the solar array foundations will be driven directly into the ground their removal will result in minimal soil damage or loss.

14.6.38 The main threats to soils and land during decommissioning relates to the trafficking of vehicles / plant and incorrect soil handling, which can cause damage to soil structure through compaction and smearing (both effects are sometimes referred to as 'deformation').

14.6.39 Appropriate soil management planning through the preparation of a Soil Management Plan and adopting best practice guidance will ensure that this impact is minimal and reversable and the magnitude of change for both soil resource (loss and damage) and land is assessed as Low.

14.6.40 For the receptor 'Land' there is a High sensitivity and a low magnitude of change associated with the decommissioning phase of the Solar Array Area which would result in a Moderate or Minor (Potentially Significant) impact.

14.6.41 For the receptors 'Loss of Soils Resource' and 'Damage to Soil Resource' there is a Medium sensitivity and a low magnitude of change associated with the decommissioning phase of the Solar Array Area which would result in a Minor (Not Significant) impact.

Assessment of Effects - Cable Route Corridor

Construction Phase

Land

14.6.42 The proposed Cable Route Corridor comprises a total of 903.2 ha of land, of which 817.8 ha is BMV land (141.9 ha Grade 1, 656 ha Grade 2, 19.9 ha Subgrade 3a) and a further 19.9 ha of Subgrade 3b (non-BMV). The assessment of the amount of Subgrade 3a and Subgrade 3b land above has been made following a 50/50 split of the provisional ALC data for Grade 3 agricultural land.

14.6.43 Provisional ALC Grade 3 land covers approximately 1.2 km, Grade 1 land covers approximately 2.5 km, and Grade 2 land covers approximately 9.6 km. The route is largely through land with a high likelihood of BMV land being present (except for the Grade 3 area which falls within the moderate likelihood of BMV land present.

14.6.44 At present, the baseline information for the receptor 'land' is based upon provisional data and no detailed post 1988 data is currently available within

the Cable Route Corridor. These ALC grades present a receptor sensitivity of Medium to Very High.

14.6.45 A detailed assessment of effects regarding the Cable Route Corridor will be provided in the ES Chapter following refinement of corridor and upon confirmation of any Cable Route Corridor surveys which will be confirmed with local planning authorities.

14.6.46 Based upon our current understanding of the baseline, the receptor sensitivity for 'Land' is a combination of High (Subgrade 3a) and Very High (Grade 1 and Grade 2).

14.6.47 With the embedded mitigation measures (Section 14.6) it is assumed that any loss of land resulting from the Cable Route Corridor would be temporary and therefore the magnitude of change would be Low. The presence of the temporary access tracks and underground cabling is expected to be a temporary impact as following construction the land above the cable route would be reinstated to agricultural use (or its predevelopment use).

14.6.48 The potential resulting effect on the receptor 'Land' is Moderate or Minor and Potentially Significant. With the embedded measures in place and the assumption that the presence of the temporary access tracks and underground cabling is temporary and that the land above the cable route would be reinstated to agricultural use (or its predevelopment use), the resulting potential resulting effect on the receptor 'Land' is Minor and Not Significant.

Soil Resource – Loss of Soil Resource

14.6.49 Ruskington (512c) soils present towards the north of Heckington are likely to be less resilient (sandier, more prone to erosion). Beccles 3 (711t) soils also present towards Heckington are likely to be more resilient (clay, less prone to erosion). Wallasea 2 (813g) soils present south of Heckington for the remaining route, likely to more resilient (clay, less prone to erosion).

14.6.50 At this stage it is not possible to provide a detailed assessment of effects due to the lack of detailed survey information and no post 1988 ALC data. Therefore, the ES Chapter will provide a detailed assessment of effects for the Cable Route Corridor following the Cable Route Corridor being refined and any survey which will be confirmed following agreement with Natural England and local planning authorities.

14.6.51 Based upon the current understanding of the soil resources the receptor sensitivity for 'loss of soil resource' is Medium as a worst-case scenario to account for the presence of both sandier and clay textured soils.

14.6.52 With the embedded mitigation measures (Section 14.6) in place, it is assumed that any loss of the soil resource resulting from the Cable Route Corridor would be minimised as good practice measures will be employed. Any temporarily displaced soil would be reinstated to its baseline condition following the temporary construction works and therefore the magnitude of change would be Low.

14.6.53 With the embedded mitigation, the potential resulting effect on the receptor 'Loss of Soil Resource' is Minor and Not Significant.

Soil Resource – Damage to Soil Resource

14.6.54 Ruskington (512c) soils present towards the north of Heckington are likely to be more resilient to structural damage (sandier soils, free draining soils). Beccles 3 (711t) soils also present towards Heckington, likely to be less resilient to structural damage (prone to waterlogging). Wallasea 2 (813g) soils present south of Heckington for the remaining route, likely to less resilient to structural damage (clays, very prone to waterlogging, marshland/marine alluvium influence).

14.6.55 At this stage it is not possible to provide a detailed assessment of effects due to the lack of detailed survey information and no post 1988 ALC data. Therefore, the ES Chapter will provide a detailed assessment of effects for the Cable Route Corridor following the Cable Route Corridor being refined and any survey which will be confirmed following agreement with Natural England and local planning authorities.

14.6.56 Based upon the current understanding of the soil resources the receptor sensitivity for 'damage to soil resource' is Medium as a worst-case scenario to account for the presence of both sandier and clay textured soils.

14.6.57 With the embedded mitigation measures in place, it is assumed that any damage to the soil resource resulting from the Cable Route Corridor would be minimised as good practice measures will be employed so that there is no permanent change to the quality of the soil resource. Therefore, the magnitude of change would be Low.

14.6.58 With the embedded mitigation, the resulting effect on the receptor 'Damage to Soil Resource' is Minor and Not Significant.

Decommissioning Phase

14.6.59 As a worst-case scenario it has been assumed that the cable will be removed during the decommissioning phase of the project. It is anticipated that any effects on agricultural land and the soil resource (in terms of loss and structural damage) resulting from the removal of the cable route would be the same as those identified during the construction phase. As per the assessment of effects for the construction phase, with the implementation of embedded mitigation measures including best practice there would be no significant effects on the identified receptors.

Assessment of Effects – Access Route Corridor

Construction Phase

Land

14.6.60 The proposed Access Route Corridor comprises approximately 125.4 ha of land, based on provisional data, 62.7 ha is BMV land (Subgrade 3a) and a further 62.7 ha of which is non-BMV land (Subgrade 3b). The assessment of the amount of Subgrade 3a and Subgrade 3b land above has been made following a 50/50 split of the provisional ALC data for Grade 3 agricultural land.

14.6.61 The route is largely through land with a moderate likelihood of BMV land being present (except for the Grade 3 area which falls within the moderate likelihood

of BMV land present with a small area of high likelihood BMV land in the southwest of the area.

14.6.62 At present, the baseline information for the receptor 'land' is based upon provisional data and no detailed post 1988 data is currently available within the Cable Route Corridor. These ALC grades present a receptor sensitivity of Medium to High.

14.6.63 A detailed assessment of effects regarding the Access Route Corridor will be provided in the ES Chapter following more detailed layout plans of the Access Route Corridor and upon confirmation of any surveys which will be confirmed with local planning authorities.

14.6.64 It is assumed as a worst-case scenario that any land use change would be temporary, and that the area would be restored to its pre-development use at the end of the construction phase.

14.6.65 Based upon our current understanding of the baseline, the receptor sensitivity for 'Land' is a combination of High (Subgrade 3a) and Medium (Subgrade 3b).

14.6.66 With the embedded mitigation measures it is assumed that any loss of land resulting from the Access Route Corridor would be temporary and therefore the magnitude of change would be Low. The construction of the access route is expected to be a temporary impact as following construction the land would be reinstated to agricultural use (or its predevelopment use).

14.6.67 With embedded mitigation measures in place, the potential resulting effect on the receptor 'Land' is Minor and Not Significant.

Soil Resource – Loss of Soil Resource

14.6.68 Ruskington (512c) soils that are mapped as occurring towards the southwest of the Access Route Corridor are likely to be less resilient to erosion (sandier soils) and therefore have a higher risk of loss through erosion (high sensitivity). The Beccles 3 (711t) soils comprise most of Access Route Corridor and are likely to be more resilient to erosion (clay soils) and therefore have a lower risk of erosion.

14.6.69 At this stage it is not possible to provide a detailed assessment of effects due to the lack of detailed survey information and no post 1988 ALC data. Therefore, the ES Chapter will provide a detailed assessment of effects for the Access Route Corridor following more detailed layout plans and any survey which will be confirmed following agreement with Natural England and local planning authorities.

14.6.70 Based upon the current understanding of the soil resources the receptor sensitivity for 'loss of soil resource' is Medium as a worst-case scenario to account for the presence of both sandier and clay textured soils.

14.6.71 With the embedded mitigation measures in place, it is assumed that any loss of the soil resource resulting from the Access Route Corridor would be minimised as good practice measures will be employed. Any temporarily displaced soil would be reinstated to its baseline condition following the temporary construction works and therefore the magnitude of change would be Low.

14.6.72 With the embedded mitigation, the potential resulting effect on the receptor 'Loss of Soil Resource' is Minor and Not Significant.

Soil Resource – Damage to Soil Resource

14.6.73 Ruskington (512c) soils that are mapped as occurring towards the southwest of the Access Route Corridor are likely to be more resilient to structural damage (sandier, free draining soils). The Beccles 3 (711t) soils comprise most of Access Route Corridor and are likely to be less resilient to structural damage (clay soils prone to waterlogging and structural damage).

14.6.74 At this stage it is not possible to provide a detailed assessment of effects due to the lack of detailed survey information and no post 1988 ALC data. Therefore, the ES Chapter will provide a detailed assessment of effects for the Access Route Corridor following more detailed layout plans and any survey which will be confirmed following agreement with Natural England and local planning authorities.

14.6.75 Based upon the current understanding of the soil resources the receptor sensitivity for 'Damage to Soil Resource' is Medium as a worst-case scenario to account for the presence of both sandier and clay textured soils.

14.6.76 With the embedded mitigation measures in place, it is assumed that any damage to the soil resource resulting from the Access Route Corridor would be minimised as good practice measures will be employed so that there is no permanent change to the quality of the soil resource. Therefore, the magnitude of change would be Low.

14.6.77 With the embedded mitigation, the resulting effect on the receptor 'Damage to Soil Resource' is Minor and Not Significant.

14.7 Additional Mitigation

14.7.1 No additional mitigation is proposed.

Monitoring

14.7.2 In order to ensure compliance with the Soil Management Plan, Construction Method Statements (or similar), the works will be monitored during soil handling activities; thereby ensuring that the soils are maintained in good condition permitting the continued, sustainable use of the soil resource.

14.8 Residual Effects

Land

14.8.1 Following good practice, the land and soils across both the Cable Route Corridor and the Access Route Corridor can be fully restored to their current baseline and directly returned to agricultural production with no residual effects.

14.8.2 Solar panels will occupy the majority of the Solar Array Site and compared to its current and potential use the agricultural productivity of the land beneath the solar arrays will be lower during the operational phase. The baseline land capacity (ALC Grade) is expected to remain unchanged, and the current

agricultural infrastructure (fences, tracks, and drainage) will remain unchanged and will be directly returned to agricultural production after decommissioning.

14.8.3 Built development will result in long term temporary reversible loss (assessed as permanent as a worst case) of agricultural land. It is expected that no more than 20 ha of land out of the 512 ha of land across all three elements would be subject to long term temporary change (permanent in worst case scenario). Under the worst-case scenario, it would not be possible to mitigate the loss of this land, therefore the effect on loss of land remains **significant** as per the assessment of effects.

Soil Resource – Loss of Soil Resource

14.8.4 Following the adoption of mitigation methods described above the residual effects will remain as per the assessment of effects and not significant.

Soil Resource – Damage to Soil Resource

14.8.5 Following the adoption of mitigation methods described above the residual effects will remain as per the assessment of effects and not significant.

14.9 Assessment of Cumulative Effects

Intra-Cumulative Effects

14.9.1 There are potential intra-project effects relating to the Soils and Agricultural Land ES Chapter and the Ecology and Biodiversity ES Chapter where the benefits of using the land for biodiversity net gain purposes may be favoured over the continued use of the Solar Array Area for agricultural purposes. This will be considered within the design of the Proposed Development, where the potential for grazing of the area around the panels will be considered against the biodiversity gains that could be achieved if the land is left ungrazed.

Inter-Cumulative Effects

14.9.2 There are not considered to be any relevant cumulative effects on soil resources as the effects of soil loss are contained within the specific Site.

14.9.3 There may be relevant effects on agricultural land, which are considered below. For the purposes of this assessment, land noted as ‘unsurveyed’, ‘urban’ or ‘non-agricultural’ will be considered ‘non-agricultural’ land in the revised grading. Additionally, where Provisional Grade 3 land is encountered, a split will be made between Subgrade 3a and Subgrade 3b for the revised ALC grading for purposes of cumulative assessment. Additionally, where Gate Burton Energy Park (EN010131) has recorded land as “estimated BMV” the revised ALC grading will assess this land as Subgrade 3a and “estimated non-BMV” will be assessed as Subgrade 3b in line with the ALC grading established in the ALC surveys of the Site.

14.9.4 Table 14.13 below sets out the baseline conditions relevant to the projects within the Lincolnshire County Council administrative boundary that have been considered to have the potential for a cumulative effect with the Proposed Development (in accordance with the current scope set out within Chapter 4).

Table 14.13 - Cumulative Effects Assessment of Developments

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Nationally Significant Infrastructure Projects (NSIPs)		
Heckington Fen Energy Park (EN010123)[19] Construction, operation and decommissioning of a solar photovoltaic (PV) electricity generating facility.	524 ha Site Grade 1: 58ha Grade 2: 39 ha Subgrade 3a: 160 ha Subgrade 3b: 265 ha Non-agricultural: 2 ha	Grade 1: 58ha Grade 2: 39 ha Subgrade 3a: 160 ha Subgrade 3b: 265 ha
Springwell Solar Farm (Information is from Scoping Report and figures are provisional awaiting an ALC Survey) (EN010149)[20] Proposed new solar farm with battery storage and supporting grid connection infrastructure in North Kesteven, Lincs.	1,702 ha Site Grade 2: 497 ha Grade 3: 1,020 ha	Grade 2: 497 ha Subgrade 3a: 510 ha Subgrade 3b: 510 ha
Tillbridge Solar Project Farm (Information is from Scoping Report and figures are provisional awaiting an ALC Survey) (EN010142)[21] Solar PV modules, PV module mounting structures, string combiner boxes, Solar DC/AC Inverters, Battery Energy Storage System (BESS), Battery DC/DC convertors, LV/MV transformer stations including switchgear, MH/HV transformer stations, MV/HV switch gear, on-site cabling, weather monitoring stations, fencing and security measures, building with control room and operation/ maintenance facilities, including storage, grid connection and HV cable route, main	1,400 ha (for the principal Site, the cable route area is undefined) Provisional Grade 3: 1,400 ha	Subgrade 3a: 700 ha Subgrade 3b: 700 ha

[19]Heckington Fen Energy Park (2023) Environmental Statement Chapter 16 Land Use and Agriculture. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010123/EN010123-000137-6.1.16%20-%20Chapter%2016%20-%20Land%20Use%20and%20Agriculture.pdf
[20] Springwell Solar Farm (2023) Springwell Solar Farm Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010149/EN010149-000006-EN010149%20-%20Scoping%20Report.pdf
[21]Tillbridge Solar Project (2022) Tillbridge Solar Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010142/EN010142-000010-EN010142%20-%20Tillbridge%20Solar%20EIA%20Scoping%20Report.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
access into the site for construction purposes off the main highway; and access tracks for construction and maintenance.		
Temple Oaks Renewable Energy Park (EN010126)[22] Ground mounted solar panels and ancillary infrastructure including centralised inverters mounted behind the panels, transformers, and temporary construction compounds. In addition, a Battery Energy Storage System would be located within the site.	350 ha Site Grade 3b: 350 ha	Subgrade 3b: 350 ha
Cottam Solar Project (EN010133)[23] Construct, operate (including maintenance), and decommission a ground mounted solar photovoltaic (PV) panel array energy generating facility, a Battery Energy Storage System (BESS), and supporting infrastructure.	1179.7 ha Site Grade 2: 6.1 ha Subgrade 3a: 43 ha Subgrade 3b: 1118.3 ha Not surveyed 13.3 ha	Grade 2: 6.1 ha Subgrade 3a: 43 ha Subgrade 3b: 1118.3 ha Non-agricultural: 13.3 ha
West Burton Solar Project (EN010132)[24] Ground mounted solar photovoltaic (PV) generating stations; grid connection infrastructure and energy storage; and the Cable Route Corridors.	757.8 ha Site Grade 1: 17.6 ha Grade 2: 9.5 ha Subgrade 3a: 172.4 ha Subgrade 3b: 557 ha Non-agricultural: 1.3 ha	Grade 1: 17.6 ha Grade 2: 9.5 ha Subgrade 3a: 172.4 ha Subgrade 3b: 557 ha Non-agricultural: 1.3 ha
Gate Burton Energy Park (EN010131)[25] Development consent to construct, operate, maintain, and decommission ground mounted	652 ha Site Subgrade 3a: 73.6 ha Subgrade 3b: 548.9 ha	Solar and Energy Storage Park: Subgrade 3a: 80.4 Subgrade 3b: 553.4

[22]Temple Oaks Renewable Energy Park (2022) Temple Oaks Renewable Energy Park Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010126/EN010126-000020-Temple%20Oaks%20Scoping%20Report%20220630%20re-ISSUED.pdf
[23]Cottam Solar Project (2023) Environmental Statement Chapter 19: Soils and Agriculture. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010133/EN010133-000239-C6.2.19%20ES%20Chapter%2019_Soils%20and%20Agriculture.pdf
[24]West Burton Solar Project (2023) Environmental Statement Chapter 19: Soils and Agriculture. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010132/EN010132-000370-WB6.2.19%20ES%20Chapter%2019_Soils%20and%20Agriculture.pdf
[25] Gate Burton Energy Park (2023) Environmental Statement Chapter 12: Socio-Economics and Land Use. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010131/EN010131-000209-EN010131%20APP%203.1%20ES%20Chapter%2012%20-%20Socio-Economics.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
solar photovoltaic (PV) panel arrays, on-site battery storage and associated infrastructure.	Non-agricultural: 18.2 ha Estimated BMV: 6.8 ha. Estimated Subgrade 3b: 4.5 ha. Grid Connection Corridor 172 ha Estimated BMV: 74.8 ha. Estimated Subgrade 3b: 58.4 ha. Non-agricultural: 38.8 ha	Non-agricultural: 18.2 ha Grid Connection Corridor: Subgrade 3a: 74.8 ha Subgrade 3b: 58.4 ha Non-agricultural: 38.8 ha *Estimated BMV has been classed as Subgrade 3a for the purposes of this assessment and estimated subgrade 3b has been classed at Subgrade 3b
Mallard Pass Solar Project (EN010127)[26] Development consent to construct, operate, maintain, and decommission ground mounted solar photovoltaic (PV) panel arrays, on-site battery storage and associated infrastructure.	Across order limits of Site: 852 ha Grade 2: 100 ha Subgrade 3a: 260 ha Subgrade 3b: 439 ha Grade 4: 18 ha Urban: 3 ha Not surveyed (roads, railways, verges etc): 32 ha	Grade 2: 100 ha Subgrade 3a: 260 ha Subgrade 3b: 439 ha Grade 4: 18 ha Non-agricultural: 21 ha
Lincolnshire Reservoir (Screening)[27] Reservoir exceeding 30 million cubic metres of water storage, together with associated development including water transfer pipelines, abstraction facilities, pumping stations, treatment works, renewable energy generation, access roads, parking, wildlife and environmental areas, leisure and recreation and education facilities.	Minimum land area of 5km^2 (500 ha) for the preliminary Site boundary Described as predominantly Subgrade 3a	Subgrade 3a: 500 ha

[26] Mallard Pass Solar Farm (2022) Environmental Statement Appendix 12.4: Land Use and Soils- Agricultural Land Classification Survey. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010127/EN010127-000163-Appendix%2012.4%20ALC%20Survey.pdf
[27] Anglian Water (2022) Site Selection Report For a reservoir in Lincolnshire. Available at: https://www.lincsreservoir.co.uk/assets/images/downloads/Site-Selection-Report%E2%80%93Lincolnshire-Reservoir%E2%80%93phase-one-consultation-2022.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Triton Knoll Electrical System (EN090019)[28] Triton Knoll Electrical System works are needed to transmit the electricity generated by the consented Triton Knoll Offshore Wind Farm to the National Grid. The electrical system will include: onshore and offshore buried export cables and associated works; an intermediate electrical compound to provide voltage stability and compensate for electrical losses; and a substation located in the vicinity of the grid connection point.	**Site boundary unknown** 12.2% of the study area would fall within ALC Grade 1 (the highest grade), 54.6% within ALC Grade 2 and 31.8% as Grade 3. *ES Documents appear to have been archived so no detailed information is available.	n/a
Outer Dowsing Offshore Wind Generating System (EN010130)[29] Offshore wind farm and associated offshore and onshore infrastructure including offshore and onshore high voltage electricity cables, onshore and offshore electricity substation(s), connection(s) to the National Grid and ancillary and temporary works.	Provisional Grade 1, 2 and 3 in Scoping Report within large scoping boundary (size of scoping boundary not defined and subsequent ALC breakdown not provided)	n/a
Boston Alternative Energy Facility (EN010095)[30] The facilities which will deliver 102 Mwe (gross) and approximately 80Mwe (net) of energy to the National Grid using Refuse Derived Fuel (RDF) as feedstock.	The Application Site covers 26.8 ha. Grade 1 as current known baseline with detailed Post 1988 outside of Site Boundary where Grade 2 and Subgrade 3a land were identified. The Application Site covers 26.8 ha.	Provisional ALC Grade 1: 26.8 ha of Grade 1 land

[28] The Planning Inspectorate (2016) Triton Knoll Electrical System: Examining Authority's Report of Findings and Conclusions and Recommendation to the Secretary of State for Energy and Climate Change. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN020019/EN020019-004772-Examining%20Authority%20Recommendation%20Report.pdf
[29] Outer Dowsing Offshore Wind Generating System (2022) Outer Dowsing Offshore Wind Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010130/EN010130-000055-EN010130-Scoping-Report-Low-Resolution.pdf
[30] Royal Haskoning DHV (2021) Boston Alternative Energy Facility – Environmental Statement Chapter 11 Contaminated Land, Land Use and Hydrogeology Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010095/EN010095-000433-6.2.11.%C2%A0Chapter%2011%20Contaminated%20Land,%20Land%20Use%20and%20Hydrogeology.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Fosse Green Energy (EN010154)[31] Installation of solar photovoltaic (PV) panels, associated electrical equipment, cabling and on-site energy storage facilities together with grid connection infrastructure	1003 ha Described in Scoping as Predominantly Grade 3 agricultural land, with some Grade 2 agricultural land (Provisional)	1003 ha of agricultural land Grade 2: 250.75 ha Subgrade 3a: 376.13 ha Subgrade 3b: 376.13 ha *For purposes of this assessment due to the lack of an ALC breakdown and the statement that the land is predominantly Grade 3 with some Grade 2, an assumption of 25% Grade 2 land and 75% Grade 3 land has been made
A46 Newark Bypass (TR010065)[32] The scheme comprises on-line widening, to the north of the existing route, for most of its length between Farndon roundabout and the A1 followed by a new section of offline dual carriageway proposed between the A1 and Winthorpe roundabout, where the new dual carriageway ties into the existing A46 to the west of Winthorpe roundabout. The widening works include earthwork widening along the existing embankments, and new structures where the route crosses the Nottingham to Lincoln and East Coast main railway lines, River Trent and the A1. The roundabouts at Farndon and Winthorpe will be enlarged and partially signalised, while the Cattle Market roundabout will be grade separated by elevating the A46. Access to the A1 to / from	6.5km of upgraded road requiring approximately 3,571,482 m2 (357.15 ha) of land within the red line boundary to be acquired permanently, and approximately 601,567 m2 (60.16 ha) of land would be needed temporarily during construction. Based on an intrusive agricultural land classification (ALC) survey conducted in spring 2021 and desktop information, the ALC grades identified in the study area include subgrade 3a (20% of study area), 3b (36% study area) and non-agricultural land (44% study area).	Total area of Site estimated at 431.31 ha and breakdown based on percentages: Subgrade 3a: 86.26 ha Subgrade 3b: 155.27 ha Non-agricultural: 189.78 ha

[31] Fosse Green Energy Limited (2023) Fosse Green Energy Environmental Impact Assessment Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010154/EN010154-000011-EN010154%20-%20Scoping%20Report.pdf
[32] National Highways (2022) A46 Newark Bypass Environmental Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010065/TR010065-000002-A46N%20-%20Scoping%20Report.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
A46 will also be improved by upgrading the Brownhill and Friendly Farmer roundabouts.		
West Burton C Power Station (EN010088)[33] Construct, operate (including maintenance) and decommission a gas-fired electricity generating station of up to 299MW at the existing West Burton Power Station site. The proposed development would comprise up to five Open Cycle Gas Turbines and associated buildings, structures, and plant, as well as associated development	32.8 ha Site No description of agricultural land classification is provided within the PINS documents.	n/a
Viking CCS Pipeline (EN070008)[34] The Viking CCS Pipeline project comprises a new 55 km (approx.) onshore underground pipeline from the point of receipt of dense phase CO2 at Immingham, through its transportation to facilities at TGT, and transportation from TGT through the existing LOGGS pipeline to Mean Low Water Spring (MLWS).	2369 ha within Study Area Grade 2: 233.1 ha Grade 3: 2082.9 ha Non-agricultural: 53.5 ha	Grade 2: 233.1 ha Subgrade 3a: 1041.5 ha Subgrade 3b: 1041.5 ha Non-agricultural: 53.5 ha
Total Land take for NSIP Developments		Grade 1: 102.4 ha Grade 2: 1135.45 ha Subgrade 3a: 4004.49 ha Subgrade 3b: 6124 ha Grade 4: 18 ha Non-agricultural: 335.88 ha Total: 11720.22 ha

[33] EDF Energy (2019) West Burton C Environmental Statement Chapter 3 Description of the Site and its Surroundings. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010088/EN010088-000248-5.2%20-%20WBC%20-%20ES%20Chapter%203%20-%20Description%20of%20the%20Site%20and%20its%20Surroundings.pdf

[34] AECOM (2022) V Net Zero Pipeline Project Environmental Impact Assessment Scoping Report. Available at: infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN070008/EN070008-000018-V Net Zero Pipeline_EIA Scoping Report.pdf

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Other Developments considered for Cumulative Assessment		
Handley Chase, Sleaford (13/0498/OUT)[35] Erection of 1,450 dwellings, two form entry primary school, care home, Local Centre (incorporating 5 no. retail units with offices above, health centre, nursery, community centre and public house) public open space, sports pitches and allotments and associated infrastructure (outline with means of access).	~61 ha Site Grade 2: 26.1 ha Subgrade 3a: 17.2 ha Subgrade 3b: 15.2 ha Non-agricultural: 2.46 ha	Grade 2: 26.1 ha Subgrade 3a: 17.2 ha Subgrade 3b: 15.2 ha
Gorse Lane Solar Farm (19/0060/FUL)[36] Erection of Solar PV Park (circa 20MW electricity generating capacity) including inverters, substations, office building, store, perimeter fencing, access tracks, temporary construction compound and associated development.	~95 ha Site Subgrade 3b: 94 ha	Subgrade 3b: 94ha
Ewerby Thorpe Solar (14/1034/EIASCR)[37] Erection of solar array with generating capacity of up to 28 MW and associated infrastructure.	Site boundary not provided	N/a
Proposed Residential Development Heckington (15/0383/EIASCR)[38] Proposed residential development comprising up to 600 dwellings and associated works situated on land north of Sleaford Road, Oak Way, Mulberry Walk, Hubbard Close and Colby Way and West of Howell Road Heckington.	19 ha Site No description of ALC in screening documents	N/a

[35] CSA Environmental Planning (2013) Environmental Statement, Handley Chase, Sleaford. Chapter 9 Land Use. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?keyVal=MM89RSLL04900&activeTab=summary

[36] ARCUS (2018) Planning Statement, Gorse Lane Solar Farm. Chapter 4 Development Plan Policy Framework. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PLDOJMLLG4X00

[37] North Kesteven District Council (2014) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N9J59GLL00S00

[38] North Kesteven District Council (2015) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NLQ1GXLL03I00

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Heckington Fen Overhead Lines (22/1596/OHL)[39] **(22/1597/OHL)**[40] **(22/1598/OHL)**[41] **(22/1599/OHL)**[42] Proposed removal of sections of existing overhead line and replacement with new underground power cable. Proposed removal of existing 11kv overhead power line and erection of new overhead power line. Proposed removal of existing 11kv overhead power line and erection of new overhead power line together with installation of new PMT transformers.	Site boundary not provided	N/a
Viking Link UK Onshore Scheme (17/1200/FUL)[43] **Also considered: (B/17/0340) and (H04-0823-17)** Works to facilitate the Viking Link electrical interconnector with an approximate capacity of 1400 megawatts (MW) extending from Revsing, Jutland, (Denmark) to Bicker Fen, Lincolnshire (UK) comprising, Installation of two (2) subsea high voltage direct current (DC) cables between Mean Low Water Springs (MLWS) and landfall at Boygrift in East Lindsey. Installation of two (2)	720 ha Site* Totals are given for DC cable working width and temporary works areas only (excluding ZoI) which were extracted from individual section data tables. Grade 1: 23.7 ha Grade 2: 182.6 ha Grade 3: 105.5 ha Grade 4: 0.4 ha * During construction activities, there will be the temporary loss of approximately 265.1 ha of agricultural land within the DC cable working width and a further 46.8 ha temporarily lost to	Grade 1: 23.7 ha Grade 2: 182.6 ha Grade 3a: 52.25 ha Grade 3b: 52.25 ha Grade 4: 0.4 ha

[39] North Kesteven District Council (2022) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RL4KXILL06200
[40] North Kesteven District Council (2022) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RL4L2DLL06200
[41] North Kesteven District Council (2022) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RL4L7FLL06200
[42] North Kesteven District Council (2022) Screening Opinion. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RL4LKPLL06200
[43] Viking Link: UK Onshore Scheme (2017) Environmental Statement. Chapter 9 Agriculture & Soils. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OV8ED2LLJIU00

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
onshore DC cables between the landfall at Boygrift and the converter station at North Ing Drove in South Holland. Construction of associated Temporary Construction Compounds (TCC) and Temporary Works Areas (TWA) and temporary vehicle access arrangements required for DC and AC cable installation. Erection of converter station buildings together with the formation of internal roads, permanent access road from the A52, erection of security fencing, formation of landscaping with associated temporary construction compounds. Installation of up to six (6) onshore high voltage alternating current (AC) cables between the converter station at North Ing Drove and the existing Bicker Fen 400 kilovolt (400kV) Substation owned and operated by National Grid Electricity Transmission Plc (NGET). Installation of link pillars along the AC cable route for inspection and maintenance purposes, these will be contained within fenced areas. Installation of two substation bays at Bicker Fen Substation to allow Viking Link to be connected to the National Grid electricity transmission system. Installation of all associated drainage mitigation works and Installation of fibre-optic cable(s) with the high voltage AC and DC cables (A bay consists of switching equipment including circuit breakers, disconnector and measuring equipment. NGET will be providing Viking Link the space available to connect to Bicker Fen).	TCCs (total = 311.9 ha), of which 251.8 ha (95.0%) is likely to be BMV agricultural land.	

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Little Hale Fen Solar (21/1337/EIASCR)[44] Proposed solar farm (up to 49.995MW generating capacity) and associated infrastructure including grid connection cabling to Bicker Fen Substation.	79 ha Site Provisional Grade 2: 79 ha	Provisional Grade 2: 79 ha
Vicarage Drove Solar Farm (B/21/0433)[45] Proposed construction and operation of a solar photovoltaic farm, battery storage and associated infrastructure, including inverters, batteries, substation compound, security cameras, fencing, access tracks and landscaping.	80.36 ha Site Grade 2: (26.06 ha) Grade 3a (54.3 ha)	Grade 2: (26.06 ha) Grade 3a (54.3 ha)
Vicarage Drove Solar Farm (B/21/0121)[46] The proposal is for the construction, operation, maintenance and decommissioning of a ground mounted solar farm with a maximum export capacity of up to 49.9 megawatts laid out across various field enclosures across the site in addition to a battery storage and other associated infrastructure.	122 ha Site It is understood that the site comprises primarily Grade 2 agricultural land (provisional data). Part of the Site falls within the site boundary of Vicarage Drove Solar Farm (B/21/0433	Provisional Grade 2: 41.64 ha *reassessed as 41.64 ha of land as 80.36 ha of the Site is considered within the boundary of the Vicarage Drove Solar Farm development (B/21/0433)
Bicker Solar Farm Cable Connection (B/22/0198)[47] Construction and installation of a 132kV underground electrical cable to connect Bicker Solar Farm to Bicker Fen Substation.	0.9 ha Site No provisional ALC Grade given	N/a

[44] Axis (2021) Screening Letter. Available at: https://planningonline.n-kesteven.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=QYV586LL06200
[45] LRA (2021) Agricultural Quality of Vicarage Drove Proposed Solar Farm. Available at: https://www.boston.gov.uk/planning-application-search
[46] DWD LLP (2021) Screening Letter. Available at: https://www.boston.gov.uk/planning-application-search
[47] DWD (2022) Planning application. Available at: https://www.boston.gov.uk/planning-application-search

PROPOSED DEVELOPMENT DESCRIPTION	ALC GRADES FROM APPLICATIONS	REVISED ALC GRADING FOR PURPOSES OF CUMULATIVE ASSESSMENT
Bicker Fen Solar Farm (B/22/0356)[48] Proposed development of a photovoltaic solar array, grid connection, access improvements works and ancillary development on land at bicker fen, Boston, and South Holland.	110 ha Site Grade 1: 7 ha Grade 2: 7 ha Grade 3a: 96 ha	Grade 1: 7 ha Grade 2: 7 ha Grade 3a: 96 ha
Total for Other Considered Developments		Grade 1: 30.7 ha Grade 2: 362.4 ha Subgrade 3a: 219.75 ha Subgrade 3b: 161.45 Grade 4: 0.4 ha Total: 774.7 ha

[48] Soil Environment Services Ltd (2021) ALC Bicker Fen Farm. Available at: https://www.boston.gov.uk/planning-application-search

NSIP Developments

14.9.5 Table 14.13 shows that the total land take associated with the considered NSIP developments is 11,720.22 ha of which 5,242.34 ha is estimated as BMV land.

14.9.6 Table 14.13 shows that the considered NSIP solar developments occupy 8,392.51 ha of land of which 3,354.68 ha is BMV agricultural land. For solar developments it is assumed that the impact on land is temporary and reversible.

14.9.7 The other NSIP developments under consideration occupied 3,327.71 ha of land. Of this land 1,887.66 ha is BMV agricultural land.

14.9.8 Table 14.10 shows that the total amount of agricultural land within the LCC Boundary is 599,272.2 ha. Of this, 410,507.98 ha is BMV land. If all the NSIP solar developments proceed, this would occupy an estimated 1.4% of agricultural land within the LCC boundary and 0.56% of this figure is BMV land.

14.9.9 The other NSIP developments under consideration would occupy 0.56% (3327.71 ha) of agricultural land within the LCC boundary and 0.31% (1887.66 ha) of this figure is BMV land.

14.9.10 The total amount of land under consideration from all the considered NSIP developments equates to 1.96% (11720.22 ha) of all the agricultural land within the LCC boundary. Of this 0.87% (5242.34 ha) is BMV land.

Other Developments Considered

14.9.11 Table 14.13 shows that the total land take associated with the other considered developments is 774.7 ha of which 612.85 ha is estimated as BMV land.

14.9.12 Table 14.13 shows that the other considered solar developments occupy 405 ha of land of which 311 ha is BMV agricultural land. For solar developments it is assumed that the impact on land is temporary and reversible.

14.9.13 The other developments under consideration occupied 369.7 ha of land. Of this land 301.85 ha is BMV agricultural land.

14.9.14 Table 14.10 shows that the total amount of agricultural land within the LCC Boundary is 599,272.2 ha. Of this, 410,507.98 ha is BMV land. If all the other proposed solar developments proceed, this would occupy an estimated 0.07% (405 ha) of agricultural land within the LCC boundary and 0.05% of this figure is BMV land (311 ha).

14.9.15 The total amount of land under consideration from all the other non-solar developments equates to 0.06% (369.7 ha) of all the agricultural land within the LCC boundary. Of this 0.05% (301.85 ha) is BMV land.

14.9.16 The total amount of land under consideration from all the other considered developments equates to 0.13% (774.7 ha) of all the agricultural land within the LCC boundary. Of this 0.1% (612.85 ha) is BMV land.

14.9.17 Some projects have not been included within this final land breakdown due to insufficient detail and data to inform the agricultural land classification breakdown and Site boundary extents.

14.9.18 Under the IEMA guidance[10], permanent land loss of over 20 ha is considered a high magnitude of change from the baseline, where this is considered within the assessment of the Proposed Development it is assumed that under 20 ha of long-term temporary (permanent in worst-case) would be lost due to the development. As a majority of the developments considered for cumulative assessment above are solar projects, it may be assumed that the impacts upon agricultural land due to built development are minimal and the majority of land take within these sites provides the opportunity for return to agriculture following decommissioning due to the majority of soils and agricultural infrastructure remaining in-situ.

14.9.19 Additionally, some of the other developments listed involve the temporary disruption of agricultural land (such as the Viking CCS pipeline) during construction with the restoration to agricultural land following construction. Proposed developments such as the A46 Bypass will result in more permanent land loss due to a higher proportion of built development and soil sealing within the scheme.

14.9.20 When considering the impact of all developments (within Table 14.13) within the LCC boundary, 2.09% (12494.92 ha) of the agricultural land base is involved of which 0.97% is (5855.19 ha) BMV land.

14.9.21 Under the IEMA guidance[10], the cumulative assessment of the land take associated with the developments and the Proposed Development is moderate and major and thus significant. The majority of this land loss is temporary and reversible, however and providing appropriate guidance and mitigation measures are in place for these developments, the associated impact on agricultural land can be minimised and considered not significant. Specific detail that is not publicly available on several large area projects considered in this assessment will be required to better inform this review as part of the ES.

Table 14.14: Summary of Cumulative Developments and Estimated Land take.

INTENDED LAND USE	LAND TAKE FROM CUMULATIVE DEVELOPMENTS WITHIN LINCOLNSHIRE COUNTY COUNCIL BOUNDARY	ALC BREAKDOWN
NSIP Projects		
Solar (all solar projects are highlighted in grey in Table 14.13)	These developments occupy 8392.51 ha of land which 3354.68 ha (40% approximately) is BMV agricultural land.	BMV: 75.6 ha of Grade 1, 902.35 ha of Grade 2, 2376.73 ha of Subgrade 3a Non-BMV: 4927.23 ha of Subgrade 3b, 18 ha of Grade 4 Non-agricultural: 92.6 ha
Other	3327.71 ha of which 1887.66 ha is agricultural BMV land.	BMV: 26.8 ha of Grade 1, 233.1 ha of Grade 2, 1627.76 ha of Subgrade 3a Non-BMV: 1196.77 ha of Subgrade 3b Non-agricultural: 243.28 ha
Total Land Take from the Cumulative Developments	11,720.22 ha of which 5242.34 ha is BMV land.	BMV: 5242.34 ha Non-BMV: 6142 ha Non-agricultural: 335.88 ha
Other Considered Developments		
Solar (all solar projects are highlighted in grey in Table 14.13)	These developments occupy 405 ha of land of which 311 ha is BMV land.	BMV:311 ha Non-BMV: 94 ha
Other	These developments occupy 369.7 ha of land of which 301.85 ha is BMV land.	BMV: 301.85 ha Non-BMV:67.85 ha
Total Land Take from the Other Considered Developments	774.7 ha of which 612.85 ha is BMV land	BMV:612.85 ha Non-BMV: 161.85 ha
Total Agricultural Land in LCC Boundary	Lincolnshire County Council Boundary: 599,272.2 ha of land	BMV: 410,507.98 ha Non-BMV: 188764.26 ha

14.10 Summary

14.10.1 The Proposed Development includes a Solar Array Area, Access Route Corridor and Cable Route Corridor.

14.10.2 This Chapter has identified and provided a preliminary review of the likely effects on Land (Agricultural land) and Soils (Damage and Loss) for the three elements of the Proposed Development during construction, operation, and decommissioning.

14.10.3 The current understanding of the baseline for soils and land is provided and the relevant legislation, good practice guidance and mitigation assumptions are reviewed and the proposed EIA methodology to be followed for the ES detailed along with an overview of the expected cumulative impacts of other

proposed developments with the Lincolnshire County Council administrative area.

Summary of the Baseline:

Land

14.10.4 A detailed ALC Survey has been conducted across the Proposed Solar Array Area which found that there is ~ 49.5% (261.43 ha) Subgrade 3b agricultural land, 44.6% (235.51 ha) Subgrade 3a and 2.8 % (14.61 ha) Grade 2 agricultural land.

14.10.5 The provisional ALC data shows that the Proposed Cable Route Corridor consists predominantly of Grade 2 (656 ha, 73%) agricultural land, with portions of Grade 1 (141.9 ha, 16 %) and Grade 3 (39.7 ha, 4 %) agricultural land.

14.10.6 The provisional ALC data shows that the Proposed Access Route Corridor is comprised entirely of Grade 3 agricultural land (125.4 ha of Grade 3 agricultural land).

Soils

14.10.7 The detailed ALC and Soil Survey across the Solar Array Area found that there were three main soil profiles identified within the Site which are consistent with the characteristics of the Beccles 3 711t, Wallasea 2 813g and Ruskington 512c soil associations. Soil profiles of the Beccles 3 association typically comprised heavy clay to clay topsoils overlying clay subsoils. Soil profiles of the Ruskington 512c association typically comprised sandy loam to sandy clay loam topsoils overlying loamy sand or sandy loam upper subsoils and varying sand textures lower subsoils with some occurrences of clay. Soil profiles of the Wallasea 2 association typically comprised silty clay or clay topsoils overlying silty clay or clay subsoils.

14.10.8 The Soil Survey of England and Wales map showed that the Cable Route Corridor comprises four soil associations: Ruskington (512c), Beccles 3 (711t), Agney (812c) and Wallasea 2 (813g).

14.10.9 The Soil Survey of England and Wales map showed that the Access Route Corridor comprises predominantly the Beccles 3 (711t) soil association with a smaller area of the Ruskington (512c) soil association in the southwest.

14.10.10 The primary soil texture found in the Solar Array Area is clay and it is expected that soils would be predominantly of a clay texture across the Cable Route Corridor and Access Route Corridor based upon the mapped soil associations. Across all three areas there may be small areas of sandy loams however these will be in the minority.

Summary of Assessment:

14.10.11 The assessment follows the 2022 IEMA guidance '*A New Perspective on Land and Soil in environmental Impact Assessment*[10]'. Based upon this approach, three sensitive receptors were identified: land; soil loss; and soil damage.

Construction Phase

Land

14.10.12 For the Solar Array Area based upon the identified ALC grades present on Site (Subgrade 3b, Subgrade 3a, Grade 2) there is a Medium to Very High sensitivity to the receptor 'Land' (High sensitivity used for purposes of assessment). There is a medium magnitude of change associated with the Solar Array Area as there is expected to be between 5 and 20 ha of long-term temporary disturbance as a result of built development which has been assessed as permanent on a worst-case scenario basis. The resulting effect with embedded mitigation in place is therefore Moderate or Major and thus Significant in EIA terms.

14.10.13 For the Cable Route Corridor, the baseline information was collated from publicly available information and for the identified provisional ALC Grades (Grade 1, Grade 2, Subgrade 3a, and Subgrade 3b) there is a Medium to Very High sensitivity to the receptor 'Land'. With the implementation of embedded mitigation there is a Low magnitude of change as any land loss resulting from the Cable Route Corridor would be temporary. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant in EIA terms.

14.10.14 For the Access Route Corridor, the baseline information was collated from publicly available information and for the identified provisional ALC Grades (Subgrade 3a and Subgrade 3b) there is a Medium to High sensitivity to the receptor 'Land'. With the implementation of embedded mitigation there is a Low magnitude of change as any land loss resulting from the Access Route Corridor would be temporary. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant in EIA terms.

Soil Resource - Loss of Soil Resource

14.10.15 For the Solar Array Area based upon the identified soil resource present on Site (predominantly clay textured soils, with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Loss of Soil Resource'. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

14.10.16 For the Cable Route Corridor, the baseline information is based upon the Soil Survey of England and Wales map and for the identified soil associations present on Site (soils are likely to be predominantly clay textured soils with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Loss of Soil Resource'. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

14.10.17 For the Access Route Corridor, the baseline information is based upon the Soil Survey of England and Wales map and for the identified soil associations present on Site (soils are likely to be predominantly clay textured soils with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Loss of Soil Resource'. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

Soil Resources – Damage to Soil Resource

14.10.18 For the Solar Array Area based upon the identified soil resource present on Site (predominantly clay textured soils, with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Damage to Soil Resource'. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

14.10.19 For the Cable Route Corridor, the baseline information is based upon the Soil Survey of England and Wales map and for the identified soil associations present on Site (soils are likely to be predominantly clay textured soils with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Damage to Soil Resource. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

14.10.20 For the Access Route Corridor, the baseline information is based upon the Soil Survey of England and Wales map and for the identified soil associations present on Site (soils are likely to be predominantly clay textured soils with smaller areas of sandier soils) there is a Medium sensitivity to the receptor 'Damage to Soil Resource. With the implementation of embedded mitigation measures there is a Low magnitude of change. The resulting effect with embedded mitigation in place is therefore Minor and Not Significant.

Operational Phase

14.10.21 For the Solar Array Area, the receptor 'Land' has a high sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Moderate or Minor (Potentially Significant) impact.

14.10.22 For the Solar Array Area, the receptor 'Loss of Soil Resource' has a medium sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Minor (Not Significant) impact.

14.10.23 For the Solar Array Area, the receptor 'Damage to Soil Resource' has a medium sensitivity and a low magnitude of change associated with the operational phase of the Solar Array Area (due to the temporary nature of any changes during this phase) which would result in a Minor (Not Significant) impact.

Decommissioning Phase

14.10.24 For the Solar Array Area, the receptor 'Land' has a High sensitivity and a low magnitude of change associated with the decommissioning phase of the Solar Array Area which would result in a Moderate or Minor (Potentially Significant) impact.

14.10.25 For the Solar Array Area, the receptors 'Loss of Soils Resource' and 'Damage to Soil Resource' have a Medium sensitivity and a low magnitude of change associated with the decommissioning phase of the Solar Array Area which would result in a Minor (Not Significant) impact.

Summary of Mitigation

14.10.26 Embedded mitigation measures will be supported by the preparation of Outline Soil Management Plan (OSMP) based upon the findings of the site-specific soil surveys of the Solar Array Area and those undertaken for the Cable Route Corridor, and Access Route Corridor. This will be provided within the ES.

14.10.27 There are no additional mitigation measures proposed.

Summary of Residual Effects (including monitoring)

Land

14.10.28 Built development will result in long term temporary reversible loss (assessed as permanent as a worst case) of agricultural land. It is expected that no more than 20 ha of land out of the 512 ha of land across all three elements would be subject to long term temporary change (permanent in worst case scenario). Under the worst-case scenario, it would not be possible to mitigate the loss of this land, therefore the effect on loss of land remains significant as per the assessment of effects.

Soil Resource – Loss of Soil Resource

14.10.29 Following the adoption of mitigation methods described above the residual effects will remain as per the assessment of effects and not significant.

Soil Resource – Damage to Soil Resource

14.10.30 Following the adoption of mitigation methods described above the residual effects will remain as per the assessment of effects and not significant.

14.10.31 A summary of the likely significant residual effects of the Proposed Development on the receptors considered within this chapter are summarised in Table 14.15 below.

Summary of Cumulative Effects

Intra-Cumulative Effects

14.10.32 There are potential intra-project effects relating to the Soils and Agricultural Land ES Chapter and the Ecology and Biodiversity ES Chapter where the benefits of using the land for biodiversity net gain purposes may be favoured over the continued use of the Solar Array Area for agricultural purposes.

Inter-Cumulative Effects

14.10.33 There are not considered to be any relevant cumulative effects on soil resources as the effects of soil loss are contained within the specific Site.

14.10.34 Inter-cumulative for agricultural land are considered. When considering the impact of all considered developments (within Table 14.13) across the Lincolnshire County Council administrative area, 2.09% (12494.92 ha) of all the agricultural land is involved of which 0.97% is (5855.19 ha) BMV land.

Table 14.15: Soils and Agricultural Land - Summary Assessment Matrix

Issue	Description of Impact	Geographical Significance							Impact	Nature	Significance	Mitigation Measures
		I	N	R	C	D	P	L				
Soils and Agricultural Land												
Loss of Agricultural Land	Construction Phase of Solar Array Area				X	X	X	X	Moderate or Major Adverse	Lt, R	Significant	Soil Management Plan implementing best practice guidance on soil handling.
	Operational Phase of Solar Array Area				X	X	X	X	Moderate or Minor	Lt, R	Potentially Significant	
	Decommissioning of Solar Array Area				X	X	X	X	Moderate or Minor	Lt, R	Potentially Significant	

Key:
Geographical Significance: I = International N = National R = Regional C = County D = District P = Parish L = Low to Local
Nature: St = Short Term Mt = Medium Term Lt = Long Term R = Reversible Ir = Irreversible

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