



Tillbridge Solar

PEI Report Volume I Chapter 9: Ecology and Nature Conservation
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9. Ecology and Nature Conservation

9.1 Introduction

9.1.1 This chapter presents the findings of an assessment of the likely significant effects on ecology and nature conservation (collectively referred to as biodiversity within this chapter) as a result of the Scheme. For more details about the Scheme, refer to **PEI Report Volume I Chapter 3: Scheme Description**.

9.1.2 This chapter identifies and proposes measures to address the potential impacts and likely significant effects of the Scheme on biodiversity, during the construction, operation and decommissioning phases. Therefore, this chapter:

- Provides a preliminary evaluation of relevant important ecological receptors (including nature conservation designations, priority habitats, protected species and invasive non-native species (INNS) associated with the Scheme, with each being assigned a nature conservation value (sensitivity value);
- Identifies the Scheme's potential direct and indirect impacts and effects on ecological receptors and their conservation status, inter-relationships, and their contribution to local (and if appropriate county, regional and national) biodiversity;
- Takes into account impact avoidance design measures and embedded mitigation when determining the significance of potential effects; and
- Identifies and describes the requirement for any additional mitigation and monitoring measures, with these considered in the assessment of potential residual effects.

9.1.3 The assessment within this chapter reports on the biodiversity baseline and Scheme design information available at the time of writing. A final assessment of the potential impacts of the Scheme on biodiversity, including any updates to the baseline, will be undertaken as part of the Environmental Impact Assessment (EIA) and will be reported in the Environmental Statement (ES) that will be submitted with the Development Consent Order (DCO) application.

9.1.4 This chapter is supported by the following technical appendices (**PEI Report Volume II**):

- **Appendix 9-1:** Ecology and Nature Conservation Legislation and Policy;
- **Appendix 9-2:** Preliminary Ecological Appraisal Report;
- **Appendix 9-3:** Aquatic Ecology Baseline Report;
- **Appendix 9-4:** Survey Report for Breeding Birds;
- **Appendix 9-5:** Badger Survey Report; and;

- **Appendix 9-6: Habitat Regulations Assessment (HRA) pre-Screening Report.**
- 9.1.5 Full details of the Survey Area, survey methods, survey dates, guidance and results of each survey are available in the reports as detailed above and included as technical appendices in **PEI Report Volume II**. A summary of the methods, survey areas and survey periods is presented in Table 9-1, with a summary of survey results provided in Section 9.6.
- 9.1.6 Effects on ecological resources from infrastructure projects can arise from direct and indirect impacts upon designated sites, habitats and, or species, and be of a temporary or permanent nature. Indirect effects can occur through pollution of air and water and via changes in lighting, noise or hydrology. This biodiversity chapter is therefore supported by information contained within the following chapters within **PEI Report Volume I**:
- **Chapter 6: Air Quality;**
 - **Chapter 7: Climate Change;**
 - **Chapter 10: Flood Risk, Drainage and Surface Water** (which includes hydrology and water pollution);
 - **Chapter 12: Landscape and Visual Amenity** (including lighting); and
 - **Chapter 13: Noise and Vibration.**
- 9.1.7 This chapter is supported by the following figures in **PEI Report Volume III**:
- **Figure 9-1: Sites Statutorily Designated for Nature Conservation Value;**
 - **Figure 9-2: Non-Statutory Sites Designated for Nature Conservation Value;** and
 - **Figure 9-3: Phase 1 Habitat Map.**
- 9.1.8 This chapter should also be read in conjunction with **PEI Report Volume I Chapters 1 to 5**, which include the location and description of the Scheme. These chapters provide alternatives and design evolution of the Scheme and sets out the EIA methodology.
- 9.1.9 As part of the ES that will be submitted with the DCO application, a Framework Construction Environmental Management Plan (CEMP), Framework Operational Environmental Management Plan (OEMP) and Framework Decommissioning Environmental Management Plan (DEMP) will be prepared, to describe management of environmental effects of the Scheme and to demonstrate compliance with environmental legislation. An initial draft of the Framework CEMP has been prepared and is included in **PEI Report Volume II Appendix 3-1**.

9.2 Legislation and Planning Policy

- 9.2.1 Legislation, planning policy, and guidance relating to Ecology and Nature Conservation and pertinent to the Scheme are provided below.

9.2.2 Full details of the legislation, policy, and guidance of relevance to the assessment of significant biodiversity effects of the Scheme is provided in full in **PEI Report Volume II Appendix 9-1**.

Legislation

9.2.3 Applicable legislation to inform the biodiversity assessment includes:

- Directive 2009/147/EC on the conservation of wild birds (Birds Directive) (Ref. 9-1);
- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref. 9-2);
- Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (IAS) (Ref. 9-3);
- The Ramsar Convention 1971 (Ref. 9-4);
- Wildlife and Countryside Act (WCA) 1981(Ref. 9-5);
- Countryside and Rights of Way Act 2000 (Ref. 9-6);
- Conservation of Habitats and Species Regulations 2017 (Ref. 9-7);
- Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref. 9-8);
- The Environment Act 2021 (Ref. 9-9);
- Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 9-10);
- Protection of Badgers Act 1992 (Ref. 9-11);
- Hedgerows Regulations 1997 (Ref. 9-12);
- Animal Welfare Act 2006 (Ref. 9-13);
- Salmon and Freshwater Fisheries Act 1975 (Ref. 9-14);
- Eels (England and Wales) Regulations 2009 (Ref. 9-15);
- Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref. 9-16); and
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 9-17).

9.2.4 European Union (EU) legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation as 'retained EU legislation'. Changes have been made to parts of the Conservation of Habitats and Species Regulations 2017 (Ref. 9-7) so that they effectively continue the legislation which implemented the EU Habitats and Species Directive (Ref. 9-2) and parts of the Birds Directive (Ref. 9-1) through the provisions of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref. 9-8). Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms of the 2017 Regulations (Ref. 9-7) remain substantively unchanged and

the network of protected European sites in the UK is now referred to as the “national site network” (previously the “Natura 2000 network”).

- 9.2.5 As part of the assessment of the Scheme, it is necessary to determine whether the Scheme is likely to have a significant effect on areas that have been internationally designated for nature conservation purposes (i.e. European sites). European sites are protected under the Conservation of Habitats and Species Regulations 2017 (Ref. 9-7). The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 (“the Withdrawal Act”) (Ref. 9-18). However, the most recent amendments to the Habitats Regulations – the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref. 9-8) – make it clear that the need for Habitats Regulations Assessment (HRA) continues to apply. Likely significant effects have been considered further, with relation to international sites in **PEI Report Volume II Appendix 9-6**. Whilst the HRA decisions must be taken by the competent authority (the Secretary of State, informed by the recommendations of the appointed Examining Authority), the information needed to undertake the necessary assessments must be provided by the Applicant for the Scheme.

National Planning Policy

- 9.2.6 This chapter takes into account relevant National Policy Statements (NPS) for solar, including relevant sections of the draft updated versions of these NPSs. In combination, these NPSs set out national policy for energy infrastructure and provide guidance and the legal framework for planning decisions. The following NPSs are considered important and relevant to the Scheme and biodiversity:
- Overarching National Policy Statement for Energy (EN-1) (2011) (Ref. 9-19);
 - Draft Overarching National Policy Statement for Energy (EN-1) (2021) (Ref. 9-20);
 - Draft National Policy Statement for Renewable Energy (EN-3) (2021) (Ref. 9-21);
 - National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011) (Ref. 9-22); and
 - Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (2021) (Ref. 9-23).
- 9.2.7 The National Planning Policy Framework (NPPF) (Ref. 9-24), with particular reference to Section 15 and paragraphs 174, 180 and 181, which state that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity. The NPPF (Ref. 9-24) is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution. The NPPF also specifies the obligations that the Local Authorities and the UK Government have regarding sites statutory designated for their

biodiversity value and otherwise protected or notable habitats and protected species under UK and international legislation and how this is to be delivered in the planning system. Protected or notable habitats and species are of material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species. Where impact is unavoidable, compensation may be required.

9.2.8 Planning Practice Guidance (Ref. 9-25) was also reviewed for further guidance and interpretation on the NPPF.

Local Planning Policy

9.2.9 Applicable local planning policy to inform the biodiversity assessment include:

- Central Lincolnshire Local Plan adopted April 2023, specifically Policies S59, S60, S61 and S62 (Ref. 9-26); and
- Bassetlaw District Council Core Strategy and Development Management Policies DPD, adopted 22 December 2011, specifically Policy DM9: Green Infrastructure, Biodiversity and Geodiversity, Landscape; Open Space and Sports Facilities (Ref. 9-27).

Other Guidance

9.2.10 Other guidance documents relevant to the assessment of the impacts of the Scheme on biodiversity include:

- Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services with regards to marine habitats, ecosystems, and fisheries (Ref. 9-28);
- 25-year Environment Plan (Ref. 9-29);
- UK Post 2010 Biodiversity Framework (Ref. 9-30);
- Biodiversity Guidance for Solar Developments (Ref. 9-31);
- Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers (Ref. 9-32); and
- Natural England and Department for Environment, Food and Rural Affairs (DEFRA) Standing Advice (protected species) (Ref. 9-33).

9.3 Assessment Assumptions and Limitations

9.3.1 This chapter forms a preliminary assessment which has been based on available information at the time of preparing the PEI Report. A final assessment will be undertaken as part of the EIA and will be reported in the ES that will be submitted with the DCO application.

9.3.2 The assessment of all the phases of the Scheme (construction, operation and decommissioning) is based upon the preliminary design for the Scheme (refer to **PEI Report Volume I Chapter 3: Scheme Description**), the construction period of which is expected to be a minimum of 24 months.

- 9.3.3 Habitat and species information referenced in the assessment has been collected from site surveys undertaken on land within and around the Scheme Boundary from March 2022, where permission to access the land was obtained from landowners. Where access was not permitted within the relevant survey areas, a precautionary approach was taken for the purposes of this PEI Report and when defining the potential impacts of the Scheme on ecological receptors.
- 9.3.4 Since the scoping process was undertaken, the design of the Scheme has evolved. The current site layout and the Scheme Boundary (see **PEI Report Volume III Figure 2-1**) were fixed in autumn 2022 for the purposes of statutory consultation in spring 2023. Surveys will continue in 2023 to inform the Ecology chapter for the ES, that will accompany the DCO application, for any survey data that are currently incomplete or limited and where further work is required to inform assessment. This is presented within Table 9-1.
- 9.3.5 Existing and forthcoming surveys will be used to inform a Biodiversity Net Gain (BNG) report, which will be prepared to inform the ES and submitted as part of the DCO application. This report is not available at this stage as the design for the Scheme continues to evolve. The BNG assessment will include a minimum 10% net gain and will be undertaken using Defra's Metric 3.1 (or latest metric, if updated). The BNG assessment will form a technical appendix to the ES chapter as part of the DCO application.
- 9.3.6 Existing and forthcoming biodiversity surveys will inform the development of an Outline Landscape and Ecological Management Plan (Outline LEMP) which will include a description of the Scheme, along with targeted landscape and biodiversity mitigation that will be incorporated into the Scheme design. This will be an iterative process, with environmental specialists actively involved in its development, using the mitigation hierarchy to avoid impacts, incorporating mitigation for those that cannot be avoided, incorporating opportunities for enhancement at the earliest possible stage and achieving overall, an integrated and coherent plan. A draft Outline LEMP has been prepared to accompany the PEI Report and is included in **PEI Report Volume II Appendix 3-2**.
- 9.3.7 Field surveys to inform this PEI Report have been undertaken within the Principal Site only with no formal surveys undertaken to date within the Cable Route Corridor, due to access restrictions. Whilst sufficient information has been obtained from the desk study to inform on the locations of non-statutory sites within the vicinity of the Cable Route Corridor and limited desk study information on the locations of protected species and notable habitats (such as from MAGIC (Ref. 9-36), surveys to validate and confirm the presence, or otherwise, of protected and notable habitats and species will be undertaken in 2023 as access becomes available. This information will be presented in the final ES and submitted as part of the DCO application.

9.4 Assessment Methodology

Study Area

- 9.4.1 The Scheme Boundary, referred to within this chapter, includes the Principal Site in which the solar arrays are located, and the Cable Route Corridor (as defined in **PEI Report Volume I Chapter 3: Scheme Description**).
- 9.4.2 The Study Area was defined to include biodiversity features likely to be at risk from possible direct and indirect impacts that might arise from the Scheme, termed the Zone of Influence (Zoi). The Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref. 9-34) define the Zoi as: “...*the area over which biodiversity features may be affected by biophysical changes as a result of the proposed project and associated activities*”.
- 9.4.3 The Study Area has captured all designated sites, sensitive habitats and species of importance that occur within it. The boundaries and zones for the Study Area reflect standard good practice and were informed by published guidance and professional judgement. This then enabled the identification of specific areas which required ecological survey (Survey Areas) which are specific to a given species, group of species or habitat) (see Table 9-1). The Survey Areas are defined by the maximum distances that statutory consultees would typically expect to be considered and these Survey Areas were presented within the EIA Scoping Report (Ref. 9-35) and acknowledged by consultees, to be appropriate.
- 9.4.4 The Survey Area varies according to the ecological receptor in question and with regards to the precautionary principle, *i.e.* if there is doubt as to whether or not an area should be surveyed, it is included in the Survey Area. Accordingly, the Survey Areas used in this assessment ensure sufficient data were gathered to meet any design iterations which may change the likely Zoi used to undertake the impact assessment.
- 9.4.5 Accordingly, the Study Area for which data were searched and collated through a desk study included:
- Sites of international nature conservation value (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites) within 10km of the Scheme Boundary as well as any SACs within 30km of the Scheme Boundary where bats are noted as the, or one of the qualifying features;
 - Statutorily designated sites of national nature conservation value, e.g. Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs) within 2km of the Scheme Boundary;
 - On-statutorily designated sites of nature conservation value, e.g. Local Wildlife Sites (LWSs), within 2km of the Scheme Boundary;
 - Ancient Woodland, veteran trees and other notable habitats within 2km of the Scheme Boundary;
 - Records of protected or notable species and scheduled invasive non-native species within 2km of the Scheme Boundary;

- Any applications for European Protected Species Licences within 2km of the Scheme; and
 - Any agri-environment schemes within the Scheme boundary, e.g. Countryside Management Schemes.
- 9.4.6 The desk study enabled determination of appropriate Survey Areas, within which all ecological receptors requiring assessment would be subject to field survey (see Table 9-1).
- 9.4.7 In defining individual Survey Areas, consideration was given to the geographic location, nature and scale of the Scheme (refer to **PEI Report Volume I Chapter 2: Scheme Location** and **PEI Report Volume I Chapter 3: Scheme Description**).

Sources of Information

Desktop Survey

- 9.4.8 The desk study undertaken identified sites designated for their biodiversity value and records of protected and, or notable habitats and species (biodiversity features) and invasive non-native species that could be relevant to the Scheme.
- 9.4.9 The desk study also identified the status of waterbodies covered by the Water Framework Directive (WFD) in order to identify waterbodies that are likely to be impacted. However, as water pollution may spread downstream or there could be downstream flood risk effects, it is also necessary to consider a wider Survey Area outside the Scheme to identify all the relevant biodiversity, chemical and physical features of waterbodies that may be impacted and that contribute to the water bodies overall importance. Consideration was therefore given to any surface water bodies or water dependent ecological sites or habitats outside of the study area and up to 2km from the Scheme Boundary, if they might be hydrologically linked.
- 9.4.10 The Study Area used for the desk study is defined in paragraph 9.1.5 of this chapter.
- 9.4.11 Lincolnshire Environmental Records Centre (LERC) and Nottinghamshire Biological and Geological Records Centre (NBGRC) were contacted to gain information on pre-existing ecological information (i.e. location and citations of Local Wildlife Sites (LWSs), records of protected, notable and scheduled invasive non-native species within 2km of the Scheme Boundary).
- 9.4.12 Protected and notable habitats and species include those listed under:
- Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 9-5);
 - Schedules 2, 4 and 5 of the Conservation of Habitats and Species Regulations 2017 (Ref. 9-7);
 - Section 41 of the NERC Act which lists species and habitats of principal importance (SPI or HaPI) for nature conservation in England (Ref. 9-10).

- Other habitats and species are also considered and have been assessed on a case-by-case basis, e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation. This is consistent with the requirements of relevant planning policy.

9.4.13 Records of invasive non-native species, as listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 9-5) and the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref. 9-16) have been taken into account when assessing potential constraints on the Scheme.

9.4.14 Sources of online data resources consulted included:

- Multi-Agency Geographic Information Centre (MAGIC) (Ref. 9-36), to identify the location (and details) of sites statutorily designated for their biodiversity value, Ancient Woodland and other notable habitats; any granted European Protected Species Licence applications within 2km of the Scheme Boundary; and any agri-environment schemes within the Scheme boundary, e.g. Countryside Management Schemes.
- Joint Nature Conservation Committee (JNCC) website (Ref. 9-37), for site information and designation details of SACs, SPAs and Ramsar Sites identified within the relevant Survey Areas (refer to Section 9.4.5);
- National Biodiversity Network (NBN) Gateway (Ref. 9-38) for open-source records of protected and, or notable species recorded within 2km of the Scheme Boundary;
- Environment Agency (EA) Ecology and Fish Data for species records of fish, macroinvertebrate and macrophytes (Ref. 9-39);
- The Biodiversity Action Plans for Nottinghamshire and Lincolnshire and for the Upper Witham Internal Drainage Board; and
- Records published in such documents as county bird reports.

Field Survey

9.4.15 The requirement for ecological field surveys was determined following the Preliminary Ecological Appraisal (PEA) (included as **PEI Report Volume II Appendix 9-2**).

9.4.16 The PEA consisted of three components: the desktop study data review; a Phase 1 Habitat survey; and a scoping survey for protected and notable species and other species of conservation concern.

9.4.17 The Phase 1 Habitat survey undertaken within the Principal Site and followed the standard JNCC method '*Handbook for Phase 1 habitat survey: A technique for environmental audit*' (Ref. 9-40). In summary, this comprised a walkover of the Principal Site to record the broad habitat types and boundary features present.

9.4.18 A scoping survey to determine the likelihood of habitats supporting protected and notable species was carried out in conjunction with the Phase 1 Habitat survey. This survey, in combination with the desk study, led to the recommendation of detailed field surveys for certain protected or notable habitats and species, as presented in **PEI Report Volume II Appendix 9-2**.

- 9.4.19 Field surveys are ongoing, having commenced in March 2022 and will continue in 2023, to characterise the ecological baseline within the relevant Survey Areas as presented in Table 9-1. Relevant survey reports to inform this PEI Report are included within **PEI Report Volume II Appendices 9-2 to 9-5**
- 9.4.20 Ecological surveys are being completed across the Scheme Boundary and these have noted the presence of Brown Hare *Lepus europaeus* and will also be used to record incidental records of Hedgehog *Erinacues europaeus*, Polecat *Mustela putorius* and any other mammals listed on S41 of the NERC Act (Ref. 9-10). However, no surveys specifically for such species will be undertaken as part of the assessment and they will be assumed to be present on site, given that the site is within the known geographical range for these species and suitable habitat to support them is present.
- 9.4.21 Table 9-1 presents details of the coverage, methods and survey periods (either undertaken where completed, or proposed) within the relevant Principal Site Survey Areas. Where surveys have been completed and data are available to inform the characterisation of the baseline in this chapter; this is identified in Table 9-1. Table 9-1 also identifies those remaining surveys that are still in progress or are planned for within the appropriate survey windows across the Scheme Boundary (which includes the Cable Route Corridor) in 2023. The data gathered will be used to inform the assessment presented in the ES and included with the final DCO application.
- 9.4.22 The survey report for Badgers is not included in full within this PEI Report, owing to the sensitivities of detailing information on the location of Badger setts. Therefore, the results, evaluation and conclusions section of **PEI Report Volume II Appendix 9-5** will be provided confidentially to key statutory stakeholders, including the Planning Inspectorate.

Table 9-1: Ecological surveys to characterise baseline conditions

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)	
Phase 1 Habitat (PEI Report Volume II Appendix 9-2)	Walkover survey recording the habitat types and boundary features present followed the standard method (Ref. 9-40).	Within the Scheme Boundary and to a maximum of 50m from the Scheme Boundary, where viewable or where access was permitted.	The land within the Scheme Boundary is an appropriate Survey Area, acknowledging that terrestrial habitats that are likely to be directly impacted by the Scheme are within the Scheme Boundary. The 50m buffer is appropriate in evaluating adjacent habitats and informing on the potential presence, or otherwise, of protected species within the vicinity of the Scheme.	Surveys within the Principal Site commenced in March 2022 with further surveys undertaken in July 2022. Surveys across the remainder of the Scheme Boundary will be completed in 2023.	Yes, reporting on habitats within the Principal Site.	Surveys required within the Cable Route Corridor.
BNG – Habitat Condition Assessment	Walkover survey to determine the condition of habitats within the Scheme Boundary for use within the BNG assessment.	Within the Scheme Boundary.	The land within the Scheme Boundary is an appropriate Survey Area, acknowledging that habitats that are likely to be lost or gained by the Scheme are within the Scheme Boundary.	To be undertaken between April and June 2023.	No, not available at the time of writing.	Surveys required across the Scheme Boundary.
Terrestrial Invertebrate scoping survey	Desk-based study using satellite imagery and the Phase 1 Habitat map, followed by a walkover survey	The Survey Area will be the land within the Principal Site and the scoping survey will identify habitats suitable to support notable	Habitat within the Principal Site is an appropriate Survey Area, acknowledging that habitats that have the potential to be permanently impacted (i.e. lost) by the Scheme and potentially	To be undertaken in 2023.	No, not available at the time of writing.	Surveys required across the Scheme Boundary.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
	by a specialist entomologist.	terrestrial invertebrates. Areas subject to any further detailed surveys, if required, will be those which have the potential to be affected by the Scheme.	supporting notable terrestrial invertebrates or assemblages are within this area. The surveys will identify any areas likely to be important for terrestrial invertebrates and inform avoidance, mitigation and enhancement.		
Terrestrial Habitats and Flora (including invasive non-native species of flora)	Surveys for arable flora will involve walking arable field boundaries to record notable species as listed in Great Britain (Ref. 9-41) and England (Ref. 9-42). Grasslands (including set-aside and verges) will be surveyed in more detail (<i>i.e.</i> : species lists with abundance ratings) for notable species and species composition to help inform mitigation, habitat compensation and enhancement proposals, with the	The Survey Area is within the Scheme Boundary and areas of terrestrial habitat to be surveyed in further detail are those with the potential to be affected by the Scheme and priority or potential priority habitats, as identified from the initial Phase 1 Habitat survey and desk study information.	Habitat within the Scheme Boundary is an appropriate Survey Area, acknowledging that habitats that are likely to be impacted by the Scheme are within the Scheme Boundary. The surveys will identify any areas of notable habitats or important for flora and inform avoidance, mitigation and enhancement.	A limited number of surveys were undertaken on the Principal Site between June and September 2022 and will continue, where required, across the Scheme Boundary in April/May 2023	No, not available at the time of writing. Surveys required across the Scheme Boundary.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
	rarity of higher plants given based on ' <i>New Flora of the British Isles</i> ' (Ref. 9-43).				
Hedgerows	Hedgerows likely to be impacted will be surveyed and assessed for their 'importance' against the Wildlife and Landscape Criteria, detailed in the Hedgerow Regulations (Ref. 9-12).	Hedgerows potentially affected by the Scheme within the Scheme Boundary.	The Scheme Boundary is an appropriate Survey Area, acknowledging that hedgerows that are likely to be impacted by the Scheme are within the Scheme Boundary. Hedgerows outside the Scheme will remain intact and unaffected by Scheme.	Surveys will be undertaken between April and June 2023.	No, not available at the time of writing. Surveys required across the Scheme Boundary.
Aquatic scoping survey (PEI Report Volume II Appendix 9-3)	Accessible and safe stretches of water body banks were walked, noting physical habitat features such as riparian cover, channel substrate, habitat type, modifications and in-stream vegetation to assess the potential for waterbodies to support protected or notable species of plants and	All water bodies identified within 250m of the Scheme Boundary, where access allows.	The land within the Scheme Boundary and a zone of 250m from the Scheme Boundary is an appropriate Survey Area to determine any potential impacts arising from the Scheme both upstream and downstream, including connectivity with other water bodies for transient species (the desk study assessed a wider 2km Study Area).	Commenced in May 2022	Yes, information on the Principal Site included. Surveys required within the Cable Route Corridor.

Survey (and Survey Method relevant technical appendix)	Survey Method	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
<p>Aquatic macrophyte and macro-invertebrate surveys, including the presence of any invasive non-native species (PEI Report Volume II Appendix 9-3)</p>	<p>Surveys of ponds were based on the Predictive System for Multimetrics (PSYM) methods used for ponds. Survey method for streams and ditches followed the aquatic macroinvertebrate sampling procedures standardised by the Environment Agency in 2017 (Ref. 9-44), and the UKTAG River Assessment Method (Macrophytes and Phytobenthos) for use with LEAFPACS2 (Ref. 9-45).</p>	<p>Water bodies identified during the aquatic scoping survey and desk study for further survey within the Scheme Boundary and up to 250m from the Scheme Boundary where access allows.</p>	<p>The land within the Scheme Boundary and a zone of 250m from the Scheme Boundary is an appropriate Survey Area to determine any potential impacts arising from the Scheme both upstream and downstream (the desk study assessed a wider 2km zone).</p>	<p>Aquatic macrophytes and aquatic macroinvertebrates were surveyed as required, between April and November 2022</p>	<p>Yes, information on the Principal Site included.</p>	<p>Surveys required within the Cable Route Corridor.</p>
<p>Amphibians, including Great Crested Newt</p>	<p>Amphibian surveys will take place from the edges of water bodies, making observations and sightings of</p>	<p>Ponds within the land within the Scheme Boundary and within 500m of the Scheme Boundary were identified</p>	<p>Habitats within the land within the Scheme Boundary and within 250m of the Scheme Boundary could constitute significant foraging areas,</p>	<p>HSI surveys commenced in June 2022 on a limited number of water bodies within</p>	<p>No, due to incomplete survey coverage across the</p>	<p>Further surveys required across the Scheme Boundary.</p>

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
<p>amphibians in the water, including tadpoles, eggs and newt efts. Refugia surveys (see reptiles) will also record the presence of other amphibians, such as Common Toad <i>Bufo</i>. Habitat Suitability Index (HSI) surveys for Great Crested Newt, evaluates the suitability of ponds following the standard method (Ref. 9-46). eDNA method, to determine the presence of absence of Great Crested Newt will be undertaken following the standard survey technique for eDNA survey (Ref. 9-47).</p>	<p>during the desk study including using 1:25,000 Ordnance survey maps. Further surveys, such as HSI will be undertaken on all water bodies within the Scheme Boundary and within 250m of the Scheme Boundary and, where further survey is identified as being required, using eDNA methods, will be undertaken on all water bodies within the Scheme Boundary and within 250m of the Scheme Boundary that are most likely to support Great Crested Newt and potentially be impacted upon by the Scheme.</p>	<p>hibernation or resting sites for Great Crested Newt, which typically utilises terrestrial habitat up to 500m from their breeding ponds (Ref. 9-48). However, 250m is an appropriate Survey Area from the Scheme Boundary acknowledging that there is a notable decrease in abundance of Great Crested Newt beyond a distance of 250m from a breeding pond (Ref. 9-49).</p>	<p>the Principal Site and will be concluded throughout the Scheme Boundary in April 2023.</p> <p>eDNA surveys commenced in June 2022 on a limited number of water bodies within the Principal Site and will be concluded throughout the Scheme Boundary between April and June 2023</p>	<p>Scheme Boundary.</p>	

Survey (and Survey Method relevant technical appendix)	Survey Method	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
Reptiles	Reptile surveys involve recording reptile species presence, or likely absence, using artificial refugia in accordance with <i>Froglife's Advice Sheet 10</i> (Ref. 9-50) and <i>Natural England's Standing Advice Sheet for Reptiles</i> (Ref. 9-51).	Suitable habitat for reptiles (such as grassland) within the land within the Scheme Boundary	The Survey Area provided sufficient information on reptile presence or likely absence within land within the Scheme Boundary, acknowledging that habitats that have the potential to be permanently impacted (<i>i.e.</i> lost) by the Scheme and potentially supporting reptiles are within this area.	Surveys to be undertaken between April and May 2023.	No, not available at the time of writing.	Surveys required across the Scheme Boundary.
Wintering (non-breeding) birds (including farmland birds)	Wintering bird surveys will use transect-based walkovers following methods detailed in ' <i>Bird Monitoring Methods</i> ' (Ref. 9-52) and ' <i>Bird Census Techniques</i> ' (Ref. 9-53).	The land within the Scheme Boundary and to a maximum of 50m from the Scheme Boundary.	Standardised survey zones for assessing the impacts of development on bird populations do not exist, however, the Survey Area used provides information on the wintering (non-breeding) birds within the area immediately surrounding the Scheme Boundary and includes areas contiguous with the Scheme Boundary, where birds may potentially be adversely affected and is sufficient to determine the likely impacts of the Scheme on the majority of wintering bird	Surveys commenced in October 2022 and are ongoing until March 2023.	No, not available at the time of writing.,	Data analysis of survey data from the Principal Site required. Surveys required within the Cable Route Corridor.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)	
Breeding birds (including farmland birds) (PEI Report Volume II Appendix 9-4)	Surveys for breeding birds are based on a standard territory mapping method for surveying breeding birds as detailed in 'Bird Monitoring Methods' (Ref. 9-52) and 'Bird Census Techniques' (Ref. 9-53); and will be adapted where necessary to include species-specific methods for other species, as required. Species-specific methods for Barn Owl will also utilise 'Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment' (Ref. 9-54), as appropriate.	The land within the Scheme Boundary and to a maximum of 50m from the Scheme Boundary for the general breeding bird assemblage. The 50m zone will be extended out from the Scheme Boundary for specific surveys of certain species, e.g.: Hobby <i>Falco subbuteo</i> and Barn Owl <i>Tyto alba</i> .	species occurring or likely to occur in the area. Standardised survey zones for assessing the impacts of development on bird populations do not exist, however, the Survey Area will provide information on the breeding birds within the area immediately surrounding the Scheme Boundary and includes areas contiguous with Scheme Boundary, where birds may potentially be adversely affected. Depending on the sensitivity of the species, birds occurring outside of the Survey Area may also be adversely affected (such as those listed on Schedule 1 of the WCA) and therefore where any such species are recorded beyond the 50m survey zone (up to 200m from the Scheme Boundary), these will also be recorded. However, the 50m survey zone is sufficient to	Surveys within the Principal Site were undertaken between April and July 2022 and will be updated by surveys within the Cable Route Corridor between March and June 2023.	Yes, information on the Principal Site included.	Surveys required within the Cable Route Corridor.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)	
Bats	Surveys for bat activity were undertaken within the Principal Site and were based on standard methods for bat activity transect surveys as described in the BCT guidelines (Ref. 9-55).	Bat activity: Principal Site only	determine the likely impacts of the Scheme on the majority of breeding bird species occurring or likely to occur in the area. The Survey Area provides sufficient information on bat usage (commuting and foraging) of the Principal Site and where impacts are predicted, assessing commuting and foraging habitat and nearby roosts, and enabling determination of impacts on bat populations occurring within, or adjacent to, the Principal Site, acknowledging that any impacts within the Cable Route Corridor will be temporary and loss of important features (such as hedgerows) minimised.	Activity surveys were completed within the Principal Site between May to September 2022	No, not available at the time of writing.	Final analysis and reporting to be presented in the ES.
	Following a Preliminary Roost Assessment (PRA) survey of trees and buildings within the Scheme Boundary, any trees or buildings with potential to support	Bat roosts; The land within the Scheme Boundary and a zone up to a maximum of 50m from the Scheme Boundary	The Scheme Boundary and a zone up to a maximum of 50m is an appropriate Survey Area to determine potential impacts (direct loss and/or disturbance) on roosting bats.	The PRA survey will be undertaken between January and March 2023 with roost characterisation surveys (if	No, not available at the time of writing.	Bat PRA surveys required across the Scheme Boundary, with follow up surveys to determine roost presence, if required.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)
	roosting bats and only those that may be impacted upon by the Scheme, will be surveyed following standard method for bat emergence/ re-entry surveys as described in the BCT guidelines (Ref. 9-55)			required), between early May and mid-June 2023	
Riparian mammals (i.e. Water Vole <i>Arvicola amphibius</i> , Otter <i>Lutra</i> and Mink <i>Mustela vison</i>).	Riparian mammal surveys will involve searching watercourses and water bodies for signs of Water Vole and Otter activity as described in the 'Water Vole Conservation Handbook' (Ref. 9-56) and 'The Water Vole Mitigation Handbook' (Ref. 9-57), guidance in the 'New Rivers and Wildlife Handbook' (Ref. 9-58); the 'Fifth Otter Survey of England 2009-2010'	All water bodies and watercourses within the Scheme Boundary (and to a maximum of 10m from the Scheme Boundary where access is permitted), identified during the desk study and Phase 1 Habitat survey as being potentially suitable for Water Vole, Otter and Mink. Additional surveys of woodland in the vicinity of water courses will be undertaken to check for Otter holts.	Surveying riparian habitats up to 10m from the Scheme Boundary is sufficient to determine presence or absence of riparian mammals within, or adjacent to, the Scheme Boundary.	Water Vole surveys will be undertaken between April and June 2023. Otter and Mink surveys will be undertaken between March and June 2023.	No, not available at the time of writing. Surveys required across the Scheme Boundary.

Survey (and Survey Method relevant technical appendix)	Survey Area	Justification for the Survey Areas	Survey Period / Survey Status	Information Included within this PEI Report?	Further Information Required to inform the ES (see also Table 9-13)	
Badger <i>Meles</i> (PEI Report Volume II Appendix 9-5)	Surveys for Badger involved a walkover survey searching for signs of Badger activity as described in the Mammal Society publication ' <i>Surveying Badgers</i> ' (Ref. 9-61) and in the National Badger Survey method (Ref. 9-62) with additional reference to ' <i>Surveying for Badgers: Good Practice Guidelines</i> ' (Ref. 9-63).	The land within the Scheme Boundary and to a maximum of 50m from the Scheme Boundary.	50m is an appropriate distance from the Scheme boundary acknowledging that the majority of habitats of importance to Badgers, such as woodland and hedgerows, will be retained and that impacts to setts outside of this distance will not occur.	Surveys within the Principal Site were undertaken between October December 2022, with any evidence of Badger also recorded during other ecological surveys from April 2022 (and ongoing). Surveys within the Cable Route Corridor will be completed between January and June 2023.	Yes, reporting on surveys with the Principal Site, where access was granted.	Surveys required within the Cable Route Corridor.

Impact Assessment Method

Assessment Criteria

9.4.2 This preliminary environmental assessment has been undertaken in accordance with best practice guidance for Ecological Impact Assessment (EclA), issued by the CIEEM (the CIEEM guidelines) entitled '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*' (Ref. 9-34) as summarised below. The aims of the ecological assessment are to:

- identify important ecological features (IEFs) (*i.e.* designated sites, habitats, species or ecosystems) which may be impacted by the Scheme;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Scheme. Impacts and effects may be positive or negative;
- facilitate scientifically rigorous and transparent determination of the consequences of the Scheme in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out what steps will be taken to adhere to legal requirements relating to the relevant ecological features concerned.

9.4.3 The principal steps involved in the CIEEM approach can be summarised as:

- Ecological features that are both present and might be affected by the Scheme are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions.
- The importance of the identified ecological features is evaluated, placing their relative nature conservation importance into geographic context, which is then used to define the relevant biodiversity features that need to be considered further.
- The changes or perturbations predicted to result as a consequence of the Scheme (*i.e.* the potential impacts) and which could potentially affect relevant ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account.
- The likely effects (positive or negative) on relevant ecological features are then assessed, and where possible quantified.
- Measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines) and if necessary, measures to compensate for effects on features of nature conservation importance are also included.

- Any residual effects of the Scheme are reported.
- Scope for ecological enhancement is considered.

9.4.4 It is not necessary in the assessment to address all habitats and species with potential to occur in the relevant study area and instead the focus is on those that are “relevant” *i.e.* ecological features that are considered to be important and potentially affected by the Scheme. The CIEEM guidelines (Ref. 9-34) makes clear that there is no need to “*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*”. This does not mean that efforts should not be made to safeguard wider biodiversity and this has been considered, where appropriate.

9.4.5 In order to undertake a biodiversity net gain (BNG) assessment, the area or length of all habitat within the Scheme Boundary must be measured and the condition of each habitat determined.

Determining Importance

9.4.6 To support a focussed assessment, there is a need to determine the scale at which the relevant ecological features identified through the desk studies and field surveys undertaken for the Scheme are of value. The value of each relevant ecological feature has been defined with reference to the geographical level at which it matters.

9.4.7 Relevant planning policy and legislation (see **PEI Report Volume II Appendix 9-1**) were used to inform on designated sites, habitats and species of nature conservation importance within each geographical level. Such features provide the starting point for identification of IEFs to consider within the EclA. This is important in demonstrating how the Scheme will comply with statutory requirements and policy objectives for biodiversity, in accordance with Section 4.3 of the CIEEM guidelines (Ref. 9-34).

9.4.8 Species populations are valued on the basis of their size, recognised status (such as through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status) and legal protection.

9.4.9 In assigning values to species populations, it is important to take into account the status of the species in terms of any legal protection. However, it is also important to consider other factors such as its distribution, rarity, population trends and the size of the population which would be affected. For example, whilst the Great Crested Newt is protected as a European protected species under the relevant legislation and therefore conservation of the species is of significance at an international level, this does not mean that every population of Great Crested Newt is internationally important. It is important to consider the particular population in its context. Therefore, in assigning values to species, the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgment of experienced ecologists.

9.4.10 Plant communities are assessed both in terms of their intrinsic value and as habitat for protected species whose habitat is also specifically protected and

for species of nature conservation concern which are particularly associated with them.

- 9.4.11 Due regard will also be paid to the legal protection afforded to species during the development of mitigation and compensation measures to be implemented for the Scheme. For European protected species there is a requirement that the Scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.
- 9.4.12 For the purposes of the assessment within this chapter, ecological features of at least Local importance are considered as IEFs that require assessment for potential significant effects. Whilst consideration of impacts at all geographic scales is important, features of less than Local importance (i.e. of Site importance) are common and widespread (therefore of no local value) and are not legally protected or included within local planning policy. As CIEEM guidelines (Ref. 9-34) state, there is no need to “*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*”.
- 9.4.13 Assessing the value of features requires consideration of both existing and future predicted baseline conditions. Therefore, the description and valuation of ecological features takes account of any likely changes, such as trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other proposed developments or land use changes, as explained in the 'Future Baseline (no development)' section of this chapter.
- 9.4.14 A summary of the value (importance) of ecological receptors and the geographical frames of reference used for this assessment, based on Section 4.7 in the CIEEM guidelines (Ref. 9-34) is presented in Table 9-2.

Table 9-2: Summary of sensitivity of ecological receptors, according to geographic context

Value / Importance of ecological receptor	Geographic Frame of Reference	Examples
Very High	International	Statutorily designated sites, such as Ramsar Sites, SACs (including candidate SACs), SPAs, normally within the geographic area of Europe. Species occurring in numbers approaching that of international importance (<i>i.e.</i> , >1% of a biogeographic population). Qualifying species connected to an SAC (such as bats).
High	UK or National (Great Britain), considering the potential for certain	Statutorily designated site, such as a SSSI or NNR.

Value / Importance of ecological receptor	Geographic Frame of Reference	Examples
		ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole)
		Species occurring in numbers approaching that of national importance (<i>i.e.</i> , >1% of the UK population). Priority habitats included on Annex I of the Habitats Directive (Ref. 9-2) or S41 of the NERC Act 2006 (Ref. 9-10).
Medium High	/ Regional Midlands)	(East Species occurring in numbers of greater geographical importance than within the county of Lincolnshire or Nottinghamshire, but does not reach the threshold to be of National importance.
Medium	County (Lincolnshire or Nottinghamshire) and, or, District (Bassetlaw and West Lindsey)	Non-statutorily designated sites, such as LWSs. Species occurring in numbers approaching that of county or district importance (<i>i.e.</i> , >1% of the county or district (if known) population).
Low	Local	Species of conservation interest, <i>e.g.</i> : UK Biodiversity Action Plan (UKBAP) / Local Biodiversity Action Plan (LBAP) species that contribute to the local community. Areas of habitat that do not meet criteria for selection as LWS in Lincolnshire or Nottinghamshire. Areas of habitat or species that are considered to enrich local area.
Negligible	Site	Species that are common and widespread and are not legally protected or included within local planning policy. Areas of habitat that are widespread and of no local value (such as a fence-line or hard-standing).

Characterising Ecological Effects

9.4.15 In accordance with Section 1.21 in the CIEEM guidelines (Ref. 9-34), the terminology used within the assessment draws a clear distinction between the terms ‘impact’ and ‘effect’. For the purposes of this chapter these terms are defined as follows:

- Impact – actions resulting in changes to an ecological feature. For example, construction activities of a development removing a hedgerow; and

- Effect – outcome resulting from an impact acting upon the conservation status or structure and function of an ecological feature, e.g. the effects on a population of bats as a result of the loss of a bat roost.

9.4.16 When describing potential impacts (and where relevant the resultant effects) consideration is given to the following characteristics likely to influence this:

- Positive or negative - *i.e.* is the change likely to be in accordance with nature conservation objectives and policy and is that change:
 - Positive - a change that improves the quality of the environment, or halts or slows an existing decline in quality e.g. increasing the extent of a habitat of conservation value; or
 - Negative - a change that reduces the quality of the environment e.g. destruction of habitat.
- Spatial extent - the spatial or geographical area or distance over which the impact or effect may occur under a suitably representative range of conditions.
- Magnitude - the ‘size’, ‘amount’ or ‘intensity’ and ‘volume’ of an impact - this is described on a quantitative basis where possible.
- Duration - the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration has been given to how this duration relates to relevant ecological characteristics such as a species’ lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact.
- Timing and frequency - consideration of the point at which the impact occurs in relation to critical life-stages or seasons.
- Reversibility – determining if the impact is temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible or cannot be achieved within a reasonable timescale, *i.e.* the lifespan of the Scheme (in the context of the feature being assessed).

9.4.17 Combined, these characteristics form the magnitude criteria for effects of the Scheme on IEFs as summarised in Table 9-3.

Table 9-3: Magnitude Criteria for Effects

Magnitude	Magnitude criteria
High	Changes to an ecological feature that almost always have an adverse effect on its integrity or conservation status. Such changes are usually long-term and often permanent and, or, irreversible.
Medium	Adverse changes on an ecological feature, that in some circumstance may affect its integrity or conservation status. Although such changes may be long-term, they are potentially reversible.

Magnitude	Magnitude criteria
Low	Adverse changes on an ecological feature that do not usually change are often short-term and, or, reversible.
Very Low	There is no noticeable change on the ecological feature.

Significance Criteria

9.4.18 For each ecological feature, only those characteristics relevant to understanding the ecological effect of the Scheme and determining the significance are described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- Not significant - no effect on structure and function, or conservation status; and
- Significant - structure and function, or conservation status is affected.

9.4.19 Sections 5.24 to 5.28 in the CIEEM guidelines (Ref. 9-34) state that effects should be determined as being significant (a 'significant effect') when "*an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national / local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)*".

9.4.20 Using this information and judgement, it is determined whether the effects will be 'significant' or 'not significant' on the structure and integrity of site or ecosystems or conservation status of habitats and, or species of each ecological feature and the impact significance is determined at the appropriate geographical scale, as presented in Table 9-2.

9.4.21 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines (Ref. 9-34) recommend the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology within this chapter, the terminology used in the CIEEM guidelines for impact assessment have been translated into the classification of effects scale, as outlined in Table 9-4.

Table 9-4: Significance Criteria for Effects

Effect classification terminology	Equivalent CIEEM terminology
Major beneficial (positive)	1) Beneficial effect on structure / function or conservation status at a regional, national or international level; and 2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate beneficial (positive)	1) Beneficial effect on structure/ function or conservation status at a county level; and 2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor beneficial (positive)	1) Beneficial effect on structure / function or conservation status at a local level; and 2) The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible beneficial	No effect on structure / function or conservation status.
Minor adverse (negative)	1) Adverse effect on structure / function or conservation status at a local level; and 2) The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Moderate adverse (negative)	1) Adverse effect on structure / function or conservation status at a county level; and 2) The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
Major adverse (negative)	1) Adverse effect on structure / function or conservation status at a regional, national or international level; and 2) The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.

Biodiversity Net Gain (BNG)

9.4.22 When the relevant provisions come into force (expected to be in November 2023), the Environment Act 2021 (Ref. 9-9) will include a mandate for at least 10% biodiversity net gain for projects, including for Nationally Significant Infrastructure Projects (NSIPs).

9.4.23 BNG is a quantitative process applied to development and can be defined as: *"development that leaves biodiversity in a better state than before and involves an approach where developers work with local governments, wildlife groups,*

land owners and other stakeholders in order to support their priorities for nature conservation” (Ref. 9-64).

- 9.4.24 The principle behind BNG is to ensure that any impacts on biodiversity, arising from any development, are taken into consideration and compensated with equivalent or additional gains to leave biodiversity in a measurably better state than before development.
- 9.4.25 For a development to achieve BNG, it is important that the principles of the mitigation hierarchy are followed.
- 9.4.26 There are four sequential steps that must be taken throughout the lifecycle of a project:
- Avoidance – actions taken to avoid causing impacts to the environment prior to beginning development (e.g. moving the development to a different location).
 - Minimisation – measures taken to reduce the duration, intensity, extent and/ or likelihood of the unavoidable environmental impacts caused by development (e.g. adapting the development design to minimise impacts).
 - Restoration or rehabilitation – actions taken to repair environmental degradation or damage following unavoidable impacts caused by development.
 - Offsets – measures taken to compensate for any adverse environmental impacts caused by development which cannot be avoided, minimised and/ or restored (e.g. including habitat creation to offset losses).
- 9.4.27 Biodiversity metrics provide a measure of overall biodiversity value based on habitat type, area, condition and distinctiveness. The current approved metric is Defra’s Metric 3.1 and this metric is a tool that allows a value to be measured, in this case biodiversity, which is calculated pre- and post-development for three habitat components: Habitat, Rivers and streams and Hedgerows. The change in biodiversity units is calculated for each component and indicates either a net loss, a net gain or no change in biodiversity.
- 9.4.28 A habitat condition assessment (see Table 9-1) will be used to inform the BNG report, which will be prepared to inform the ES and submitted as part of the DCO application. However, the BNG report is not available at this stage, as habitat condition assessment surveys are yet to commence and the design for the Scheme continues to evolve.

9.5 Stakeholder Engagement

- 9.5.1 A request for an EIA Scoping Opinion was sought from the Secretary of State through the Planning Inspectorate in 2022 as part of the EIA Scoping Process. Relevant stakeholders responses as set out in the November 2022 Scoping Opinion are summarised in Table 9-5.
- 9.5.2 In addition to the statutory consultation process, there will be ongoing engagement with other consultees to steer the development of the Scheme. Therefore, this section will be updated for the ES, based on further

consultation on the Scheme and matters raised by stakeholders. Such matters will be considered and addressed within the final DCO submission.

Table 9-5: Summary of responses

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
Planning Inspectorate	<i>Attraction of aquatic invertebrates to solar panels: The Applicant proposes to scope out this matter on the basis that there are no designated sites with aquatic invertebrate species or assemblages as qualifying features within the study area. The Inspectorate is content to scope out consideration of this matter on this basis.</i>	Comment noted. As set out in Table 9-1 appropriate aquatic surveys have and will continue to be undertaken, but this impact pathway will not be included in the ES.
Planning Inspectorate	<i>Attraction of Birds to Solar Panels: The Applicant proposes to scope out this matter on the basis that there is limited evidence from operational solar schemes to suggest that solar panels attract birds and increase the risk of mortality. The Scoping Report also notes that the Proposed Development is not located within a migratory route or near areas which support large congregations of birds. Considering the information available the Inspectorate is content that significant effects are unlikely to occur and as such this matter can be scoped out. However, the ES should ensure that impacts of the Proposed Development on birds are assessed using a suitable approach, seeking agreement from relevant consultation bodies where possible.</i>	Comment noted. A full assessment on the potential impacts of birds will be prepared for the ES and submitted with the DCO application, but this impact pathway will not be included in the ES.
Planning Inspectorate	<i>Surveys for Polecat, Hedgehog, and Brown Hare: Scoping Report paragraph 10.32 states that specific surveys of Brown Hare, West European Hedgehog, and Polecat will not be conducted however no justification is provided for this approach. Records of Brown Hare and Hedgehogs were found within the study area, as stated in Scoping Report paragraph 10.25 and the Preliminary Ecological Appraisal (PEA) provided in Appendix B. It is unclear why specific surveys for these species are not proposed, particularly</i>	The presence of all three species within the Scheme Boundary has been assumed, given that the site is within the known geographical range for these species and suitable habitat to support them is present. PEI Report Volume I Chapter 9: Ecology and Nature Conservation , Table 9-12 assesses the impacts of the Scheme on Brown Hare and West European Hedgehog and incidental

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<p><i>considering Brown Hare and Hedgehogs have been recorded. The ES should consider effects on these species and be supported by robust survey data, unless otherwise agreed with a, unless otherwise agreed with relevant consultation bodies.</i></p>	<p>records of these species will be recorded during other ecological surveys. Furthermore, mitigation proposed will take into consideration the presence of such species.</p>
<p>Planning Inspectorate</p>	<p><i>Directional drilling methods: The potential for sediment mobilisation and emissions of pollutants from the riverbed through the use of directional drilling methods or the vibration impacts arising from this method to install cable connections are not identified in this paragraph of the Scoping Report. The ES should consider the effects of drilling in watercourses on invertebrates and fish species found in these drilling locations.</i></p>	<p>PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-12 assesses the impacts of the Scheme, on Aquatic macrophytes and macroinvertebrates and fish, including where appropriate non-intrusive methods such as drilling.</p>
<p>Planning Inspectorate</p>	<p><i>Table 6-1 of the PEA (Scoping Report Appendix B) provides a summary of the ecological constraints and recommended further requirements. Impacts on non-statutory designated sites are not listed within the table despite there being sites located within the proposed Cable Route Corridor area. The ES should ensure that impacts on non-statutory designated sites are assessed and where there is the potential for significant effects to occur this should be assessed within the ES.</i></p>	<p>PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-11 assesses the impacts of the Scheme on non-statutory designated sites.</p>
<p>Planning Inspectorate</p>	<p><i>In addition to the assessment of impacts at the project scale, the Applicant should assess the potential for the Proposed Development to result in regional level impacts on ground nesting birds from the loss of suitable habitat.</i></p>	<p>Comment noted. A full assessment on the potential impacts of the Scheme on birds will be prepared for the ES, submitted with the DCO application, once the full baseline for the Scheme Boundary has been identified and the Scheme design fixed. An outline assessment is presented in the PEI Report.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
Planning Inspectorate	<p><i>Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable ecological features. Specific survey and assessment data relating to the presence and locations of species such as badgers, rare birds and plants that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a confidential annex. All other assessment information should be included in an ES chapter, as normal, with a placeholder explaining that a confidential annex has been submitted to the Inspectorate and may be made available subject to request.</i></p>	<p>Comment noted. The ES will take the approach of using confidential annexes where necessary, as has been the approach for PEI Report Volume II, Appendix 9-5.</p>
Planning Inspectorate	<p><i>Veteran trees are not referenced in the Ecology chapter of the Scoping Report. The ES should identify any veteran trees which may be affected by the Proposed Development and explain how such features have been avoided or where this is not possible assess any likely significant effects that may arise.</i></p>	<p>Comment noted. An Arboricultural Impact Assessment will be prepared to accompany the DCO Application.</p>
Bassetlaw District Council	<p><i>The need for 10% net gain is welcomed and this should be scoped into the assessment. The Environment Act 2021 promotes biodiversity net gain in new development, albeit from 2023. However, the NPPF recommends securing net gains now. Reflecting the principles of national planning policy and the emerging provisions of the Act we would strongly recommend that the proposal secures at least 10% net gain in biodiversity to ensure that the value of the development exceeds the pre-development on site habitat value by at least 10%. It will be possible to make specific comments when a more exact route is known. Ongoing consultation with the Nottinghamshire Wildlife Trust will</i></p>	<p>Comment noted. See Section 9-4 regarding Biodiversity Net Gain. Table 9-1 outlines ecological surveys including BNG – Habitat Condition Assessment.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
Environment Agency	<p><i>be important. Designations such as SSSIs, Local Wildlife Sites and other relevant designations should be avoided where possible.</i></p> <p><i>The most relevant policies are Policy DM9 of the Bassetlaw Core Strategy, Section 15 of the NPPF, Policies ST39 and ST40 of the Draft Bassetlaw Local Plan, Policy 6 of the Rampton and Woodbeck Neighbourhood Plan and Policy 2 of the Treswell and Cottam NP.</i></p>	<p>Comment noted. This is considered within PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-1.</p>
Environment Agency	<p><i>In respect of the Biodiversity Net Gain (BNG) assessment, we suggest referring to relevant Biodiversity Opportunity Mapping documents that may provide enhancement and/or mitigation suggestions. The relevant contacts for this will be through the Nottinghamshire Biodiversity Action Group or the Greater Lincolnshire Nature Partnership, depending on the location.</i></p> <p><i>The Applicant (if not already aware) may be able to utilise Environment Agency data within their assessment, which is accessible at:</i></p> <p><i>Open WIMS data; and</i></p> <p><i>England Catchment Data Explorer</i></p>	<p>Comment noted. The Scheme will commit to achieving a minimum 10% biodiversity net gain. A habitat condition assessment (see Table 9-1) will be used to inform the BNG report, which will be prepared to inform the ES and submitted as part of the DCO application.</p>
Natural England	<p><i>Section 5.2.1 of the Scoping Report notes that the scheme sits outside the IRZ for solar development for Ashtons Meadow SSSI, but despite this, section 5.2.2 states that indirect impacts to the SSSI will be assessed fully. Ashtons Meadow SSSI is designated for its neutral grassland</i></p>	<p>Comment noted. PEI Report Volume I Chapter 6: Air Quality will address changes in air quality. Table 9-11 outlines effects on designated sites.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<p><i>interest, which may be susceptible to changes in air quality. Due to the immobile nature of the interest features of the site, and relatively large distance to the development site (approx.. 1km) we consider impacts to be unlikely, but continue to welcome the intention to rule out any impacts within the ES.</i></p>	
Natural England	<p><i>Whilst Natural England do not hold information regarding locally designated sites, we consider that the ES should consider any impacts upon local wildlife and geological sites, including local nature reserves. Local Sites are identified by the local wildlife trust, geoconservation group or other local group and protected under the NPPF (paragraph 174 and 175). The ES should set out proposals for mitigation of any impacts and if appropriate, compensation measures and opportunities for enhancement and improving connectivity with wider ecological networks.</i></p>	<p>PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-11 assesses the impacts of the Scheme on designated sites.</p>
Natural England	<p><i>The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law. Records of protected species should be obtained from appropriate local biological record centres, nature conservation organisations and local groups. Consideration should be given to the wider context of the site, for example in terms of habitat linkages and protected species populations in the wider area.</i></p> <p><i>The area likely to be affected by the development should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. Surveys</i></p>	<p>PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-12 assesses the impacts of the Scheme on protected species and Table 9-1 lays out ecological surveys (methods, time periods and survey areas), within the Scheme Boundary.</p> <p>Section 9.7 outlines Embedded Design Mitigation.</p> <p>Desk study data has been obtained from the Greater Lincolnshire Nature Partnership and Nottinghamshire Biological and Geological Record Centre.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<p><i>should always be carried out in optimal survey time periods and to current guidance by suitably qualified and, where necessary, licensed, consultants.</i></p> <p><i>Natural England has adopted standing advice for protected species, which includes guidance on survey and mitigation measures. A separate protected species licence from Natural England or Defra may also be required.</i></p>	
Natural England	<p><i>Priority Habitats and Species are of particular importance for nature conservation and included in the England Biodiversity List published under section 41 of the Natural Environment and Rural Communities Act 2006. Most priority habitats will be mapped either as Sites of Special Scientific Interest, on the Magic website or as Local Wildlife Sites. Lists of priority habitats and species can be found here. Natural England does not routinely hold species data. Such data should be collected when impacts on priority habitats or species are considered likely.</i></p> <p><i>The Environmental Statement should include details of:</i></p> <ul style="list-style-type: none"> <i>• Any historical data for the site affected by the proposal (e.g. from previous surveys)</i> <i>• Additional surveys carried out as part of this proposal</i> <i>• The habitats and species present</i> <i>• The status of these habitats and species (e.g. whether priority species or habitat)</i> <i>• The direct and indirect effects of the development upon those habitats and species</i> <i>• Full details of any mitigation or compensation measures</i> <i>• Opportunities for biodiversity net gain or other environmental enhancement</i> 	<p>Comment noted. This approach will be applied to the ES to include the details stated.</p>
Natural England	<p><i>Section 10.17-10.19 shows that a BNG assessment will be undertaken</i></p>	<p>Comment noted. The Scheme will commit to</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<p><i>using the latest version of the Biodiversity Metric (currently 3.1) in line with the requirements of the Environment Act. We note that the Environment act requires habitats to be secured for at least 30 years. Section 3.63 states that ‘A Framework Biodiversity and Landscape Management Plan will set out the principles for how the land will be managed throughout the operational phase, following the completion of construction. A detailed Biodiversity and Landscape Management Plan will be produced following grant of the DCO and prior to the start of construction’. Due to the 40 year lifespan of the development, this management plan is likely to fulfil the 30 year management requirement of BNG habitats.</i></p> <p><i>We recommend that all habitat creation on site should be designed to complement the surrounding area, enhancing existing features, improving connectivity across the development area and contributing to the Nature Recovery Network</i></p>	<p>achieving a minimum 10% biodiversity net gain. A habitat condition assessment (see Table 9-1) will be used to inform the BNG report, which will be prepared to inform the ES and submitted as part of the DCO application.</p> <p>There is no commitment to a 40-year operation or specific year for decommissioning. The timing and effects of decommissioning, whilst unknown at this stage, will need to adhere to relevant legislation and policy at the time of decommissioning. See Section 9.8 and Table 9-12 regarding decommissioning and the determination of relevant habitats.</p>
Natural England	<p><i>The ES should include details of the decommissioning and after use of the site, with details relating to proposed methods of restoration of land to agricultural use – which should be of an equal grade to the pre-development ALC grading.</i></p> <p><i>Section 6.34 states that a Framework DEMP will be included in the ES. We acknowledge that this will require some assumptions to be made, as a result of the uncertainty introduced by the time elapsing during the operational phase. Nonetheless, alongside setting out the basis for protecting habitats and species during decommissioning, this should provide the framework for ensuring soil resources are protected.</i></p> <p><i>There is additional uncertainty regarding decommissioning due to the potential establishment of important habitats during the</i></p>	<p>Comment noted. There is no commitment to a 40-year operation or specific year for decommissioning. The timing and effects of decommissioning, whilst unknown at this stage, will need to adhere to relevant legislation and policy at the time of decommissioning. See Section 9.8 and Table 9-12 regarding decommissioning and the determination of relevant habitats.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<p><i>operational phase. The ES should include a framework to enable the most valuable habitats to be retained through – CHECK S42.</i></p> <p><i>The loss of created habitats in order to revert to agriculture after 40 years of operation could have a negative impact on biodiversity, habitats and species which have established in the operational period. We acknowledge the difficulty in pre-planning for a scenario 40 years into the future, but consider that the ES should include provision for new surveys and assessment to inform any additional mitigation/compensatory measures to be implemented prior to any reinstatement works occurring. We would also encourage the retention of areas of particular biodiversity value, i.e. widened field boundaries/buffer areas, and/or compensatory habitat being provided off-site.</i></p>	
<p>West Lindsey District Council</p>	<p><i>This agricultural landscape has a network of hedgerows and ditches, with small geometrical blocks of woodland giving extensive wildlife corridors across the area. The ES should assess the impact upon this important habitat network, and any landscape proposals should aim to improve connectivity of habitat networks. Information should be included from the Greater Lincolnshire Nature Partnership (GLNP), LERC and Lincolnshire Wildlife Trust (LWT).</i></p>	<p>PEI Report Volume I Chapter 9: Ecology and Nature Conservation, Table 9-12 assesses the impacts of the Scheme on Hedgerows and woodland.</p> <p>The Scheme will retain and avoid areas of woodland within the Site boundary. Furthermore, hedgerows will be retained and avoided as much as is practicable and new planting will seek to bolster existing defunct hedgerows and create new hedgerows, where possible, with the aim of creating wildlife corridors.</p>
<p>West Lindsey District Council</p>	<p><i>No Tree preservation Orders (TPO) are present within the site area, though there are TPO protected trees within the buffer zone. Therefore the protected tree legislation of The Town and Country Planning (Tree Preservation)(England) Regulations 2012, and the Town and Country</i></p>	<p>Comment noted. The Town and Country Planning Act 1990 Part 8 Chapter 1, will need to be considered in the ES.</p>

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
	<i>Planning Act 1990 Part 8 Chapter 1, will need to be considered (10.8).</i>	
West Lindsey District Council	<i>10.17 – The Council is encouraged that A BNG assessment will be undertaken (using Defra Metric 3.1 or the most up to date metric) to identify opportunities for contributing to BNG. However, the Scoping Report does not set out whether the development proposes to achieve above or beyond 10% BNG. This needs to be clear, as to how this will be accounted for in the ES.</i>	Comment Noted. The Scheme will commit to achieving a minimum 10% biodiversity net gain. A habitat condition assessment (see Table 9-1) will be used to inform the BNG report, which will be prepared to inform the ES and submitted as part of the DCO application.
West Lindsey District Council	<i>10.20 - The Council does not presently have in-house expertise to cover ecology matters. This is an area in which we will be seeking additional resource. It is recommended that information is sought from the Greater Lincolnshire Nature Partnership and the Lincolnshire Wildlife Trust.</i>	Comment noted. Data has been obtained from relevant sources during the desk study.
West Lindsey District Council	<i>10.35 – The effect of deer fencing should also be considered during construction and operational phases, and the effect on commuting habits.</i>	Comment noted. The assessment of impacts on biodiversity will follow CIEEM guidelines. Table 9-12 outlines effects on ecological features during construction and operational phases, including any reduction in connectivity resulting from Scheme, such as through fencing.
Canal and River Trust	<i>The Scoping Report mentions the consideration of sediments in paragraph 11.78, but has not discussed in detail the potential for sediment mobilisation from the riverbed through the use of directional drilling methods to install cable connections beneath waterways such as the River Trent. There will be a small risk of vibrations leading to sediment mobilisation, or the emission of pollutants, although such impacts are considered likely to be minor to moderately adverse in the short to medium term. We consider that directional drilling can cause</i>	Potential impacts of sediment mobilisation and other impact pathways as a result of HDD beneath the River Trent will be assessed in the ES Chapter. A desk study has been completed to identify sensitive receptors (including fish) in the River Trent.

Stakeholder	Summary of Scoping Opinion Comment	Summary of Response
Canal and River Trust	<p><i>sediment discharges and problems arising from mud toxicity due to vibrations below the river. As a result, we believe the impact should be scoped in, with consideration given to the provision of field studies into invertebrates and fish species found in the water to assess the sensitivity of these species to potential sediment movement</i></p> <p>Temporary construction lighting along the cable corridor route in the vicinity of the River Trent will have the potential to disturb wildlife. As a result, we believe the impact should be scoped in, with consideration given to the provision of mitigation measures to minimise impacts on ecology and biodiversity, as well as landscape and visual impact.</p>	<p>A lighting strategy will be developed to accompany the DCO application, but any lighting used during construction or operation will be task-specific and will avoid unnecessary light-spill onto adjacent habitats. The impacts of lighting will be considered throughout the ES chapter, where relevant.</p>

9.6 Baseline Conditions

Existing Baseline

Existing Land Use and Background Information

- 9.6.1 The existing land use within the Scheme Boundary is dominated by intensive agriculture. The Principal Site covers an area of approximately 1,400ha of flat landscape which heavily relies on significant inputs to achieve the artificial drainage that sustains arable agriculture. To ensure this, abstraction licences are needed to irrigate arable fields.
- 9.6.2 From the information received from the Environment Agency, there is one licenced surface water abstraction within the Study Area of the Principal Site and one within the Study Area of the Cable Route Corridor. Both abstractions are used for agricultural irrigation / storage. The former is located approximately 350 m east of the Scheme Boundary west of Glentworth Hall. The water is abstracted from an un-named watercourse at Glentworth. The latter is located approximately 1 km south of the site boundary, east of the village of Stow. The water is abstracted from a dyke draining to the River Till (See **PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water**).
- 9.6.3 Alongside irrigation of the land, there are multiple agricultural chemical inputs that increase agricultural production. The artificial lowering of water levels by water abstraction for irrigation purposes and use of agricultural chemicals may negatively impact rivers and drains. This has a further impact on wildlife that

rely on these habitats. Their condition can also be worsened by agricultural runoff causing eutrophication.

- 9.6.4 The land within the Principal Site is classified in the Agricultural Land Classification (ALC) as predominantly Grade 3b (moderate quality) agricultural land with some Grade 3a (good quality) agricultural land (refer to **PEI Report Volume I Chapter 14: Socio-economics and Land Use**). This comprises land with moderate limitations that affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown, yields are generally lower or more variable than on land in higher grades. The soil type is characterised by slightly acidic and base-rich loamy and clayey soils with impeded drainage.
- 9.6.5 The land within the Cable Route Corridor, as determined through aerial photography, is predominantly agricultural land. However, an ALC survey of the Cable Route Corridor is not currently proposed (refer to **PEI Report Volume I, Chapter 14: Socio-economics and Land Use**). Instead, at ES stage ALC along the Cable Route Corridor will be mapped based on secondary data sets. The Cable Route Corridor is crossed by the River Till and the River Trent and the land includes several woodlands. Using MAGIC (Ref. 9-36), coastal and floodplain grazing marsh, good quality semi-improved grassland, traditional orchards and deciduous woodlands were identified as habitats within the Cable Route Corridor.

Sites statutorily designated for biodiversity importance

- 9.6.6 There are no sites internationally designated for their biodiversity value within 10km of the Scheme nor any for which bats are a special feature within 30km of the Scheme Boundary.
- 9.6.7 There is one statutory site designated for nature conservation within the Study Area set out in Section 9.4. The location of this statutory site, Ashton's Meadow SSSI, is presented in **PEI Report Volume III Figure 9-1**. The site, 3.6 hectares (ha) in area, is an ancient traditionally maintained meadow, surrounded by species rich hedgerows, 1.5km to the west of the Cable Route Corridor. It is a Nottinghamshire Wildlife Trust nature reserve.

Sites non-statutorily designated for biodiversity importance

- 9.6.8 There are 14 non-statutory sites designated for nature conservation within 2km of the Scheme Boundary and these are presented in Table 9-6 and listed in ascending order, with those closest to the Scheme Boundary listed first. These sites have been designated as Local Wildlife Sites (LWS) for their biodiversity value at a county level and are known to supporting a wide variety of protected and notable species and/ or habitats. The locations of these non-statutory sites, relevant to the Scheme, are presented in **PEI Report Volume III Figure 9-2**.

Table 9-6: Sites non-statutorily designated for biodiversity importance within 2km of the Scheme Boundary

Non-Statutory Site Name and Designation	Description	Approximate Distance and direction from closest point of the Scheme
Upton Grange Road Verges LWS	The north and east verges are species-rich and the south and west verges comprise linear herb-rich neutral grassland with adjacent species-poor hedgerows. The invertebrate diversity on these verges is likely to be high given the floral diversity and abundance of nectar resources.	Within the Cable Route Corridor.
Willingham to Fillingham Road Verges LWS	This length of road, marked by sharp bends at each end, is flanked by verges 3-3.5m wide on both sides. Both verges are level, receive full sun and run alongside ditches with a species-rich hedgerow. Nitrophiles (certain plant species showing a preference for a habitat rich in nitrate) are occasional but never dominating. Coarser grasses are frequent but not dominating. Both verges are flailed with cuttings left in late summer by the adjacent landowner. This management maintains current biodiversity but could be improved through collection of cuttings. The site is therefore best described as being in favourable condition but under negative management.	Within the Cable Route Corridor.
Cow Pasture Lane Drains LWS	Drains with notable aquatic and bankside vegetation including Branched Bur-reed <i>Sparganium erectum</i> , Amphibious Bistort <i>Persicaria amphibia</i> , Blunt-fruited Water-starwort <i>Callitriche obtusangula</i> and stands of Reed Sweet-grass <i>Glyceria maxima</i> . The lower reaches of the bank support Wild Angelica <i>sylvestris</i> and False Fox-sedge <i>Carex otrubae</i> .	Within the Cable Route Corridor.
Coates Wetland LWS	The River Trent meanders around this site comprising a mosaic of habitats including wetland, developing woodland and grassland enclosed within a flood bank.	Adjacent to the Cable Route Corridor.
Cottam Wetlands LWS	Part of the former Cottam Power Station, this wetland mosaic comprises lagoons, marshy grasslands, swamp and a representative length of the River Trent.	210m north of the Cable Route Corridor
Cottam Ponds LWS	A number of ponds supporting abundant wildlife.	660m south of the Cable Route Corridor.
Mother Drain Upper Ings LWS	Mother Drain is notable for supporting 46 water beetle species and 11 water bug species, including the nationally near threatened water beetle <i>Hydrochus elongatus</i> at its only Nottinghamshire location and the nationally scarce water beetle <i>Hygrotus quinquelineatus</i> .	810m to the north of the Cable Route Corridor.

Non-Statutory Site Name and Designation	Description	Approximate Distance and direction from closest point of the Scheme
Broad Lane Grassland, North Leverton LWS	This small neutral grassland is bordered by Hawthorn <i>Crataegus monogyna</i> and Blackthorn <i>Prunus spinosa</i> hedgerows and a linear broadleaved woodland, separating it from a railway line.	865m to the north of the Cable Route Corridor.
Torksey Ferry Road Ditch LWS	A drain of interest for water beetles, including the near threatened water beetles <i>Agabus uliginosus</i> , <i>Cercyon convexiusculus</i> , <i>Cymbiodyta marginellus</i> and <i>Ilybius montanus</i> .	985m to the south of the Cable Route Corridor.
Ashton's Meadow LWS	This meadow is also a SSSI owned and managed by the Nottinghamshire Wildlife Trust. The sward is unimproved and species-rich with a range of characteristic grasses and forbs	1.5km to the west of the Cable Route Corridor.
Thornhill Lane Drain, Littleborough LWS	A linear watercourse feature designated for the presence of near threatened / nationally scarce water beetles.	1.5km to the north of the Cable Route Corridor.
Littleborough Lagoons LWS	Littleborough Lagoons has pasture fringes and is important for overwintering birds, including Common Sandpiper <i>Actitis hypoleucos</i>	1.7km to the north of the Cable Route Corridor.
Bushstocks, Lane Meadow LWS	This old hay meadow has a sward containing many plant species indicative of unimproved neutral grassland. Ridge and furrow running in an east-west direction influences the composition of the sward. Damper hollows support abundant Meadow Foxtail <i>Alopecurus pratensis</i> whilst the drier ridges are dominated by Common Knapweed <i>Centaurea nigra</i> .	1.5km to the west of the Cable Route Corridor.
Retford Road Wood LWS	A mature deciduous woodland set in an arable landscape has a mixed canopy of Beech <i>Fagus sylvatica</i> , Sycamore <i>Acer pseudoplatanus</i> and some Large-leaved Lime <i>Tilia platyphyllos</i> .	1.8km to the west of the Cable Route Corridor.

9.6.9 In addition, one area of Ancient Woodland was identified within 2km of the Scheme. This is Burton Wood which is approximately 550m north of the Cable Route Corridor. The location of this Ancient Woodland site is presented in **PEI Report Volume III Figure 9-2**.

Habitats

9.6.10 The land within the Principal Site, approximately 1,368 ha, is flat and dominated by arable agriculture (1,240.74ha / c.91%), the fields being intersected by a network of drainage ditches (13.6 km). Other habitat includes improved grassland fields (12.6 ha / 0.9%), mature trees and hedges (c. 30 km), small, wooded copses (c.20 ha / 1-2%) and ponds (<20). The surrounding habitat is mainly arable, with small pockets of mature broadleaved woodland (plantation and semi-natural). There are individual and clusters of residential properties located adjacent to the Scheme Boundary.

- 9.6.11 The majority of the Principal Site is farmed under agri-environment Schemes, such as the Countryside Stewardship Scheme (Middle Tier). The Mid-Tier is a Scheme to allow farmers and land managers to help them protect the environment e.g. through improving the land for the benefit of wildlife or managing the risk of flooding.
- 9.6.12 The broad terrestrial habitats present within the Principal Site were identified during the Phase 1 Habitat survey, undertaken in March and July 2022; (and reported in **PEI Report Volume II Appendix 9-2**). These habitats are the broad habitat types found within the Principal Site and will be further defined, where necessary, by the detailed habitat surveys set out in Table 9-1. The broad habitats are summarised in Table 9-7, alongside area calculations (taken from digitised maps of the Phase 1 Habitats) and their biodiversity importance. The locations of these habitats are presented in **PEI Report Volume III Figure 9-3** and included in **PEI Report Volume II Appendix 9-2**. Furthermore, where the desk study has identified priority habitats within the Cable Route Corridor, these are also summarised in Table 9-7.
- 9.6.13 Habitat data required to calculate the biodiversity net gain or net loss has been collected in the Phase 1 Habitat survey and will be updated, as necessary, through subsequent surveys (such as arable flora and hedgerow surveys) to ensure a comprehensive baseline of data for the BNG assessment. This will be prepared and submitted with the ES for the DCO application.

Table 9-7: Broad habitat types within the Scheme Boundary (where known)

Habitat	Area (ha) / length (km)	% of Principal Site area	Notable Habitat	Biodiversity Importance	Rationale for Biodiversity Importance
A1.1.1 – Broad-leaved woodland - semi-natural	16.75ha	1.2	Habitat of Principal Importance (HaPI) – Lowland Mixed Deciduous Woodland and Wet Woodland. LBAP habitat in Lincolnshire	County	<p>There are a number of areas of this habitat within the Principal Site, including a larger woodland in the north-east. Species within these include Pedunculate Oak <i>Quercus robur</i>, Ash <i>Fraxinus excelsior</i> along with Hawthorn, Blackthorn, Field Maple <i>Acer campestre</i> and Elder <i>Sambucus nigra</i>.</p> <p>A data search for veteran or ancient trees did not identify any such trees within 2km of the Scheme Boundary. However, surveys have identified a number of likely veteran trees and / or ancient trees with veteran features or ancient features within the Principal Site.</p> <p>There is no Ancient Woodland within the Scheme Boundary, with the nearest Ancient Woodland being Burton Wood, approximately 550m north of the Cable Route Corridor.</p>
A1.1.2 – Broad-leaved woodland – plantation	3.52ha	0.3	No	Site	Not a HaPI.
A1.3.2 - Mixed woodland – semi-natural	1.81ha	0.1	No	Site	Not a HaPI.
A2.1 - Scrub - dense/continuous	0.30ha	<0.1	No	Site	Not a HaPI.

Habitat	Area (ha) / length (km)	% of Principal Site area	Notable Habitat	Biodiversity Importance	Rationale for Biodiversity Importance
A2.2 - Scrub – scattered	1.02km	-	No	Site	Not a HaPI.
B2.2 - Neutral grassland - semi-improved	7.03ha	0.5	<p>Lowland meadows and upland hay meadows is a HaPI.</p> <p>Lowland meadows is an LBAP habitat in Lincolnshire</p> <p>Lowland neutral grassland is an LBAP habitat in Nottinghamshire</p> <p>Coastal and Floodplain Grazing Marsh is a HaPI.</p>	Site (possibly up to County within Cable Corridor Route)	<p>This habitat is present in two locations in the north-east of the Principal Site and, identified through the desk study, within the Cable Route Corridor.</p> <p>The majority of neutral semi-improved grassland is not a HaPI. However, grassland either side of the River Trent is a HaPI as identified on MAGIC (Ref. 9-36).Further survey required to confirm the importance of this habitat type.</p>
B4 - Improved grassland	12.68ha	0.9	No	Site	Not a HaPI.
B6 - Poor semi-improved grassland	26.10ha	1.9	No	Site	Not a HaPI.

Habitat	Area (ha) / length (km)	% of Principal Site area	Notable Habitat	Biodiversity Importance	Rationale for Biodiversity Importance
C3.1 - Other tall herb and fern – ruderal	4.87ha	0.4	No	Site	Not a HaPI.
G1 - Standing water	1.64ha	0.1	Ponds of certain criteria are a HaPI.	Local	<p>Ponds can be defined as permanent (or seasonal) waterbodies up to 2ha in extent and qualify as being a HaPI if they meet one or more criteria for UKBAP classification, including supporting species of high conservation importance. There are c.20 ponds within the Principal Site, the majority of which contained little to no macrophytes or aquatic vegetation and had little other ecological value. Furthermore, these ponds are not a stand-alone habitat within the wider area, as similar habitat can be found in the surrounding area. There were two ponds identified during scoping surveys that warranted subsequent survey, due to the in-channel macrophytes present. These were a U-shaped moat with a small embankment and stocked with Carp <i>Cyprinus carpio</i> for recreational fishing, and a rectangular agricultural drainage pond.</p> <p>All ponds that were assessed through PYSM survey did not meet criteria for a HaPI, according to UK BAP criteria. One pond had poor biological quality, whilst four had moderate biological quality, and macrophyte growth was suppressed due to shading, eutrophication, and partial drying. However, some of these ponds may support protected species, such as Great Crested Newt and further surveys will be undertaken to determine their presence or absence.</p> <p>Overall, given the lack of status as a HaPI, poor to moderate biological quality and lack of notable species, the ponds were assessed to be of Local importance only.</p>
G2 - Running water	2.43ha	0.2	Rivers are a HaPI	County	<p>The River Trent is within and crossed by the Cable Route Corridor.</p> <p>Watercourses from the Eau de Source to Northorpe Beck, Fillingham Beck and River Till catchments lie within the principal site boundary, all with Poor to Moderate ecological status. The watercourses present consisted of agricultural</p>

Habitat	Area (ha) / length (km)	% of Principal Site area	Notable Habitat	Biodiversity Importance	Rationale for Biodiversity Importance
					<p>ditches, with simple herb and rank vegetation or hedgerow vegetation or deciduous tree vegetation, and in-channel macrophytes. Three-spined Stickleback <i>Gasterosteus aculeatus</i> was recorded, and the ditches had potential to support protected species, though none were recorded. All watercourses within the Principal Site were subject to habitat diversity and water quality pressures, with Very Poor, Heavily Polluted water quality and high levels of siltation, and overall Low conservation value for macroinvertebrates (except for a couple of sites). Due to a lack of scoring macrophyte taxa present within the watercourses, WFD status for macrophytes was unclassifiable.</p> <p>Given the lack of notable species supported by the ditches, and low conservation value, the reaches were considered of Site Importance only.</p> <p>Overall, running water habitats that may be impacted by the development are of Medium Importance, given the River Trent being included in the Cable Route Corridor.</p>
Hardstanding	5.30 ha	0.4	No	Site	Not a HaPI.
I2.2 – Spoil	0.04ha	<0.1	No	Site	Not a HaPI.
J1.1 - Cultivated/disturbed land – arable	1240.74	90.6	No	Site	Excluding arable field margins, not a HaPI.
Hedgerows without trees (intact and defunct)	29.42km	-	HaPI.	County	HaPI, legally protected under the Hedgerows Regulations (Ref. 9-12).

Habitat	Area (ha) / length (km)	% of Principal Site area	Notable Habitat	Biodiversity Importance	Rationale for Biodiversity Importance
			LBAP habitat in Lincolnshire and Nottinghamshire		
Hedgerows with trees (intact and defunct)	2.97km	-	HaPI. LBAP habitat in Lincolnshire and Nottinghamshire	County	HaPI and legally protected under the Hedgerows Regulations (Ref. 9-12). Some hedgerows may contain veteran trees.
J2.4 – Fence	1.37km	-	No	Site	Not a HaPI.
J2.6 - Dry ditch	13.67km	-	No	Site	Not a HaPI.
J3.6 – Buildings	0.19ha	<0.1	No	Site	Not a HaPI.
J4 - Bare ground	5.09ha	0.4	No	Site	Not a HaPI.
J5 – Other habitat	5.47ha	0.4	No	Site	Not a HaPI.
A3.1 – Broadleaved parkland/scattered trees	2.37km	-	No	Site	Not a HaPI.
Unclassified	35.60ha	2.6	-	-	Areas within the Principal Site that have not yet been fully surveyed on the ground for habitat composition.

Protected and notable species and invasive non-native species

- 9.6.14 The data search returned records of protected and notable species and scheduled invasive non-native species within the Scheme Boundary and the 2km search radius from the Scheme Boundary for the preceding ten years. These protected and notable species, including species of conservation importance, and invasive non-native species can be reviewed in **PEI Report Volume II Appendix 9-2**.
- 9.6.15 Table 9-8 presents a summary of protected or notable animal species that have been identified, as of January 2023, through a combination of desk study and/ or ecological surveys as present, or potentially present, within the Scheme Boundary and Survey Areas (see Table 9-1) alongside an evaluation and justification of each receptors importance / value (sensitivity).
- 9.6.16 The assessment of biodiversity importance of species has been made for the entirety of the Scheme Boundary, where sufficient information of protected or notable animal species has been gathered from the desk study and/ or surveys undertaken to date. This assessment will be further updated by ongoing surveys within the relevant survey windows in 2023 and will be presented within the final ES. Where the biodiversity importance of a receptor is specific to a particular area of the Scheme Boundary (e.g. occurring within the Principal Site only), then this is specified with population size or specific species in Table 9-8.

Table 9-8: Summary of Baseline Details for Protected and Notable Species, recorded as of January 2023, alongside assessment of Biodiversity Importance of Ecological Features

Ecological feature and technical appendix	Baseline Detail	Nature Conservation Receptor	Biodiversity Importance	Rationale for Biodiversity Importance
Breeding birds (PEI Report Volume I, Appendix 9-4)	Breeding assemblage of 55 bird species within the Principal Site	Assemblage of breeding birds, including specially protected species, within the Principal Site	Species Diversity is of County Importance Population of Skylark is of District Importance	No species are present within the Principal Site in numbers of national significance, i.e., 1% or more of the UK population. Species recorded within the survey area, included on Annex 1 of the EU Birds Directive (Ref. 9-1) or Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended) (Ref. 9-5), and with single territories (of each species) confirmed or thought probable / possible included: Quail, Barn Owl and Hobby. Fourteen SPI (Ref. 9-10) were recorded within the survey area.

Ecological feature and technical appendix	Baseline Detail	Nature Conservation Receptor	Biodiversity Importance	Rationale for Biodiversity Importance
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				<p>Twelve species, included on the Birds of Conservation Concern (BoCC) Red List (Ref. 9-67) and 15 species, included on the BoCC Amber list (Ref. 9-67), were recorded within the survey area. The remaining species are all included on the Green list and are of least conservation concern.</p>
<p>Badger (PEI Report Volume I, Appendix 9-5)</p>	<p>At least one Badger clan recorded within the Principal Site.</p>	<p>Presence of this species within the Principal Site.</p>	<p>Local</p>	<p>Protected under The Protection of Badgers Act 1992 (Ref. 9-11), however, they remain common and widespread throughout Lincolnshire and Nottinghamshire.</p>
	<p>The data search returned records of Brown Hare within the Study Area. Brown Hare was recorded within the Principal Site during other ecological surveys.</p>	<p>Presence of this species confirmed within the Principal Site and assumed throughout the Scheme Boundary.</p>	<p>Local</p>	<p>SPI in England (Ref. 9-10) and Local BAP species in Lincolnshire (Ref. 9-68). No surveys have or will be undertaken for Brown Hare. However, Brown Hare was recorded in arable land during other ecological surveys undertaken to date and when considering the amount of arable habitat within the Scheme Boundary, an assumption has been made that this species is located throughout the Scheme Boundary.</p>
	<p>The data search returned records of Hedgehog within the Study Area. The species has the potential to occur across the Scheme Boundary.</p>	<p>Assumed presence within Scheme Boundary.</p>	<p>Local</p>	<p>SPI in England (Ref. 9-10) and Local BAP species in Lincolnshire (Ref. 9-68) and Nottinghamshire (Ref. 9-69). No surveys have or will be undertaken for Hedgehog. However, an assumption has been made this species is likely to be present across the Scheme Boundary. Widespread and abundant in Lincolnshire and</p>

Ecological feature and technical appendix	Baseline Detail	Nature Conservation Receptor	Biodiversity Importance	Rationale for Biodiversity Importance
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				Nottinghamshire, but declining.
European Eel <i>Anguilla anguilla</i>	No Environment Agency fish surveys have been undertaken within the search area for the project, but records of European eel were found at Squires Bridge on the River Till, just outside of the search radius.	Possible presence within Scheme Boundary and in connected water bodies	County	Afforded protection under the Eels (England and Wales) Regulations 2009, which places a requirement on developers to ensure continued eel passage and to prevent eel entrainment.
Spined Loach <i>Cobitis taenia</i>	Records of Spined Loach were found within a water body within the Scheme Boundary.	Assumed presence within Scheme Boundary	County	Listed in Annex II of the European Commission Habitats and Species Directive and Appendix III of the Bern Convention.
Fish species known to be present in the River Trent	Records of migratory species Atlantic Salmon <i>Salmo salar</i> , Brown (or Sea Trout <i>Salmo trutta</i>) and a species of Lamprey.	Present within Cable Route Corridor Boundary in River Trent and tributaries	County	All fish species and their habitats are afforded protection under the Salmon and Freshwater Fisheries Act; Atlantic Salmon and Lamprey species are listed in Annex II of the Habitats Directive; all fish species, with the exception of Brook Lamprey <i>Lampetra planeri</i> , are SPI.
Invasive non-native species	The data search recorded a non-native, but non-invasive, freshwater amphipod shrimp <i>Crangonyx psuedogracilis/floridanus</i> at the Environment Agency Fillingham Beck	Possible presence within Scheme Boundary	County	Although these species are not listed as invasive non-native species in Schedule 9 of the WCA (1981), their spread should be avoided.

Ecological feature and technical appendix	Baseline Detail	Nature Conservation Receptor	Biodiversity Importance	Rationale for Biodiversity Importance
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monitoring site in 2016. There were also records of the non-native but non-invasive New Zealand mud snail *Potamopyrgus antipodarum* within the Study Area, between 2013 and 2016.

9.6.17 A summary of desk study data, used to determine the further surveys required within the Scheme Boundary and a summary of partial datasets collected from field surveys in 2022 (such as eDNA for Great Crested Newt) is presented in Table 9-9. Data gathered from these surveys in 2023 will be presented in the final ES.

Table 9-9: Summary of data for the Study Area for protected and notable species found from the data search and from limited field surveys in 2022

Ecological feature	Desk study results
Flora/plants	<p>The desk study identified records of notable plants occurring within the Study Area (but outside of the Scheme Boundary), including, Bluebell <i>Hyacinthoides non-scripta</i> and Tasteless Water-pepper <i>Persicaria mitis</i>.</p> <p>The data search returned no records of protected macrophyte species within the search area. The field surveys identified several macrophyte species, but none of these were notable species.</p> <p>The Phase 1 Habitat survey and field surveys to date did not record any notable or protected plant species. However, further investigation of the arable field margins and other notable habitats will be required to determine their value.</p>
Terrestrial invertebrates	<p>The data search returned no records of protected or notable terrestrial invertebrate species occurring within the Study Area.</p> <p>However, there are grassland margins and scrub habitats present across the Scheme Boundary that may support protected and notable invertebrate species.</p>
Aquatic invertebrates	<p>The data search returned records of aquatic invertebrates, including Willow Emerald Damselfly <i>Chalcolestes viridis</i> (formerly <i>Lestes viridis</i>). No protected aquatic invertebrate species were identified within the desk study nor field surveys that were undertaken in the Principal Site. There were no records of White-clawed Crayfish <i>Austropotamobius</i></p>

Ecological feature Desk study results

pallipes nor the invasive non-native American Signal Crayfish *Pacifastacus leniusculus*.

There are aquatic habitats present with the Scheme Boundary, including the Cable Route Corridor (where further surveys are pending) (e.g. ponds and watercourses) with potential to support notable aquatic invertebrate species and assemblages.

Amphibians The desk study identified four amphibian species (Great Crested Newt *Triturus cristatus*, Smooth Newt *Lissotriton vulgaris*, Common Frog *Rana temporaria*, and Common Toad *Bufo bufo*) occurring within the Study Area, but outside of the Scheme Boundary.

eDNA surveys of four waterbodies within the Principal Site undertaken in June 2022, did not identify the presence of Great Crested Newt. Further eDNA surveys and investigation of ponds relevant to the Scheme (where these were not surveyed in 2022 due to changes in the Scheme Boundary outside of the relevant survey window in 2022) will be undertaken within the appropriate survey windows in 2023 to determine their potential suitability for Great Crested Newt and other amphibians.

Reptiles The data search returned small numbers of Grass Snake *Natrix helvetica* within 2km the Study Area (but outside of the Scheme Boundary) and a single record of Common Lizard *Zootoca vivipara* outside of the Scheme Boundary.

Reptile habitat is limited across the Scheme Boundary, but small pockets of habitat suitable for reptiles do exist comprising uncropped field margins, hedgerows, woodland edge habitats and ditches.

Bats The data search returned records of at least eight bat species (Brown Long-eared *Plecotus auritus*, Common Pipistrelle *Pipistrellus pipistrellus*, Noctule *Nyctalus noctule*, Brandt's bat *Myotis brandtii*, Natterer's bat *Myotis nattereri*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Nathusius's Pipistrelle *Pipistrellus nathusii*, Daubenton's bat *Myotis daubentonii*, and a species of *Myotis*) occurring within the Study Area. The desk study identified roosts of two species of bat (Common Pipistrelle and Brown Long-eared Bat) within 2km of the Scheme Boundary and mature trees / woodland within the Scheme Boundary as being may be of 'high' potential to support roosting bats. The Scheme Boundary contains trees, woodlands and buildings which have the potential to support roosting bats. The habitat within the Scheme Boundary also provides connectivity and foraging resources for bats.

Other mammals The desk study did not return any records of other mammals listed on S41 of the NERC Act (Ref. 9-10), such as Polecat or Harvest Mouse *Micromys minutus*.

The habitat within the Scheme Boundary, such as woodland and hedgerows has the potential to support this species.

Otter The data search returned records of Otter within the Study Area, including from within the Scheme Boundary and the watercourses and

Ecological feature Desk study results

	water bodies occurring within the Scheme Boundary have the potential to support Otter.
Water Vole	<p>The data search returned records of Water Vole within the Study Area, including within the Scheme Boundary.</p> <p>The watercourses and water bodies occurring within the Scheme Boundary have the potential to support Water Vole.</p>
Invasive Non-native Species (INNS)	<p>The data search returned records of five invasive non-native species, including Mitten Crab <i>Eriocheir sinensis</i>, New Zealand Mud Snail <i>Potamopyrgus antipodarum</i> and freshwater amphipod shrimp <i>Gammarus fasciatus</i>, American Mink <i>Mustela vison</i>, New-Zealand Pigmyweed <i>Crassula helmsii</i>, Himalayan Balsam <i>Impatiens glandulifera</i> and Japanese Knotweed <i>Reynoutria japonica</i>.</p> <p>There is potential for invasive non-native species to be present within the Scheme Boundary although no invasive non-native species were recorded within the Scheme Boundary during field surveys. These species will continue to be surveyed for.</p>

Future Baseline

- 9.6.18 The future baseline (no development) scenarios are set out in **PEI Report Chapter 5: EIA Methodology**.
- 9.6.19 This section considers those changes to the baseline conditions, described above, that might occur in the absence of the Scheme and during the time period over which the Scheme would be in place.
- 9.6.20 In the short to medium term, in the absence of the Scheme, habitats within the Scheme Boundary (such as arable fields (cropped on rotation), mature trees, hedgerows, ponds and woodland) have and will continue to provide a number of species with potential habitat for foraging and reproduction, such as arable farmland for ground-nesting breeding birds. In the long term, in the absence of the Scheme, habitats within the Principal Site will be under agricultural management and therefore the concerning low biodiversity of this landscape and the damaged soil, poor water quality and artificially low water tables will remain, making recovery of these ecosystems harder to achieve. The distribution of some species will change in response to changes in crop type, whilst the assemblages are likely remain broadly the same. Any changes to the baseline between now and the future scenario have been taken into account in the assessment and when determining mitigation measures.
- 9.6.21 Irrespective of whether the Scheme were to proceed or not, the current national, regional and local trend is for a decline in species diversity and abundance, e.g. farmland birds. These declines are likely to continue in the landscape surrounding the Scheme throughout its duration.

Construction Period (2025-2027)

- 9.6.22 Based on current trends, in the absence of the Scheme, species abundance and diversity are likely to remain similar to the existing baseline conditions

during the construction period, although the trajectory for the many species is continued decline.

- 9.6.23 If the Scheme did not proceed, the majority of existing habitats are likely to continue being present, although some changes in habitat extent, composition and structure will occur as a result of ecological succession, e.g. the gradual establishment of tree and shrub seedlings within woodland areas and along hedgerows. These resultant gradual changes in habitat composition are unlikely to materially alter the ecological baseline and therefore the habitats and species present are very unlikely to undergo significant change prior to 2025 and up to 2027.

Operation

- 9.6.24 Based on current projections the long-term, will see extreme weather conditions due to climate change (see **PEI Report Volume I Chapter 7: Climate Change**) to which the arable landscape has low resilience. For example, heavy and prolonged rainfall would exacerbate loss of soil and sedimentation of ditches, drains and rivers. There would be a continued decline in biodiversity, including species associated with the baseline conditions present within the Scheme Boundary.
- 9.6.25 Local planning policy targeted at halting and reversing these declines is presented in **PEI Report Volume II Appendix 9-1**.
- 9.6.26 If the Scheme did not progress, based on available information, whilst there is likely to be an overall decline in biodiversity, there are no reasons to expect that there would be any marked change in the broad habitat types associated with the Scheme between opening and decommissioning. Habitats such as broad-leaved trees and scrub will be more mature but are likely to support a broadly similar species assemblage and arable farmland will also be managed accordingly, maintaining broadly similar species assemblages.

Decommissioning

- 9.6.27 In the absence of the Scheme, the future baseline conditions are currently unknown and more difficult to predict given the time period that would need to lapse between now and then. Habitats such as plantation woodland would have matured further, though some may have been felled or partially cropped. Species assemblages are also likely to have changed in accordance with the site conditions, with changes in biodiversity likely to occur if climate change continues at its current pace. Effects could include changes in species habitats and compositions and consequently changes in species assemblages and distribution.

Important Ecological Features

- 9.6.28 Table 9-10 summarises the known IEF that are relevant to the Scheme, based on survey data collected to date. Based on CIEEM guidelines (Ref. 9-34) and using professional judgement, features of Site importance, i.e. less than Local importance, are not considered further in the assessment process, unless legislation requires their consideration. Therefore, in recognition of the protected status of species occurring at a local level (e.g. the general wintering

bird assemblage), the Scheme will embed appropriate mitigation to minimise impacts in line with the relevant legislation.

Table 9-10: Summary of known Important Ecological Features (IEFs) as of January 2023

IEF	Biodiversity Importance (Table 9-2)	Reason for valuation
Ashton's Meadow National SSSI		Statutory site of nature conservation importance and therefore qualifies as High Importance.
14 sites of county importance (LWSs – see Table 9-7)		Non-statutory sites of nature conservation importance, qualifying as Medium Importance.
Habitat – broad-leaved woodland (semi-natural)		Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Therefore, this habitat qualifies as being of Medium Importance.
Habitat – semi-improved neutral grassland (Coastal and Floodplain Grazing Marsh)		Coastal and Floodplain Grazing Marsh either side of the River Trent qualifies as a habitat of ecological importance included as a Priority Habitat and LBAP habitat. Therefore, this habitat qualifies as being of Medium Importance.
Habitat – Standing Water		The ponds within the Principal Site do not meet Priority criteria, and do not support any notable species, thus are considered of Low importance.
Habitat – Running Water		The River Trent is within the Scheme Boundary and qualifies as being of Medium Importance. Surveys of the network of ditches with running water did not identify any notable macroinvertebrate, macrophyte or fish species, and are mostly of Low conservation value. However, the ditches are likely to support protected species, such as bats and Water Vole, therefore these would also qualify as being of Medium Importance.
Habitat – hedgerows		The network of hedgerows across the Scheme Boundary will be of value to birds, bats and other fauna, therefore hedgerows qualify as being of Medium Importance.
Aquatic macroinvertebrates and macrophytes		There were no notable aquatic macroinvertebrate or macrophyte species recorded within the Scheme Boundary and within 2 km of the site, or within the site. There were five uncommon (by the Freshwater Habitat Trust) macrophyte species recorded within one of the ponds, but these species are

IEF	Biodiversity Importance (Table 9-2)	Reason for valuation
		of Least Concern. Therefore, aquatic macroinvertebrate and macrophyte communities qualify as being of Negligible Importance.
Fish	County	European Eel is listed in Annex II of the Habitats Directive and is a SPI. European eel is afforded protection under the Eel Regulations, which places an onus on developers to maintain eel passage and prevent eel entrainment. Spined Loach was present within the same water body; this species is listed on Annex II of the European Commission Habitats and Species Directive (3) and Appendix III of the Bern Convention. It is relatively widespread in central and eastern England. European Eel and Spined Loach are both listed on Section 41 of the NERC Act. Therefore, these species would qualify as being of Medium Importance.
Breeding Birds (General breeding bird assemblage)	Up to County	Populations of common and notable breeding bird species, of up to County importance, and therefore qualifies as being of Medium Importance.
Breeding birds – territories of Skylark within the Principal Site	District	Population of Skylark within the Principal Site qualifies as being of Medium Importance.
Breeding birds – territories of specially protected species within the Principal Site.	Local	Population of Quail, Hobby and Barn Owl, within the Principal Site qualifies as being of Low Importance.
Badger	Local	Badgers occurring within the Scheme Boundary are of Low importance, due to the presence of a single Badger clan within the Principal Site.
Other mammals (Brown Hare and Hedgehog)	Local	Presence likely across the Scheme Boundary and both species would qualify as being of Low Importance.

9.6.29 Identification of further IEFs, will be determined by the ongoing field surveys during 2023 and, if appropriate, following the criteria mentioned within this chapter, will be presented in the ES.

9.7 Embedded Design Mitigation

9.7.1 This section contains the mitigation measures relevant to this chapter that are already incorporated into the Scheme design, as described in **Chapter 3: Scheme Description**.

9.7.2 These measures are provided on the basis of baseline conditions known at the time of reporting. It is anticipated that further measures may be required as the baseline conditions are fully established. If required, the scheme design will be further refined to include more embedded mitigation, as appropriate, should forthcoming baseline data suggest it is required or would be advantageous. Any such measures will be confirmed within the final ES and detailed proposals submitted with the DCO application.

Construction

9.7.3 Primary mitigation measures will be embedded into the Scheme to minimise construction impacts and these will be formalised through the implementation of the Framework CEMP that will detail the measures required to mitigate any construction related effects on biodiversity, including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. A Framework CEMP is included within **PEI Report Volume II Appendix 3-1**.

9.7.4 This embedded mitigation is needed to successfully integrate the Scheme within the context of the existing landscape and prevent or reduce any adverse effects on ecological features.

9.7.5 The Framework CEMP will include measures to manage the environmental effects of the Scheme and to demonstrate compliance with environmental legislation. The following standard mitigation measures secured through the Framework CEMP will be implemented during construction to protect retained vegetation, designated sites, protected species and other areas of biodiversity value from disturbance, damage and accidental pollution:

- The design of the Scheme will comply with good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management, noise prevention or amelioration.
- Existing watercourse crossing points will be used for construction access, where practicable, to avoid additional watercourse crossings being required.
- Within the Cable Route Corridor, the crossing of the River Trent will be undertaken using HDD methods to lay cabling, therefore avoiding impacts to watercourses, including the Coastal and Floodplain Grazing Marsh either side of the River Trent, with launch and exit pits located outside of this habitat, which is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to the River Trent, the Coastal and Floodplain Grazing Marsh and Otter, which potentially use the river for commuting and foraging.

- The Framework CEMP will specify requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel), to prevent them reaching standing and running waters through flood events during construction. It will ensure that those involved with the construction stages are committed to agreed best practice and meet all relevant environmental legislation including the Hazardous Waste Regulations 2005. A full list of crossing methods and an explanation of these techniques is provided in **PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water** (which includes hydrology and water pollution).
 - Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to bats and other species. Temporary construction site lighting will need to be deployed in accordance with the following recommendations to prevent or reduce the impact on human and ecological receptors:
 - The use of lighting will be minimised to that required for safe site operations and security;
 - Lighting will be controlled by infrared settings;
 - Lighting will utilise directional fittings to minimise outward light spill and glare (e.g. via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and
 - Lighting will be directed towards the middle of the Scheme Boundary rather than towards the boundaries.
- 9.7.6 A Scheme drainage strategy will be developed to manage surface water runoff and will reduce the likelihood and severity of potential pollution incidents and flooding affecting watercourses and the local ditch network to reduce or eliminate adverse effects for aquatic and riparian species and habitats.
- 9.7.7 The following Scheme design, impact avoidance and embedded mitigation measures have been incorporated to avoid, reduce or minimise effects on biodiversity:
- A perimeter deer fence around the Scheme (of between 1.8m and 2.5m in height) will be implemented early in the construction phase to secure the Scheme Boundary. The fence design will include gaps to allow mammals, including Badgers, to pass underneath at strategic locations. This fence will also prevent construction activity in proximity to designated sites and habitats retained within and adjacent to the Scheme Boundary.
 - The Scheme has been designed so that impacts upon important habitats (including woodland, running water and ponds) are avoided. Measures to ensure incursion into these habitats does not occur will be put in place, e.g. security (deer) fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

- Throughout the Scheme Boundary, undeveloped buffers will be included with the Scheme to protect hedgerows, individual trees and ponds during construction. These buffers will include:
 - 10m from the centre-line of watercourses to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to water courses and any protected species (such as Water Vole) that use them.
 - Specific tree protection measures will be implemented, including fencing and construction exclusion zones. Tree Root Protection fencing will be erected around retained trees, in line with British Standard *BS 5837: Trees in relation to design, demolition and construction – Recommendations* (Ref. 9-70) and these undeveloped buffers will be of at least 15m from the boundary of woodlands, tree lines, individual trees and hedgerows with trees and at least 5m from hedgerows without trees (as measured from edge of the woodland or hedgerow boundary). For individual veteran/ancient trees (including those on the edge of woodlands) the distance as measured from the trunk should be 15 times larger than the diameter of the tree and 5m from the edge of the canopy if this distance is greater. An Arboricultural Impact Assessment will be prepared to accompany the DCO application.
 - Reasonable avoidance measures, including appropriate buffers (of up to 30m) around any identified Badger setts, or trees with bat roost potential (a buffer of 15m) throughout the Scheme Boundary.
- Within some of these buffers, natural regeneration of woodland will create additional scrub and woodland habitat. Other areas will be managed as grassland.
- Pre-construction surveys will be undertaken to validate and, where necessary, update the baseline survey findings. The purpose of these pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. This will also be required for any protected species licensing that may be identified as being necessary at detailed design stage.
- Mitigation strategies will be prepared for protected species and where required, application for species licences from Natural England for any relocation of animals away from construction areas (sufficiently in advance of the works to meet with the optimum time for mitigation and to minimise any changes to the construction programme).
- In the case of any construction of watercourse crossings, culverting of water bodies, and the extension of existing culverts, construction should ensure that connectivity is maintained along watercourses to allow Eel passage and connectivity for other aquatic species. Fish rescues may be required if draw-down or over-pumping is required during construction. Open-trenching for pipeline crossings will be avoided and HDD methods undertaken, for all watercourse crossings and where practicable.

- Vegetation clearance will avoid the nesting bird period, where practicable i.e., March to August (inclusive), however, should any vegetation clearance be required within the nesting bird period this will be checked, prior to vegetation removal, for the presence of nesting birds, by a suitably qualified ornithologist. If active nests are found, then these will be avoided with appropriate buffer zones put in place and the area monitored until the young birds have fledged and, or the nesting attempt has ceased.
- Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year so as to avoid incidental injuring or killing of reptiles and amphibians (if present), concordant with the requirements for other species, such as nesting birds and Brown Hare.
- Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas and preventing them from falling into and becoming trapped in excavations. No excavations will remain open overnight and if excavations are required to be left open, ramps will be provided to allow animals a means of escape.
- Throughout the Scheme Boundary, new habitats will be provided to increase the biodiversity of the Scheme and will include bare ground, grassland, 'cover crops', hedgerows, tree and scrub planting. These habitats will provide landscape scale benefits for wildlife through increased habitat provision and connectivity and will be of value to a wide range of fauna, including farmland birds such as Skylark and Yellowhammer. Habitat creation within the Principal Site will include:
 - Grassland to be provided adjacent to and beneath the solar PV panels in the Principal Site, including in larger open fields, to increase the diversity of flora in comparison to existing intensive agriculture and provide new habitat niches to encourage other fauna such as invertebrates and birds, such as Skylark.
 - Vegetation would be established through natural regeneration or from seed collection from the grasslands identified within the Scheme Boundary and through a suitable long-term habitat management regime. Consideration will be paid to microclimatic conditions when identifying appropriate species.
 - Gaps in currently defunct hedges will be planted with suitable native species to improve the connectivity of habitats (such as between ancient and other broad-leaved woodland) within and adjacent to the Scheme Boundary.
 - New areas of tree planting will be provided to create screening from Scheme infrastructure, improve habitat connectivity and increase the area of hedgerow (and woodland habitat) within the Scheme Boundary. Tree planting will be avoided in any areas where there may be ecological features which require open landscapes.

- Hedgerows and trees will be allowed to grow tall and wide to provide maximum benefits for biodiversity and this natural regeneration will encourage a mosaic of successional habitats, forming broad habitat corridors throughout the Scheme.
- Planting of aquatic macrophyte and riparian species to enhance water bodies and riparian/marginal habitats. Removal of selected shrub will also be done to reduce shading in the channel and promote macrophyte growth.
- For the purposes of BNG, the habitat creation for the Scheme will seek to achieve overall net gains in habitat units for biodiversity and for river and hedgerow habitats. Whilst the majority of habitat potentially to be lost is of low ecological value and of no more than Local importance, e.g. arable farmland, embedded design measures described above will be used in the final assessment to ensure no net loss in important habitat types.
- Pre-construction and pre-decommissioning surveys will be undertaken to provide an update on the presence and location of any invasive species, the findings of which will inform the implementation of measures to prevent their spread into the wild. These surveys will inform the production of a Biosecurity Management Plan which will set out procedures to ensure that no invasive species are brought onto the Scheme Boundary (e.g. Wildlife and Countryside Act 1981 (as amended) (Ref. 9-5) Schedule 9 species) and will be secured through the Framework CEMP and DEMP, submitted with the ES. In the event that any future infestations of invasive non-native species are identified prior to and or during the development process, exclusion zones will be established around them and an Ecological Clerk of Works (ECoW) contacted for advice as required.

9.7.8 The ongoing baseline surveys are likely to record further important ecological features which will need consideration in the final Scheme design. The specifics and quantity of any such mitigation will be informed by the baseline surveys and appropriate mitigation incorporated into the Scheme design submitted with the DCO application.

Operation

9.7.9 A Framework OEMP, to be submitted with the DCO application, will detail the measures required to minimise operational impacts, including:

- No part of the Scheme will be continuously lit. Manually operated and motion-detection lighting will be utilised for operational and security purposes around electrical infrastructure such as inverters, transformers and switchgear across the Principal Site, and within the compounds and substations. Lighting will be directed downward and away from boundaries. No visible lighting will be utilised at the site perimeter fence, aside from the site entrance points.
- The Scheme drainage strategy will include measures to manage surface water runoff during operation and will reduce flooding affecting

watercourses and the local ditch network to reduce or eliminate adverse effects for aquatic and riparian species and habitats, where these occur.

- Where watercourses and ditches are to be culverted, the culvert will be designed to ensure continued fish passage by having a natural bed and no drop inlet or outlet.
- The creation and subsequent management of habitats will be determined by the characterisation of the existing baseline. However, management will seek to maximise floristic diversity, which will require low density and short frequency, sheep grazing (conservation grazing) or an appropriate, sensitive mowing regime.

Decommissioning

- 9.7.10 A Framework DEMP, to be submitted with the DCO application, will be produced to set out measures to mitigate any decommissioning related effects on biodiversity. Pre-decommissioning surveys are likely to be required to inform on any mitigation and protected species licensing, as required at the time of decommissioning.

9.8 Assessment of Likely Impacts and Effects

- 9.8.1 The Scheme as outlined in **PEI Report Volume I Chapter 3: Scheme Description** has been considered in assessing the likely impacts and effects of the Scheme, whilst considering the embedded mitigation described in the previous section.

Potential Impacts

- 9.8.2 Prior to the implementation of any mitigation, the Scheme has the potential to affect biodiversity (positively or negatively), during construction, operation and decommissioning, in the following ways.

Construction (2025-2027)

- 9.8.3 Impacts on biodiversity features during construction of the Scheme are likely to include:
- Habitat loss or gain – direct impacts associated with changes in land use resulting from the Scheme, for example temporary works associated with site clearance, and permanent land-take (mainly arable land) associated with the installation of the Scheme.
 - Fragmentation of populations or habitats – indirect impacts due to the Scheme dividing a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function.
 - Disturbance – indirect impacts resulting from a change in normal conditions (light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range.
 - Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, for example changes in chemical water quality or changes in surface flow or groundwater.

- Species mortality – direct impacts on species populations associated with mortalities due to construction activities, for example site clearance.
- Introduction of invasive species, due to the movement of personnel, equipment and plant machinery, potentially facilitating the introduction of invasive species.

Operation

9.8.4 Impacts on biodiversity features during the operational phase of the Scheme are likely to include:

Negative impacts:

- Potential attraction of aquatic invertebrates to solar panels, causing displacement and mortality;
- Potential avoidance of species using the Scheme Boundary, such as bats and birds, due to indirect impacts through operational lighting;
- Disturbance of sensitive species during operational maintenance activities; and
- Fragmentation of habitats causing a barrier effect, e.g. due to fencing.

Beneficial impacts:

- Increases in permanent habitat of greater floristic diversity than arable farmland, increasing invertebrate assemblages and abundance;
- Potential attraction and increases in species foraging around the Scheme Boundary, such as bats and birds, from increases in prey items (i.e. flying insects);
- Potential increases in abundance and distribution of species, due to lack of human disturbance and changes in habitat (such as agricultural practices) within the Scheme Boundary; and
- Indirect beneficial impacts through a possible reduction of agricultural chemical inputs to watercourses /reduction in pesticide use on crops within the local area resulting in an increase in invertebrate abundance and diversity.

Decommissioning

9.8.5 Field surveys would be required in advance of decommissioning to define the ecological baseline at the time of decommissioning and to ensure that impacts on ecological features are identified. Upon decommissioning, the above-ground physical infrastructure will be removed and the Scheme Boundary returned to landowners in the condition as at the end of operation, including the established habitats. An initial consideration of potential impacts and effects arising from the construction, operation and decommissioning phases of the Scheme on the IEFs identified in Table 9-10 is provided in Table 9-11 to Table 9-12, to set the requirements for the more detailed assessment that follows. The initial screening, presented in Table 9-11 to Table 9-12 is based on the characterisation of the baseline conditions to date, in the absence of any mitigation over and above that which is embedded in the design. The further surveys identified in Table 9-1 may identify additional IEFs to those presented in Table 9-10. An assessment of the likely impacts and potential effects of the Scheme on any additional IEFs identified following submission

of the PEI Report will be presented in the ES. As such, it provides a 'worst case' assessment based on the information that is available in support the PEI Report.

Sites statutorily and non-statutorily designated for their biodiversity value

- 9.8.6 The statutory and non-statutory designated sites that have been considered are presented in Table 9-11. Where there is the potential for significant effects on known IEFs then this is stated and the relevant receptors assessed.

Table 9-11: Determination of relevant ecological features – Designated Sites

IEF	Importance	Potential Impacts	Potential for an effect to occur?
Ashton's Meadow SSSI (located 1.5km from the Scheme Boundary)	High	<p>Construction: This SSSI (primary designation being grassland habitats) is 1.5km to the west of the Cable Route Corridor and there are no ecological or hydrological connections between this SSSI and the Scheme. Given the distance between the Scheme Boundary and Ashton's Meadow SSSI, there will be no direct impacts on habitat within the SSSI; no fragmentation of habitats, or of populations of species using habitats, within Ashton's Meadow SSSI; no impact on the integrity or the functioning of Ashton's Meadow SSSI (through dust generation, noise or visual disturbance); no construction related pollution that would affect the SSSI as standard environmental protection measures will be adopted during construction (and formalised in the Framework CEMP); and no species mortality of any species associated with Ashton's Meadow SSSI. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Ashton's Meadow SSSI.</p> <p>Operation: The distance between the SSSI and the Cable Route Corridor is 1.5km and there are no pathways (e.g. habitat loss or disturbance to designated site features occurring during operation of the Scheme (such as through noise, water quality changes, lighting or visual)), during operation of the Scheme that could affect Ashton's Meadow SSSI.</p> <p>Decommissioning: The decommissioning of the Scheme will not directly impact on habitat within Ashton's Meadow SSSI, owing to the distance between this SSSI and the Scheme Boundary. There will be no fragmentation of habitats, or of populations of species using habitats, within Ashton's Meadow SSSI during decommissioning. There will be no disturbance to this SSSI, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to remove or reduce impacts during decommissioning will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	No
Upton Grange Road Verges	Medium	<p>Construction: Upton Grange Road Verges LWS, Wilingham to Fillingham Road Verges LWS and Cow Pasture Lane Drain LWS are within the footprint of the Cable Route Corridor and these LWSs are designated for their habitat. It should be possible to avoid these LWSs and route the working area away from the LWS,</p>	Yes – subject to Cable

IEF	Importance Potential Impacts	Potential for an effect to occur?
LWS, Willingham to Fillingham Road Verges LWS, Cow Pasture Lane Drains LWS (within the Cable Route Corridor)	<p>with setbacks of 10m to protect riparian habitats outside of the construction area. The exact habitat composition of the LWSs within the footprint of the Scheme has not been determined and will be surveyed in detail in 2023.</p> <p>Dependent on the construction methods used to install the Cable Route Corridor, there is potential to directly impact on habitat within Cow Pasture Lane Drain LWS along a working area 30m to 40m wide. Methods such as HDD would not directly impact upon habitats within the LWSs, although the exact route and construction methods to be used are yet to be defined. Once defined, measures to remove or reduce impacts on the LWSs will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p> <p>Construction of the Cable Route Corridor will lead to temporary fragmentation of habitats within the LWS. Boundary vegetation will be retained and protected, as much as is practicable, which will maintain connectivity for any species using the LWS.</p> <p>Any construction within the vicinity of LWSs may require temporary lighting, which has the potential to spill into adjacent habitats. With reference to PEI Report Volume I Chapter 3: Scheme Description, construction working hours will be 7am until 7pm Monday to Saturday and any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats. Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising sky glow, glare and light spillage. The direction of required construction lighting (facing away from LWSs and into the Scheme and existing boundary features (woodland/hedgerows)) will also reduce the potential for light spill on sensitive habitats from construction activities.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses hydrologically connected to these sites, which have the potential to adversely affect habitats within the LWSs and, consequently, species associated with such habitats. The implementation of standard environmental protection measures (such as dust suppression and pollution prevention) will be adopted during construction, formalised into the Framework CEMP. With the implementation of standard environmental protection measures, there will be no indirect impacts to LWSs which will affect their integrity.</p>	Route Corridor refinement and construction methods.

IEF	Importance Potential Impacts	Potential for an effect to occur?
	<p>There will be no species mortality of any species associated with LWSs, as a result of construction of the Scheme.</p>	
	<p>Operation: During operation of the Scheme, there are no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect these LWSs.</p>	No
	<p>Decommissioning: Buried cables are likely to remain <i>in situ</i> and therefore there would be no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect LWSs during decommissioning. However, where there is potential to remove buried cables, any decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to LWSs, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to remove or reduce impacts during decommissioning will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	No
<p>Cottam Wetlands LWS, Coates Wetland LWS, (located outside of the Scheme Boundary, but within 250m)</p>	<p>Construction: These LWSs lie outside the Cable Route Corridor (with Coates Wetland LWS adjacent to the Cable Route Corridor) and the construction of the Scheme will not directly impact on habitat within this non-statutory designated site.</p> <p>There will be no fragmentation of habitats, or of populations of species using habitats within Cottam Wetlands LWS during construction. Boundary vegetation, such as hedgerows and ditches will be retained.</p> <p>Preparation and construction of the Scheme will result in dust generation, along with noise and visual disturbance. Noise (see PEI Report Volume I Chapter 13: Noise and Vibration) and visual disturbance (see PEI Report Volume I Chapter 12: Landscape and Visual Amenity) will not impact on the integrity or the functioning of these LWSs. Furthermore, the construction of the Cable Route Corridor will be screened by existing vegetation.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses hydrologically connected to LWSs, which has the potential to adversely affect habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water)</p>	No

IEF	Importance Potential Impacts	Potential for an effect to occur?
	<p>will ensure that no indirect impacts to watercourses, which in turn could affect this LWS occurs. Standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p> <p>There will be no species mortality of any species associated with Cottam Wetlands LWS, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites.</p>	
	<p>Operation: During operation of the Scheme, there are no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect these LWSs.</p>	No
	<p>Decommissioning: These LWSs are outside of the Scheme Boundary and there are no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect LWSs during decommissioning and any impacts would be mitigated fully in line with legislation and policy requirements at the time of decommissioning. Measures to remove or reduce impacts during decommissioning will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	No
Cottam Ponds LWS, Broad Lane Grassland, North Leverton LWS, Torksey Ferry Road Ditch LWS, Mother Drain	<p>All Medium</p> <p>Construction: These non-statutory designated sites (all LWS) are all outside the Scheme Boundary, the closest of which is Cottam Ponds LWS, which is approximately 660m from the Scheme Boundary.</p> <p>The construction of the Scheme will not directly impact on habitat within these non-statutory designated sites. There will be no fragmentation of habitats, or of populations of species using habitats within any of these non-statutory designated sites during construction. Boundary vegetation, such as hedgerows and ditches will be retained.</p> <p>Construction of the Scheme will result in dust generation, along with noise and visual disturbance. Noise (see PEI Report Volume I Chapter 13: Noise and Vibration) and visual disturbance (see PEI Report Volume I Chapter 12: Landscape and Visual Amenity) will not impact on the integrity or the functioning of these sites, owing to the distance between these non-statutory designated sites and the Scheme Boundary. Furthermore, the construction of the majority of the Scheme will be screened by existing vegetation.</p>	No

Habitats and Species

- 9.8.7 The relevant ecological features that have been identified to date and therefore considered in this PEI Report, are presented in Table 9-12. Where there is the potential for significant effects on known IEFs, then this is stated and the relevant receptors assessed.

Table 9-12: Determination of relevant ecological features – Habitats and Species

IEF	Importance	Potential Impacts	Potential for an effect to occur?
Broad-leaved woodland	Medium	<p>Construction: This habitat was recorded within the Principal Site, with smaller copses likely to be present within the Cable Route Corridor. The construction of the Scheme will not directly impact broad-leaved woodland and measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing. Furthermore, buffers from woodland habitats are embedded into the design of the Scheme. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p> <p>There will be no fragmentation of woodland habitats, or of populations of species using woodlands, during construction. Boundary vegetation, such as hedgerows connecting woodland sites will be retained as much as is practicable, which will maintain connectivity for species across the Scheme Boundary.</p> <p>Buffer zones, of a minimum of 15m between woodland habitats and any development is embedded into the Scheme and standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application. With the buffer zones and implementation of standard environmental protection measures, there will be no indirect impacts to broad-leaved woodland. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon broad-leaved woodland during construction of the Scheme.</p> <hr/> <p>Operation: There are no impact pathways (e.g. habitat loss or degradation to woodland), No during operation of the Scheme which could affect broad-leaved woodland.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant legislative and policy requirements at the time of decommissioning. These measures will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
Semi-improved neutral grassland (Coastal and Floodplain and Grazing Marsh)	Medium	<p>Construction: This habitat was identified from MAGIC (Ref. 9-36) as occurring within the Cable Route Corridor. Where HDD methods are used to cross the River Trent and providing launch and exit pit avoid this habitat (which is either side of the River Trent), there will be no direct loss of coastal floodplain and grazing marsh habitat and there will be no fragmentation of habitats, or of populations of species using habitats, during construction. During construction, there is potential for pollutant spills and surface runoff into the floodplain habitats and these spills have the potential to adversely affect habitats and species associated with running water habitats. However undeveloped buffers from watercourses and standard environmental protection measures (see Section 9.7) will be implemented and adopted during construction, formalised through the Framework CEMP (PEI Report Volume II Appendix 3-1) and these measures will include dust suppression and pollution prevention. Consequently, indirect effects (such as disturbance and habitat degradation) to the floodplain habitats during construction will not occur.</p>	No
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect semi-improved neutral grassland as this habitat is within the Cable Route Corridor.</p>	No
		<p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant legislative and policy requirements at the time of decommissioning. These measures will be included within the Framework DEMP, submitted with the ES as part of the DCO application. However, buried cables under the River Trent are likely to remain <i>in situ</i> and therefore there are no pathways (e.g. habitat loss or disturbance to habitat features such as through noise, water quality, air quality, lighting or visual) which could affect this habitat during decommissioning.</p>	No
Standing Water	Low	<p>Construction: All standing water (ponds) present within the Scheme Boundary will be retained and measures embedded within the Scheme design to protect retained habitats during construction, such as that security fencing will be established at an early stage to protect retained habitats from incursion during construction. Therefore, there will be no direct loss of standing water habitat.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
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There will be no fragmentation of habitats, or of populations of species using standing water habitats (such as amphibians), during construction and marginal vegetation around ponds will be retained. Furthermore, surrounding habitat will be converted from arable to grassland, which will improve connectivity for any species associated with standing water (such as amphibians).

During construction, there is the potential that preparation and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact ponds, through surface water run-off. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP (**PEI Report Volume II Appendix 3-1**) submitted with the ES as part of the DCO application. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (**PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water**) to ensure that no indirect impacts to standing water habitats occurs. Consequently, pollution during construction will not affect the integrity of ponds and of those species using ponds.

There will be no species mortality of any species using standing water habitats during construction of the Scheme.

Therefore, there are no impact pathways, either directly or indirectly, that would impact upon standing water within the Scheme Boundary.

Operation: There are no impact pathways (e.g. habitat loss or degradation), during No operation of the Scheme which could affect standing water.

The change in land use from agricultural to solar will see benefits in the water table, which has previously been artificially lowered for the purpose of irrigation of arable fields. With 1,400 ha of arable fields no longer needing irrigation, there will be less water abstracted from surface waterbodies. New habitats created by the Scheme will see the removal of

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>agricultural chemicals from land parcels within the Scheme Boundary, reducing the quantity of agricultural run-off and chances of eutrophication in nearby rivers and ditches.</p>	
		<p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant legislative and policy requirements at the time of decommissioning. These measures will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	No
Running Water	Medium	<p>Construction: There will be no direct loss of running water habitat and there will be no fragmentation of habitats, or of populations of species using habitats, within the River Trent during construction.</p> <p>The Principal Site is within the Witham Upper Operational Catchment, and will likely cross the following catchments:</p> <ul style="list-style-type: none"> - Fillingham Beck (WFD water body ID: GB105030062490) - River Till (GB105030062411) - Eau de Source to Northorpe Beck (GB104028057970). <p>It is assumed that the Cable Route Corridor may cross further catchments:</p> <ul style="list-style-type: none"> - Till (Witham) (GB105030062500) - Tributary of the Till (GB105030062480) - Skellingthorpe Main Drain Water Body (GB105030062390) - Complex network of unnamed ditches, and tributaries flowing into the larger watercourses associated with the agricultural nature of this location. <p>Construction methods across the River Trent and all watercourses set out above will utilise HDD methods. There is no potential for any direct impacts on running water habitat along the Cable Route Corridor (see PEI Report Volume I Chapter 3: Scheme Description). Methods such as HDD, boring, micro-tunnelling or impact moling are all trenchless methods that would not directly impact upon running water habitats, although the exact route and construction methods to be used are yet to be defined. Once defined, these measures to remove or reduce impacts on running water will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
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During construction of the Cable Route Corridor, boundary vegetation will be retained and protected, as much as is practicable, which will maintain connectivity for any species using running water habitats. There are no protected aquatic invertebrates nor macrophyte species present, yet the protected European Eel could be present, and connectivity for eel passage will be maintained. Protected species surveys will be undertaken in 2023 to determine the presence of riparian mammals, e.g. Otter.

Any construction within the vicinity of watercourses may require temporary lighting, which has the potential to spill into the River Trent. Artificially lighting of these habitats may disrupt species' movements. Therefore, any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats. Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising sky glow, glare and light spillage.

During construction, there is potential for pollutant spills and surface runoff into the River Trent and other watercourses and these spills have the potential to adversely affect habitats and species associated with running water habitats. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP (**PEI Report Volume II Appendix 3-1**) and these measures will include silt fencing, dust suppression and pollution prevention, as well as construction at least 10 m from the bank tops of all watercourses. Consequently, indirect effects (such as disturbance and habitat degradation) to the River Trent and other watercourses during construction will not occur.

Where possible, site surface water will drain from the Scheme's SuDS based drainage system to local receiving watercourses via a new ditch as this avoids the need to construct an engineered outfall. However, if engineered outfalls are required, the location, position and orientation of them will be carefully designed to minimise any adverse impacts on aquatic habitats.

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>There will be no species mortality of any species associated with running water during construction of the Scheme. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon running water.</p> <hr/> <p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats and pollution), No during operation of the Scheme which could affect retained habitats. Benefits to running water from an increase in the water table and quality as for standing water.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant legislative and policy requirements at the time of decommissioning. Buried cables are likely to remain <i>in situ</i> and therefore there are no pathways (e.g. habitat loss or disturbance to habitats such as through noise, water quality, air quality, lighting or visual) which could affect this habitat during decommissioning. These measures will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	
Hedgerows	Medium	<p>Construction: Hedgerows are located across the Scheme Boundary. Whilst the embedded mitigation includes the retention and avoidance of the majority of hedgerows, there is the potential for a loss of sections of hedgerow during construction, to facilitate the Cable Route Corridor, new fence lines and access routes. These habitats will be restored, post-construction, but there is likely to be a temporary (short-term) adverse effect on this habitat type.</p> <p>Buffer zones, of a minimum of 5m between hedgerows and any solar development is embedded into the Scheme and standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application. With the buffer zones and implementation of standard environmental protection measures, there will be no indirect impacts to the majority of hedgerows.</p>	Yes

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during No operation of the Scheme which could affect hedgerows.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with legislation No and policy requirements at the time of decommissioning. Measures to remove or reduce impacts during decommissioning will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	
Breeding birds (General Medium breeding bird assemblage)		<p>Construction: The construction of the Scheme will lead to the loss of arable habitat, used No by a small number of breeding bird species such as Skylark (see below), a species that is ground-nesting and relies on open space. Habitats supporting the majority of the breeding bird assemblage, such as hedgerows and woodland areas will be retained, which will not affect the majority of breeding bird species found across the Scheme Boundary. The loss of any arable habitat will lead to the temporary displacement of ground-nesting breeding bird species reliant on this habitat, such as Skylark (see below) and will require replacement habitat. Retained habitats, such as hedgerows and woodland, will maintain occupation of the majority of breeding bird species and therefore the majority of breeding bird species found across the Scheme Boundary will not be affected.</p> <p>The construction of the Scheme will be undertaken over many months and will not impact upon retained habitats used by breeding birds (such as woodland and hedgerows), which will maintain connectivity across the Scheme Boundary for the majority of breeding bird species. Therefore, there will be no fragmentation of habitats used by breeding birds.</p> <p>Construction methods will include implementation of measures to minimise noise, lighting and vibration disturbance to breeding birds to ensure that, where construction of the Scheme is undertaken within the bird breeding season (typically March to August inclusive), then disturbance to breeding birds in adjacent and retained habitats will be minimised. These measures will be formalised in the Framework CEMP.</p> <p>The construction of the Scheme, if undertaken within the bird breeding season (typically March to August inclusive) has the potential to cause mortality to breeding birds in habitats that are to be removed. The majority of vegetation clearance will be undertaken outside of</p>	

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>this period. However, where construction cannot avoid nesting birds, then nesting bird checks will need to be undertaken by an ornithologist prior to construction (where this occurs within the breeding season) to ensure there is no species mortality. Therefore, there will be no species mortality of any breeding bird species associated during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the general breeding bird assemblage.</p> <p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), No during operation of the Scheme which could affect breeding birds.</p> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant No legislative and policy requirements at the time of decommissioning. Measures to remove or reduce impacts will be included within the Framework DEMP submitted with the ES as part of the DCO application.</p>	
<p>Breeding birds - Medium Population of Skylark within the Principal Site</p>		<p>Construction: The loss of arable habitat, which in turn will lead to the displacement of breeding Skylark reliant on this habitat, will be avoided and mitigated through the retention of existing grassland and undeveloped mitigation areas. However, there may be a short-term impact whilst habitats succeed.</p> <p>Good industry practice construction methods as detailed in the Framework CEMP will include implementation of measures to minimise noise, lighting and vibration disturbance which will reduce or remove all such impacts to breeding birds, including Skylark.</p> <p>The implementation of standard mitigation measures (such as timing of vegetation clearance to avoid the bird breeding season) will ensure there is no species mortality during construction of the Scheme.</p> <p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), No during operation of the Scheme which could affect breeding Skylark.</p> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant No legislative and policy requirements at the time of decommissioning. Measures to remove or</p>	<p>Yes</p>

IEF	Importance	Potential Impacts	Potential for an effect to occur?
Breeding birds – Low population of specially protected species (Quail, Hobby, Barn Owl) within the Principal Site		<p>reduce impacts will be included within the Framework DEMP submitted with the ES as part of the DCO application.</p> <p>Construction: The loss of arable habitat would lead to the displacement of breeding Quail, where this species is recorded prior to construction, although this will be avoided and mitigated through the retention of existing grassland and undeveloped mitigation areas. However, there may be a short-term impact whilst habitats succeed. Barn Owl nest in mature trees, buildings and in artificial nesting sites such as nest boxes. All such habitats (where found within the Scheme Boundary) will be retained during construction. The provision of additional nest boxes (for Barn Owl) and creation of new habitats (such as hedgerows for Hobby) will increase the availability of potential nesting and foraging habitat on and adjacent to the Scheme Boundary for these species.</p> <p>Operation: During operation, no part of the Scheme will be continuously lit and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure. Therefore, lighting will not impact upon Quail, Barn Owl and Hobby that utilise retained habitats (such as woodland, grassland and hedgerows), newly created habitats (such as grassland or cover crops) within the Scheme or adjacent habitats. The management of surface water will ensure no hydrological impacts occur on retained and newly created habitats and that there are consequently no impacts upon habitats supporting these species. Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme.</p> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with relevant legislative and policy requirements at the time of decommissioning. Measures to remove or reduce impacts will be included within the Framework DEMP submitted with the ES as part of the DCO application.</p>	Yes (Quail)

IEF	Importance	Potential Impacts	Potential for an effect to occur?
Badger	Low	<p>Construction: The construction of the Scheme will seek to retain and avoid Badger setts recorded within the Scheme Boundary. Furthermore, buffers (of 30m) from identified setts are embedded into the design of the Scheme (see Section 9.7). These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application. Pre-construction Badger surveys will be undertaken to determine baseline conditions remain the same as currently recorded and if any changes to Badger distribution are identified and where setts cannot be reasonably avoided, then a Natural England licence may be required and mitigation measures updated accordingly.</p> <p>There will be no fragmentation of habitats used by Badger as the Scheme has embedded sufficient buffers from retained habitats to ensure that Badger can move freely across the Scheme Boundary. Any perimeter fencing will be permeable to Badgers. Connectivity across the Scheme Boundary will be improved with the creation of new hedgerows and grassland, therefore increasing foraging opportunities for Badger.</p> <p>Standard best practice measures during construction including covering excavations or leaving them with suitable egress and safe storage of chemicals would be implemented to minimise the potential of injury to Badgers during the construction phase. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p> <p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect Badger.</p> <hr/> <p>Operation: During operation, no part of the Scheme will be continuously lit and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure. Therefore, lighting will not impact upon Badger that utilise retained habitats (such as woodland and hedgerows), newly created habitats (such as grassland or cover crops) or on Badger setts.</p> <p>The management of surface water, including for solar PV panel runoff, will ensure no hydrological impacts occur on Badger setts, or retained and newly created habitats and that there are consequently no impacts upon Badger.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect Badger.</p>	
		<p>Decommissioning: Decommissioning impacts will be mitigated fully in line with legislation and policy requirements at the time of decommissioning including, retention and avoidance of habitats supporting Badger (including Badger setts) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures will be included within the Framework DEMP, submitted with the ES as part of the DCO application.</p>	
Other Mammals (Brown Low Hare and Hedgehog)	Low	<p>Construction: The construction of the Scheme will convert arable farmland, used by Brown Hare, into permanent grassland. Hedgerows, scrub and woodland (potentially used by Hedgehog) will be retained and avoided.</p> <p>There will be no fragmentation of habitats used by Brown Hare or Hedgehog as the Scheme has embedded sufficient buffers from retained habitats to ensure that both species can move freely across the Scheme Boundary. Any perimeter fencing will be permeable to both species.</p> <p>Connectivity across the Scheme Boundary will be improved with the creation of new hedgerows and grassland, therefore increasing foraging opportunities for both species.</p> <p>Standard best practice measures during construction including covering excavations or leaving them with suitable egress and safe storage of chemicals would be implemented to minimise the potential of injury to Brown Hare and Hedgehog during the construction phase. These measures will be included within the Framework CEMP (PEI Report Volume II Appendix 3-1) submitted with the ES as part of the DCO application.</p> <p>The construction of the Scheme, if undertaken within the Brown Hare breeding season (typically March to August inclusive) has the potential to cause mortality to this species using habitats that are to be removed. However, the construction of the Scheme will be undertaken over many months and therefore any impacts upon Brown Hare during construction are likely to be localised and short-term. Additionally, there will be no species mortality of Hedgehog as this species, if present, would occupy retained habitats such as</p>	

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>woodland and hedgerows. Therefore, there will be no species mortality of Brown Hare or Hedgehog during construction of the Scheme</p> <p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect Brown Hare or Hedgehog.</p> <hr/> <p>Operation: During operation, no part of the Scheme will be continuously lit and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure. Therefore, lighting will not impact upon retained or newly created habitats.</p> <p>The management of surface water, including for solar PV panel runoff, will ensure no hydrological impacts occur on retained and newly created habitats and that there are consequently no impacts upon species using them (such as Brown Hare or Hedgehog).</p> <p>The conversion of arable farmland to grassland and creation of new habitats (such as hedgerows) will improve connectivity across the Scheme Boundary for both species.</p> <p>Therefore, there are no pathways (e.g. habitat loss and/ or disturbance, such as noise, lighting or visual), during operation of the Scheme which could affect Brown Hare or Hedgehog and there are likely to be beneficial effects to both species.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with legislation and policy requirements at the time of decommissioning with retention and avoidance of habitats supporting Brown Hare and Hedgehog at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures will be included within the Framework DEMP which will form part of the DCO application.</p>	No
Aquatic macrophytes and Negligible macroinvertebrates		<p>Construction: The construction of the Scheme will avoid ditches and watercourses which support aquatic macrophytes and macroinvertebrates where possible, and these will be retained and suitably buffered. The construction of the Scheme will be offset (>10 m from the bank top of the watercourses) from any peripheral watercourses, as detailed in the embedded design mitigation (see Section 9.7). These offsets will prevent disturbance to aquatic and riparian habitats.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
<hr/> <p>Where watercourses and ditches are culverted, culverts will be designed to allow continued connectivity along the watercourse, with a natural bed and no drop inlet or outlet.</p> <p>The construction of the Cable Route Corridor and any internal access, where this crosses watercourses, will utilise non-intrusive HDD methods to avoid physical disturbance to the watercourse, therefore avoiding disturbance to species, habitat loss and direct mortality for aquatic species.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect habitats and species. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP, secured through the DCO. These measures will include dust suppression, silt fencing and pollution prevention. Consequently, indirect effects to watercourses supporting aquatic species during construction will not occur.</p> <p>With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon aquatic macrophytes or macroinvertebrates.</p> <hr/>			
<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during No operation of the Scheme that could affect aquatic macrophytes or macroinvertebrates.</p> <p>Artificial horizontally polarising surfaces (e.g., solar panels), the reflection-polarisation characteristics of which are similar to those of water, can attract water-leaving polarotactic insects posing a potential threat to these species. Aquatic macroinvertebrates in their terrestrial or airborne phase may be attracted to these surfaces, which may then disrupt their life cycle. Some aquatic insects are attracted to solar panels although this is an unusual event dependent on the coincidence of a number of suitable conditions to trigger such behaviour. The likelihood of aquatic insects from the local aquatic habitat of Negligible Importance being attracted to large open areas of shiny surfaces is low given that such species will preferentially use smaller shiny surfaces. Most of the aquatic insect species recorded are of low conservation value, and do not use open water areas for any of their</p> <hr/>			

IEF	Importance	Potential Impacts	Potential for an effect to occur?
		<p>behaviours. The impact of solar panels on these aquatic insects would therefore be negligible.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be mitigated fully in line with legislation and policy requirements at the time of decommissioning with retention and avoidance of habitats supporting aquatic macrophytes or macroinvertebrates (such as running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP.</p>	
Fish	Medium	<p>Construction: The construction of the Scheme will avoid ditches and watercourses which support fish where possible, and these will be retained and suitably buffered. The construction of the Scheme will be offset (>10 m from the bank top) from any peripheral watercourses, as detailed in the embedded design mitigation (see Section 9.7). These offsets will prevent disturbance to aquatic habitats supporting fish.</p> <p>Where watercourses and ditches are culverted, culverts will be designed to allow continued connectivity and fish passage along the watercourse, with a natural bed and no drop inlet or outlet.</p> <p>For pipeline crossings, the avoidance of intrusive trenching techniques will minimise impacts on fish species and maintain connectivity of habitats for fish, e.g. Eels. However, fish rescue may be required during construction where de-watering or over-pumping is required. This will be further explored in the ES.</p> <p>The construction of the Cable Route Corridor and any internal access across the Scheme Boundary, where this crosses watercourses, will utilise non-intrusive methods to avoid physical disturbance to the watercourse, therefore avoiding disturbance to species, habitat loss and direct mortality for aquatic species.</p> <hr/> <p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect fish.</p>	No

IEF	Importance	Potential Impacts	Potential for an effect to occur?
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Decommissioning: Decommissioning impacts will be mitigated fully in line with legislation and policy requirements at the time of decommissioning with retention and avoidance of habitats supporting fish (running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP.

Significance of Effects

- 9.8.8 The effects on known IEFs have been assessed following consideration of the potential impacts and with consideration of the embedded mitigation measures outlined above.
- 9.8.9 The aim of the evaluation was to identify potentially significant effects and determine the need for bespoke additional mitigation measures.
- 9.8.10 Accordingly, the evaluation has identified that during construction, the following impacts on IEFs have been taken forward for further preliminary assessment:
- Direct loss of hedgerows within the Scheme Boundary.
 - Temporary loss of Skylark breeding habitat within the Principal Site.
 - Temporary loss of Quail breeding habitat within the Principal Site.
- 9.8.11 Baseline surveys are ongoing and that these surveys may determine the presence of further IEFs, such as Great Crested Newt, Otter, Water Vole, bats and protected and priority non-breeding bird species. These will be subject to detailed assessment, following the methods detailed in Section 9.4 and in line with the assessment presented for the IEFs identified to date, and will be presented in the ES. The absence of significant effects presented in this chapter does not preclude further significant effects arising as further ecological data becomes available and allows the full characterisation of the ecological baseline and identification of any additional IEFs. The significance of effects on any further IEFs identified, will be presented in the ES.
- 9.8.12 Where the current characterisation of the baseline and assessment have identified that potential or reasonable likely presence of an IEF, but this is either not confirmed or the extent of any presence fully established yet, Table 9-13 sets out how the Scheme has either embedded mitigation to avoid a significant effect occurring or whether further additional mitigation may be required, subject to outcomes of detailed surveys, to avoid and reduce an effect.

Table 9-13: IEFs not fully defined (January 2023)

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
Habitats	Priority habitats, such as hedgerows and woodland, occurring within the Scheme Boundary.	<p>Scheme Design</p> <ul style="list-style-type: none"> - Retention of majority of known priority and notable habitats. - Undeveloped buffers of at least 15m from woodlands, individual trees and hedgerows with trees and at least 5m from hedgerows without trees. <p>Construction</p> <ul style="list-style-type: none"> - Secured through the CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management. - The implementation of a security perimeter fence will prevent construction activity in proximity to retained habitats within and adjacent to the Scheme Boundary. - Specific tree protection measures will be implemented, including fencing and construction exclusion zones. Tree Root Protection fencing will be erected around retained trees, in line with British Standard BS 5837: Trees in relation to design, demolition and construction – Recommendations (Ref. 9-70) 	<p>Yes.</p> <p>Detailed botanical surveys being undertaken to determine the value of identified habitats and categorise further habitats of value. These will be used to inform specific mitigation requirements and inform Scheme design evolution, e.g. location of access tracks and internal cable routes.</p>	<p>Retention and protection of further habitats within the Scheme Boundary.</p> <p>Creation of habitats within the Principal Site to mitigate any further impacts.</p>
Flora/plants	Given, the arable landscape there is a high chance that	<p>Scheme Design</p> <ul style="list-style-type: none"> - Retention of known priority and notable habitats. 	<p>Yes.</p> <p>Detailed botanical surveys being undertaken to determine the</p>	<p>Retention of any areas where notable flora are recorded.</p>

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
	notable arable flora may be present within the Scheme Boundary.	<ul style="list-style-type: none"> - Undeveloped buffers of at least 15m from woodlands, individual trees and hedgerows with trees and at least 5m from hedgerows without trees. <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management. - The implementation of a security perimeter fence will prevent construction access into retained habitats within and adjacent to the Scheme Boundary. - Specific tree protection measures will be implemented, including fencing and construction exclusion zones. Tree Root Protection fencing will be erected around retained trees, in line with British Standard BS 5837: Trees in relation to design, demolition and construction – Recommendations (Ref. 9-70). 	presence and locations of notable flora and plant species. These will be used to inform specific mitigation requirements and inform Scheme design evolution.	Creation of areas within the Principal Site to mitigate any impacts on flora.
Terrestrial Invertebrates	Notable terrestrial invertebrates may be present in the Study Area. The Scheme Boundary contains areas of habitat, e.g. grasslands and	<p>Scheme Design</p> <ul style="list-style-type: none"> - Retention of known priority and notable habitats. - Undeveloped buffers of at least 15m from woodlands, individual trees and hedgerows with trees and at least 5m from hedgerows without trees. <p>Construction</p>	Yes. Terrestrial invertebrate scoping survey being undertaken to identify and characterise any areas within the Scheme Boundary of an elevated value for terrestrial invertebrates.	Retention of any areas where notable invertebrates are recorded, such as field margins and additional areas of grassland. Creation of further areas within the

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
	hedgerows suitable to support assemblages of notable species.	<ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management. - The implementation of a security perimeter fence will prevent construction access into retained habitats within and adjacent to the Scheme Boundary. 	These will be used to inform specific mitigation requirements and inform Scheme design evolution	Principal Site to mitigate any further impacts on invertebrates.
Amphibians	Four species of amphibian are known to be present in the Study Area, including Great Crested Newt. Ponds are present within the Scheme Boundary.	<p>Scheme Design</p> <ul style="list-style-type: none"> - Retention of ponds and a minimum of 10m of terrestrial habitats surrounding ponds. <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management, - The implementation of a security perimeter fence will prevent construction access into retained habitats within and adjacent to the Scheme Boundary. 	<p>Yes.</p> <p>Great Crested Newt surveys currently being undertaken to determine the presence of the species within the Scheme Boundary and wider ZoI for the species.</p> <p>These will be used to inform specific mitigation requirements and inform Scheme design evolution</p>	Retention of larger areas of terrestrial habitats surrounding ponds containing Great Crested Newt and maintaining connectivity throughout the Scheme Boundary.
Reptiles	Grass Snake is known to be present in the Study Area. Small pockets of reptile habitat present within the Scheme Boundary,	<p>Scheme Design</p> <ul style="list-style-type: none"> - Retention of majority of known priority and notable habitats. - Undeveloped buffers of at least 15m from woodlands, individual trees and hedgerows with 	<p>Yes.</p> <p>Reptile surveys will be undertaken to determine the presence of reptile species within the Scheme Boundary.</p>	Retention of larger areas of habitats containing reptiles and maintaining connectivity throughout the Scheme Boundary.

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
	including uncropped field margins, hedgerows, woodland edge habitats and ditches.	<p>trees and at least 5m from hedgerows without trees.</p> <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management, - The implementation of a security perimeter fence will prevent construction access into retained habitats within and adjacent to the Scheme Boundary. 	These will be used to inform specific mitigation requirements and inform Scheme design evolution.	
Bats	At least six bat species (Brown Long-eared, Common Pipistrelle Noctule, Natterer's bat, Soprano Pipistrelle Daubenton's bat, and a Myotis species), recorded within the Study Area, with Common Pipistrelle, Soprano Pipistrelle, Noctule, Brown Long-eared, Leisler's <i>Nyctalus leisleri</i> and a <i>Myotis</i>	<p>Scheme Design</p> <ul style="list-style-type: none"> - Reasonable avoidance measures, including appropriate buffers (of 15m) around any trees with bat roost potential throughout the Principal Site. - Gaps in currently defunct hedges will be planted with suitable native species to improve the connectivity of habitats (such as between ancient and other broad-leaved woodland) within and adjacent to the Scheme Boundary. - New areas of tree planting will be provided to create screening from Scheme infrastructure, improve habitat connectivity and increase the area of hedgerow (and woodland habitat) within the Scheme Boundary. - No part of the Scheme will be continuously lit. Manually operated and motion-detection lighting 	<p>Yes.</p> <p>Bat activity survey and roost appraisals being undertaken to identify and characterise any areas within the Scheme Boundary of an elevated value for bats and to determine the presence and locations of bat species.</p> <p>These will be used to inform specific mitigation requirements and inform Scheme design evolution.</p>	Retention of additional areas of existing habitats within the Principal Site for bats. Undeveloped buffers and/or construction buffers within the Scheme Boundary to minimise disturbance to bats.

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
	<p>species. recorded foraging/commuting across the Scheme Boundary.</p>	<p>will be utilised for operational and security purposes around electrical infrastructure such as inverters, transformers and switchgear across the Principal Site, and within the compounds and substations. Lighting will be directed downward and away from boundaries. No visible lighting will be utilised at the site perimeter fence, aside from the site entrance points.</p> <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management, - The implementation of a security perimeter fence will prevent construction access into retained habitats within and adjacent to the Scheme Boundary. 		
Otter	<p>Otter recorded within the Study Area. Watercourses and water bodies within the Scheme Boundary have the potential to support Otter.</p>	<p>Scheme Design</p> <ul style="list-style-type: none"> - 10m buffer from watercourses within the Principal Site to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to water courses and any protected species (such as Otter) that use them. - The Scheme drainage strategy will include measures to manage surface water runoff during operation and will reduce the likelihood and severity of potential pollution incidents and 	<p>Yes.</p> <p>Otter surveys being undertaken to identify and characterise any areas within the Scheme Boundary used by Otter. These will be used to inform specific mitigation requirements and inform Scheme design evolution.</p>	<p>Undeveloped buffers and/or construction buffers within the Scheme Boundary to minimise disturbance to Otter.</p>

Potential IEF	Current understanding of the baseline and presence	Embedded and Additional Mitigation	Further surveys being undertaken within appropriate survey windows to characterise baseline (see also Table 9-1)?	Potential Requirement for Additional Mitigation
		<p>flooding affecting watercourses and the local ditch network to reduce or eliminate adverse effects for aquatic and riparian species and habitats</p> <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management. 		
Water Vole	Water Vole recorded within the Study Area..	<p>Scheme Design</p> <ul style="list-style-type: none"> - 10m buffer from watercourses within the Scheme Boundary to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to water courses and any protected species (such as Water Vole) that use them. <p>Construction</p> <ul style="list-style-type: none"> - Secured through the Framework CEMP, the Scheme will comply with industry good practice and environmental protection legislation during construction e.g. prevention of surface and ground water pollution, fugitive dust management. 	<p>Yes.</p> <p>Water Vole surveys being undertaken to identify and characterise any areas within the Scheme Boundary used by Water Vole.</p> <p>These will be used to inform specific mitigation requirements and inform Scheme design evolution.</p>	<p>Undeveloped buffers and/or construction buffers within the Scheme Boundary to minimise disturbance to Water Vole.</p>

Construction

Direct loss of hedgerows within the Scheme Boundary

- 9.8.13 Construction activities are predicted to result in the potential for the loss of sections of hedgerow (minimised as much as is practicable) as a result of security fencing and access routes across the Principal Site and to facilitate the Cable Route Corridor (yet to be defined). Whilst the extent of any loss of this habitat is currently unknown, through continued scheme refinement, it is predicted that the majority of hedgerows across the Scheme Boundary will be avoided and any replanting required has been embedded within the Scheme design for creation of hedgerows. It is noted that this may take time to develop and therefore, there is likely to be a temporary (short-term) adverse effect on this habitat type in some areas. Lengths of new, species rich, hedgerow would be planted to compensate for any lost, using three core species: Hawthorn, Blackthorn and Field Maple with others to add diversity including: Oak, Hornbeam, Holly *Ilex aquifolium*, Hazel, Spindle, Crab Apple *Malus sylvestris*, Elder *Sambucus nigra*, Buckthorn *Rhamnus cathartica*, Dogwood *Cornus sanguinea*, and English Elm* *Ulmus procera* (*a disease resistant cultivar). Once hedgerows establish along with additional hedgerow planting proposed across the Scheme Boundary, it is predicted that the Scheme will be able to deliver a net gain in this habitat and the overall impact will be beneficial.
- 9.8.14 Given, that at this preliminary stage the loss of hedgerows, and their relative value, is not quantified, whilst taking into account embedded protection measures and Scheme design to minimise the impact of construction activities causing direct loss of small sections of hedgerows, using a precautionary approach, it is provisionally assessed that the magnitude of this impact is **medium**, which results in a temporary **moderate adverse** effect, that is potentially significant in EIA terms. Further development of the mitigation measures required for hedgerows will be undertaken to reduce the significance of this potential effect.

Loss of Skylark habitat within the Principal Site

- 9.8.15 The survey of breeding birds (**PEI Report Volume II Appendix 9-4**) identified 148 territorial males present across the Principal Site. As Skylark in arable habitats are particularly susceptible to nest failure or low fledgling success (in part due to autumn sown cereals), through predation and lower abundances of invertebrate food, than say natural unimproved grasslands (causing adults to forage over greater distances), any reduction in brood numbers can consequently reduce the productivity of the local population. Whilst, 148 territorial males were recorded from surveys of the Principal Site, nests are not actively searched for during territory mapping surveys and so the number of active nests or indeed breeding attempts or successful fledgling is unknown. Therefore, whilst, the number of territories of this species provides an idea of the overall potential habitat resource, it is not necessarily a good indicator for assessing the quality of that habitat and its overall productivity for the Skylark population. The dominance of arable habitats within the Principal Site, such as autumn sown Wheat, would suggest (through professional judgement) that the number of successful broods and/ or breeding attempts is likely to be low, which in turn is likely to result in low productivity and juvenile recruitment into the local breeding population.

9.8.16 It is acknowledged that construction activities will result in the loss of arable farmland used by breeding Skylark. Therefore, the Scheme has sought to incorporate areas of non-developed open space for the creation of biodiverse grassland, specifically managed for ground-nesting birds. These measures will provide suitable nesting and foraging habitats for Skylark and other ground nesting birds. At this stage, the mitigation measures are not fully defined and therefore, a precautionary approach is presented in this assessment. As such, given there is the potential for a long-term effect on a Skylark population of importance at a District (medium sensitivity) level, the magnitude of this impact is provisionally assessed to be **high**, resulting in a **moderate adverse** effect that is potentially significant in EIA terms as it could undermine the long-term viability/ stability of the Skylark population. Further development of the mitigation measures required for Skylark will be undertaken to reduce the significance of this potential effect.

Temporary loss of Quail habitat within the Principal Site

9.8.17 The survey of breeding birds (**PEI Report Volume II Appendix 9-4**) identified a single Quail territory within arable habitat on the Principal Site, although this territory was formed from a singing bird on a single occasion. Quail rely on open arable and grassland habitats within which to breed, therefore the inclusion of undeveloped areas within the Principal Site, including wide field margins around solar PV panels will be of longer term benefit to this species. However, in the short-term, there may be a temporary loss of habitat available to Quail in some areas of the Principal Site as newly planted habitats mature.

9.8.18 In consideration of undeveloped areas to provide nesting and foraging habitat for Quail, the likelihood that over a 24-month construction period that not all habitat within the Principal Site will be lost at once (ensuring available habitat around the Principal Site during the construction period), it is provisionally assessed that the magnitude of this impact is **low**, which results in a temporary **minor adverse** effect, that is not significant in EIA terms.

Operation

9.8.19 The evaluation has concluded that the operation of the Scheme will not lead to any impacts on IEFs identified. The significance of effects during operation of the Scheme on any further IEFs identified, will be presented in the ES.

Decommissioning

9.8.20 The evaluation has concluded that the decommissioning of the Scheme will not lead to any impacts on IEFs identified. The significance of effects during decommissioning of the Scheme on any further IEFs identified, will be presented in the ES. At this stage, the effects of decommissioning of the Scheme are likely to be similar to those for construction, although IEFs, such as hedgerows and LWS, should be able to be avoided, as no new infrastructure will be required. Decommissioning will need to follow legislation and policy requirements at the time of decommissioning.

Summary of Magnitude of Impact and Significance of Effect

9.8.21 Table 9-14 summarises the sensitivity (value) of IEFs, impacts and effects resulting from construction of the Scheme. No impacts and effects, arising from operation or decommissioning of the Scheme have been identified at this stage. This assessment is provisional and presents a worst case scenario.

Table 9-14 Summary of Magnitude of Impact and Significance of Effect

Receptor	Sensitivity (value)	Description of impact	Magnitude of Impact	Effect Category	Potential for Significant Effect
Hedgerows	Up to Medium (County)	Temporary loss of habitat	Medium	Up to Moderate Adverse	Yes
Skylark	Medium (District)	Temporary loss of habitat	High	Up to Moderate adverse	Yes
Quail	Low (Local)	Temporary loss of habitat	Low	Minor adverse	No

9.9 Additional Mitigation and Enhancements

9.9.1 At this stage, pending clarification on LWS and hedgerow loss and establishment of the undeveloped land required for ground-nesting birds, such as Skylark it is predicted that the Scheme design has embedded sufficient mitigation to avoid significant adverse effects to important ecological features, without additional mitigation measures being required. EIA is an iterative process, and should further mitigation be identified, e.g. if further ecological surveys determine other impacts, then the Scheme design will look to mitigate these wherever possible.

9.9.2 The Scheme will seek to deliver significant enhancements for biodiversity in line with national and regional policies and biodiversity priorities. These enhancements will also be based on consultation responses as the Scheme progresses. A robust monitoring programme will also be defined in the DCO submission to ensure mitigation and enhancement measures are delivered successfully and to implement any remediation as required.

9.10 Residual Effects

9.10.1 This section summarises the residual effects of the Scheme on Ecology and Nature Conservation following the implementation of embedded and additional mitigation.

9.10.2 At this stage, there is the potential for significant effects on known IEFs and therefore additional mitigation measures will be identified as necessary and will be developed further to avoid significant effects in known IEFs. Accordingly, significant residual effects on ecological features are currently predicted during construction of the Scheme on the following IEFs:

- Hedgerows; and
- Breeding Skylark.

9.10.3 No significant residual effects on ecological features are currently predicted during operation or decommissioning of the Scheme.

9.10.4 The final assessment of residual effects will be presented in the ES and submitted as part of the DCO application for the Scheme.

9.11 Cumulative Effects

9.11.1 An assessment of cumulative effects is provided in **PEI Report Volume I Chapter 17: Cumulative Effects**.

9.12 References

- Ref. 9-1. EC (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version). EC, Brussels.
- Ref. 9-2. EC (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. EC, Brussels.
- Ref. 9-3. Regulation (EU) 1143/2014 (2014) on the prevention and management of the introduction and spread of invasive alien species (the IAS Regulation).
- Ref. 9-4. Ramsar Convention (1971). Ramsar, Iran
- Ref. 9-5. HMSO. (1981). Wildlife & Countryside Act 1981 (as amended). <https://www.legislation.gov.uk/ukpga/1981/69>
- Ref. 9-6. HMSO. (2000). Countryside and Rights of Way Act 2000. <https://www.legislation.gov.uk/ukpga/2000/37/contents>
- Ref. 9-7. HMSO (2018). Conservation of Habitats and Species Regulations 2017. HMSO, London. <http://www.legislation.gov.uk/uksi/2017/1012/contents/made>
- Ref. 9-8. HMSO (2019) The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. HMSO, London
- Ref. 9-9. HMSO (2021). The Environment Act. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>
- Ref. 9-10. HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London.
- Ref. 9-11. HMSO. (1992). Protection of Badgers Act 1992. <https://www.legislation.gov.uk/ukpga/1992/51/contents>
- Ref. 9-12. HMSO. (1997). Hedgerows Regulations 1997. <http://www.legislation.gov.uk/uksi/1997/1160/contents/made>
- Ref. 9-13. HMSO (2006). Animal Welfare Act 2006. HMSO, London
- Ref. 9-14. HMSO (1975). The Salmon and Freshwater Fisheries Act 1975. HMSO. London.
- Ref. 9-15. The Eels (England and Wales) Regulations 2009 (SI 2009/3344).
- Ref. 9-16. HMSO (2019). The Invasive Alien Species (Enforcement and Permitting) Order 2019. <https://www.legislation.gov.uk/uksi/2019/527/contents>
- Ref. 9-17. HMSO. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations <https://www.legislation.gov.uk/uksi/2017/407/contents/made>

- Ref. 9-18. HMSO (2020) European Union (Withdrawal Agreement) Act 2020, <https://www.legislation.gov.uk/ukpga/2020/1/contents/enacted>
- Ref. 9-19. Department of Energy and Climate Change (DECC), (2011) Overarching National Policy Statement for Energy (EN-1), Available at: <https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure>
- Ref. 9-20. Department for Energy Security and Net Zero (2023) Draft Overarching National Policy Statement for Energy (EN-1)
- Ref. 9-21. Department for Energy Security and Net Zero (2023) Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
- Ref. 9-22. DECC (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5), Available at: <https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure>
- Ref. 9-23. Department for Energy Security and Net Zero (2023) Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)
- Ref. 9-24. National Planning Policy Framework 2021. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Ref. 9-25. Planning Practice Guidance: <https://www.gov.uk/government/collections/planning-practice-guidance>
- Ref. 9-26. Central Lincolnshire Local Plan. (2023) <https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf>
- Ref. 9-27. Bassetlaw District Council (2011). Core Strategy and Development Management Policies DPD <https://www.bassetlaw.gov.uk/media/1543/cs1adoptedcorestrategy.pdf>
- Ref. 9-28. DEFRA (2011). Biodiversity 2020: A strategy for England's wildlife and ecosystem services. <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services>
- Ref. 9-29. HMSO. (2018). A Green Future: Our 25 Year Plan to Improve the Environment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
- Ref. 9-30. UK Post-2010 Biodiversity Framework. Joint Nature Conservation Committee and Department for Environment, Food and Rural Affairs (2012). http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf
- Ref. 9-31. BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene

- Ref. 9-32. Bennun, L., van Bochove, J., Ng, C., Fletcher, C., Wilson, D., Phair, N., Carbone, G. (2021). Mitigating biodiversity impacts associated with solar and wind energy development. Guidelines for project developers. Gland, Switzerland: IUCN and Cambridge, UK: The Biodiversity Consultancy
- Ref. 9-33. Natural England and the Department for Environment, Food and Rural Affairs (2016) Protected species: how to review planning applications. <https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>
- Ref. 9-34. CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- Ref. 9-35. AECOM (2022) Tillbridge Solar EIA Scoping Report
- Ref. 9-36. Defra, Multi-Agency geographical information for the countryside (MAGIC) map. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed: January 2023].
- Ref. 9-37. JNCC website: <https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/> [Accessed March 2022]
- Ref. 9-38. NBN Atlas: <https://nbnatlas.org/> [Accessed March 2022].
- Ref. 9-39. Environment Agency Ecology and Fish Data Explorer website: <https://environment.data.gov.uk/ecology/explorer/>
- Ref. 9-40. JNCC (2010) Handbook for phase 1 habitat survey – a technique for environmental audit. Joint Nature Conservation Committee, Peterborough.
- Ref. 9-41. Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J. and Taylor, I. (2005). The Vascular Plant Red Data List for Great Britain. JNCC.
- Ref. 9-42. Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. and Taylor, I. (2014). A Vascular Plant Red List for England. Botanical Society of Britain and Ireland, Bristol.
- Ref. 9-43. Stace, C.A. (2019). New Flora of the British Isles, 4th edition. C&M Floristics.
- Ref. 9-44. Environment Agency (2017). Freshwater macro-invertebrate sampling in rivers Operational Instruction 018_08. Environment Agency, Bristol, UK
- Ref. 9-45. WFD-UKTAG (Water Framework Directive – United Kingdom Advisory Group) (2014). UKTAG River Assessment Method Macrophytes and Phytobenthos: Macrophytes (River LEAFPACS2)

- Ref. 9-46. Oldham, R.S., Keeble, J., Swan, M.J.S., and Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal, Vol. 10, pp. 143-155.
- Ref. 9-47. Biggs, J., Ewald N., Valentini, A., Gaboriaud C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.
- Ref. 9-48. English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- Ref. 9-49. Natural England (2004). An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt. <http://publications.naturalengland.org.uk/publication/134002>
- Ref. 9-50. Froglife (1999) Froglife Advice Sheet 10: Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife, London.
- Ref. 9-51. Natural England (2015). Reptiles: surveys and mitigation for development projects
- Ref. 9-52. Gilbert G., Gibbons D.W., and Evans J. (1998) Bird Monitoring Methods: A manual of techniques for key UK species. RSPB, Bedfordshire.
- Ref. 9-53. Bibby, C.J., Burgess, N.D. & Hill, D.A. (1992) Bird Census Techniques. The University Press, Cambridge.
- Ref. 9-54. Shawyer, C.R. (2011). Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester
- Ref. 9-55. Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines. Third Edition. The Bat Conservation Trust, London.
- Ref. 9-56. Strachan, R., Moorhouse, T. and Gelling, M. (2011). Water Vole Conservation Handbook. Third Edition. WildCRU, University of Oxford.
- Ref. 9-57. Dean, M., Strachan, R. Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Matthews, F. and Chanin, P. The Mammal Society, London
- Ref. 9-58. RSPB, NRA and RSNC (1994). The New Rivers & Wildlife Handbook. RSPB.
- Ref. 9-59. Environment Agency (2011). Fifth otter survey of England 2009 – 2010.
- Ref. 9-60. Chanin, P. (2003). Ecology of European Otter. Conserving Natura 2000 Rivers Ecology Series No.10 English Nature.
- Ref. 9-61. Harris, S., Cresswell, P, and Jefferies D (1989). Surveying Badgers, Mammal Society.

- Ref. 9-62. Cresswell, P., Harris, S. and Jefferies, D.J., (1990). The history, distribution, status and habitat requirements of the Badger in Britain. Nature Conservancy Council, Peterborough.
- Ref. 9-63. Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1.
- Ref. 9-64. Baker, J., Hoskin, R. and Butterworth, T. (2019). Biodiversity Net Gain – Good Practice Principles for development, A practical guide. Available at: <https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development/> [Accessed August 2022].
- Ref. 9-65. Greater Lincolnshire Nature Partnership (GLNP) (2013). Local Wildlife Site Guidelines for Greater Lincolnshire, 3rd Edition.
- Ref. 9-66. Crouch, N.C. (2018) Nottinghamshire LWS Handbook – Guidelines for the selection of Local Wildlife Sites in Nottinghamshire. Part 1 – An overview of Local Wildlife Sites in Nottinghamshire. 2nd Edition. Nottinghamshire Biological and Geological Records Centre, Nottingham.
- Ref. 9-67. Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.
- Ref. 9-68. Lincolnshire Biodiversity Action Plan. (2012-2020) 3rd edition. <http://www.southkesteven.gov.uk/CHttpHandler.ashx?id=7371&p=0>
- Ref. 9-69. Nottinghamshire Biodiversity Action Group (2008) Local Biodiversity Action Plan. <https://nottsbaq.org.uk/lbap/lbap-introduction-and-sections-1-to-6/>
- Ref. 9-70. BS 5837: Trees in relation to design, demolition and construction – Recommendations