

Cottam Solar Project

Preliminary Environmental Information Report: Chapter 9: Ecology and Biodiversity

Prepared by: Clarkson & Woods
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Issue Sheet

Report Prepared for: Cottam Solar Project Ltd.

Preliminary Environmental Information Report: Ecology and Biodiversity Report

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9 Ecology and Biodiversity

9.1 Introduction

9.1.1 The Ecology and Biodiversity chapter of the PEIR sets out the baseline information available at the time of writing and provides a preliminary consideration of the likely effects of the Scheme on ecological features during its construction, operation and decommissioning phases.

9.1.2 Ecological features which will form the basis of the assessment will include:

- Statutory and non-statutory sites designated for nature conservation at international, national and local levels;
- Habitats and species of principal importance for the conservation of biodiversity; and
- Other legally protected, red-listed or notable species of conservation interest.

9.1.3 This chapter will describe the currently available ecological baseline derived from extensive site and desk-based surveys and assess the possible level of effects likely to arise, together with any avoidance, mitigation and compensation measures likely or capable of being adopted to reduce these in accordance with nature conservation legislation and planning policy. Proposals for ecological enhancement to contribute to local conservation priorities and achievement of Biodiversity Net Gain (BNG) in line with the Environment Act 2021 (if applicable) and national and local policies will also be presented.

9.1.4 Where Scheme designs and details are either not yet known or incomplete at this stage, either assumptions have been made based on professional judgment, or, in the event that it is not possible to make any assumptions, no attempt at a full assessment has been made. This assessment is an iterative process and will be both expanded and made more specific as survey data is collected, analysed and reported on, and designs are further developed. This process will be carried out in conjunction with relevant consultees and third parties as necessary to achieve the most robust outcome.

Appendices and Figures

9.1.5 This chapter is supported by the following appendices:

- **Appendix 9.1** Preliminary Ecological Appraisal, Cottam Solar Project – Clarkson and Woods, August 2021.

- **Appendix 9.2** Extended Phase 1 Habitat Survey Maps, Cottam Solar Project – Clarkson and Woods, August 2021.
- **Appendix 9.3** Cable Route Desk Study
- **Appendix 9.4** Consultation Responses
- **Appendix 9.5** Summary of Bat Survey Results to Date
- **Appendix 9.6** Summary of Otter and Water Vole Survey Results
- **Appendix 9.7** Schedule of Protective Ecological Buffers

Legal and Policy Context

9.1.6 Key legislation relevant to biodiversity and nature conservation which will inform the assessment process includes:

- The Environment Act 2021;
- The Conservation of Habitats and Species Regulations 2017 (as amended) ('The Habitats Regulations');
- The Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural Communities (NERC) Act 2006, specifically the 'Section 41 lists' of Species and Habitats of Principal Importance which are capable of being material consideration within the planning process;
- The Countryside Rights of Way Act 2000;
- The Protection of Badgers Act 1992; and
- The Hedgerows Regulations 1997.

9.1.7 Key planning policy relevant to biodiversity and nature conservation which will inform the assessment process includes:

- Adopted National Policy Statement (NPS) EN-1: Energy and the draft revised NPS EN-1;
- Draft revised NPS EN-3 Renewable Energy Infrastructure;
- The National Planning Policy Framework Section 15;
- Central Lincolnshire's Local Plan (adopted 2017). Specific policies:
 - Policy LP19: Renewable Energy Proposals

- Policy LP20: Green Infrastructure Network
- Policy LP21: Biodiversity and Geodiversity
- Bassetlaw Core Strategy (adopted 2011);
- Neighbourhood Plans listed at section 6.5 of the PEIR.

9.1.8 Key guidance relevant to biodiversity and nature conservation which will inform the assessment process includes:

- Natural England Standing Advice regarding Protected Species
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services
- Lincolnshire Biodiversity Action Plan
- Nottinghamshire Biodiversity Action Plan
- Biodiversity Opportunities Mapping for Lincolnshire
- Nature Recovery Strategy for Lincolnshire
- Defra's Biodiversity Metric v3.1
- British Standard BS42020: Biodiversity: a Code of Practice for Planning and Development
- BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene
- Natural England Technical Information Note TIN101 (2011) Solar Parks: Maximising Environmental Benefits. Natural England
- Natural England (2017) Evidence Review of the Impact of Solar Farms on Birds, Bats and General Ecology (NEER012) 1st Edition
- Montag H, Parker G and Clarkson T (2016) The Effect of Solar Farms on Local Biodiversity: A Comparative Study. Clarkson and Woods and Wychwood Biodiversity
- 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

- Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). Valuing Bats in Ecological Impact Assessment. In Practice, December 2010. Chartered Institute of Ecology and Environmental Management

9.2 Consultation

9.2.1 The preparation of this document has been informed through consultation with relevant parties, as summarised in Table 9.1 below. Consultation responses can be found compiled in **Appendix 9.4**.

Table 9.1: Chronological Summary of Consultation

Consultee, Enquiry and Dates	Summary of Response	Action or Outcome
<p>RSPB 23/08/21 Applicant ecologist contacted RSPB Adviser to request consultation advice on scheme. Response received 13/09/21.</p>	<p>RSPB Conservation officer for The Wash and North Norfolk Coast responded to confirm that the RSPB do not have advisers working in the geographical region of the Scheme and therefore are unable to resource any consultation in this instance.</p>	<p>No further action taken.</p>
<p>Nottinghamshire Wildlife Trust (NWT) Pre-application advice received from Senior Conservation Officer dated 29/10/21.</p>	<p>NWT provided high-level advice on the expectations for avoidance and mitigation of impact and assessment of baseline conditions. Advice based on Preliminary Ecological Appraisals (PEAs) and generic design information. This document forms part of the consultation package submitted to PINS during the EIA scoping process.</p>	<p>Advice has been noted with a view to being acted upon throughout the baseline data collection, design, mitigation and assessment processes.</p>
<p>NWT Applicant ecologist contacted Senior Conservation Officer on 25/11/21 request meeting to discuss progress on Scheme and approach to baseline assessment. Meeting took place 01/12/21.</p>	<p>Discussion took place to provide background on ecological survey scope, identify potential ecological impacts and outline the avoidance and mitigation measures which might be incorporated. Officer broadly satisfied with progress and no amendment to previously-supplied pre-application advice was considered necessary.</p>	<p>No action required as a result of the meeting.</p>

<p>NWT Applicant ecologist contacted Senior Conservation Officer on 14/04/22 to request meeting to discuss progress on Scheme and approach to baseline assessment of the cable routes. Meeting took place 21/04/22. Written response received 22/04/22.</p>	<p>Officer acknowledged all documents provided on the layout of cable routes and detailed proposed approach to ecological survey scope. Officer was satisfied with all provided information in relation to survey scope. Officer recommended cabling operations to be undertaken via a Precautionary Method of Working/Ecological Clerk of Works arrangement. MS recommended stronger wording in relation to the avoidance of impacts on Local Wildlife Sites, including opportunities for their enhancement.</p>	<p>All advice noted and will be incorporated into the proposed Outline Construction Environmental Management Plan (CEMP) and Landscape Ecological Management Plan Outline (LEMP) as necessary, as well as the design of the Scheme.</p>
<p>Lincolnshire Wildlife Trust (LWT) Applicants ecologist contacted LWT on 25/11/21 to request meeting to discuss progress on Scheme and approach to baseline assessment. No meeting took place but written response received from- Conservation Officer dated 15/12/21.</p>	<p>Conservation Officer provided high-level advice on the expectations for avoidance and mitigation of impact and assessment of baseline conditions. Advice based on Preliminary Ecological Appraisals (PEAs) and generic design information. This document forms part of the consultation package submitted to PINS during the EIA scoping process.</p>	<p>Recommendations for observance of: Biodiversity Opportunities Mapping, mitigation for skylark and yellow wagtail, grassland management practicalities, roadside nature reserves, fencing permeability, lighting impacts, local parish policies, BNG, post-construction ecological monitoring and habitat management objectives were noted and will be factored into the Scheme design.</p>
<p>Lincolnshire Wildlife Trust (LWT) Applicants ecologist Head of Conservation (HoS) on 14/04/22 to discuss progress on Scheme and approach to baseline assessment of the cable routes. Meeting took place 22/04/22. Awaiting written response.</p>	<p>HoS broadly satisfied with approach to ecological survey and assessment both in relation to array sites and the cable routes. HoS advised that resources were limited at LWT at the current time but would endeavour to put a response in writing in due course.</p>	<p>No action required as a result of the meeting.</p>

<p>Natural England (NE) Applicants ecologist requested opening a Discretionary Advice Service (DAS) contract which was signed on 14/02/22. Kick off meeting took place 05/04/22 and advice requested.</p>	<p>Applicants ecologist requested advice concerning various aspects including species survey scope, identification of sources of potential impact, identification of potential avoidance techniques and mitigation measures and impacts upon protected sites. Advice received confirmed general acceptability of approach to survey for several species (bats, great crested newt, otters and water voles) and lack of impacts on Humber Estuary and Scotton Common and Laughton Woods SSSI complex.</p>	<p>Advice received is referred to as appropriate within this document and will form basis of future assessment. DAS is an ongoing process and dialogue with NE will be progressed to confirm further points in relation to cable installation works and mitigation proposals.</p>
<p>Sturton by Stow Parish Council (SSPC) Pre-application consultation received 14/02/22</p>	<p>SSPC referred to the presence of the River Till ecological restoration corridor as an opportunity for BNG. The local presence of golden plover, lapwing, swans and great burnet were also noted.</p>	<p>All points noted and have been and will be considered in the assessment, mitigation and habitat management process as appropriate.</p>
<p>Planning Inspectorate (PINS) EIA Scoping Opinion received 09/03/22.</p>	<p>PINS recommended polecat and fish should be scoped in to the assessment and agreed with scoping out dormice. PINS also recommend further information on mitigation for skylark, yellow wagtail, lapwing and birds breeding in boundary features. Potential lighting impacts should be identified and assessed. A 30km data search radius to be used for designated sites with bat or bird features. Further badger survey information to be collected. Confidential annexes to be used in the ES concerning sensitive ecological information.</p>	<p>Polecat and freshwater fish remain part of this assessment. Further requested information on bird mitigation and lighting will be incorporated into this assessment when available. 30km search radius used as requested. Further information of badger setts has been collected and will be summarised in the confidential appendix for the ES.</p>

<p>NE EIA scoping consultation received 09/03/22 (dated 25/02/22).</p>	<p>NE advise that impacts upon four SSSIs associated with Scotton Common and Laughton Woods should be considered (proximity to Cottam 3). NE recommend that cumulative impacts from three other solar projects (not including West Burton Solar Project) should be factored in. Further information on BNG and connectivity with the Nature Recovery Network is recommended. Information on decommissioning impacts and aftercare is also advised.</p>	<p>SSSI advice has been superseded by DAS advice received since. Cumulative effects of the mentioned sites is incorporated into this assessment, as are decommissioning effects. BNG is discussed, albeit in advance of a full assessment being possible at this stage. Enhancements are proposed in this assessment which contribute to the aims of the Nature Recovery Networks.</p>
<p>Bassetlaw District Council (BDC) EIA scoping consultation received 09/03/22 (dated 24/02/22).</p>	<p>BDC highlight the need for sensitivity in potential impacts on the River Trent 'main green corridor' and Cottam Power Station Local Wildlife Site, provision of BNG and the need to understand potential for lighting impacts on ecology.</p>	<p>Comments noted and will be incorporated into future iterations of this assessment as the preferred cable route has not yet been finalised so detailed impacts cannot be assessed. The intention is to remediate and enhance following any impacts upon notable habitats associated with the River Trent.</p>
<p>West Lindsey District Council (WLDC) EIA scoping consultation received 09/03/22 (dated 25/02/22).</p>	<p>WLDC recommend further information regarding impacts of fencing on mammal movements is provided.</p>	<p>Noted and incorporated as appropriate into this document.</p>
<p>Canal and Rivers Trust (CRT) EIA scoping consultation received 09/03/22 (dated 14/02/22)</p>	<p>CRT note that directional drilling was proposed for cable installation beneath the River Trent and that this process risks release of sediments and contaminants into the water. The CRT also draw attention to the potential impacts of construction lighting on river wildlife.</p>	<p>Comments noted and discussion on river disturbance and lighting incorporated as appropriate into this document.</p>

<p>Environment Agency (EA) EIA scoping consultation received 09/03/22 (dated 24/02/22)</p>	<p>EA highlight opportunities for enhancement of watercourses within the Scheme and point out the opportunities for Natural Flood Management. EA recommend an assessment of invasive species across the Site.</p>	<p>As per response to comments from BDC above. Additionally, opportunities for Natural Flood Management will be explored.</p>
<p>Defence Infrastructure Organisation (DIO) EIA scoping consultation received 09/03/22 (dated 23/02/22).</p>	<p>Due to the presence of the aerodrome at RAF Scampton, some 5km from Cottam 1, the DIO recommend further consultation in relation to any part of the Scheme which might attract large and/or flocking birds and so increase the risk of birdstrike.</p>	<p>It is considered highly unlikely that the Scheme will attract flocking birds within proximity of RAF Scampton.</p>

9.3 Assessment Methodology

9.3.1 The baseline conditions are derived from several in-progress and some complete desk and field based studies, the methodologies of which are given separately in Section 9.4. The following section describes the method for the assessment of effects of the Scheme on these baseline conditions. The standard approach applied in the UK to Ecological Impact Assessment (EclA) is that developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) in 2018 and revised in 2019¹. This will be used to evaluate existing conditions, and to assess the significance of likely effects on ecological features that may arise during construction, operation and decommissioning of the Scheme. This involves determining the relative importance of each ecological feature and undertaking an impact assessment pre and post-implementation of mitigation measures. From this, any residual effects likely to occur can be identified along with an appreciation of their significance.

Assessment of Ecological Importance

9.3.2 When evaluating the baseline biodiversity importance of natural features found on the site (those listed in 9.1.2), the following characteristics are considered:

- Animal or plant species which are rare or uncommon, either internationally, nationally or more locally;
- Ecosystems which provide the habitats required by the above species;

¹ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. CIEEM, Winchester.

- Species that are afforded legal protection;
- Endemic or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/ or other synergistic associations;
- Priority Species and Habitats under the Natural Environment and Rural Communities (NERC) Act, 2006;
- Notably large populations or concentrations of animals considered uncommon or threatened in a wider context;
- Plant communities that are considered to be typical of valued natural/ semi-natural vegetation types;
- Species at the edge of their range; and
- Species-rich assemblages of plants or animals.

9.3.3 Habitats, species and sites identified in the baseline conditions will all be attributed with an ecological importance. The importance or potential importance of an ecological feature will be described in a geographical context (i.e. International, National, Regional, County, District and Local importance). Furthermore, a category of 'Site' importance will be applied to a feature which is present or potentially present at the site, but where the importance to nature conservation of the feature is of relatively low value in the context of the wider landscape. A further 'Negligible' category will be assigned to features of no particular intrinsic nature conservation importance.

9.3.4 In line with the guidelines set out by CIEEM, the impacts of the proposed development will only be assessed on those Important Ecological Features (IEFs) with importance equal to, or higher than Local level, or where mitigation is required for non-IEFs where it is necessary to ensure legal compliance. Habitats or species which are present for which there may be a potential breach of legislation will be considered to be IEFs, even if the feature itself is not considered to be of significant intrinsic nature conservation importance. Non-statutory designated sites will also be identified as IEFs where these lie within the Zone of Influence of the project.

9.3.5 Published selection criteria, contained within the selection of Biological Sites of Special Scientific Interest (SSSI), can also be referred to aid the assessment of importance. Where significant habitats, such as Ancient Woodland, do not carry a designation, these are nevertheless considered at a specified geographic level.

Characterisation of Impacts

- 9.3.6 When assessing the impact of the development and impacts on baseline conditions, predictions will be made which focus solely on the Zone of Influence for each IEF in the context of the lifetime of the development. The Zone of Influence will be assessed separately for each individual feature. Features considered when defining the Zone of Influence of the Scheme on each IEF include the vulnerability of sites and habitats to the effects of construction and operation of the array, the mobility of species both on and surrounding the site, the sensitivity of species to noise and disturbance, the impacts on transient or migratory species and the importance of any particular species or habitats as keystone features within local ecological networks.
- 9.3.7 Each potential impact on an IEF will be assessed at its respective geographical scale. Where appropriate, the following parameters will be used in characterising effects:
- Positive or Negative (whether the impact will have a Positive or Negative effect);
 - Magnitude (the size of the impact);
 - Extent (area over which impact occurs);
 - Duration (time impact expected to last before recovery);
 - Reversibility (an impact may be permanent or temporary); and
 - Timing and frequency (impact may be seasonal e.g. bird nesting season).
- 9.3.8 Impacts are described as being short-term, medium-term and long-term. Generally short term impacts are taken as those which are not anticipated to persist for longer than 3 years, medium-term impacts those which persist between 4 and 10 years and long-term impacts are those which are anticipated to persist over a period in excess of 10 years. It should be noted that for certain species groups, such as invertebrates, a short-term impact of two years may constitute four generations and as such may be more consistent with a medium-term impact for this species group. Where short, medium or long-term are considered to deviate from the timeframes described above this is highlighted for that particular habitat or species.

Application of The Mitigation Hierarchy and Biodiversity Net Gain

- 9.3.9 The stepwise approach of avoidance, mitigation and compensation will be followed when reducing potential impacts.
- 9.3.10 Negative impacts can be avoided through fundamental scheme design choices, such as which fields to include within the final scheme and the extent of the final

development site boundary. Avoidance of impacts can also be part of the mitigation package, such as the imposition of protective buffer zones from sensitive features kept free of all development activity. A distinction is made between avoidance undertaken in deciding the fundamental size and location of the scheme and avoidance undertaken in the mitigation process when designing the detailed scheme (such as fencing and buffer zones). Fundamental avoidance is included in the characterisation of impacts 'pre-mitigation', while all other measures are taken into consideration when characterising impacts in the light of proposed mitigation.

- 9.3.11 Mitigation measures are typically given where likely adverse impacts are identified upon the IEFs. The mitigation measures will aim to reduce the overall impact value, typically at the location at which the impact occurs. An assessment of residual effects which takes account of the proposed mitigation is then made. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals, using the terms defined above.
- 9.3.12 Mitigation measures are also identified for species which did not qualify as IEF but which are afforded legal protection under the Wildlife and Countryside Act (1981) or other legislation, and as such will require certain precautionary methodologies to avoid offences being committed.
- 9.3.13 Compensation measures may be appropriate for IEFs which are likely to experience significant effects once mitigation options have been exhausted. Compensation measures seek to offset these residual effects, for example through the provision of alternative habitat either elsewhere within or outside of the scheme boundary. An examination of the uncertainty in achieving successful compensation will take place. Finally, any remaining residual effects can then be assessed.
- 9.3.14 Ecological monitoring is likely to form a key role in the success of any proposed mitigation or compensation measures.
- 9.3.15 Ecological enhancement measures are those which are not expressly required in order to deliver mitigation or compensation but are included to provide further benefits for nature conservation. The Environment Act 2021 contains provisions that require that at least a 10% net gain for biodiversity be demonstrated through a Biodiversity Net Gain assessment (using Defra's Biodiversity Metric 3.1 or later). It is noted that these provisions are not currently in force for NSIPs, however, a Biodiversity Net Gain assessment will form part of the ES chapter.

Residual Effects and Assessment of Significance

- 9.3.16 Following the methodology described by CIEEM, an ecologically significant effect is defined as "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”.

- 9.3.17 In line with CIEEM guidance, significance of residual effects will be described as being ‘significant’ or ‘not significant’. As CIEEM guidance discourages the use of the matrix approaches to assign categories (e.g. minor, moderate, major) to residual effects, ‘significant’ residual effects will be qualified with reference to the appropriate geographical scale at which the effect is considered to be felt.

Cumulative and In-Combination Effects

- 9.3.18 In-construction, consented or emerging proposals of sufficient size, scale and development nature to cause or increase effects upon IEFs in combination with the proposed development will be examined. Cumulative effects may be additive or synergistic and result from individually non-significant but collectively significant impacts. Implications for further mitigation or compensation will be considered, as well as changes to any likely residual effects. This includes, principally, the associated proposal for the West Burton Solar Project and Gate Burton Solar Project as well as others identified through consultation and detailed accordingly. Please refer to **Chapter 2** and **Appendices 2.2 and 2.3** within this PEIR for information regarding the process for establishing which schemes will form part of this assessment.

9.4 Preliminary Baseline Conditions and Ecological Evaluation

- 9.4.1 This section aims to provide ecological background information and a summary of desk study and preliminary survey information, together with a summary of the kinds of impacts on ecological features which may arise from the proposals.

Study Area and Ecological Context

- 9.4.2 The Scheme comprises three solar array (incorporating battery energy storage) Sites, Cottam 1, 2 and 3 (comprising Cottam 3a and 3b), with an associated cable route to cover approximately 20km between the Sites and Cottam Power Station which will be the Point of Connection. Further short sections of cable will link up the disparate parcels of land which make up Cottam 1.
- 9.4.3 At present, the final cable route is yet to be determined. A red line boundary encompassing land to be examined as a candidate for the final cable route has been established. It is understood that only a narrow width within these corridors will be required for the cable route and its construction. This is referred to as the ‘Cable Route Search Area’ (CRSA) for the purposes of this ecology chapter and forms the scope of the ecological desk study for the cable route used at PEIR stage, within which ecological records (notable species and habitats and designated sites) will be searched for.

- 9.4.4 The final location of the cable route elements will be refined through use of the desk study, supported by further ecological survey and consideration of responses to statutory consultation, prior to submission of the DCO application. Therefore, the survey work undertaken for these elements to date is less advanced. This refinement process is underway but is incomplete. The process will result in a preferred cable route corridor ('PCRC' for the purposes of this ecology chapter) being determined subsequent to PEIR submission which will form the Survey Area for necessary ecological fieldwork. This corridor will comprise a 100m wide swathe of land, made up of 50m either side of the preferred cable route. The results of surveys will then be further analysed and the PCRC refined and it is this final route which will be included for submission with the DCO application.
- 9.4.5 The array sites predominantly comprise large, open and generally flat arable fields characterised by winter-sown cereal crops with some fields of permanent pasture (Cottam 1), bounded by a network of managed hedgerows and ditches with narrow field margins, where present. The Sites' habitats are very much typical of the surrounding landscapes which are dominated by arable farmland and occasional pasture grassland that is interspersed with small settlements and farmsteads linked by minor and single track roads. The landscape surrounding Cottam 1 – 3 is mostly flat but to the east of the Sites lies the 'Lincoln Cliff', a significant north-south escarpment, located 3km east of Cottam 1. The River Trent is located 5km west of Cottam 1 as it flows north towards the Humber Estuary, itself some 22km north of Cottam 3.
- 9.4.6 While no significant woodland is present within the sites, several small stands of managed and unmanaged woodland are present adjacent and in the surrounding landscape, often the result of historical game management. Permanent standing water is generally absent from the Sites and the surroundings following the in-filling of traditional livestock drinking ponds, save for a very small number of agricultural pools/pits, decoy ponds or managed recreational fishing ponds. Flowing water occurs occasionally in the form of various feeder streams for more significant local watercourses and are managed as agricultural drainage ditches within or adjacent to the Sites, many of which regularly dry out. The River Till runs adjacent to the western boundary of Cottam 1, while the Corringham and Yawthorpe Becks bound much of Cottam 2, and then Northorpe Beck forms the eastern boundary of Cottam 3.

Designated Sites

- 9.4.7 Statutory designated sites for nature conservation were identified using the Natural England/DEFRA web-based MAGIC map database (www.MAGIC.gov.uk). The Lincolnshire Environmental/ Biological Records Centre (LERC) was consulted for details of locally-designated and non-statutory sites for nature conservation. The following search criteria were used:

- 'International' designated sites (e.g. Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites) were searched for within 10km from each array site and the cable route. This was extended to 30km for any such sites for which migratory birds or bats are listed as a qualifying feature.
- 'National' sites (e.g. Sites of Special Scientific Interest (SSSIs)) and Local Nature Reserves (LNR) were searched for within 5km.
- Local sites (Such as Local Wildlife Sites (LWSs)) were searched for within 2km.

9.4.8 These search radii are standard distances used in ecological impact assessment for projects of this nature and scale. It is considered unlikely that the proposed development would give rise to impacts on designated sites beyond these ranges.

9.4.9 Statutory and non-statutory sites designated for nature conservation were identified within the desk study element of the PEA in **Appendix 9.1** and for the Cable Route Search Area in **Appendix 9.2**. Both appendices also provide maps showing the relationship between the designated sites and the Sites or Cable Route. This information is summarised below.

All Sites

9.4.10 The Humber Estuary SPA is situated approximately 24km from Cottam 3, 28km from Cottam 2 and 35km from Cottam 1. It is the second largest coastal plain estuary in the UK (covering over 37,600ha) and supports important numbers of geese, ducks and waders during the winter, as well as important breeding populations of bittern, marsh harrier, avocet and little tern during the summer. This site is considered to be of **International Importance**.

Cottam 1

9.4.11 Three non-statutorily designated sites were identified within 2km of Cottam 1. These were all considered to be of **County Importance** and comprise:

- Willingham to Fillingham Road Verges LWS – Adjacent to site - a length of road verge that supports a diverse range of grassland species. A walkover survey of this site was undertaken on 8th September 2021 and found the verge to be in reasonably good condition for the majority of its length, with a moderate diversity of species including abundant meadowsweet, greater burnet and black knapweed and a moderate diversity of fine grasses. The verge had been heavily mown along the western reaches close to residential properties and yellow composite were most evident here. It is noted that the verge suffers substantially from over-run due to the narrowness of the road carriageway which leads to damage from overtaking and the passage of agricultural

machinery (particularly during harvesting). At the eastern end, the verge was closely mown on the north side close to a residential track and dominated by hogweed and umbellifers on the north.

- Willingham Parish Fields LWS – 165m north west - Two adjacent fields beside Stone Pit Lane that together support a good range of neutral grassland plants, as well as a botanically-rich pond.
- Upton Grange Road Verges LWS – 1.1km north – Botanically species-rich verges with neutral grassland and adjacent hedgerows. The invertebrate diversity on these is likely to be high.

Cottam 2

9.4.12 No designated sites were identified in proximity to Cottam 2 within the desk study.

Cottam 3

9.4.13 Five SSSIs and one LNR were located at least 1.5km north of the Site. The SSSIs were components of a complex of sites within Laughton Woods and Scotton Common which are large, contiguous Forestry Commission woodland sites which contain important habitats and reserves for protected habitats (heathland, wetland, grassland and woodland) and species (reptiles, invertebrates, birds – woodlark, nightjar, and plants). Similarly, the six Local Wildlife Sites (LWSs) given are also associated with the above SSSI sites, overlapping with, or augmenting them. These sites are considered to be of **National Importance** (SSSIs) and **County Importance** (LWSs) and comprise:

- Dallison Plantation LWS – 0.9km north – Botanically important with wide variety of locally rare habitats including dry heathland, wetland and neutral grassland.
- Scotton Common SSSI – 1.5km north – Rare example of lowland heathland in Lincolnshire, supporting common lizard, adder, scarce plants and rare moths.
- Scotton Road Verges LWS – 1.5km north - A botanically diverse road verge with wet ditch containing county-rare plants and orchids.
- Scotton Beck Fields SSSI – 1.6km north – Unimproved acidic grassland and heathland botanical communities.
- Scotton Common, Loates Field LWS – 1.6km north – Diverse grassland flora.
- Laughton Forest South-east LWS – 1.6km north – Diverse beech and pine plantation with botanically rich acidic grassland and fern flora.

- Scotton Common East LWS – 1.6km northeast – Diverse neutral and unimproved acid grassland, as well as ditches and a pond.
- Laughton Forest East LWS – 1.8km north – Large areas of heathland and acid peatland supporting county rare species of flora and fauna, including breeding woodlark and nightjar, and common lizard.
- Laughton Common SSSI – 2.3km northwest – Lowland acid grassland, dune and heath.
- Scotton and Laughton Forest Ponds SSSI – 2.4km north – Peaty heathland pools with open acid grassland and botanically important mire habitats.
- Tuetoes Hill SSSI – 5.0km north – Important mosaic of dry acid grassland including dune grassland.
- Owlet LNR – 2.2km west – Birch, oak and pine woodland interspersed among open heathland. Supports important diversity of invertebrates.

Cable Route Search Area

9.4.14 As detailed and mapped within **Appendix 9.3**, five designated sites were located within the Cable Route Search Area. These comprised five LWSs as summarised below and are considered to be of County Importance. No statutory designated sites were located within the Cable Route Search Area.

- Cow Pasture Lane Drains LWS – Botanically diverse network of roadside watercourses.
- Coates Wetland LWS – Relatively large mosaic of wetland, woodland and grassland habitats enclosed within a flood bank.
- Trent Port Wetland LWS – Unmanaged area of floodplain meadow east of the River Trent, incorporating scrub and wetland habitats.
- Willingham to Fillingham Road Verges LWS – 3-3.5m wide roadside verges. Main habitats are calcareous grassland and neutral grassland (unimproved/semi-improved). Additional habitats include coarse grassland, species rich hedgerow and ditches.
- Upton Grange Road Verges LWS – Species rich neutral grassland. Additional habitats include calcareous grassland and species poor hedges. North and east verges are exceptionally species rich and notable due to isolation.

Field Survey Methodologies and Scope

9.4.15 The ecological field surveys which have been carried out across the array sites are described below along with applicable methodological notes and survey scope rationale:

- Extended Phase 1 Habitats Survey²³ of all land within the solar array site boundaries (completed April/May 2021). The survey comprised a thorough walkover survey of all accessible land within the array sites, and where accessible and relevant up to 30m beyond this, to collect baseline habitat inventory and condition information. The survey paid close attention to any potential Habitats of Principal Importance or local priorities, including hedgerows. The survey evaluated the habitats' potential to support notable or protected species and any signs of presence were recorded.
- Five breeding bird survey visits of all land within the solar array site boundaries (May 2021 - May 2022). Method follows British Trust for Ornithology (BTO) Common Bird Census techniques as informed by <http://birdsurveyguidelines.org>. Observations were recorded onto paper maps using BTO symbology which were later digitised for analysis using QGIS.
- One nocturnal/crepuscular bird survey visit (focus on quail and owls) of all land within the solar array site boundaries (late June to early July 2021). Method follows recommendations in Royal Society for the Protection of Birds (RSPB) Bird Monitoring Methods.
- Six wintering bird surveys of all land within site boundaries (November 2021 to February 2022). Method follows BTO Common Bird Census techniques as informed by <http://birdsurveyguidelines.org>.
- Great Crested Newt (GCN) Habitat Suitability Index (HSI)⁴ and environmental DNA (eDNA)⁵ of all (28) accessible ponds within the site boundaries and land within 250m under same land ownership (June 2021). Follows Natural England eDNA survey guidance.
- Monthly static bat detector surveys utilising 22 detector locations per month between June and September 2021 and April and May 2022 (six months). Informed by Bat Conservation Trust Good Practice Guidelines (2016). Locations chosen were at hedgerows and woodland edges within the centre of the proposed array sites to gain a representative sample of bat species

² JNCC (2010) Handbook for Phase 1 habitat survey – a technique for environmental audit. Joint Nature Conservation Committee, Peterborough

³ Institute of Environmental Assessment (1995). Guidelines for Baseline Ecological Assessment. E & FN Spon, London.

⁴ Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*) (2000) Oldham et al. Herpetological Journal 10:143-155.

⁵ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, 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.

assemblage and activity and not impede agricultural operations. Due to the hedgerow and field boundary network totalling approximately 75km and area of the Sites totalling approximately 1000ha it was considered impractical to carry out effective transect surveys and unlikely to add meaningful data over and above that which could be derived from the hundreds of detector-nights' worth of data collected from a high concentration of static detector deployments. Complementary information on potential roost locations was collected as set out below.

- Ground-based assessment of all trees within site boundaries for potential to support roosting bats (December 2021 – March 2022). Follows Bat Conservation Trust Good Practice Guidelines (2016) as informed by the Bat Tree Habitat Key⁶.
- Daytime inspections of all buildings within the site boundaries and immediately adjacent (where accessible) for their potential to support roosting bats (March-May 2022). Follows Bat Conservation Trust Good Practice Guidelines.
- Autumn 2021 survey of all water courses and ditches within site boundaries for water vole and otters, followed by a follow-up repeat visit to all optimal, suitable and dry ditches in spring 2022. Follows guidance within Water Vole Field Signs and Habitat Assessment by Mike Dean (2020) and The Water Vole Mitigation Handbook by The Mammal Society (2016). Habitat suitability assessments were undertaken at all ditches and watercourses on site, while mammal observations and field sites were noted and mapped digitally.
- A survey of all sites for badger setts was carried out in March-April 2022, with sett locations recorded digitally and setts classified according to likely status and activity.

9.4.16 Surveys currently planned to be carried out at the Site and CRSA are:

- A GCN eDNA and HSI survey of all accessible ponds within 250m of array site boundaries on third-party land (approximately 30, pending access approval), plus a re-survey of all ponds previously found to be dry (8) (May - June 2022).
- Extended Phase 1 Habitats Survey of a refined, 'Preferred Cable Route Corridor' (PCRC) (June-July 2022). The final cable route would be determined following the completion of this survey. A thorough walkover survey of all accessible land within the Survey Area, and where accessible and relevant up to 30m beyond this, to collect baseline habitat inventory and condition

⁶ Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (2018)

information. The survey will pay close attention to any potential Habitats of Principal Importance or local priorities, including hedgerows. The UKHAB standard and protocol will be employed in order to provide a baseline for Biodiversity Net Gain assessments.

- A qualitative assessment of habitat suitability for the following species/groups will be undertaken at the same time to identify those which may be at risk from being impacted by proposals, to inform future survey needs:
 - Badgers (setts and signs of activity to be recorded in all accessible habitats).
 - Bats (ground based, daytime inspections of trees and buildings present on or adjacent to the Survey Area for potential roost features and signs of roosting. Assessment of potential value of habitats to foraging and commuting bats).
 - Otters and water voles (brief visual inspection of ditch/watercourse habitat suitability).
 - Amphibians (to identify terrestrial and aquatic/breeding habitat of particular potential, especially GCN).
 - Breeding birds (particular focus on likely presence of Ground Nesting Birds such as skylark, yellow wagtail, quail and grey partridge, as well as Schedule 1 or priority species including barn owl, hobby, peregrine or turtle dove).
 - Terrestrial and aquatic invertebrates (to assess for the presence of habitat of potentially elevated suitability which could be revisited, if necessary, where potential impacts determined).
 - Reptiles (to assess habitat for elevated suitability).
 - A GCN eDNA and HSI survey of all accessible ponds within 250m of the PCRC (9 ponds additional to those already completed, pending access approval) (May - June 2022).

9.4.17 The survey effort and scope presented above reflects what is believed at the time of writing to be sufficient and proportionate to inform the evaluation of baseline conditions for this project based on our professional judgment, and through consultation with Natural England, Lincolnshire Wildlife Trust and Nottinghamshire Wildlife Trust, as appropriate. As Ecological Impact Assessment is an iterative process, the scope may be extended or modified in due course as influenced by emerging survey results as well as through continued consultation.

- 9.4.18 At the present time and given the recency of the data collection, no technical reports for completed survey work have been prepared. This baseline evaluation section is based upon a summary of the findings as they stand. Technical reports will be prepared in due course and will accompany the eventual ES as appendices.

Habitats

- 9.4.19 The following section provides a summary of the extent and character of the various habitats which occur on the four array sites as derived from the fieldwork to date. Their likely ecological importance is also provided.
- 9.4.20 At the time of writing, no fieldwork in relation to the PCRC has been undertaken, although an examination of publicly-available mapping, and a desk study to search for the location of Priority Habitats has been completed (see **Appendix 9.3**) and informs this section.
- 9.4.21 This information should be read in conjunction with the Phase 1 habitat survey maps provided in **Appendix 9.2** as well as the Target Note tables given in **Appendix 9.1** which accompany them.

Woodland

- 9.4.22 Woodland cover on the proposed sites is sparse and limited to occasional broadleaved or mixed copses, spinnies and shelter belts adjacent to the red line boundaries. Lowland mixed deciduous woodland is a Habitat of Principal Importance. No stands of woodland are actually present within the red line boundaries or the footprint of development. The majority of this adjacent woodland cover is associated with Cottam 1, as its current management includes a partridge shoot and is considered a managed habitat. Relatively larger stands of woodland occur in the local area, again especially in proximity to Cottam 1, although these are still discontinuous and linked only by the local hedgerow network. Within the Cable Route Search Area, small to medium sized blocks of deciduous woodland were revealed within the desk study.
- 9.4.23 Considering the absence of woodland within the sites, being limited to adjacent to the sites only, together with the presence of relatively few woodland stands within the CRSA, woodland is considered to be of **Local Importance**.

Hedgerows and Trees

- 9.4.24 Hedgerows are a Habitat of Principal Importance and 'Hedgerows and Hedgerow Trees' is listed on the Lincolnshire Biodiversity Action Plan.
- 9.4.25 The Sites contain an extensive network of approximately 75km of managed hedgerows, roughly half of which contain occasional mature and semi-mature trees. Several hedgerows are considered species rich, although the majority are not and

are dominated by blackthorn and hawthorn. A large proportion of the hedgerows also contain a drainage ditch which dries out for a portion of the year. The hedgerows were generally dominated by hawthorn and blackthorn, with sporadic field rose. Most hedgerows are frequently managed, although the hedgerows at Cottam 1 showed signs of being less frequently, and more rotationally, managed. Trees present variously comprised ash (often showing extensive signs of dieback), elder, holly, field maple, grey willow and oak.

- 9.4.26 The CRSA also appears to be characterised by a very similar hedgerow network, with occasional trees, although further survey of the preferred cable route corridor will be required to confirm this.
- 9.4.27 These hedgerow networks often comprise the most important ecological features within the Sites and provide foraging, dispersal and sheltering habitat for a variety of invertebrates, mammals, birds and other species groups. Owing to the substantial size of the hedgerow network and its listing as a priority habitat, the Sites' and the CRSA's hedgerows and hedgerow trees are considered as being of **District Importance**.

Arable Fields

- 9.4.28 The arable fields occupied the vast majority (approximately 840ha) of the Sites' areas and the CRSA, and were intensively farmed monocultures focussing on wheat, barley, linseed and some oilseed which are likely to receive periodic fertiliser and pesticide treatments. The arable fields across all Sites are therefore generally botanically poor and contained little particular ecological interest, save for their value to a relatively small number of ground-nesting bird species and arable specialists including hunting raptors (several of which are notable species of conservation concern) and brown hare, as described later in this document. No arable weeds of particular interest or potentially notable communities were noted.
- 9.4.29 The crop rotation at Cottam 3 was noted to leave several fields bare and/or uncultivated at certain points through the spring, particularly F13 and F7 (see **Appendix 9.2**), which may provide value to birds which feed on fallow or set-aside type vegetation, such as turtle dove.
- 9.4.30 As they are of negligible botanical interest, the arable fields are considered to be of **Site Importance** only.

Grassland and Arable Field Margins

- 9.4.31 Arable field margins are a Habitat of Principal Importance and listed on the Lincolnshire BAP.

- 9.4.32 The uncultivated arable field margins across the Sites are predominantly absent or very narrow (<2m wide), apart from some areas in Cottam 1 and 2 which have been purposefully left wide, in places approximately 5-7m. Generally they are species poor and poor in terms of structure, being mown most years in order to halt any scrub encroachment from hedgerows. Parcels of richer grassland habitat have been individually noted within the corresponding habitat maps (**Appendix 9.2**), although these are infrequent.
- 9.4.33 Most often, margins at Cottam 1 were dominated by perennial ryegrass, Yorkshire fog, dandelion, rough meadow-grass, with occasional cowslip, cow parsley, wood sage, teasel, yarrow, oxe-eye daisy, rib-wort plantain, docks, meadowsweet, red clover, ground ivy, creeping thistle and cut-leaved cranesbill. However, there are a small number of species-rich grassland patches in uncultivated areas at edges of fields or at headlands close to watercourses such as the River Till.
- 9.4.34 At Cottam 2, field margins were generally narrow, although wider semi-improved grassland margins of up to 5m were present at fields F1, F4 and F9, with patches of moderately diverse semi-improved grassland present at F1 and F9, each surrounding in-field ponds which have clearly been avoided during cultivation. F8 was characterised by poor semi-improved grassland. Dominant species were cock's foot, meadow foxtail, false oat-grass with hogweed, teasel, cowslip and willowherbs.
- 9.4.35 At Cottam 3, field margins were particularly small, typically measuring 0-2m. There were no areas of notable grassland save for fragments of poor semi-improved grassland at field edges bordering features such as bunds and other made-up ground associated with either the farms or racetrack infrastructure.
- 9.4.36 Similarly, the small number of permanent pasture fields on all three sites were all considered to contain species-poor semi-improved grassland.
- 9.4.37 Arable field margins are considered to be of **Local Importance**, while semi-improved grassland and improved grassland fields are considered to be of **Site Importance**. At this stage, it is considered likely that the evaluation would apply also to the habitats within the CRSA, pending further assessment of the PCRC as planned.

Ditches and Watercourses

- 9.4.38 Rivers are a Habitat of Principal Importance while Rivers, Canals and Drains are listed on the Lincolnshire BAP. Over 60km of dry or wet ditches are present (mainly associated with hedgerows) within the Site.
- 9.4.39 The River Till runs adjacent to Cottam 1, while other minor watercourses and drains are present at Cottam 2 and 3 and were fed by various drainage ditches present at field boundaries. Most wetted ditches featured grassy banks and were approximately 2-4m deep and 2-4m wide with emergent vegetation. Water quality

appeared to vary, and in many cases was relatively poor owing to the presence of agricultural run-off. The hedgerow network often contains associated ditches, some of which contain water for longer periods of time and so contribute to the hydrology and riparian habitats present on and off site. The Corringham, Yawthorpe and Northorpe Becks are located in proximity to Cottam 2 and 3, and along the CRSA.

- 9.4.40 The ditches at Cottam 1 were predominantly wet and associated with hedgerows, although many significant drainage ditches and watercourses were recorded. These measured up to 7-8m wide and 3-4m deep in places, with tussocky grassland banks colonised by ruderal and marginal wetland plant species. Generally, many of the ditches at Cottam 1 were of good quality and species diversity.
- 9.4.41 At Cottam 2, the ditch numbers which form the north western boundary (fields D7, D9, H9 and H10) are together known as the Corringham Beck which is a minor stream. Similarly, those along the north eastern boundary, predominantly D1, are known as the Yarthorpe Beck, another minor stream. These are the two most significant watercourses on Cottam 2.
- 9.4.42 At Cottam 3, Ditches are only present toward the western and eastern edges of the Site. Ditches at fields H2 and H3 form part of the Northorpe Beck. Generally, ditches are between 1.5 and 4m wide and typically feature grassy banks with some surface and emergent vegetation such as hemlock, hogweed, duckweed, water figwort and willowherbs.
- 9.4.43 Considering the extent of the ditch network and the presence of several which supported moderate botanical diversity, the ditches on Site can be attributed a **District Importance**.
- 9.4.44 For the most part, it is considered likely that this evaluation would also apply to the CRSA, however the presence of the River Trent within it elevates this to **County Importance**. Further walkover habitat assessment of the PCRC will seek to corroborate this.

Ponds

- 9.4.45 Ponds are a Habitat of Principal Importance and listed on the Lincolnshire BAP.
- 9.4.46 Waterbodies were very thinly distributed on site with no in-field ponds being present. A small number of ponds are located within boundary scrub and woodland blocks within Cottam 2, although exclusively outside of the development footprint. Most agricultural ponds will have been filled following the decline of pasture and mixed farming in favour of arable intensification. Those which remain on the Sites tend to be formed by wider, pooled sections of drainage ditches, are agricultural sumps/slurry pits, or are associated with woodland or woodland edge as shooting decoys.

- 9.4.47 Further information on the ponds on Site including a Habitat Suitability Assessment for breeding great crested newts will be provided in a separate report in due course.
- 9.4.48 Given the general absence of ponds at the Sites, those which are present are considered to be of **Local Importance**. An assessment is yet to be undertaken for the CRSA.

Protected and Notable Species

- 9.4.49 This section summarises the findings to date of the species-specific surveys relating to the array Sites, as well as the desk study, for which species records within 2km were obtained from Lincolnshire Environmental Records Centre. As surveys are either ongoing or very recently completed, no technical reports have been produced at the time of writing. Therefore, this represents only a preliminary summary of the baseline conditions at the Site.
- 9.4.50 The detailed results of the desk study and initial species surveys (Phase 1, badgers and GCN eDNA) for the array sites are contained within **Appendix 9.1** and **9.2** and for the CSRA in **Appendix 9.3**.

Badgers

- 9.4.51 Badgers, including their setts, are protected under The Protection of Badgers Act, 1992.
- 9.4.52 Numerous records of badger setts were revealed by the desk study, within 1km from each of the Sites, predominantly Cottam 1, for which 18 records within the red line boundary were returned.
- 9.4.53 Woodlands were not extensively searched for badgers during the extended Phase 1 survey as they lay outside of the red line boundary, although their peripheries were entered where accessible and/or where potential mammal pathways led into them. Setts were noted where there was evidence, such as pathways or latrines, visible from the field edges, or within hedgerows.
- 9.4.54 A main badger sett was recorded at Cottam 1 (north), along with a further two subsidiary setts and an outlier. The majority of badger activity was located at Cottam 1 as it was adjacent to the most blocks of woodland and scrub. Two outlying setts and a subsidiary sett were each located at Cottam 2 and Cottam 3. All setts within the sites were located at field boundaries.
- 9.4.55 The Sites contain significant extents of habitat suitable for foraging by badgers, across the arable fields and the field margins. Badgers predominantly feed on soil invertebrates, particularly earthworms, but will take a wide variety of plant and animal prey items depending on availability. Arable fields have a lower earthworm

abundance than grassland fields, therefore the uncultivated margins, woodlands/hedgerows and gardens are likely to be more productive for badgers.

- 9.4.56 Badgers are not a species of conservation concern but receive legal protection on account of historic and ongoing persecution. Consequently, they are considered to be of Site value in terms of conservation status. They will be included within the impact assessment nonetheless due to these legal obligations.

Bats

- 9.4.57 All bat species and their roosts are fully protected under the Habitats Regulations, are Species of Principal Importance and appear on the Lincolnshire BAP. A summary of the locations used for static detectors and the results gathered by them are given in **Appendix 9.5**.
- 9.4.58 For Cottam 1, approximately 200 records for six species were recorded within the desk study data, none of which were recorded within the red line boundary and the vast majority beyond 250m of the Site. The most commonly recorded species was common pipistrelle, followed by brown-long eared bat, Myotis bats (Natterer's and Daubenton's) and noctule bats. This represents a relatively low diversity of species, all of which can be expected to roost within buildings and/or trees in the local area. The species present in the data were generally common and widespread. Most records were made post-2000.
- 9.4.59 For Cottam 2 there were only 12 records of bats across two species (common pipistrelle and brown long-eared bat), all of which were located over 1Km from the Site boundary.
- 9.4.60 For Cottam 3, there were only 11 records of bats across two species (common pipistrelle and noctule bat), all of which were located over 700m from the Site boundary.
- 9.4.61 Initial habitat assessment determined that the quality of habitats for bats across the Sites was generally low, being dominated by monoculture arable and a simple, but extensive, network of managed hedgerows. The presence of ditches, occasional hedgerow trees, adjacent woodland blocks (Cottam 1) and larger watercourses locally elevated this value by providing relatively stronger corridors for dispersal and foraging and more opportunities for roosting.
- 9.4.62 Bat survey information was gathered through the use of an array of 22 static detectors deployed monthly for six months. To date, a total of 147,056 bat passes were recorded over 992 recording nights at 22 deployment locations. This equates to an average of 148.24 bat passes per recording night. This is considered to represent a moderate level of bat activity in comparison to other sites throughout England.

- 9.4.63 When taken individually, Cottam 3b had by the highest level of activity with an average of 305.87 passes per night, which was considered to be a high level of activity. Cottam 2 which had an average of 67.21 passes per night, which was considered to be a low level of activity. Each of the other Sites had an average of between 100 and 200 passes per night, which was considered to be a moderate level of activity.
- 9.4.64 Preliminary survey data analysis indicates that a moderate diversity of species is present across the Sites, with at least nine species recorded (not separating the *Myotis* genus). The majority of activity was made up of common and soprano pipistrelle, noctule bat and several *Myotis* species, which was expected. Brown long-eared bat is another relatively common species which featured regularly within the assemblage.
- 9.4.65 The highest levels of species richness was recorded at Cottam 1, with 9+ species being recorded at each of the distinct areas (Cottam 1 North, South and West). Cottam 2 had the lowest level of species richness with 7+ species being recorded and Cottam 3 and 3b had 8+ species recorded.
- 9.4.66 Two rarer species featured infrequently and in very low numbers, which were barbastelle and Nathusius' pipistrelle. The sites are located at the northern edge of the range for these two species. Barbastelle bats are rare and Nathusius' pipistrelle uncommon in Lincolnshire according to the Lincolnshire Biodiversity Action Plan (BAP). Strongholds for barbastelle bats are known across East Anglia and Lincolnshire contains a known population. Nathusius' pipistrelles are known to exhibit migratory behaviour and it is likely that this dispersal has been recorded here. Furthermore, several calls made by serotine bats were recorded, which is a species on the edge of its range in Lincolnshire, and its status in the county is unconfirmed. It is considered probable that roosts for all the more regularly-recorded species recorded within the dataset occur either in trees within the Sites, or in trees and buildings in the local area.
- 9.4.67 Surveys of trees were carried out to assess their potential to support roosting bats and were categorised as having high, moderate, low or negligible bat roost potential. Field boundaries were assessed in terms of the tree with the highest potential for roosting bats and, as such, only the tree with the highest level of bat roost potential within each field boundary was recorded and mapped. All in-field trees were surveyed, recorded and mapped. A total of 50 high bat roost potential trees, 67 moderate bat roost potential trees, 74 low bat roost potential and 118 negligible bat roost potential trees were recorded within the Sites. It is likely that a substantial number of bat roosts are present within trees that are located within the Sites from a range of different species.
- 9.4.68 Surveys of buildings within the Zone of Influence of the project were carried out where access was granted, to assess their potential to support roosting bats. A total

of 10 buildings were inspected, all of which were located outside of but in close proximity to the Sites. A small number of bat droppings, morphologically consistent with those of pipistrelle sp. were recorded within one building and was therefore confirmed as a bat roost, no evidence of bat presence was recorded within any other building that was surveyed. Of the remaining buildings three were assessed as having high bat roost potential, five were assessed as having low bat roost potential and one was recorded as having negligible bat roost potential. It is likely that a low number of bat roosts are present within buildings that are in close proximity to the Sites.

9.4.69 It is considered that the general assemblage and rate of activity recorded was typical for the habitats present on the Sites. The presence of serotine in very low numbers was notable as this species has not been confirmed as resident within Lincolnshire and was therefore considered as being of potentially **County Importance**. The presence of barbastelle and Nathusius' pipistrelle is notable but not unexpected and these species can be considered as being of **District Importance** in the context of the Site. The remaining assemblage of bat species is considered to be of **Local Importance** in terms of their conservation status and activity rates.

9.4.70 Considering the nature of the proposals within the PCRC being confined to temporary and reversible works (i.e. the impacted habitats will be restored once installation works have concluded) within a narrow working strip, it was not considered proportionate to carry out sampling surveys for bat activity. The narrow, linear layout of a PCRC meant also that it would be impractical to collect meaningful data which would have a bearing on the siting of the cable. Instead, an appraisal of the habitats, particularly hedgerows and field margins for foraging and dispersal and trees/buildings for roosting, will be undertaken. Any such valued features which may be directly or indirectly affected by the proposals would be investigated further and the findings used in the final design of the route. At this stage, it is considered that the evaluation made above is based on robust evidence and is likely to be appropriate for the CSRA given the similarity of habitats and topography between it and the array sites, although this will be corroborated through further walkover assessment as planned.

Otter

9.4.71 Otter are a Species of Principal Importance and protected under the Habitats Regulations.

9.4.72 For Cottam 1, ten desk study records of otters were present within the red line boundary, all within Coates South, showing association with the River Till and tributaries. A further 15 records were present within 250m of Coates West.

9.4.73 No records of otter within 2km of Cottam 2 were present in the Desk Study data.

- 9.4.74 For Cottam 3, there were four pre-2000 records of otter approximately 2km from the Site.
- 9.4.75 Otter are relatively widespread within Lincolnshire, being associated with all principal river catchments in the county.
- 9.4.76 During the two surveys of ditches carried out across the Sites, several signs of otters were recorded, as can be seen in **Appendix 9.6**.
- 9.4.77 Records are associated with the most permanently wet, and higher quality ditches. There are no major watercourses on any of the Sites, rather intermittently-drying ditches and minor streams/drains with fewer food items than rivers. The ditches and streams were seen to be relatively devoid of bankside features conducive to holt creation, with trees being present only occasionally and bankside scrub being generally absent or sparse.
- 9.4.78 Considering the presence of otter principally within the larger watercourses at the Sites and relatively limited riparian corridors within the red line boundaries, otter are considered to be of **Local importance** in the context of the Site. This evaluation is considered likely to be appropriate also for the CRSA on account of the similarity of ditch and watercourse network within it, pending further walkover assessment of the habitats within the PCRC as planned.

Water Vole

- 9.4.79 Water voles are protected under the Wildlife and Countryside Act, are a Species of Principal Importance and appear on the Lincolnshire BAP.
- 9.4.80 For Cottam 1, 12 records of water vole were present within the red line boundary, all within Coates North, showing association with the ditch network on Site. A further 19 records were present within 250m of the Site showing association with the ditches and also the River Till. 82 further records are located between 250m and 2km from the Site. Most records were made post-2000.
- 9.4.81 For Cottam 2, 14 records of water vole were present, six of which were located within the red line boundary between 2002 and 2011. Two were located within 250m of the Site.
- 9.4.82 For Cottam 3, 31 records of water vole were present, all located at least 250m from the Site boundary.
- 9.4.83 During the two surveys of ditches carried out across the Sites, several signs of otters were recorded, as can be seen in **Appendix 9.6**. It is concluded that otters and water voles will be present within the more suitable watercourses at least sporadically through the year, with the likelihood of there being otter holts being low (none have been confirmed so far). However, the River Till lies close or adjacent to Cottam 1

which can be expected to increase the likelihood of a regular presence thereon. Otters and water voles are unlikely to cover open ground, with otters remaining relatively inactive for most of the daylight hours. Both species are restricted to ditch and stream corridors and nearby scrub, thickets and dense vegetation.

9.4.84 As with otters, suitable habitat for water vole was restricted to river corridors, wet ditches and streams present on or adjacent to the Sites. Habitat requirements for water vole focus on shelter (diggable earth banks), aquatic vegetation and reliable access to water.

9.4.85 It is considered that water voles are of **District Importance** and that this evaluation is likely to apply to the CRSA on account of the similarity of ditch and watercourse network within it, pending further walkover assessment of the habitats within the PCRC as planned.

Other Mammals

9.4.86 Other mammals which are Species of Principal Importance and potentially present on site and capable of being impacted include hedgehog, harvest mouse, polecat and brown hare.

9.4.87 One polecat record 1.2km southeast of Cottam 1 was revealed by the desk study. Records of this species in Lincolnshire are extremely sparse, with their strongholds being Wales and the west of England. Polecat are likely to be of **Local Importance** in the context of the Site.

9.4.88 Brown hare are ubiquitous across the Sites, present in relatively high numbers within the arable fields and field edges. Not of particular conservation interest in the area, brown hare are considered to be of **Local Importance** in the context of the Site.

9.4.89 Hedgehogs are likely to be present across the Sites, particularly in field boundaries, with numerous records of this species being present within the desk study data. A single dead hedgehog was found in a field boundary during fieldwork on Cottam 1. Given that hedgehog numbers are in decline nationally, this species is considered as being of **Local Importance**.

9.4.90 Harvest mice or their nests have not been observed during site visits but can be assumed to be present at least at low density within the hedgerow, woodland and field margin habitats, with many records present in the desk study data. This species is therefore considered to be of **Local Importance** in the context of the Site.

9.4.91 No deer species receive special legal protection or are considered priority species of conservation concern. Fallow deer, muntjac and roe deer all occur in Lincolnshire. The arable fields are of little value to deer, which would be expected to keep more

closely to woodland, pasture and field boundaries. Considering the highly open nature of the Site's habitats and general absence of woodland or dense habitats, as well as a very low coverage of permanent pasture, deer are considered to be of **Site Importance**.

9.4.92 All evaluations are likely to apply to the CRSA on account of the similarity of farmland habitats within it, pending further investigation within the PCRC.

Reptiles

9.4.93 Reptiles are Species of Principal Importance and receive varying levels of protection under the Wildlife and Countryside Act.

9.4.94 At Cottam 1, 6 historical (pre-2000) records for common lizard located beyond 250m of the Site were present, as well as 32 records for grass snake (4 post 2000) again all beyond 250m from the Site.

9.4.95 No reptile records were present within 2km of Cottam 2.

9.4.96 All reptile records for Cottam 3 were located approximately 2km from the Site to the north, presumably close to the populations within Laughton and Scotton commons. These comprised 35 records of common lizard, 39 records of adder and 14 records of grass snake.

9.4.97 Habitats for reptiles are generally limited in quality and extent across all the Sites, being restricted to hedgerow bases, tussocky field margins and woodland edges. The desk study data shows a lack of records for reptile species within 2km of the sites, with an absence generally within 250m. The only significant number of reptile records in proximity to the sites are derived from Laughton Forest some 2km north of Cottam 3. For these reasons, specific reptile surveys were not considered proportionate to undertake.

9.4.98 The only reptile sighting on site to date was of a single grass snake on the banks of the River Till in Cottam 1.

9.4.99 Considering the restricted extent and suitability of habitats for reptiles, and their likely presence across the Sites at a low or very low density, reptiles are of **Local Importance** in the context of the Site. At this stage, this is considered likely to be the case for the CRSA until a walkover assessment of habitats within the PCRC can be made as planned.

Amphibians

9.4.100 Great crested newt and common toad are Species of Principal Importance and all newts are listed on the Lincolnshire BAP.

- 9.4.101 For Cottam 1, 76 great crested newt records are present beyond 250m of the Site, the closest being 475m south west of the Site. 43 records of toad were present in the dataset, the closest being located 600m west of the Site. A small number of other amphibian records (smooth newt, common frog and palmate newt) were revealed between 250m and 2km from the Site.
- 9.4.102 No amphibian records were present within 2Km of Cottam 2.
- 9.4.103 For Cottam 3, 36 records of toad were present, mostly made pre-2000, the closest located 500m west of the Site. In addition, there were 34 records of common frog similarly distributed.
- 9.4.104 Clusters of records of amphibians exist predominantly around Lincoln, presumably due to a more diverse sub-urban landscape with more permanent coverage and interconnectivity of scrub, grassland, gardens and woodland and greater recording effort. Clusters of records are also present around the Trent valley – especially on floodplain grassland between Cottam power station and Torksey. The dearth of records within the arable landscape may also indicate the influence of under-recording away from established settlements.
- 9.4.105 Great crested newt eDNA surveys of 26 ponds on Site have been undertaken which found one positive pond very close to (but beyond) the boundary of Cottam 1 (south – see **Appendix 9.1**). Several great crested newt desk study records were derived from the surrounding area. Habitat for great crested newt is localised and limited to the hedgerow and woodland network as well as the limited extent of scrub and uncultivated grassland within the site. The arable fields are considered to be highly suboptimal for this species. Other amphibian species recorded within the desk study included common toad, common frog and smooth newt.
- 9.4.106 Considering the lack of records or substantial presence of optimal habitat for these species, amphibians are considered to be of **Local Importance**. This evaluation is likely to apply to the CRSA on account of the relative dearth of ponds within it, pending further investigation within the PCRC.

Breeding Birds

- 9.4.107 From the data records for Site, notable species within the data search included farmland birds including corn bunting, lapwing, grey partridge quail, skylark, tree sparrow, turtle dove, yellow wagtail and yellowhammer, as well as barn owl, waders and raptors. Many records were from outside of the redline boundary which is likely due to lack of data from within, rather than absence of species.
- 9.4.108 Many bird species are listed as Species of Principal Importance and appear as either green, amber or red-listed species within the RSPB/BTO Birds of Conservation Concern lists. Farmland birds appear on the Lincolnshire BAP. All birds and their

eggs are protected, while some which appear on Schedule 1 of the Wildlife and Countryside Act are protected further from disturbance while nesting.

- 9.4.109 At Cottam 1, numerous records of 56 species of notable birds, or birds of conservation concern, were revealed by the Desk Study. These are detailed in **Appendix 9.1**. The only species with records made within the Site boundary was house sparrow (Coates West). The majority of these species records comprise farmland birds such as corn bunting, quail, barn owl and turtle dove as well as waders and raptors.
- 9.4.110 For Cottam 2, numerous records of 23 species of birds were recorded. These included several within the red line boundary of the site, which were; two records of barn owl, four records of lapwing and four records of skylark. All other bird species were recorded beyond 250m from the Site, including curlew, tree sparrow and yellowhammer.
- 9.4.111 For Cottam 3, numerous records of 17 bird species were recorded. One record of cuckoo was located within 250m of the red line boundary. All other records were located beyond approximately 500m of the Site, including species such as yellowhammer, yellow wagtail, nightjar, lapwing and barn owl.
- 9.4.112 The most prevalent species included within the data search included those typically associated within farmland and woodland habitats, with species of note including barn owl, corn bunting, curlew, lapwing, quail, tree sparrow, turtle dove and yellow wagtail, as well as waders and raptors. The nesting habitats present on site of greatest value to breeding birds were generally restricted to the hedgerows and trees, adjacent woodland and any uncultivated field margins, tussocky grassland, scrub and game cover crop, excluding ground-nesters. Of course the majority of these species have also adapted and utilise the surrounding farmland to secure territories and foraging resources throughout their breeding season and, for some, to support overwintering their populations. This includes arable managed fields and pasture even where intensive management is creating habitats that are overall suboptimal for a large proportion of species. The majority of farmland species are inevitably closely associated with in-field habitats, especially lapwing, grey partridge, linnet, skylark, quail, yellow wagtail and yellowhammer which all forage within the arable fields, among other habitats.
- 9.4.113 Following preliminary survey information analysis, species recorded on or adjacent to the site considered most vulnerable to habitat loss and change impacts would be ground-nesting species of open habitats, principally lapwing, skylark and yellow wagtail as they almost exclusively nest within the arable and cultivated fields and require long, unbroken sightlines for predator avoidance. Common quail are also mostly associated with open fields but potentially at a lesser risk given their use of boundary habitats for nesting and records returned from each land parcel. This included single records of singing males on single visits at each land parcel and

therefore considered likely to have some breeding attempts on Site. Skylark and yellow wagtail territories were recorded consistently across all Sites, with approximately 250 skylark territories recorded. Lapwing were also present, although occurred more sporadically. Curlew, including calling individuals, were also recorded at the same land-parcel at Cottam 1 across three separate visits and considered likely foraging within arable fields and potentially breeding nearby (but off-site). Overall, the breeding bird species assemblage and distribution appear to be relatively uniform across the Sites owing to the similarities in habitat and topography, but with habitat diversity field size and land-use all affecting the overall value and assemblage of birds at any given land-parcel to breeding birds.

- 9.4.114 Species typically associated with boundary habitats were recorded consistently across the Sites with distribution patterns largely influenced by their specific ecological requirements, such as yellowhammer and linnet utilising vegetation boundaries (e.g. hedgerow, scrub) whilst nesting in hedgerow and amber-listed reed bunting nesting within ditch habitats/margins and feeding within arable crops, especially oilseed rape. The farmland species with more specific requirements and loyalty nesting places or established colony locations were recorded less frequently, such as tree sparrows. Although recorded across the Sites, their distribution was very localised around likely nesting places within hedgerow, standard trees etc. as well as foraging in-field.
- 9.4.115 Another farmland bird with specialist requirements included turtle dove with a single individual observed feeding within a fallow field at Cottam 3 on one occasion and subsequently heard calling from fields adjacent to this land parcel on another and considered to be a breeding territory. All sites support breeding grey partridge, while Cottam 1 particularly rich in numbers as nearby land is specifically managed for these birds.
- 9.4.116 Waterbodies also increase habitat diversity of any given site with amber-listed breeding moorhen recorded at Cottam 2. A notable species for Lincolnshire, ravens were recorded at Cottam 1 and Cottam 2 although not breeding on-site.
- 9.4.117 Several birds of prey were noted on Site, including barn owl, hobby, kestrel, little owl, peregrine, marsh harrier and short-eared owl. The possible breeding of Schedule 1 species, including peregrine at Cottam 3 and nesting and foraging barn owl across Cottam 1 - Cottam 3. Marsh harriers were also recorded foraging/commuting across Cottam 1 and Cottam 2. Kestrel were also confirmed breeding at Cottam 2 including juveniles seen. Little owl and short-eared owl are green-listed species and as such field survey results will be summarised for these species in a breeding bird survey technical report.
- 9.4.118 At present, given the similarity of the habitats present on Site with those in the surrounding area, and the likelihood that the breeding bird assemblage on Site is mostly very typical of the surroundings save for some notable additions. Overall,

the assemblage of breeding birds at the Sites is considered to be of **District Importance** in the context of the Site. At this stage, this is considered likely to be the case for the CRSA until a walkover assessment of habitats within the PCRC can be made as planned. In the impact assessment a differentiation will be made between ground nesting birds of open habitat and other species.

Overwintering Birds

- 9.4.119 The large majority of the Sites are managed as autumn or winter sown arable, with very few fields containing pasture, grassland or overwinter stubbles which are of greater interest to overwintering birds for foraging purposes.
- 9.4.120 A technical report analysing the findings of the wintering bird surveys at the Sites is in preparation. Preliminary wintering bird survey results indicate that the Sites are of some value to winter thrushes, waders and wildfowl, although the Sites are unlikely to be of elevated value above that of neighbouring land. Cottam 1 was observed as being sporadically used by moderate to large flocks of golden plover and smaller numbers of lapwing. Pink-footed geese were regularly observed flying high above the Sites, presumably on passage between the Humber Estuary and The Wash, although direct interaction with the Site was not observed. Moderate numbers of meadow pipit and skylark persist in the fields for cover and foraging purposes.
- 9.4.121 It is considered likely that the assemblage of wintering birds at the array sites is of **Local Importance** in the context of the Site. At this stage, this is considered likely to be the case for the CRSA until a walkover assessment of habitats within the PCRC can be made as planned.

Invertebrates

- 9.4.122 White-clawed crayfish appear on the Lincolnshire BAP.
- 9.4.123 At Cottam 1, records of 27 species of notable invertebrate species (three butterfly and 24 moth species), were revealed by the Desk Study. All species were recorded beyond 250m of the Site boundary. No invertebrate records within 2km of Cottam 2 were present in the Desk Study. The only records of invertebrates given within 2km of Cottam 3 were of hazel pot beetle, wall butterfly and two moth species all between 500m and 2km north of the Sites.
- 9.4.124 The only invertebrate species to feature on the Lincolnshire BAP is white-clawed crayfish. This species is restricted to a 27km stretch of the upper River Witham, in south Lincolnshire near Grantham, and in three river catchments in western Nottinghamshire (Erewash, Leen and Maun) significantly distant from Cottam 1.

- 9.4.125 The principal habitats present at the Sites, arable fields and species-poor semi-improved grassland, along with managed and minor hedgerows, ditches, and streams, are not considered to be of special conservation value for invertebrates or likely to support notable communities of invertebrate species. Considering their often regular maintenance in the form of trimming and dredging, together with overspray and run-off of pesticides and other treatments, the network of boundary hedgerows, margins and drainage ditches which make up the remainder of the site are most likely to support only common invertebrate assemblages typical of the local arable farming landscape. For these reasons, it was not considered proportionate to carry out aquatic or terrestrial invertebrate surveys.
- 9.4.126 Invertebrates are considered likely to be of **Local Importance** within the array sites and CRSA (pending walkover of the PCRC).

Plants

- 9.4.127 Only one notable plant species occurs within the desk study data which was bluebell, in proximity to Cottam 1 and 2. Greater water parsnip appears on the Lincolnshire BAP but has not been recorded on or near the site.
- 9.4.128 The habitats on site are considered typical in diversity and quality for their surroundings, resulting from highly managed farming practises and management. Some hedgerows and patches of uncultivated grassland may be of elevated interest above others on site, however it is considered unlikely that notable botanical communities, including rare arable weeds, are present within them. Indeed, none have been recorded by the experienced surveyors who have been regularly surveying the site.
- 9.4.129 The botanical interest of the Site is considered to be of **Site Importance**. Pending further investigation, the botanical interest of the CRSA is given **Local Importance** until an assessment can be made within the PCRC.

Freshwater Fish

- 9.4.130 A small number of records of European eel, barbel and spined loach derived from the waterways close to Cottam 1 and 3 occur within the desk study data which are Species of Principal Importance. Freshwater fish are listed on the Lincolnshire BAP.
- 9.4.131 Considering the nature of the proposals, it has not been considered appropriate to conduct detailed surveys for freshwater fish. The presence of these species is assumed within principal watercourses including the River Till and the River Trent. Consequently, these species are considered to be of **Local Importance** in the context of the Site's dominance by arable habitats.

Invasive Species

- 9.4.132 Invasive non-native species appear on the Lincolnshire BAP.
- 9.4.133 No observations of invasive non-native species have been made during any of the fieldwork carried out to date. Species particularly closely looked for were Himalayan balsam, Japanese knotweed and giant hogweed.
- 9.4.134 Further surveys are ongoing and any such incidental sightings will be noted, including within the PCRC.
- 9.4.135 It is illegal to release or cause the dispersal of invasive non-native species and therefore they will be considered within the impact assessment as a non-IEF included in light of legal obligations.

Preliminary Ecological Evaluation Summary

- 9.4.136 Table 9.2 summarises the Preliminary Ecological Evaluation. All features considered Important Ecological Features will be carried through to the assessment of effects.

Table 9.2. Summary of Preliminary Ecological Evaluation

Ecological Feature	Ecological Importance	IEF?
Humber Estuary SPA	International	Yes
Willingham to Fillingham Road Verges LWS	County	Yes
Willingham Parish Fields LWS	County	Yes
Dallison Plantation LWS	County	Yes
Upton Grange Road Verges LWS	County	Yes
Scotton Common SSSI	National	Yes
Scotton Road Verges LWS	County	Yes
Scotton Beck Fields SSSI	National	Yes
Scotton Common, Loates Field LWS	County	Yes
Laughton Forest South-east LWS	County	Yes
Scotton Common East LWS	County	Yes
Laughton Forest East LWS	County	Yes
Laughton Common SSSI	County	Yes
Scotton and Laughton Forest Ponds SSSI	National	Yes
Tuetoos Hill SSSI	National	Yes
Owlet LNR	County	Yes
Thornhill Lane Drain LWS	County	Yes
North Leys Road Ditch LWS	County	Yes
Cow Pasture Lane Drains LWS	County	Yes
Coates Wetland LWS	County	Yes
Trent Port Wetland LWS	County	Yes
Woodland	Local	Yes
Hedgerows and Trees	District	Yes

Arable Fields	Site	No
Grassland and Arable Field Margins	Local	Yes
Ditches and Watercourses – Array Sites	District	Yes
Ditches and Watercourses – CRSA	County	Yes
Ponds	Local	Yes
Badgers	Site	No, but included in Impact Assessment for legal reasons.
Bats – General assemblage	Local	Yes
Bats – Barbastelle and Nathusius' pipistrelle	District	Yes
Bats – Serotine	County	Yes
Otter	Local	Yes
Water Vole	District	Yes
Polecat	Local	Yes
Brown hare	Local	Yes
Hedgehog	Local	Yes
Harvest mouse	Local	Yes
Deer	Site	No
Reptiles	Local	Yes
Amphibians	Local	Yes
Breeding Birds	District	Yes
Overwintering Birds	Local	Yes
Invertebrates	Local	Yes
Plants	Site	No
Freshwater Fish	Local	Yes
Invasive Species	Site	No, but included in Impact Assessment for legal reasons.

9.5 Scheme Design and Potential Ecological Impacts

Design Elements with Ecological Influence

- 9.5.1 As described within **Chapter 4**, the scheme will comprise the construction, operation, maintenance and decommissioning of ground mounted solar panels and a battery energy storage scheme. Solar panels will be mounted on a galvanised steel and anodised aluminium mounting system which is pushed into the ground with a small plant rig to a depth of between 1 and 2m. Cables linking the rows of panels are buried in the ground within trenches. Further cables are used to link areas of panels to inverters which are constructed on concrete pads, which are then linked (via the PCRC) to an existing electricity distribution site at Cottam Power Station. Internal access tracks are required, which involve the laying of permeable aggregate. The battery energy storage system will be located on hard standing.

9.5.2 Assessment is made of impacts which might arise during both the construction phase (which is anticipated to last up to two years) and the operational phase (which it is estimated to be 40 years for the purposes of the EIA).

9.5.3 Design measures proposed that have ecological influence include:

- A Landscape and Ecological Management Plan (LEMP) will be produced to accompany the ES. To accompany this PEIR, an Outline LEMP has been produced (**Appendix 4.5**) to summarise the principles which will be followed within the design of mitigation and enhancement for landscape and ecology. This will set out the whereabouts, rationale and objectives for habitat mitigation and creation across the Scheme, such as for hedgerows, trees and grassland. The LEMP will also provide details on the ongoing management of these habitats for the duration of the Scheme as well as ecological monitoring requirements. The LEMP will be secured by a Requirement in the DCO.
- An outline Construction Environmental Management Plan (CEMP) has been produced to accompany the PEIR. It can be found as **Appendix 4.3**. A detailed CEMP will be produced to accompany the ES. The CEMP will detail measures and approaches to be adopted which will limit the likelihood of impacts upon retained habitats through damage, pollution and disturbance during the construction phase in order to achieve the objectives set out in the ES (and this PEIR). The CEMP is intended to be followed by those responsible for the construction of the Scheme. The CEMP will contain (among others) the following provisions.
 - Detail on the location and specification of temporary and permanent protective fencing to be installed prior to the onset of construction. It is anticipated that the specified buffer zones will drive these locations.
 - Restrictions on the use of fuels and other contaminants in proximity to boundary features and other sensitive habitats.
 - Measures to limit the dust generating activities, such as when working in dry conditions.
 - Measures to limit the mobilisation of sediments and run-off, such as when working in very wet conditions or the use of silt fencing when working in ditches.
 - Construction personnel will receive a 'Toolbox Talk' detailing the presence of sensitive ecological features at or close to the Sites and will be informed that no materials should be stored, or vehicles drive, through buffer zones.

- Access tracks will be routed with ecological sensitivity in mind, along existing farm tracks, and will be sited to avoid designated buffer zones wherever possible. Any unavoidable deviations from this (e.g. for access to critical hardware) will be clearly set out in the ES.
- Access for construction and operation will utilise existing field entrances and gaps in hedgerows and other linear habitats wherever possible. The final locations of any unavoidable new gaps in hedgerows will be provided in due course to accompany the ES. Hedgerow losses associated with the construction phase only will be reinstated. Translocation of hedgerow sections will be explored as a further mitigation option where appropriate. New accesses will range from 3 – 5 metres depending upon whether they are for construction or operation (operational access are usually narrower than construction ones).
- The final cable route will be sited to best avoid impacts on ecological features as identified during the desk study and ecological fieldwork. This will include observing appropriate buffers from sensitive boundary features wherever possible.
- Lighting will be required during construction periods but will be temporary in nature and normal working hours will be adhered to except in specified circumstances.
- Buffers from field boundary habitats have been recommended according to a set of ecological importance criteria. Buffers are measured from the outer edge of the hedgerow, root protection area of the tree canopy (in the case of woodland or individual trees) or the banktop of the watercourse. Buffers will not contain any array structures, hard standing or electrical hardware. Buffers over 10m may contain perimeter fencing or simple tracks for maintenance vehicle access although this will only be where essential. Protected construction-phase fencing will also observe these buffer distances. The layout of ecological buffers is mapped in **Appendix 9.7**. The measurement criteria are as follows:
 - 5m minimum from species-poor hedgerows with no associated ditch.
 - 8m minimum from either a species-rich hedgerow, a field boundary containing a tree with 'low' potential for roosting bats, or a field boundary/hedgerow with a ditch of any kind.
 - 10m minimum from an 'outlier' badger sett, any field boundary with a ditch/watercourse with signs of either otters or water vole, or a boundary containing a tree with 'moderate' potential for roosting bats.

- 12m minimum from any boundary containing a tree with 'high' potential for roosting bats.
 - 20m minimum from a 'subsidiary' or 'annexe' badger sett, moderate-sized watercourses (e.g. becks, dykes and streams), ponds (not positive for GCN eDNA) or woodland.
 - 30m minimum from a 'main' badger sett, ancient woodland or major watercourses (e.g. rivers).
 - 50m minimum from ponds testing positive for GCN eDNA.
 - Other, bespoke buffers will be agreed around bat roosts and the nesting sites of Schedule 1 birds as appropriate.
- Within the above-mentioned buffer zones, habitat management options in order to provide net gains for biodiversity will be agreed and set out within the finalised LEMP in due course.
 - The perimeter of the arrays will be fenced for security purposes. It is not established at this stage to what extent internal array field boundaries will be fenced. This will determine the separation or continuity of habitat management within buffer zones or under arrays.
 - A standoff of between 2 and 3m between the perimeter security fencing and array structure will be implemented in order to allow movement for maintenance vehicles.
 - Habitats under operational arrays will be either managed through grazing or cutting. The proportion of grazing and cutting will be balanced so as to emphasise the ecological benefits which can arise from a sensitively-timed cutting regime. Grazing methods such as pulse-grazing, aftermath grazing and conservation grazing can also be employed. Management proposals are contained within the Outline LEMP which can be found as **Appendix 4.5**. Further information will be contained within the detailed LEMP which will accompany the ES submitted with the DCO application.
 - Where land has been excluded from development within the array sites, these areas will be examined for their potential to be managed for ecological mitigation and enhancement, in order to provide Biodiversity Net Gain and contribute to policy-led green infrastructure and Nature Recovery Network principles. All such enhancements will be detailed within the ES submitted with the DCO application.
 - It is anticipated that the Scheme will deliver substantial new hedgerow and tree planting, reinforcement planting at existing hedgerows and field

boundaries, extensive grassland habitat creation and sympathetic management both within buffers and under the arrays, as well as discrete, valuable habitat creation away from the panels. While these measures have not yet been final, they are discussed as appropriate in relation to proposed ecological mitigation, Biodiversity Net Gain and enhancements in later sections within this document. Final details will be provided within the ES submitted with the DCO application.

- Operation of the array requires minimal intervention and as such levels of disturbance (light, noise and human presence) upon wildlife within the Site will be minimal, and likely lower or no more than at present, during the operational phase. As noted in **Chapter 4**, operational lighting will only be necessary during periodic maintenance activities during the hours of darkness and only associated with substation structures and the battery energy storage facilities. No lighting will be installed at the array sites.
- Final details for the installation of the cables are not yet determined but general principles are understood to comprise the creation of a narrow trench with an excavator into which a duct or ducts are placed before the trench is backfilled. The cables will be pulled through the ducts between intermittent access hatches. Intermittent site compounds are understood to be necessary, and the working width is understood to likely be narrow (a maximum parameter of 25m has been included in the description of the Scheme in **Chapter 4**, however it could be less than this in certain locations). It is understood that this will be narrower at crossings of field boundary features but a measurement cannot be given at this stage. As already outlined, the final route the cable will take will depend on the outcome of the planned further ecological surveys. The route design process will continue to seek to avoid all ecologically valuable features as far as possible and mitigated for any impacts arising. It is anticipated that a Precautionary Method of Working will be employed, to include the supervision of an Ecological Clerk of Works where necessary, sensitive ecological timing of works, horizontal directional drilling beneath particularly sensitive features and other mitigation measures outlined in this section. The ecological avoidance, mitigation and compensation measures determined to be necessary for cable route installation will be detailed within a detailed CEMP.

Potential Sources of Impact

- 9.5.4 The following sources of ecological impacts are given here to provide context in the preliminary assessment of effects. The examples given are not exhaustive.
- 9.5.5 Chartered Institute of Ecology and Environmental Management (CIEEM) guidance draws a necessary distinction in Ecological Impact Assessment between ‘impacts’ and ‘effects’. An ‘impact’ is an action resulting in changes to an ecological feature,

whereas an 'effect' is the outcome to an ecological feature from an impact. Impacts are discussed here while potential effects and potential options for mitigation are discussed later in this chapter.

Construction Phase

- **Habitat Loss and Habitat Change:** Limited habitat loss (for example at hedgerows) may occur where access for construction and operation is required where existing field accesses cannot be used or need to be widened. Other examples include clearance to facilitate any permanent hard standing such as foundations or footings. Habitat change will principally be associated with the reversion of arable fields to grassland and other habitats through management, as well as habitat creation where valuable habitat creation opportunities are identified.
- **Killing and Injury:** Habitat clearance and the actions of plant during construction has the potential to cause direct harm to species.
- **Fragmentation:** Described by CIEEM as, "The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function". Potentially in combination with habitat loss and habitat change, fragmentation can reduce the function of a habitat as well as impede the ability of a species to disperse and maintain a viable population. Installation of fencing or culverting streams may also cause fragmentation, as well as through excessive light and noise disturbance.
- **Disturbance:** Pressures or changes in the environment acting on individuals of a species so as to alter their behaviour may arise through noise, movement and vibration during construction operations, as well as increased human presence.
- **Pollution and Habitat Degradation:** Release of chemical, sediment or dust pollution can interfere with the normal function of habitats and directly harm species, while processes such as erosion, compaction and alteration of soil/water chemical composition cause the degradation of habitat quality. The construction phase risks the release of pollutants through vehicle and plant movement/operation as well the introduction of new materials onto and into the soil. Protection of sensitive features will be important in safeguarding them throughout the life of the scheme.
- **Habitat Creation and Enhancement:** Beneficial effects are likely to arise from the creation of new woodland, grassland, hedgerow and wetland habitats on site, as well as the enhancement of retained habitats through development-free buffer zones and increased habitat connectivity. Beneficial effects may

also be derived from the cessation of cultivation, chemical treatments and soil inputs.

Operational Phase

- **Habitat Loss and Habitat Change:** Significant impacts from these are not anticipated as operation will be largely benign, unless major unexpected maintenance or repair events are required. Ongoing habitat maintenance will seek to ensure favourable condition and enhancement of all newly created and retained habitat for the life of the scheme. Ecological monitoring will be key to realising this.
- **Killing and Injury:** Routine operational works are unlikely to give rise to these effects although there is the risk of direct harm to species from the movement of vehicles around the site, or the trapping of certain species within the fencing or fenced area.
- **Fragmentation:** The presence of a solar project is anticipated to be habituated to by most species, especially with the creation of new, and enhancement of retained, habitats. Typical perimeter fencing is not considered to impede the movement of most mammals, although movement of deer is likely to be impacted. Migrating birds and bats may interact with or be perturbed by the surfaces of the solar array so this will be considered in the assessment.
- **Disturbance:** Operational disturbance may occur through the routine movement of vehicles and personnel on site, as well as the presence of low-level noise associated with electrical equipment. Light reflection may be another factor.
- **Pollution and Habitat Degradation:** The risk of these impacts during operation are very low. Good maintenance practice will be key to avoid further pollution events or degradation of adjacent habitats.
- **Habitat Creation and Enhancement:** Ecological benefits can be maximised through the implementation of a habitat management and monitoring scheme for the life of the development. Beneficial effects may also be derived from the cessation of cultivation, chemical treatments and soil inputs.

Decommissioning Phase

- 9.5.6 A 40 year operational lifespan of the Scheme has been assumed for assessment purposes. Given this, the accurate prediction of decommissioning effects is challenging and can only be informed by the legal, policy and conservation constraints and priorities present at the time of the DCO application.

- **Habitat Loss and Habitat Change:** It is assumed that the fields will be able to be returned to agricultural use upon decommissioning, therefore this habitat change will need to be considered, including impacts on any newly created habitats.
- **Killing and Injury:** As per the construction phase, risks for direct harm to species should be discussed.
- **Fragmentation:** While the removal of development infrastructure as a reversal of the construction phase is unlikely to result in habitat fragmentation, the reversion to agriculture may impact the habitats and species which have arisen as a result of the proposed development.
- **Disturbance:** Disturbance impacts are likely to be the same as the construction phase.
- **Pollution and Habitat Degradation:** Pollution and habitat degradation risks are likely to be the same as the construction phase.

In-combination Impacts

9.5.7 The following sources of potential in-combination impacts will be considered in the assessment:

- The combination of individual effects, for example, the combined effects of noise, dust and visual effects on a particular receptor;
- The combination of individual topics, for example, the combined effects of climate change on ground conditions;
- The combination of different works of the Scheme on a particular receptor for example, the in-combination effects of the construction of the cable route and the energy storage at the same time; and
- The combined effects of the three generating stations and cable route.

9.6 Preliminary Assessment of Effects

9.6.1 This section identifies and characterises potential construction and operation phase impacts of the Scheme considered possible according to current baseline data and current designs on each Important Ecological Feature. Likely and potential measures to avoid and mitigate for these impacts are outlined, which includes any measures already incorporated into the scheme design. Ecological enhancements which will or may be adopted are also outlined. A preliminary assessment is made of the significance of any residual effects after mitigation measures have been accounted for.

Designated Sites

Humber Estuary SPA

- 9.6.2 The distances between the Site (including CRSA) and the Humber Estuary (between 24km and 35km) are substantial and minimise the likelihood that they can be considered to be functionally linked. While several (golden plover, marsh harrier, teal, mallard and lapwing) of the 31 species for which the SPA has been designated have been recorded flying over or, far less frequently, foraging or sheltering within the Sites during bird surveys, they are highly unlikely to be dependent to any significant extent upon the Site themselves for this reason. Furthermore, the Scheme does not trigger any Impact risk Zones for the Humber Estuary. This assessment has been informed and corroborated through consultation with Natural England. Consequently, the SPA should be considered beyond the Zone of Influence of the proposals and therefore no impacts upon the SPA from the construction or operational phases are likely to occur. No mitigation measures are considered necessary and **no residual effects** likely.

Willingham to Fillingham Road Verges LWS, Willingham Parish Fields LWS and Upton Grange Road Verges LWS.

Construction Phase Impacts

- 9.6.3 These three LWSs are located in close proximity to Cottam 1, with Willingham to Fillingham Road Verges LWS located adjacent to the northern section of Cottam 1. This makes it the most susceptible to short to medium-term degradation impacts from discharge/deposition of sediments, dust and contaminants (although situated beyond the Site's boundary hedgerows), or temporary over-run from traffic movements. The other two sites are separated from Cottam 1 by 165m and 1.1km respectively, lessening the likelihood and potential severity of the above impacts
- 9.6.4 Careful design of Site accesses will be carried out in order to minimise the number of new field accesses. However, the current design requires a single new access to be imposed (access 10 as shown in the CTMP at **Appendix 14.1** Figure 2.1) at Cottam 1 (north) as there are no other permissible access points into this field. In this case, a short section of the Willingham to Fillingham Road Verges LWS will be permanently lost. The other LWSs will not be affected in this way.
- 9.6.5 Depending on the final location of haul routes, the remaining two LWSs may also receive some minor impacts from dust deposition, with the Upton Grange Road Verges LWS potentially receiving a temporary increase in vehicle over-run damage.

Operational Phase Impacts

- 9.6.6 Operationally, impacts on these three sites are likely to be negligible, owing to the nature of the Scheme whereby no further construction activity or other intrusive, extractive or potentially damaging/polluting activity is required. Access onto the Sites for maintenance of hardware and habitats will be required at regular intervals but by small numbers of vehicles and personnel. Vehicle movements along public roads is not anticipated to be greater than baseline levels. There is a very low likelihood of accidental discharge of pollutants from the movement and refuelling of vehicles and plant on the adjacent LWS.
- 9.6.7 Specifically for the Willingham to Fillingham Road Verges LWS, a beneficial impact may arise from the cessation of the use of agricultural sprays and inputs which may cause the reduction of biodiversity value in its habitats (particularly for invertebrates) and lead to the encouragement of vigorous grasses and plants which outcompete other desirable species.

Mitigation Measures

- 9.6.8 The smallest practical access gap permissible will be used at the proposed new access 10 (CTMP **Appendix 14.1**, Figure 2.1). The final access location will be determined through follow-up investigation of the designated site during the summer months which will establish whether any lower-quality sections may be more appropriate sites for the gap.
- 9.6.9 Consultation with Lincolnshire Wildlife Trust and the Greater Lincolnshire Nature Partnership will be carried out in order to discuss compensatory habitat management measures in order to restore and improve the ecological value of the LWS elsewhere along its length. The outcome of this will be incorporate into the ES submitted with the DCO application.
- 9.6.10 A permanent buffer of 12m from the edge of the adjacent hedgerow/ditch banktop to the development zone/fencing will be observed. This will minimise the likelihood and severity of any pollution or run-off events affecting the LWS.
- 9.6.11 Measures within the CEMP set out in Section 9.5 concerning the protection of sensitive habitats and avoidance of accidental damage, dust deposition or pollution events will be secured.
- 9.6.12 A Construction Traffic Management Plan (CTMP) will be produced at the DCO application stage which will detail how vehicles, plant and materials will be transported to the construction zone and the measures required to avoid over-run and damage of the verges of both roadside LWSs. (An Outline CTMP has been produced to accompany the PEIR).

Ecological Enhancement

- 9.6.13 The LWS lies within a Biodiversity Opportunity zone identified as 'Opportunity for Creation' by the Greater Lincolnshire Nature Partnership (see **Appendix 9.1**). The potential to enhance the Green Infrastructure network to which this LWS contributes, potentially through sympathetic and management of adjoining and adjacent road verges at the Sites will be explored.
- 9.6.14 The planting of significant new lengths of native hedgerow within the Scheme will contribute positively to the network of Green Infrastructure local to the Site.

Residual Effects

- 9.6.15 There is likely to be a small loss and fragmentation of the Willingham to Fillingham Road Verges LWS as a result of the Scheme. However, the proposed mitigation, incorporating sensitive siting, buffering, protection and compensatory management of the LWS itself, is considered to reduce the overall severity to result in a **neutral** residual effect that is **non significant**. With the successful implementation of habitat enhancement beyond the LWS, this has the potential to realise a net benefit for the features for which the LWS is designated, although this will depend on ongoing maintenance and monitoring.
- 9.6.16 For all three LWSs, taking into account the protective measures proposed for inclusion within the CEMP, the potential effects from pollution and dust deposition are reduced to **neutral** levels that are **non significant**.

Dallison Plantation LWS, Scotton Common SSSI, Scotton Road Verges LWS, Scotton Beck Fields SSSI, Scotton Common, Loates Field LWS, Laughton Forest South-east LWS, Scotton Common East LWS, Laughton Forest East LWS, Laughton Common SSSI, Scotton and Laughton Forest Ponds SSSI, Tuetoes Hill SSSI and Owlet LNR

Construction Phase Impacts

- 9.6.17 These 12 designated sites are all located within 5km north of Cottam 3 and all are associated with an area of mostly post-WWII plantation woodland to the north and west of the village of Laughton. This complex of complementary and inter-related designated sites occupy wetland, heathland and grassland habitats both within and on the periphery of the woodland plantation areas. They are all functionally inter-linked and hydrologically connected.
- 9.6.18 The proposed development does not trigger any Impact Risk Zones for the SSSIs and, therefore, it is reasonable to assume that this is the case for the LWSs and LNR. None of the habitats for which the species the designated sites are notified are present within Cottam 3, such as heathland, woodland or acid grassland supporting

woodlark and nightjar. The absence of strong habitat corridors between the designated sites and Cottam 3 also reduces the likelihood that any of the reptiles or invertebrate species listed under the designations would rely on or disperse onto/via Cottam 3. These reasons, in conjunction with the nature of the development, being self contained and largely passive for its duration, means it is unlikely that any impacts on the designated sites will arise. This conclusion is supported by advice received from Natural England on the subject.

- 9.6.19 A low possibility of pollution events via the known hydrological links between Cottam 3 and Laughton Common SSSI exists, where sediments or contaminants may be discharged accidentally into watercourses.

Operational Phase Impacts

- 9.6.20 During the operational phase, it is considered unlikely that any impacts beyond the low possibility of contamination or sediment mobilization occurring.

Mitigation Measures

- 9.6.21 Due to the extent of the 12 sensitive designated sites within proximity to Cottam 3, it is imperative that measures are adopted during the construction period which will avoid as far as possible the chance of sediment mobilisation and release of contaminants into the ditches and watercourses surrounding the Site.
- 9.6.22 Measures within the CEMP set out in Section 9.5 concerning covering the protection of boundary features, working in extremely dry or wet weather, storage and use of fuels and chemicals so as to minimise the risk of discharge of pollutants and sediments into the shared water catchment will be secured as part of the DCO.

Ecological Enhancement

- 9.6.23 It is proposed that a proportion of the retained and created habitats either beneath the arrays, within buffer zones or in areas not proposed for coverage with arrays may be able to be managed proactively for biodiversity. Practical opportunities to manage some of these habitats to benefit those species which for which these sites are designated will be explored through consultation with key stakeholders such as Natural England and the Greater Lincolnshire Nature Partnership.

Residual Effects

- 9.6.24 Provided the CEMP is implemented fully during the construction phase, a **non significant neutral** effect on these 12 designated sites is anticipated.

Thornhill Lane Drain LWS, North Leys Road Ditch LWS, Cow Pasture Lane Drains LWS, Coates Wetland LWS and Trent Port Wetland LWS

Construction Phase Impacts

- 9.6.25 These designated sites all occur within the CRSA and are separated from each other in terms of location and functional linkage. They variously contain road verges, ditches, diverse grassland and wetland habitats. As the route of the cable has not yet been finalised, a detailed assessment of impacts upon these sites is not possible. However, in the absence of mitigation, potential impacts upon them could arise from direct harm should any part of the sites be removed to facilitate cable installation. Indirectly, fragmentation from this habitat loss, or degradation reduction in habitat quality from pollution or other means may also follow.

Operational Phase Impacts

- 9.6.26 Once the cable is installed, it is understood that the cable route will remain undisturbed for the life of the Scheme. Therefore, impacts upon these sites are not anticipated during this phase.

Mitigation Measures

- 9.6.27 The process of finalising the cable route will avoid any direct impacts upon all the designed sites as far as possible. All alternatives to passing through or causing impacts upon these sites will be explored.
- 9.6.28 In the event that the cable route cannot avoid a designated site, the most likely method of cable installation to be adopted would be that of Horizontal Directional Drilling, entailing the trench-less installation of cable using an automated drilling machine. Care would be taken in any case in order to minimise sediment release or disturbance through appropriate siting of entry and exit pits and depth settings.
- 9.6.29 In the event that direct impacts are unavoidable, detailed survey and consultation with bodies such as Lincolnshire and Nottinghamshire Wildlife Trusts and the Greater Lincolnshire Nature Partnership will be carried out to determine the best way to remediate and reinstate habitats which are affected, tailored to the site in question. An agreed method of working, likely to involve Ecological Clerk of Works supervision, sensitive seasonal timing and phased habitat clearance would form part of the CEMPCI for the cable route in this instance.

Ecological Enhancements

- 9.6.30 Where the finalised cable route passes in proximity to any designated site, opportunities for the enhancement of the designated site, or of intervening connected Green Infrastructure as a result of the Scheme will be explored. Advice will be sought from the above-mentioned parties for practical and meaningful steps to improve local biodiversity and contribute to Nature Recovery Networks.

Residual Effects

- 9.6.31 It is fully intended that all reasonable steps will be taken to ensure that **no residual effects** will occur on these sites as a result of the cable installation works.

Habitats

Woodland

Construction Phase Impacts

- 9.6.32 No direct loss of woodland is anticipated, as all access, hardware and cabling installation will avoid the few woodland habitats which occur adjacent to the Sites.
- 9.6.33 A protective development-free buffer of 20m from all woodland has been designed into the scheme and will be demarcated by protective fencing prior to commencement of construction as part of the CEMP so that accidental damage can be avoided. The buffer distances would be observed for the life of the scheme thereafter.
- 9.6.34 Woodland in close proximity to the array sites, haul routes and cable installation works would remain sensitive to degradation through accidental pollution events, dust deposition and vehicle over-run. In the absence of mitigation the severity of these impacts would range from minor to severe but would be expected to be short or medium term and reversible in the long term.
- 9.6.35 Construction activities could lead to a small amount of noise and possibly light disturbance to the species within the woodland. However, this would be temporary and would only affect the margins of the woodland. It should be noted that a certain amount of noise disturbance, dust deposition and run off would be anticipated as a result of routine agricultural activities, and as such impacts are likely to be similar to the current baseline conditions.

Operational Phase Impacts

- 9.6.36 Due to the largely passive nature of the operational Scheme, impacts on woodland are not anticipated. A LEMP will be implemented so as to delineate all different retained and protected habitats and set out the different management practices to be carried out within them. Woodland management is not anticipated to be necessary, although periodic pruning or trimming back of self-seeded boundary vegetation might be required in order to keep the arrays and maintenance tracks clear of tall, woody vegetation.
- 9.6.37 Maintenance visits by a small number of personnel at regular intervals will be required, although movement of vehicles close to the woodland edges is not anticipated during operation of the array due to the imposition of sufficient

protected buffer zones and the restriction of vehicles to demarcated tracks wherever possible.

- 9.6.38 Woodland habitats are currently subject to spray drift following intensive arable farming practices, from the use of pesticides and herbicides. The cessation of these processes is likely to be of benefit to the woodland habitat edges during the life span of the Scheme, encouraging the proliferation of woodland ground flora.

Mitigation Measures

- 9.6.39 Measures within the CEMP set out in Section 9.5 covering the protection of woodland at boundaries, working in extremely dry or wet weather, storage and use of fuels and chemicals and the movement of vehicles and plant will be secured as part of the DCO.

Ecological Enhancements

- 9.6.40 In places, new tall woodland belts and shelter are proposed, which would contribute to the joining up of woodland stands and proliferation of Green Infrastructure. Locations for planting will be directed by the need for landscaping and visual impact mitigation but will also be influenced by the objectives within the Biodiversity Opportunities Mapping for Lincolnshire and where gains from connecting habitats parcels are clearest.

Residual Effects

- 9.6.41 Provided the CEMP is implemented during the construction phase and buffer zones observed, **no residual effects** on woodland are anticipated.

Hedgerows and Trees

Construction Phase Impacts

- 9.6.42 The potential for loss of hedgerows and trees to the Scheme is very limited as existing hedgerow gaps will be utilised in order to gain access for construction and operation. In the finalisation of designs, there may be the need for a small number of new gaps to be created, although in the context of the site's hedgerow network, any loss will be proportionately very small.
- 9.6.43 A protective development-free buffer of between 5m and 12m from all hedgerows and trees has been designed into the scheme, to be installed during the construction phase and observed for the life of the scheme thereafter. This will help avoid any accidental damage or degradation during the construction phase.
- 9.6.44 All individual in-field trees will be retained within the Sites. Such trees act as island or stepping-stones for wildlife and these are to be buffered from development

according to their ecological value (between 8m and 12m from extent of Root Protection Zone). In addition, they are to be 'reconnected' to field boundaries through the planting of corridors of hedgerow and trees, improving their contribution to Green Infrastructure as corridors of dispersal.

- 9.6.45 The cessation of intensive arable farming and use of pesticides and fertilisers is likely to be of benefit to the hedgerows and trees during the life span of the Scheme, encouraging the diversification of hedgerow ground flora.

Operational Phase Impacts

- 9.6.46 As with woodlands, the largely passive nature of the operational Scheme means impacts on hedgerows and trees are not anticipated, especially considering all buffers to be observed. The LEMP will set out the different management regimes which apply to the hedgerows, including periodic pruning or trimming back of self-seeded boundary vegetation in order to keep the arrays and maintenance tracks clear of tall, woody vegetation.

Mitigation Measures

- 9.6.47 Measures covering the protection of woodland at boundaries, working in extremely dry or wet weather, storage and use of fuels and chemicals and the movement of vehicles and plant will be incorporated into the CEMP and specifically tailored to avoid impacts upon hedgerows and trees.
- 9.6.48 Management measures will be contained within the LEMP which will have the aim of maximising the biodiversity value of retained and planted hedgerows in the long term. This will include rotational cutting of the hedgerows to ensure a diversity of habitats on the site each year and the aim to maintain head rose at a minimum height of 2m as this has been demonstrated to be important for promoting the biodiversity value of hedgerows.

Ecological Enhancements

- 9.6.49 Enhancement through the planting of new trees and hedgerows at boundaries is proposed and will focus on the gapping up of currently defunct hedgerows, creation of new hedgerows at boundaries where none exists, planting around Public Rights of Way and where landscape and visual impact mitigation is required. In addition, there may be some limited opportunities for the replanting of old, removed field boundaries where appropriate.

Residual Effects

- 9.6.50 Provided the CEMP is implemented during the construction phase and buffer zones observed, impacts on hedgerows and trees are anticipated to be **neutral** and **not significant**.

Grassland and Arable Field Margins

Construction Phase Impacts

- 9.6.51 Without the creation of the protective buffer zones, arable field margins would stand to be lost to some, potentially significant, degree during the clearance of the site and construction of the arrays. This would be avoided by the establishment of the buffer zones protected by fencing (to measure between 5 and 20+m depending on habitat value) prior to the onset of construction activities.
- 9.6.52 Without careful scheme design, the most diverse fragments and patches of peripheral semi-improved grassland would either be lost or would succeed to scrub over time.
- 9.6.53 Other grassland present on site, such as improved pasture and silage fields would also be lost, although this is not considered to be an adverse impact.

Operational Phase Impacts

- 9.6.54 While arable field margin habitat within the retained buffer zones and patches of semi-improved grassland would benefit from cessation of agricultural inputs and sprays, they would be at risk of long term degradation through eventual succession to scrub without periodic management.

Mitigation Measures

- 9.6.55 The implementation of extensive buffer zones which almost universally measure wider than current arable field margins will result in a significant net gain in the coverage of marginal grassland habitats.
- 9.6.56 Areas of semi-improved grassland with moderate species and structural diversity which do not get cultivated will be retained wherever possible, particularly in field headlands and in those areas close to the River Till in Cottam 1 which are difficult to cultivate. These habitats will be managed sympathetically via the LEMP through implementation of a rotational cutting regime whereby not all areas are cut each year.

Ecological Enhancements

- 9.6.57 The arable fields which dominate the Site will be reverted to grassland under the panels following ground preparation and sowing which should lead to a significant net gain for grassland biodiversity. Prescriptions for the management of all grassland on site (under panels and in buffer/ecological mitigation zones) would be set out within the eventual finalised LEMP. The general objective would be to generate a simple mosaic of grassland habitats through the adoption of a number of different habitat management types revolving around the timing and frequency

of cutting. Grassland management objectives would range from conservation-grazed pasture, to tussocky grassland, flowering meadow and ruderal-mix grassland. Further detail and refinement of the LEMP would be undertaken in consultation with key stakeholders including conservation organization, site management companies and consultees, so as to ensure both the optimum biodiversity value and practicability/delivery of the prescriptions.

Residual Effects

- 9.6.58 It is anticipated that only small areas of arable field margins and only the species-poor semi-improved grassland habitats will be lost to the Scheme. These would be more than adequately compensated for through the retention of wider undeveloped buffer zones, the reversion of arable to a mosaic of grassland management and an ecologically beneficial management scheme. The species richness and structural diversity of all arable land will be increased and support habitats of higher biodiversity value than at baseline. Taking into account the measures to be set out in the LEMP, a **moderate beneficial effect** is considered likely to occur which would be **significant** at a **District** level.

Ditches and Watercourses

Construction Phase Impacts

- 9.6.59 The Scheme will avoid and minimise direct impacts upon ditches by utilising existing crossings for access wherever possible. The number of new ditch crossings is anticipated to be very small and as such proportionately very little of the overall ditch and watercourse network. Consequently, a neutral effect on ditches is anticipated. The small size of the crossing required will not result in fragmentation of this habitat.
- 9.6.60 Without the implementation of protective buffer zones, there is a risk that the existing habitat may be damaged or degraded through direct construction damage or indirect impacts such as the release of sediments or dust which could flow into connected watercourses off site. Accidental pollution events are considered unlikely, but if they were to occur they would potentially have a detrimental effect on the quality of habitats on site and downstream beyond the Site in the short to medium term depending on severity. The Scheme has, however, been designed to implement buffer zones free of development at least 8m from every ditch and up to 20 and 30m for larger watercourses as previously described.
- 9.6.61 It should also be noted that a certain amount of dust deposition and run off would be anticipated as a result of routine annual agricultural activities and as such effects are likely to be similar to the current baseline conditions. Nevertheless, given the large extent of this habitat present at the site, effects from dust deposition and/or run off are considered to have the potential to result in detrimental impacts.

Operational Phase Impacts

- 9.6.62 Water quality can be expected to significantly increase post-development due to the anticipated reversion to permanent grassland under the array (reduced sediment run-off) and cessation of application of fertilisers and pesticides.
- 9.6.63 The sympathetic management of field margin habitats which will be detailed within the eventual LEMP can be expected to benefit the biodiversity value of the ditch network through the proliferation of marginal wetland species following a reduction in management (cutting) frequency and agricultural inputs.
- 9.6.64 The risk of ongoing pollution or damage from routine maintenance operations is minimal given the general restriction of vehicle movements to made-up tracks and the imposition of development free buffer zones between hardware and ditch habitats.

Mitigation Measures

- 9.6.65 Protective measures within the eventual CEMP including fencing and steps to minimise the risk of accidental pollution or sediment mobilisation as previously described will be implemented.
- 9.6.66 The LEMP will set out habitat management measures to be carried out in retained buffer zones and grassland habitats adjacent to rivers and streams which will benefit the flora and fauna associated with the ditch network.

Ecological Enhancement

- 9.6.67 The opportunity for practicable ditch and watercourse management, including vegetation clearance (for choked ditches) or planting of locally-appropriate wetland marginal species will be explored through consultation with local conservation stakeholders and consultees.

Residual Effects

- 9.6.68 With the provisions of the CEMP and LEMP in place, potential impacts upon watercourses and ditches can be mitigated and/or avoided, thereby resulting in a **non-significant neutral** effect. There is the potential for this effect to be improved to a minor or moderate beneficial effect at a Local to District level depending on the outcome of habitat management and monitoring and the adoption of ecological enhancements for the benefit of the ditch and watercourse network.

Ponds

Construction Phase Impacts

- 9.6.69 No ponds will be directly impacted through habitat loss or fragmentation as a result of the proposed Scheme. All ponds are situated relatively close to the field boundaries and can be sufficiently excluded and buffered from development, with the vast majority, if not all, intervening connected habitat retained. A 20m development free buffer from all ponds will be observed. This will extend to a minimum of 50m for all pond testing positive for GCN eDNA.
- 9.6.70 There is a risk of degradation of the retained pond habitats through dust deposition, accidental pollution events and run off during construction activities. This could damage the habitat within and surrounding the ponds as well as affecting the species which inhabit them. This impact would be temporary, as it would be the result of construction activities close to the pond only. This effect could be reversible in the short to long term depending on severity.

Operational Phase Impacts

- 9.6.71 There is a risk that ponds may become damaged should sheep be utilized for grazing post construction. Sheep may poach pond habitats causing damage to the adjacent vegetation and increased suspended sediment content of the water
- 9.6.72 The risk of ongoing pollution or damage from routine maintenance operations is minimal given the general restriction of vehicle movements to made-up tracks and the imposition of development free buffer zones between hardware and ditch habitats.
- 9.6.73 As with ditches and other watercourses, the cessation of agricultural practices is likely to lead to an improvement in the water quality within retained ponds.

Mitigation Measures

- 9.6.74 The adoption and implementation of the CEMP and its measures to avoid and minimise the risk of impacts from damage, run-off and pollution will be crucial to mitigating impacts on ponds.
- 9.6.75 The LEMP will contain grassland, buffer and pond-edge habitat management measures with the aim of maximising the biodiversity value of the retained ponds, including minimising the risk of poaching by livestock.

Ecological Enhancement

- 9.6.76 Opportunities to create new areas of standing water, either in the form of swales for flood water attenuation or wildlife ponds will be explored during the next design

stages of the Scheme. Ponds may be inappropriate in locations at high risk of drying out, while may be better located to extend or augment an existing pond network in a hydrologically suitable location.

Residual Effects

- 9.6.77 Protective measures that will be adopted in the form of the CEMP, together with positive habitat management via the LEMP would mean that potential impacts upon the ponds could be mitigated to **non significant, neutral** effects.
- 9.6.78 There is the potential for this effect to be improved to a minor or moderate beneficial effect at a Local to District level depending on the outcome of habitat management and monitoring and the adoption of ecological enhancements for the benefit of the ditch and watercourse network.

Species

Bats

Construction Phase Impacts

- 9.6.79 The hedgerows, woodland edges and the ditches and watercourses were considered to be the habitats of highest value for foraging and commuting bats on Site. While the existing field accesses will be utilised in the vast majority of cases, losses of short (3-5m) sections of hedgerow will be unavoidable in a small number of cases, to be determined. Pending the final allocation of new gaps, they are highly likely to be proportionately very minor in terms of the overall hedgerow network, and unlikely to significantly fragment foraging or commuting routes. The species recorded on the Site and considered able to overcome hedgerow gaps of 3-5m (as per existing gaps) when dispersing. At this stage, it is considered that a low number of new gaps would be unlikely to have an impact upon the favourable conservation status of bat assemblage present within the Site.
- 9.6.80 No artificial construction lighting is considered likely to be required outside of the winter months. During winter, artificial lighting may be required within the construction zone due to the short day lengths. If this is the case, light may spill onto hedgerows. It is understood that the construction phase would be progressive, working on one or a small number of fields after another, rather than across all fields at the same time, thereby lessening potential impacts. Furthermore, as bats are in hibernation during the winter months, and only active occasionally for short periods, they are unlikely to be significantly affected. Therefore it is anticipated that fragmentation of habitat as a result of light pollution will not occur.
- 9.6.81 Many trees with bat roosting potential were recorded on Site within hedgerows, tree belts and woodland edges. 50 trees with high roosting potential, 67 with moderate,

74 with low and 118 with negligible potential were recorded. Any loss of trees capable of supporting roosting bats, could result in direct harm, population fragmentation and habitat degradation, and construction activities could cause disturbance through noise and vibration, although this is unlikely to far exceed baseline levels originating from agricultural activity. The adoption of a variety of development free buffers at field boundaries will reduce the potential for disturbance impacts upon any roosts present in trees, as well as the potential for accidental damage.

Operational Phase Impacts

- 9.6.82 The effects of the installation of solar panels on bat activity and the activity of their prey is largely unknown. However, a recent study into this concluded that no significant differences in bat abundance between the centre and edges of fields containing solar arrays⁷. Some concern has previously been raised that the presence of solar panels may have detrimental impacts on bats when echolocating, for instance by confusing solar panels for water bodies. Studies^{8,9} into this potential impact do not suggest that this would result in detrimental impacts on bat populations however. It is probable that these impacts on bats will be largely neutral, especially given the higher habitat suitability of both boundary habitats and field-centre habitats in operational situations over baseline.
- 9.6.83 External lighting is only to be installed at substations and battery storage facilities (and not within the arrays) and will only be used as necessary. Luminaires installed will be downward directional so as to avoid upward light spill.
- 9.6.84 The planting of trees, hedgerows and other new habitats, as well as the enhancement of those being retained, would likely increase the permeability of the landscape and overall habitat diversity and quality for bats.
- 9.6.85 Beneficial effects may potentially arise from the increased capacity of the newly-sown and managed grasslands under and around the panels to support flying invertebrates compared to arable, thereby improving access to foraging resources.

⁷ Montag H, Parker G and Clarkson T (2016) The Effect of Solar Farms on Local Biodiversity: A Comparative Study. Clarkson and Woods and Wychwood Biodiversity.

⁸ Russo, D., Cistrone, L., and Jones, G. (2012) Sensory ecology of water detection by bats: a field experiment. *PLoS ONE*. 7(10): e48144

⁹ Greif, S., and Siemers, B. M. (2010) Innate recognition of water bodies in echolocating bats. *Nat. Commun.* 2(1):107

Ecological Enhancement

- 9.6.86 The planting of new hedgerows and the management of diverse field boundaries stands to benefit bat populations through an increased number of roosting opportunities and increases in foraging capacity respectively.
- 9.6.87 The opportunity to create new waterbodies and wetland features will be explored in conjunction with flood attenuation requirements.
- 9.6.88 Opportunities for the inclusion of new bespoke tree and building-mounted bat roosting features will be explored.

Mitigation Measures

- 9.6.89 Trees will be retained wherever possible. Any trees for which removal is unavoidable will be re-investigated closely through a climbing inspection and the use of video endoscopes to determine the presence or likely absence of roosts. The loss of any roost will need to be covered under a licence from Natural England, but all alternatives will be explored beforehand. The remaining trees will be retained and so no further loss of potential roosting sites will occur.
- 9.6.90 The CEMP will detail habitat protection measures and any lighting which will be required within the construction phase.

Residual Effects

- 9.6.91 With the adoption of buffer zones and the sensitive design of the Scheme to retain as much bat habitat as possible and avoid lighting impacts, it is considered that residual effects on bats would be at least **neutral** and **not significant**. Further information will be required on new hedgerow gap and lighting requirements, as well as noise assessments, in order to make a full assessment. The potential exists for the diversity and abundance of night flying invertebrates, as well as roosting opportunities in the long term, to increase on Site as a result of the Scheme. This has the potential to confer a benefit on the local bat population provided that management objectives are successfully realised.

Otter and Water Vole

Construction Phase Impacts

- 9.6.92 Otters and water voles may be impacted through direct harm (to animals or their burrows) or disturbance during any construction activity affecting ditches, watercourses and associated adjacent scrub, hedgerows or woodland habitat.
- 9.6.93 Barriers to movement in the form of severed or blocked/culverted watercourses and linear natural features may cause population fragmentation, however it is not

known at this stage how many new ditch/watercourse crossings will be required and their design/form that they will take.

- 9.6.94 Construction activities and, potentially, routine operation and maintenance may cause disturbance to otters and water voles within shelter and accidental harm to their habitat or burrows.
- 9.6.95 Riparian habitat quality is at risk of degradation through pollution resulting from run-off, sediment/dust deposition and contamination are possible during the construction phase.
- 9.6.96 The design of the Scheme is such that buffer zones will be installed prior to the onset of the construction phase, limiting movements of construction vehicles, plant, personnel and material within at least 8m (and up to 30m) of every ditch and watercourse.

Operational Phase Impacts

- 9.6.97 Operational impacts are expected to be minimal as vehicle movements will be infrequent and limited, taking place by and large outside of the installed buffer zones. This will significantly limit the risk of disturbance, pollution and damage impacts.

Ecological Enhancement

- 9.6.98 The opportunity to enhance existing watercourses where otters and/or water voles have been recorded, or those connected to such features which have the potential to support these species, will be explored with advice from local conservation organisations.

Mitigation Measures

- 9.6.99 The detail of all protective measures to safeguard the suitability of habitats on Site for otters and water voles will be set out in the CEMP.
- 9.6.100 The LEMP will secure the favourable management of the site's buffer zones for the duration of the scheme, thereby maintaining and potentially enhancing the habitat quality of ditches and water voles.

Residual Effects

- 9.6.101 Taking into account the CEMP requirements, residual effects upon otters and water voles are considered to be **neutral** and **not significant**. A beneficial effect may be

possible through the enhancement of ditches and watercourses to make previously poorly-suitable ditches more favourable for these species.

Polecat, Hedgehog and Harvest Mouse

Construction Phase Impacts

- 9.6.102 These species are all potentially, or confirmed to be, present at the Site, likely in low to moderate densities given the suboptimal to moderate habitat suitability for them (predominantly managed hedgerows and field margins). Harvest mouse would also be expected to reside within the arable fields, if present. It is probable this is also the case within the CRSA.
- 9.6.103 Impacts upon these species may arise from direct harm and mortality through movement of vehicles and clearance of habitat associated with creation of access gaps where necessary and the trenching of cables at or close to field boundaries.
- 9.6.104 Habitat degradation through pollution events may also occur, and disturbance during the construction period may also cause some temporary displacement of these species.
- 9.6.105 Unmitigated, these impacts are likely to be localised and short term, although the buffer zones designed into the scheme will avoid them for the most part.
- 9.6.106 Harvest mouse stand to be adversely affected by the loss of arable crop within which to make nests and forage. While the presence of harvest mice is known in the county, accurate data on populations and distribution in Lincolnshire is sparse as this species is hard to detect. Intensive arable is considered suitable, although modern farming practices, including spraying and a lack of winter stubbles and uncultivated overgrown headlands, have reduced this suitability. The population on Site is therefore assumed to be widespread but at a low to moderate density. The impact of habitat loss would be felt for the life of the Scheme and potentially be of moderate to high severity.

Operational Phase Impacts

- 9.6.107 Impacts on polecat, hedgehog and harvest mouse during the operation of the Scheme are likely to be minimal, considering the adoption of ecological buffer zones and the restriction of development and vehicle movement to outside of these, save for habitat management operations.

Mitigation Measures

- 9.6.108 The CEMP will detail precautionary methods of working during any necessary clearance of boundary habitats associated with creating new access gaps, as well as trenching of cables. These will include sensitive seasonal timing of works, the

presence of an Ecological Clerk of Works and phased habitat removal. All cable trenching works will be followed by the reinstatement of any lost boundary habitats.

- 9.6.109 The LEMP will include a significant proportion of tussocky grassland habitat management within both buffer zones and beneath arrays. Furthermore, significant lengths of new hedgerow and tree planting is proposed. Buffer zones will be wider than existing uncultivated field margins throughout the Scheme. These measures will increase the abundance of field margin habitat of suitability to these species, including mitigating the effects of habitat loss for harvest mice. Connectivity and dispersal corridors for these species would likely increase, along with a reduction in disturbance and degradation from farming practices.

Residual Effects

- 9.6.110 Taking into account the protective precautionary measures of the CEMP, and the positive habitat management measures of the LEMP, residual effects on polecat and hedgehog should be able to reduce to **neutral** levels and be **non significant**. **Minor adverse** residual effects on harvest mice are considered likely to be **non significant** due to the replacement of lost suitable habitat with substantial tussocky and tall grassland within the majority of the Sites and cessation of intensive arable practices.

Brown Hare

Construction Phase Impacts

- 9.6.111 Brown hares do not utilise burrows and instead raise their young leverets in scrapes (shallow indentations in the middle of fields). Although the leverets are precocial from birth, there is still a small risk of injury or mortality from construction activities. Hares breed between January and August and during these periods impacts upon hares may be slightly greater than at other times of year.
- 9.6.112 Hares are highly mobile and the temporary loss of habitats within the array sites during construction is anticipated to be similar in effect (i.e. causing disturbance or temporary displacement to hare) to the regular agricultural activities or harvesting, sowing, harrowing and rolling that take place at present. It is considered that the Site would become suitable again for hares immediately once works in a particular area are complete. The progressive nature of construction, rather than all fields being developed simultaneously, would enable disturbance impacts to be dissipated over the development area.
- 9.6.113 Security or protective fencing is not considered to impede the movement of hares around or onto the Site. Monitoring carried out over large numbers of active solar arrays indicates that hares appear to benefit from the access to grazing and foraging beneath panels, being found in relatively high densities at sites where hares were

recorded pre-construction. This may be due to either improved abundance or quality of food items or improved predator avoidance within an array.

Operational Phase Impacts

- 9.6.114 Operationally, the cessation of intensive arable farming and expected reversion of land to sheep grazed grassland is likely to benefit hares, particularly as a result of the lack of disturbance from ploughing and harvesting. The solar panels also appear to be attractive sheltering features for brown hares avoiding predators and inclement weather.

Mitigation Measures

- 9.6.115 The CEMP will detail how a 10mph speed limit will be applied across the construction sites, how the arable habitats will be cleared or left fallow prior to construction. It will also detail that, as part of their induction, construction staff will be informed of the potential presence of protected species including hare as well as the need to temporarily cease works and implement an exclusion zone in the unlikely event that dependent leverets are discovered on site. Construction traffic will generally be confined to the main access roads.

Residual Effects

- 9.6.116 No adverse effects above that which are currently experienced by brown hare within an agricultural system are anticipated as a result of the development. It is likely that a **minor beneficial** effect on brown hare results from the reversion of arable to grassland, which would be significant at a **Local** level.

Reptiles and Amphibians

Construction Phase Impacts

- 9.6.117 Almost universally, the Scheme will be sited on land of low habitat quality for reptiles, being restricted to narrow uncultivated field margins, hedgerows and sporadic pockets of woodland edge. Grass snake and common lizard have been noted on Site.
- 9.6.118 To date, one pond adjacent to the Site (Cottam 1) has been found to support great crested newts. Habitat for amphibians is limited owing to the general absence of wetland habitat and standing water, together with the network of generally poor hedgerow and field margin habitat. It has been therefore assumed that widespread amphibian species are potentially present at low densities both within these peripheral habitats at the array Sites and within the PCRC.
- 9.6.119 Impacts upon these species might comprise direct harm, habitat degradation and habitat loss should any clearance of hedgerows or other field boundary habitats be

required for access or cable trenching, although this is likely to be very limited as the intention is to use existing field accesses wherever possible. These impacts are likely to be avoided through the incorporation of generous ecological buffer zones during construction and operation of the Site, measuring wider than existing field margins. A vegetated exclusion zone of at least 50m from the GCN-positive pond adjacent to Cottam 1 will be incorporated within final proposals. Where limited numbers of breaches for Site access are required, some minor habitat loss can be expected, although the distances involved (3-5m) are not considered to be a significant barrier to dispersal. Ponds will be retained on Site.

- 9.6.120 The habitat suitability and species distribution is likely to be the same or similar within the PCRC, pending further survey. The cable route will be expected to require the clearance of several narrow gaps through hedgerows at field boundaries which, if unmitigated, could lead to direct harm to these species. As habitat reinstatement will follow immediately after completion of trenching in each location, impacts on connectivity are considered to be temporary and short-term.

Operational Phase Impacts

- 9.6.121 Impacts on reptiles and amphibians during the operation of the Scheme are likely to be minimal, considering the adoption of ecological buffer zones and the restriction of development and vehicle movement to outside of these, save for habitat management operations.

Ecological Enhancement

- 9.6.122 Specific habitat features, as well as habitat management prescriptions, can be incorporated into the LEMP for locations within the Sites considered to be of greatest value to reptiles and amphibians. These include tussocky grassland margins to the River Till and scrubby field margins where occasional reptile sightings have already been made.

Mitigation Measures

- 9.6.123 The CEMP shall set out the supervision and protective measures required during works affecting potential reptile habitat at field boundaries, for example where new hedgerow gaps for access or cabling are required. These will include sympathetic, staged habitat clearance and timing and the supervision of an ecologist where necessary.
- 9.6.124 Habitat management operations will be timed appropriately to minimise mortality risk and detailed in the LEMP, although no habitat management operations involving the removal of such habitats will be required. Habitat management within and close to the 50m buffer zone surrounding the known GCN pond will be tailored to

maximise its value to this species, particularly through encouragement of tussocky grassland and scattered scrub.

Residual Effects

- 9.6.125 Protective construction-phase measures to be detailed within the CEMP and sympathetic habitat management operations to be set out in the LEMP would be likely to reduce potential effects to **neutral** levels and be **non significant**. It is possible that habitat enhancement measures, in conjunction with the favourable management of buffer zones which are considerably larger than current field margins, would result in a beneficial effect for reptiles, potentially significant at a local level.

Breeding Birds – Ground Nesting Birds of Open Habitats

Construction Phase Impacts

- 9.6.126 Conservation priority ground-nesting bird species present on Site and likely to be most impacted by development of the open habitats are skylark, yellow wagtail and lapwing. Preliminary data analysis indicated approximately 250 territories for skylark on Site. Territory numbers are considerably smaller for yellow wagtail, and only a handful of likely territories exist for lapwing, from within Cottam 1. These species are considered likely to be displaced to a significant degree owing to the imposition of tall structures and other hardware into the arable fields. Yellow wagtail may stand to be displaced the least as they are believed to be able to nest in taller habitats and with shorter sightlines. Displacement may lead to population fragmentation and increased intra-specific pressures on surrounding arable and grassland habitat which may be at, or approaching, carrying capacity.
- 9.6.127 Grey partridge and quail are ground nesting species which were recorded on Site, although nesting by quail could not be determined as they are notoriously difficult to detect. These species are more likely to be found nesting towards the edges of fields, although not exclusively. It is considered that the nest habitat requirements of these species are less particular than those above as they are able to exploit scrub, woodland-edge and field boundary habitats and therefore are likely to persist, at least to a moderate degree, within the developed Site. Impacts of solar development on these species are largely unknown, therefore a precautionary approach should be taken, and a moderate level of displacement is assumed in the absence of mitigation.
- 9.6.128 There is the potential for accidental mortality to these birds during site clearance or preparation procedures at the onset of construction, for both the array and cable routes. The temporary nature of the cable installation means disturbance would be very time limited for any particular location. Similarly, the very limited land-take of

the cable installation operation means that the likelihood of encountering nests is low.

Operational Phase Impacts

- 9.6.129 During the operation of the Scheme, further impacts on these bird species are likely to be limited as displacement will have occurred at the construction phase. However, it is important to note that while nesting by skylark, lapwing and yellow wagtail stands to decline significantly on Site, the reversion of arable to diverse, low-input grassland which is managed relatively infrequently, is likely to increase the abundance of invertebrate prey items for skylark and yellow wagtail markedly. A mosaic of grassland management would be employed for maximum benefit. Therefore, displacement effects are expected to be counteracted to an extent by the increased foraging potential of the operational array sites. Skylark and yellow wagtail regularly forage tens or hundreds of metres away from nesting sites and both have been recorded foraging in significant numbers on active solar arrays. Lapwing are less likely to enter the solar arrays for foraging as they are more reliant on short-sward vegetation in open environments within which to probe for food item.
- 9.6.130 Grey partridge and quail are likely to benefit from the creation of wider field margins through the imposition of buffer zones free of development which are two or three times wider than at present. This will substantially increase both the suitability and abundance of habitat for foraging and nesting by these birds and offset the probable reduced availability of low-productivity foraging habitat within the arrays.

Mitigation Measures

- 9.6.131 The CEMP will detail nest avoidance precautions to be taken during the construction phase at both the array site and cable route. These will comprise measures such as seasonally timed working, the presence of an Ecological Clerk of Works and the setting up of exclusion zones around nesting sites.
- 9.6.132 Measures to mitigate for the displacement effects on skylark and yellow wagtail and lapwing from the array Sites are currently being explored. These are likely to consist of favourable management practices on suitable land where possible which have the aim of increasing the carrying capacity so as to 'absorb' territories, or a significant proportion of territories from the Site. Such measures, in conjunction with the increased foraging productivity within the Site should reduce residual effects on these species significantly. All mitigation sites will be managed under the terms of prescriptions contained within an eventual LEMP.
- 9.6.133 Measures to mitigate for the displacement effects on lapwing from the array Sites are currently being explored and would involve the management of open areas of grassland or arable farmland as productive nesting sites for these species. All

mitigation sites will be managed under the terms of prescriptions contained within an eventual LEMP.

Residual Effects

- 9.6.134 It is not possible at this stage to predict the residual effects on skylark, yellow wagtail and lapwing as mitigation measures have not been fully designed, although a substantial reduction in the severity and significance of adverse effects is anticipated.
- 9.6.135 For grey partridge and quail, it is predicted that nesting will continue to occur within the Site and that the enhanced boundary habitats (with a greater abundance of weedy, seed bearing vegetation), together with the presence of permanent short grassland within the mosaic of habitat management under the array will reduce displacement of these birds to **minor adverse** effects, significant at a **local** level.

Breeding Birds – Other Species

Construction Phase Impacts

- 9.6.136 Conservation priority bird species which breed in field boundary and woodland-edge habitats such as tree sparrow, yellowhammer, linnet, common and lesser whitethroat, reed bunting, and great spotted woodpecker were recorded on Site. Several raptor species were noted to breed on site, including barn owl, short-eared owl, little owl, peregrine, hobby and kestrel. Hobby, peregrine and barn owl are all species which receive protection from disturbance while nesting under Schedule 1 of the Wildlife and Countryside Act, 198 (as amended).
- 9.6.137 Nesting sites of all these birds are capable of being harmed by certain habitat clearance activities, either to facilitate access onto the array Sites or cabling works. Accidental damage to nesting habitat, or degradation through pollution events would be avoided through the adoption of protective buffer zones from the onset of construction.
- 9.6.138 Minor losses of hedgerow habitat at the array sites are not considered to cause a cumulative impact on the birds which use them as losses are limited to 3-5m lengths and represent a fraction of the total hedgerow network available.
- 9.6.139 A turtle dove was observed foraging within Cottam 3 and associated with a territory immediately off Site. Loss of foraging habitat for this species might adversely affect the breeding success of this species of conservation concern.

Operational Phase Impacts

- 9.6.140 Owing to the use of development free buffer zones from the onset of construction, it is considered unlikely that the habitats within which these birds nest will be

degraded through the presence of the adjacent arrays. Similarly, the temporary nature of the cabling work means that once cabling is complete, no impacts are anticipated.

Ecological Enhancement

- 9.6.141 The addition of bespoke features which provide nesting opportunities for various bird species, including for barn owl, will feature within the LEMP and make use of trees, on-Site structures and adjacent buildings.

Mitigation Measures

- 9.6.142 The CEMP will detail measures to be taken during the cabling works and to ensure that disturbance of Schedule 1 bird species are not disturbed while nesting and that any other bird nests are not harmed. This will involve sensitive timing of works in proximity to known or likely nesting sites, pre-commencement and regular monitoring by an Ecological Clerk of Works, briefing talks to all construction staff and the enhanced buffering from development of certain buildings or trees confirmed or likely to contain nesting sites.
- 9.6.143 An area of habitat will be reserved for turtle dove foraging habitat within Cottam 3 and not be included within the array layout. This will be managed specifically to promote fallow and set-aside type habitat which contains the seed producing foodplant species relied on by turtle doves. The creation, management and monitoring of this habitat will be set out in the LEMP.
- 9.6.144 The LEMP will contain details of the extensive additional planting of new hedgerows, trees and other woody vegetation across the Site boundaries which will increase nesting and foraging opportunities for numerous bird species.
- 9.6.145 The LEMP will also detail the various habitat creation and management prescriptions to be applied as a mosaic within the buffer zones and panelled areas. The reversion of the arable land to a patchwork of grassland types, and the widening of uncultivated margins, will increase the availability of seed and invertebrate food for a wide variety of bird species.

Residual Effects

- 9.6.146 The protective measures during construction and cable-laying, together with the improvements in habitat diversity and productivity for recorded bird species should ensure that potential adverse effects can be reduced to **neutral, non-significant** levels. The potential exists for a moderate beneficial effect on the general bird species assemblage, due to the proposed habitat management prescriptions, and enhancements set out in the LEMP. Such benefits could be significant at a Local to District level.

Overwintering Birds

Construction Phase Impacts

- 9.6.147 The potential for, and severity of, impacts on overwintering birds depends on the timing of construction activities. It is assumed that, with a c.18 month build programme, working over the winter months will be unavoidable. Consequently, there remains the risk that flocks of wading birds such as golden plover and lapwing will be dissuaded from areas of the Site or PCRC they might ordinarily use on an occasional basis for foraging and shelter. However, given the considerable extent of similar open habitat in the vicinity, and the fact that the habitats on Site were not seen to be of elevated importance compared to their surroundings, or functionally linked to important sites designated for bird conservation, this impact is not considered to be more than a minor one.
- 9.6.148 The onset of construction or cable installation activities within a given field, or the movement of vehicles or personnel into undeveloped fields, risks the disturbance and flushing of birds at a time of year where they are most susceptible to energetic stress. However, the Site was not seen to regularly support such flocks but rather act as an 'option' within a large network of similar habitat in the landscape.

Operational Phase Impacts

- 9.6.149 The operation of the arrays would mean that the Site is effectively removed as an option for foraging and shelter for flocks of waders during the winter. As a proportion of this habitat in the local area, it is relatively small, especially given the lack of functional linkage with sites designated for overwintering bird conservation.
- 9.6.150 It is considered likely that flocks of other birds observed overwintering at the site such as starling, redwing and fieldfare would continue to forage within the grassland beneath panels and be largely unaffected.

Mitigation Measures

- 9.6.151 The CEMP will detail how work during the winter months will seek to minimise potential impacts on flocks of overwintering birds. This will involve the construction (including cabling) site management following a regime where undeveloped fields are not entered by plant or personnel unless it can be confirmed that they do not contain flocks of waders or wildfowl such as geese or plovers, so as to avoid unnecessary energy expenditure at a sensitive time of year.

Residual Effects

- 9.6.152 It is not proposed for any specific mitigation for the removal of the Site from the overall expanse of foraging habitat within the local landscape, although this impact is considered to be minor. Mitigation against the risk of causing undue disturbance

is proposed. Overall, it is considered that there would likely be **minor adverse** residual effects, significant only at a **Site level**.

Invertebrates

Construction Phase Impacts

- 9.6.153 The hedgerows, woodland edges, ditches, watercourses and uncultivated field margins were relatively higher in value to invertebrates than the cultivated arable land. No habitat of particularly elevated or notable/significant quality for terrestrial or aquatic invertebrates was recorded within the array Sites. This is likely to also be the case within the PCRC, pending further survey.
- 9.6.154 The nature of the proposals are such that these edge habitats will be retained by and large in their entirety, with array development activities taking place within the fields. Cable route laying may impact a number of very short individual sections of hedgerow and field boundary habitats temporarily, before being reinstated. Where non-arable vegetation is removed from the Site, there is a minor risk for adverse impacts on the assemblage of invertebrate species associated with these plants, although the suitability of habitat for invertebrates is generally low or of little conservation significance.
- 9.6.155 Aquatic invertebrates associated with rivers such as the Till and Trent may be impacted through sediment mobilisation during horizontal directional drilling activities.
- 9.6.156 Construction activities may result in dust/sediment deposition leading to degradation of the varied habitats at the field boundaries, including woodland edge, hedgerows, and ditches/watercourses, which were considered to be the most valuable habitats for invertebrates. Effects of this are only likely to be temporary, although could end up being felt in the long term if aquatic habitats are seriously affected. However, the imposition of fenced buffer habitats during construction (and beyond) will minimise the potential for these harms.

Operational Phase Impacts

- 9.6.157 The cessation of intensive arable farming practices (particularly insecticide spraying) and reversion of the land to permanent (for at least the duration of the array) grassland can be expected to result in increased diversity and abundance of invertebrates at the operational Site. This includes a number of pollinating butterfly and bee species which have been shown to have increased diversity and abundance in solar arrays compared to control plots. Given the large extent of habitat that will likely increase in quality, the operational impacts of the development will have beneficial effects on a range of invertebrates.

Ecological Enhancement

- 9.6.158 Opportunities to enhance the biodiversity value of the ditches and watercourses around the Site will be explored in collaboration with local conservation organisations. Furthermore, management options of benefit to invertebrates within the Site's retained and protected buffer zones and the grassland habitats beneath the arrays will be developed in the finalisation of the LEMP.

Mitigation Measures

- 9.6.159 The CEMP will set out measures to minimise the risk of pollution, run-off and dust deposition impacts on the Sites' boundary habitats during construction.
- 9.6.160 Fieldwork to be conducted for the PCRC will take account of the relative habitat suitability for invertebrates, especially at field boundaries. This will enable key areas of relatively elevated suitability to be identified in advance of any cabling activities which will require further assessment, mitigation or compensation. It is anticipated that any loss of suitable habitat, such as hedgerows and marginal grassland, shall be reinstated so as to ensure any impacts are temporary and short term. These measures will be set out within the CEMP and LEMP.
- 9.6.161 The CEMP will also provide precautionary working methods surrounding the installation of the cables and the minimisation of risks associated with horizontal directional drilling. This would include visual monitoring for discharge of sediments, monitoring for vibrations, suitable depth settings and precautionary siting of entry and exit pits.

Residual Effects

- 9.6.162 Taking into account the habitat protection measures in the CEMP, and appropriate habitat investigation and reinstatement measures for cabling works, residual effects on invertebrates are likely to be able to be reduced to **neutral, non significant levels**.

Freshwater Fish

Construction Phase Impacts

- 9.6.163 Several records of notable fish species were present in the desk study data derived from major watercourses in proximity to the Site. While these waterways do not form part of the Sites themselves, the Sites and CRSA lie within the catchment for them and contain drains or streams which flow downstream into this catchment zone. Therefore, within the array Sites, potential impacts on these species is considered only possible from pollution events during construction, although it is considered that these would have to be of a high severity or duration to cause significant impacts, which is thought unlikely due to the wide buffer zones to be

implemented around all ditches and watercourses on Site, although possible where ditch/boundary feature crossings are proposed.

- 9.6.164 The cable installation process which is likely to be required to cross underneath rivers, will utilise directional drilling methods. While this is far preferable to any cable installation which might involve any direct harm to the river beds themselves, a small risk remains of vibrations leading to sediment mobilisation, or the emission of pollutants. Such impacts are likely to be minor to moderately adverse in the short to medium term, depending on severity.

Operational Phase Impacts

- 9.6.165 As the nature of the proposals are relatively passive, with movement of vehicles and personnel close to ditches and watercourses being restricted, the opportunity for impacts from pollution or run-off is highly limited.

Mitigation Measures

- 9.6.166 In addition to the various boundary buffer zones, the CEMP will contain a raft of measures to be followed during construction which will limit the potential for pollution events and the release of sediments and run-off into watercourses. This will include ecological supervision and inspection prior to and during works affecting watercourses, such as installation of ditch crossing for access, and precautions concerning vehicle/plant refuelling, sediment trapping and storage of materials.
- 9.6.167 The CEMP will also provide precautionary working methods surrounding the installation of the cables and the minimisation of risks associated with horizontal directional drilling. This would include visual monitoring for discharge of sediments, monitoring for vibrations, suitable depth settings and precautionary siting of entry and exit pits.

Residual Effects

- 9.6.168 Provided that the construction phase risk mitigation measures to be detailed in the CEMP are followed in full, risks of adverse effects on freshwater fish populations can be minimised to **neutral** levels which are **not significant**.

Non-IEFs

Badgers

Construction Phase Impacts

- 9.6.169 Badgers may be adversely impacted by the proposed development through loss of habitat in which to build setts, accidental direct harm during construction, disturbance by vehicles and personnel or the compaction of soil around setts. 10m,

20m and 30m development free buffer zones around all known setts according to their status have been designed into the Scheme.

- 9.6.170 Perimeter fencing is not considered to be a barrier to badger movement given their propensity for digging (the fencing is not proposed to be buried).
- 9.6.171 During construction works, if deep trenches are left open overnight or high voltage machinery is present, there may be potential for incidental injury or mortality to badgers exploring the site during the night.

Operational Phase Impacts

- 9.6.172 Badgers are likely to benefit from improved abundance of favoured food items within the grassland under the arrays as permanent pasture grassland has been shown to contain a greater abundance of earthworms and soil invertebrates than arable soils.
- 9.6.173 Further benefits include reduced disturbance or habitat degradation due to cessation of agricultural activities and increased sheltering and dispersal habitat cover due to new hedgerow, tree and grassland habitat creation.
- 9.6.174 With the buffer zones in place, badgers are not considered likely to be affected by ongoing operational maintenance. Routine maintenance will also not typically be conducted during the hours of darkness.

Mitigation Measures

- 9.6.175 Badger gates are not considered necessary within security or protective fencing as there is no evidence of their usage from information gathered from extensive monitoring of active solar sites. Badgers are known to preferentially dig under fencing or move through gaps in the fencing material as opposed to actively seek features such as gates. Natural undulations in the ground should be used to ensure sufficient space beneath fencing to facilitate badger access is available. Where no such undulations occur it is considered most effective to raise the height of fencing panels to leave a narrow gap (no greater than 100mm) which badgers (among other animals) will exploit to gain access.
- 9.6.176 Permanent or temporary exclusion of the known badger setts is not anticipated to be required.
- 9.6.177 All contractors will be informed about the presence of setts via a toolbox talk delivered by an ecologist prior to construction. No machinery will be driven within buffers or materials stored in them.

- 9.6.178 The CEMP will detail measures to be taken to reduce the probability of incidental mortality of badgers, especially in situations where open excavations are made and in respect of site speed limits.

Residual Effects

- 9.6.179 With the implementation of the buffer zones and above mitigation measures, effects on badgers can be expected to be **moderately beneficial** at the **Site** level.

Invasive Species

Construction Phase Impacts

- 9.6.180 Although none have been observed to date, invasive non-native species may be caused to spread through works associated with ditches and crossing thereof, or during any necessary works to clear habitats. Non-native plant species are considered most likely to occur at field boundaries and in habitats associated with watercourses.

Operational Phase Impacts

- 9.6.181 Should any be present, operational phase impacts are considered unlikely due to the buffering of peripheral habitats included within the Scheme.

Mitigation Measures

- 9.6.182 The fieldwork proposed for the PCRC will pay attention to the presence of non-native invasive species and record these where found.
- 9.6.183 The CEMP will describe precautionary measures to be taken to avoid the accidental spread of these species. This includes a briefing for all construction staff on the issue to ensure vigilance for these species, as well as inspections of proposed working locations at watercourses and ditches by an ecologist prior to commencement.

Residual Effects

- 9.6.184 It is considered that the continued and specific monitoring for invasive non-native plant species as set out in the CEMP will reduce potential residual effects on this issue to **neutral** levels, especially considering their absence in the baseline information to date.

9.7 Decommissioning Effects

- 9.7.1 Please refer to the Decommissioning Statement which accompanies this PEIR. Removal of solar panel frames, underground cabling (although cabling is intended to remain in situ), substations and concrete footings, access and battery energy

storage would be expected to have similar or lesser effects as those described in the construction phase impacts for each receptor. Comparable levels of disturbance from movement of vehicles and personnel would be expected. However, the duration of decommissioning activities is expected to be shorter than construction.

- 9.7.2 The restoration of the land back to open arable farmland would likely be beneficial for some species of farmland bird which require open sightlines, as well as for plant species associated with arable margins, but much of the biodiversity value which it is anticipated will develop in the preceding (approximately) forty years would be lost along with habitat for a variety of other species. In order to revert back to arable food production, it may be required to enhance the nutrient content of the soil if it has been depleted, which would likely be achieved through treatment with fertilisers, although it is believed that this is highly unlikely and an increase in soil fertility is likely to arise and this will be explored further at the DCO application stage. An increase in the use of pesticides and herbicides would also be expected. The decision on the nature of the agricultural use will be made by the landowner, once it has been handed back to them post decommissioning.
- 9.7.3 Depending on the ecological value of the habitats that develop over the lifespan of the scheme, it is possible that certain areas of the site may need to be retained due to their value for wildlife on decommissioning. Alternatively, and on application of the ecological mitigation hierarchy principles (i.e. avoidance-mitigation-compensation as per CIEEM guidance), their loss may require compensation through on or off-site measures to ensure land/habitats are preserved for wildlife into the future.
- 9.7.4 No more than twelve months prior to decommissioning commencing, the site will be visited by an appropriately qualified ecologist to identify any ecological constraints arising from decommissioning activities. Further surveys, mitigation and/or compensatory measures may then be required. As a minimum, an extended Phase 1 Habitat survey (or equivalent) will be required to identify the potential presence of protected species and important habitats.
- 9.7.5 Based upon current (2022) legislative protection, protected species which could be directly impacted by decommissioning activities would include badgers, water vole, otter, great crested newts, reptiles (grass snake) and breeding birds. Further surveys to identify the use of the site by these receptors would therefore also be expected as a minimum.
- 9.7.6 Any mitigation measures undertaken at the point of decommissioning aimed at maintaining ecological value of the site should take account of changes in ecological objectives that have occurred over the lifespan of the array and battery energy storage elements. In particular, changes in ecological conditions both on the site and on a national scale as a result of climate change may result in new ecological objectives that cannot at the current time be reasonably foreseen.

9.8 Cumulative Effects

9.8.1 Cumulative effects arising from the combination of similar or large-scale development in proximity to the Scheme will be fully assessed within the ES submitted with the DCO application. Development schemes we are aware of at this stage which will form part of the assessment are:

- **West Burton Solar Project** – A similar sized scheme as Cottam Solar Project located in Bassetlaw District and West Lindsey District. Application and construction timetable to run in parallel with Cottam Solar Project.
- **Gate Burton Energy Park** – c.500MW scheme located close to Gate Burton, northwest of Cottam 1. EIA scoping opinion issued December 2021. The CRSA overlaps the Gate Burton ‘Grid Connection Corridor Options’.

9.8.2 The above schemes are likely to be very similar to the proposed Scheme, in that they will both revolve around the reversion of arable fields to solar arrays and battery energy storage, and retain, protect and (it is assumed) enhance the vast majority of their boundary habitats, which are the most important ecological assets. Consequently, the likelihood of cumulative effects on protected species associated with the boundary habitats is low.

9.8.3 Ground nesting bird species of open countryside will be adequately mitigated for by the proposed Scheme, although the presence of the above schemes may combine to cause a fragmentation effect within the local landscape. Similarly, harvest mice stand to be adversely affected by the loss of arable, and although mitigation is proposed, cumulative effects from the combination of these schemes may result. As these sites will remain permeable to the majority of wildlife, cumulative fragmentation effects are considered largely unlikely. While not considered an Important Ecological Feature, impediments to the movement of deer may be increased through the cumulative effect of these developments as they are the only mammal species considered likely to be impacted by the presence of perimeter fencing. This represents the most likely cumulative effects at the present time and so is not an exhaustive assessment. This assessment will be expanded as further survey work, analysis, design and consultation are carried out.

9.9 Biodiversity Net Gain and Ecological Enhancements

9.9.1 A detailed Biodiversity Net Gain assessment will be carried out to support the DCO application. The assessment will follow Defra’s Biodiversity Metric 3.1 (or later) protocol. No assessment can be carried out at this time given the incomplete survey data and preliminary nature of the Scheme designs.

9.9.2 It is anticipated that a significant Net Gain for area-based, linear and water habitats is possible as a result of the scheme. This is due to the large scale reversion of arable

to permanent grassland, as well as the adoption of generous ecological buffer zones (including of watercourses and marginal habitat) which will be sympathetically managed to maximise biodiversity value (within the LEMP). Furthermore, significant planting of new hedgerows and tree lines will contribute to the enhancement of linear habitats.