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UK Onshore Scheme

Environmental Statement

Volume 2 Document ES-2-B.06

Chapter 10

Ecology (Proposed Underground DC Cable)

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Environmental Statement Volume 2			
ES Reference	**Chapter**	**Chapter Title**	
ES-2-A.01	Ch01	Introduction	
ES-2-A.02	Ch02	Development of the UK Onshore Scheme	
ES-2-A.03	Ch03	The UK Onshore Scheme	
ES-2-A.04	Ch04	Environmental Impact Assessment Methods	
ES-2-B.01	Ch05	The Proposed Underground DC Cable	
ES-2-B.02	Ch06	Intertidal Zone	
ES-2-B.03	Ch07	Geology & Hydrogeology	
ES-2-B.04	Ch08	Water Resources & Hydrology	
ES-2-B.05	Ch09	Agriculture & Soils	
ES-2-B.06	**Ch10**	**Ecology**	
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Glossary & Abbreviations

Glossary of Terms	
Term	**Meaning**
Ancient Woodlands	Ancient Woodlands are those which have had continuous woodland cover since 1600AD to the present day. Clearance at some time for underwood or timber production does not exclude a wood from this category.
base scheme design	The design of the UK Onshore Scheme for the purposes of the planning application.
Biodiversity Action Plan (BAP)	An agreed plan for habitat or species, which forms part of the UK commitment to biodiversity. The UK BAP has now been superseded by the BAP website http://www.ukbap.org.uk Biodiversity 2020 Strategy (which continues to prioritise the S41 list, setting national targets for the period to 2020) and the UK Post-2010 Biodiversity Framework (which shows how these contribute to targets at the European level). Whilst the UK BAP is no longer formally recognised, elements of the supporting research and resources still form the basis of work at a more local level.
Culvert	A channel or pipe that carries water below the level of the ground
Cumulative Effects	The assessment of the impact on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time.
dB LA	The dB LA figure is used to relate better to the loudness of the sound heard. The dB LA figure corrects the variation in the ear's ability to hear different frequency and provides a good representation of how loud sound is received.
Direct Current (DC)	Electric power transmission in which the voltage is continuous. This is most commonly used for long distance point to point transmission.
Ecological Clerk of Works	Suitably qualified ecologist responsible for the planning and implementation of ecological mitigation prior to and during construction works on site.
Ecological Impact Assessment	A standard process of assessing impacts of development on features of nature conservation value developed by CIEEM.
Embedded mitigation	How the scheme has been specifically designed to avoid or minimise the occurrence of adverse environmental effects.
Environmental DNA	DNA that can be extracted from environmental samples, in this case great crested newt DNA in water bodies.

Glossary of Terms	
Term	**Meaning**
Equivalent Continuous Sound Level (Leq)	Sound levels tend to fluctuate, and as such an 'instantaneous' measurement like sound pressure level cannot fully describe many real-world situations. A summation can be made of the measured sound energy over a certain period, and a notional steady level can be calculated which would contain the same total energy as the fluctuating sound. This notional level is termed the equivalent continuous sound level Leq. Leq can be determined over any time period, which is indicated as Leq,T where T is the time period (e.g. Leq,24h). In mathematical terms, for n discrete sound level measurements, Leq is given by: Leq,T = 10 log10 (t1 x 10L1/10 + t2 x 10L2/10 +… tn x 10Ln/10)/T where t1 = time at level L1 dB; t2 = time at level L2 dB; and T = total time
European Sites	SACs (including candidate SACs (cSACs)) are designated under the Habitats Directive for the protection of flora, fauna and habitats, and SPAs (including proposed SPA) are designated under the Birds Directive for the protection of rare, vulnerable and migratory birds. Together with Ramsar sites these combine to create a Europe-wide 'Natura 2000' network of designated sites.
Fauna	All of the animals in a given area
Flora	All of the plants in a given area
Habitat	The natural home or environment of an animal, plant, or other organism.
Internal Drainage Board	A type of operating authority which is established in areas of special drainage need in England and Wales with permissive powers to undertake work to secure clean water drainage and water level management within drainage districts.
Invertebrates	Animals without backbones
Joint Nature Conservation Committee	The public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.
Limits of Deviation	These define the maximum extents of the corridor for which planning permission is sought and within which proposed DC and AC cable routes may be installed.
Maximum Sound Pressure Level or Maximum Noise Level	This is the maximum RMS sound pressure level occurring within a specified period. The time weighting is usually specified, such as in LFmax
Mitigation	Measures which are incorporated into the design or implementation of a development project for the purpose of avoiding, reducing, remedying or compensating for its adverse environmental impacts. It may also include measures to include environmental benefits.

Glossary of Terms	
Term	**Meaning**
Modified neutral grassland	The neutral grassland categories detailed within the Phase 1 Habitat Survey Handbook are concentrated on grassland associated with rural situations (pastures and meadows), as such it was agreed with JNCC in 2005 (P. Gateley, pers. comm.) that neutral grassland habitats that don't easily fit within these categories, usually within urban or industrial areas, can be referred to as modified neutral grassland – 'Modified neutral grassland is not derived from agricultural grassland and the terms semi-improved and improved do not apply. Some modified neutral grassland may be species-rich but many swards are dense, coarse and species-poor. Modified neutral grassland naturally regenerates on disturbed ground and is unmanaged. It most commonly occurs in urban areas and on post-industrial land'.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Multi-Agency Geographic Information for the Countryside	Searchable mapping website which, among other things, displays location of statutory sites of nature conservation interest and important/notable habitats.
National Nature Reserve	National Nature Reserves are designated under the National Parks and Access to the Countryside Act 1949 or the Wildlife and Countryside Act 1981 (as amended) primarily for nature conservation, but can also include sites with special geological or physiographic features. They were established to protect the most important area of wildlife habitat and geological formations in Britain, and as places for scientific research. All NNR's receive SSSI designation under The Countryside and Rights of Way Act 2000 and The Wildlife and Countryside Act 1981 (As amended)
Natura 2000	Network of nature protection areas established under the 1992 Habitats Directive and 1979 Birds Directive (includes SPA, SAC, and Ramsar sites). See also 'European Site'.
Natural England	A Government Agency promoting the conservation of England's wildlife and natural features and is responsible for designating National Nature Reserves, identifying Sites of Special Scientific Interest and for advising a wide range of bodies and individuals including the Government on matters affecting Nature Conservation.
The National Vegetation Classification (NVC)	One of the key common standards developed for the country nature conservation agencies. The original project aimed to produce a comprehensive classification and description of the plant communities of Britain, each systematically named and arranged and with standardised descriptions for each

Glossary of Terms	
Term	**Meaning**
No main habitat but additional habitats present	This priority habitat category is taken to mean that although the habitats present do not fit into the defined S41 principal habitat descriptions, they may exhibit some features of S41 principal habitats and provide important supporting habitat and functions
Phase 1 Habitat Survey	The Phase 1 habitat classification and associated field survey technique provides a relatively rapid system to record semi-natural vegetation and other wildlife habitats. Each habitat type/feature is defined by way of a brief description and is allocated a specific name, an alpha-numeric code, and unique mapping colour. The system has been widely used and continues to act as the standard 'phase 1' technique for habitat survey across the UK
Public Rights of Way	A footpath, bridleway or restricted byway on which the public have a legally protected right to pass and re-pass.
Ramsar	The convention on wetland's (Ramsar, Iran, 1971) called the 'Ramsar Convention' is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their wetlands of International Importance and to plan for the wise use and sustainable use, of all the wetlands in their territories.
Residual Effect	The effect left over once the development is constructed and operational.
the Scheme	UK Onshore Scheme from MLWS to the connection point comprising underground AC and DC cables, converter station and access road.
Scoping	Scoping is the process of determining the content and extent of matters that should be covered in the environmental information to be submitted to a competent authority or other decision making organisation
Section 41	A list of priority species and habitats in England in the NERC Act 2006
Site of Special Scientific Interest	The highest national level of protection afforded to nature conservation sites in the United Kingdom. SSSIs are the basic building block of site-based nature conservation legislation in the UK.
Special Area of Conservation	Strictly protected sites, classified in accordance with the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC. Article 3 of the Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the habitats listed in Annex I and species listed in Annex II. Candidate SAC (cSAC) are those which have been identified and the process of designation is in progress.
Special Protection Area	Strictly protected sites, classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds 79/409/EEC 1979. SPAs are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species. Proposed SPA (pSPA) are those which have been identified and the process of designation is in progress.

Glossary of Terms	
Term	**Meaning**
Species	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.
The Countryside and Rights of Way Act 2000	Amends the WCA, expanding the terms of offences to include reckless activity. The main national legislation relating to wildlife and nature conservation. Also provides for the designation and protection of SSSIs.

List of Abbreviation	
Abbreviation	**Meaning**
AIA	Arboricultural Impact Assessment
AOD	Above Ordnance Datum
ASNW	Ancient Semi-Natural Woodland
BBC	Boston Borough Council
BBS	Breeding Birds Survey
BCT	Bat Conservation Trust
BoCC	Birds of Conservation Concern
BS	British Standard
BTO	British Trust for Ornithology
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW Act	The Countryside and Rights of Way Act 2000
DC	Direct Current
DEFRA	Department for the Environment, Food and Rural Affairs
DSI	Ditch Suitability Index
EA	Environment Agency
EC	European Commission
EcCOW	Ecological Clerk of Works
EcIA	Ecological Impact Assessment
ECoW	Environmental Clerk of Works
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
FCS	Favourable Conservation Status
GB	Great Britain

List of Abbreviation	
Abbreviation	**Meaning**
GCN	Great Crested Newt
GLNP	Greater Lincolnshire Partnership
ha	hectare
HDD	Horizontal Directional Drilling
HSI	Habitat Suitability Index
IDB	Internal Drainage Board
JNCC	Joint Nature Conservation Committee
km	kilometre
km^2	square kilometre
kV	kilovolt
LBAP	Local Biodiversity Action Plan
Leq	Equivalent Continuous Sound Level
Lmax	Maximum Sound Pressure Level or Maximum Noise Level
LoD	Limits of Deviation
LPA	Local Planning Authority
LWS	Local Wildlife Site
LWT	Lincolnshire Wildlife Trust
m	metre
Magic Map	Multi-Agency Geographic Information for the Countryside
mAOD	metres Above Ordnance Datum
mm	millimetre
NERC	Natural Environment and Rural Communities Act (2006)
NGR	National Grid Reference
NGVL	National Grid Viking Link Limited
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statements
NVC	National Vegetation Classification
PPG	Pollution Prevention Guidance
PRoW	Public Rights of Way
RAMs	Reasonable Avoidance Measures
RSPB	Royal Society for the Protection of Birds

List of Abbreviation	
Abbreviation	**Meaning**
S41	Section 41 habitats and species of principal importance as listed in the NERC Act 2006
SAC	Special Area of Conservation
Sch1	Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 as amended
Sch5	Animal species listed on Schedule 5 of the Wildlife and Countryside Act 1981 as amended
Sch8	Plant species listed on Schedule 8 of the Wildlife and Countryside Act 1981 as amended
SHDC	South Holland District Council
SNCI	Site of Nature Conservation Interest
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TEP	The Environment Partnership Ltd
UK	United Kingdom
VP	Vantage Point
WCA	Wildlife and Countryside Act 1981 (as amended)

1 Introduction

1.1 Introduction

1.1.1 This chapter has been prepared by TEP. It reports the results of baseline studies and the assessment of the potential impacts of the proposed Direct Current (DC) cable route on Ecology. Table 10.1 below sets out the structure of the Environmental Statement (ES) with respect to Ecology. Reference should be made to other documents which form part of the ES as appropriate.

1.1.2 Impacts on ecology are interrelated with impacts on the Intertidal Zone (ES-2-B.02, Chapter 6), Water Resources and Hydrology (ES-2-B.04, Chapter 8), Landscape and Visual Amenity (ES-2-B.07, Chapter 11), and Noise and Vibration (ES-2-B.11, Chapter 15), reference should also be made to their relevant chapters.

Table 10.1 Environmental Statement: Ecology

ES Reference	ES Volume	ES Chapter	Content
ES-2-B.06	2	10	Main Report: Proposed Underground DC Cable
ES-2-C.05	2	23	Main Report: Proposed Converter Station
ES-3-B.01	3	10	Figures: Proposed Underground DC Cable
ES-3-C.01	3	23	Figures: Proposed Converter Station
ES-4-B.06	4	10	Technical Appendices: Proposed Underground DC Cable
ES-4-C.05	4	23	Technical Appendices: Proposed Converter Station

1.2 Chapter Structure

1.2.1 The remainder of this chapter is structured as follows:

- Section 2. Approach to Assessment. Describes the approach to the identification and assessment of impacts including approach to consultation, scope of the assessment and methods of baseline data collection and ecological impact assessment.
- Section 3. Basis of Assessment. Sets out the key assumptions which have been made in undertaking the impact assessment.
- Section 4. Planning Policy and Legislative Considerations. Sets out the key legislation and policy of relevance to ecology and protected species with respect to development.
- Section 5. Baseline Conditions. Reports the results of desktop and field studies undertaken to establish existing conditions.

- Section 6. Potential Impacts. Identifies the potential impacts on ecology which may occur as result of construction and operation.
- Section 7. Mitigation. Identifies the mitigation which is proposed including measures which are incorporated into the siting, design and construction of the underground cable.
- Section 8. Residual Effects. Reports the residual effects which remain taking into account proposed mitigation and identifies whether these are significant or not.
- Section 9. Monitoring. Identifies any proposed short, medium or long term monitoring which is proposed to be undertaken during construction and/or operation.
- Section 10. Cumulative Effects. Identifies the inter-project cumulative effects which may occur in combination with other developments and intra-project cumulative effects which may occur between the underground cable and UK Offshore Scheme.
- Section 11. Summary of Assessment. Provides a summary of the key findings of the impact assessment.
- Section 12. References

2 Approach to Assessment

2.1 Introduction

2.1.1 This section describes the approach to the identification and assessment of impacts resulting from the construction and operation of the proposed DC cable route on ecology.

2.2 Summary of Consultation

Scoping Opinion Review

2.2.1 Table 10. summarises the issues raised in the scoping opinion in relation to Ecology and outlines how and where this has been addressed in subsequent chapters of the ES. A copy of the scoping opinion is included in Appendix 4.1.

Table 10.2 Scoping Opinion (Ecology)

Consultee	Summary of Comment	How and where addressed
Boston Borough Council (BBC)	Comments based on Natural England's (NE) scoping response which is summarised below.	See response to NE comments below
East Lindsey District Council (ELDC)	Comments based on scoping responses provided by NE, Lincolnshire Wildlife Trust (LWT) and Lincolnshire County Council (LCC) which are detailed below.	See response to NE comments below
Environment Agency (EA)	No comments relating to Ecology.	N/A
Lincolnshire County Council (LCC)	Suggest that any semi-natural habitats are surveyed against the Local Wildlife Site (LWS) criteria and any sites suitable for LWS designation are avoided.	Habitat surveys of semi-natural habitats were carried out to a sufficient level of detail to enable assessment against LWS criteria. No habitats met the criteria and therefore avoidance has not been necessary.

Table 10.2 Scoping Opinion (Ecology)		
Consultee	**Summary of Comment**	**How and where addressed**
Lincolnshire Wildlife Trust (LWT)	Recommended that semi-natural habitats, particularly permanent pasture, are surveyed to LWS criteria and that all designated sites and those meeting LWS criteria are avoided. If not then appropriate mitigation should be applied. Provided clarifications regarding chalk rivers and coastal grazing marsh designations and correct reference for LWS Guidelines for Greater Lincolnshire.	Habitat surveys of semi-natural habitats were carried out to a sufficient level of detail to enable assessment against LWS criteria. No habitats met the criteria and therefore avoidance has not been necessary. Clarifications noted and incorporated into relevant sections of this chapter and Technical Appendix 10.4.
Natural England (NE)	Advised that: mitigation for groundwater contamination is also related to designated sites; all Sites of Special Scientific Interest (SSSIs) likely to be impacted are identified and fully assessed; consideration is given to standing advice on survey and mitigation requirements; noise and vibration impacts are assessed and mitigated particularly with respect to protected breeding birds; full assessment of all ecological features is undertaken in line with CIEEM guidelines and national policy; Phase 2 surveys to be undertaken on important habitats; air pollution impacts on key habitats is assessed; climate change effects and adaptation is considered; that ancient woodland is avoided.	All advice regarding groundwater contamination, protected sites, noise and vibration, air quality and climate change has been taken account of in the ecological assessment and is addressed in this chapter where relevant. Potentially important habitats were assessed for survey to Phase 2 level (National Vegetation Classification (NVC) survey) where required. All ancient woodland was avoided during the cable routeing process.
North Kesteven District Council (CLLP)	No comments relating to Ecology	N/A
South Holland District Council (SHDC)	Comments based on Natural England's scoping response which is summarised above.	See response to NE comments above

Additional Consultation

2.2.2 Table 10. summarises additional consultation undertaken with relevant statutory and non-statutory consultees in relation to Ecology for the proposed DC cable route and outlines how and where this has been addressed in subsequent sections of this chapter.

Table 10.3 Additional Consultation (Ecology)

Consultee	Nature of additional consultation	How and where addressed
NE	Consultation on Ecological Survey Scope at Shortlisted Terminal Points (see Appendix 10.1) including: modified Ditch Suitability Index (DSI) survey for ditches with respect to assessing suitability for great crested newt (GCN); and information on great crested newt presence/absence in Sea Bank Clay Pits SSSI – March/April 2016	Confirmation from NE that survey methods were acceptable and that no records of GCN are known from Sea Bank Clay Pits SSSI, consequently no great crested newt survey required. Information on otter and badger presence also provided and fed into baseline surveys and desktop data study.
	Consultation on modified environmental DNA (eDNA) sampling approach for ditches due to their linear nature. – May/June 2016	Confirmation from NE that modified eDNA survey approach was acceptable. Addressed in section 2.4 and Appendix 10.6.
	Meeting to discuss survey progress and results and the scope for future surveys and assessment. – 9 June 2016	Confirmation that survey results so far would be included in a supporting document to the Scoping Report for review, that winter bird survey effort was sufficient and no further surveys were required.
	Consultation on Ecological Survey Scope – Full Scheme (see Appendix 10.2) taking into account approach to remaining surveys, including our approach for a presence/absence water vole survey. – July 2016	Confirmation from NE that revised survey approach acceptable, including presence/absence water vole survey method.
	Submission of interim survey results report to accompany Scoping Report for comment. – August/September 2016	Confirmation from NE that no specific issues to raise; agreed that winter bird survey effort at the landfall is sufficient.
	Meeting to update on survey progress and results, approach to assessment and mitigation. March 2017	Confirmation that natural re-vegetation of drains rather than reseeding with a seed mix was acceptable. This is discussed in section 3.2.
	Consultation on proposed mitigation	Confirmation from NE that satisfied

Table 10.3 Additional Consultation (Ecology)		
Consultee	**Nature of additional consultation**	**How and where addressed**
	approach for protected species - July 2017	with the proposed approach to mitigation for protected species.
LWT	Introductory discussion on progress so far and key issues the LWT might have - June 2016	Provision of information from LWT on bittern heard several kilometres south of the selected landfall.
	Consultation on Ecological Survey Scope – Full Scheme (see Appendix 10.2) taking into account approach to remaining surveys, including the approach for a presence/absence water vole survey - July 2016	Recommendation from LWT that semi-natural habitats are also surveyed to a sufficient standard to enable assessment against the LWS criteria for Lincolnshire. Query regarding water vole survey approach which was clarified and confirmed as acceptable. Recommendation fed into assessment process.
	Submission of interim survey results report to accompany Scoping Report for comment – August/September 2016	No specific comments from LWT regarding results and one query relating to great crested newt information provided by NE which was resolved.
LCC – Environment Officer	Introductory discussion on progress so far and key issues LCC might have - June 2016	Key issue is the Lincolnshire Coastal Country Park.
	Consultation on Ecological Survey Scope – Full Scheme (see Appendix 10.2) taking into account approach to remaining surveys, including the approach for a presence/absence water vole survey - July 2016	Impacts on this site with respect to ecology are assessed under the relevant habitats and species features within this chapter.
	Submission of interim survey results report to accompany Scoping Report for comment – August/September 2016	No specific comments on the proposed ecological survey scope or survey results.
Royal Society for the Protection of Birds (RSPB)	Correspondence on progress so far and key issues the RSPB might have – June 2016	No specific comments from RSPB on work undertaken so far.

Table 10.3 Additional Consultation (Ecology)		
Consultee	**Nature of additional consultation**	**How and where addressed**
Lindsey Marsh Internal Drainage Board (IDB)	Correspondence on progress so far and key issues the IDB might have – June 2016	Key issues relate to method of crossing IDB watercourses, minimising effects on grazing marsh habitat and being aware of barn owl nest boxes. IDB also provided their Biodiversity Action Plan (BAP) and information on water voles and barn owls. All information is taken account of in this chapter.
Witham Fourth IDB	Correspondence on progress so far and key issues the IDB might have – June 2016	IDB provided their BAP and information on botanical surveys. All information is taken account of in this chapter.
Black Sluice IDB	Correspondence on progress so far and key issues the IDB might have – December 2016	IDB provided their BAP and information on water voles and bat surveys. All information is taken account of in this chapter.

2.3 Scope of Assessment

Spatial Scope

2.3.1 The spatial scope of this chapter reflects the 'zone of influence' of the base scheme design. The base scheme design comprises the proposed DC cable route and Limits of Deviation (LoD), all temporary works compounds and areas required for drainage within the planning application boundary. This is the area over which the ecological features present may be subject to significant effects. To identify these zones consideration was given to potential direct and indirect effects that may occur during the construction and operation of the project.

2.3.2 From the outset, desktop study information was obtained for a large study area (Figure 10.1) to ensure that a suitable buffer around all potential areas for the base scheme design was obtained, enabling a robust assessment of ecological constraints during landfall site selection and cable routeing. The following buffers have been applied to the base scheme design with respect to designated sites and protected species information:

- 10 km for internationally designated sites. However, to take into account potential effects on overwintering bird populations the search was extended to include The Wash Special Protection Area (SPA)/Ramsar site and Gibraltar Point SPA/Ramsar site;
- 2 km for nationally designated sites. However, as a precaution, the search was extended to SSSIs outside this buffer where the potential for impacts was considered possible as a result of hydrological links; and

- 1 km for non-statutory designated sites, priority habitats and protected and notable species records.

2.3.3 The zone of influence for field survey and assessment comprises the base scheme design area, including all temporary work areas and access routes, along with any buffers required to take account of survey methods and species specific zones of influence. The study area for each ecological feature is presented in the Field Studies section (Section 2.4) and corresponding appendices and figures. These are summarised below:

- Extended Phase 1 habitat survey – Base scheme design plus immediately adjacent habitats for context;
- Hedgerow survey – Base scheme design area;
- Great crested newt *Triturus cristatus* surveys:
  - Habitat Suitability Index/ Ditch Suitability Index surveys – Base scheme design plus 250 m buffer.
  - Presence/ absence (eDNA) - Base scheme design plus 250 m buffer;
  - Population estimate (traditional survey) - Base scheme design plus 50 m buffer;
- Bat survey – Base scheme design;
- Water vole *Arvicola amphibius* and otter *Lutra lutra* survey – watercourse crossing points within base scheme design plus 100 m buffer upstream and downstream;
- Badger *Meles meles* survey – Base scheme design plus 30 m buffer;
- Winter bird survey – Base scheme design plus 500 m buffer (and including extended landfall survey area to south); and
- Breeding bird survey – Base scheme design plus 100 m buffer.

Temporal Scope

2.3.4 The construction phase is anticipated to be 24 to 36 months from approximately 2019 to 2022. The operational lifetime of the base scheme design is approximately 40 years, which will likely be extended beyond this following refurbishment activities. Following this, decommissioning will be undertaken.

2.3.5 Temporary impacts will generally occur during construction with key activities including fencing, site clearance, topsoil stripping, installation of drainage, installation of cables and backfilling, followed by reinstatement and landscaping works. Temporary impacts with relevance to ecology will include the potential for damage and degradation during construction as well as temporary habitat loss. With respect to fauna, temporary impacts may include displacement, disturbance, and the potential for killing or injury. Temporary fragmentation of habitats leading to severance or barrier effects on commuting and dispersing fauna may also occur as a result of construction activities.

2.3.6 Longer term, operational and permanent impacts will include the length of time taken for habitats to mature and establish following reinstatement of temporarily disturbed areas or planting within landscaped areas. This could lead to longer term fragmentation or severance effects on

commuting or dispersing fauna. Operational impacts relating to ecology will be limited to those occurring during infrequent maintenance visits. There is also the potential for electric and magnetic field (EMF) effects on fish e.g. European eel. Permanent habitat loss is likely to be restricted to trees which cannot be replaced in-situ over the permanent easement of the proposed DC route.

2.4 Identification of Baseline Conditions

Desk Studies

2.4.1 Information regarding designated sites, together with protected and notable habitats and species was collated from the sources listed in Table 10.. Information from Magic, the Forestry Commission and the Greater Lincolnshire Nature Partnership (GLNP) was obtained for the overall base scheme design. Information from other sources correlated with their area of jurisdiction or interest.

Table 10.4 Sources of Desktop Study Information

Organisation	Information Supplied
Black Sluice IDB	Black Sluice Drainage Board Biodiversity Action Plan (BAP) 2014 (Ref 10-1)
Forestry Commission (FC)	Ancient woodland and other woodland sites.
Greater Lincolnshire Nature Partnership (GLNP)	Non-statutory designated sites boundaries and citations and protected and notable species records. Lincolnshire BAP (2011) (Ref 10-2) LWS Guidelines for Greater Lincolnshire (Ref 10-3)
Lincolnshire Coastal Grazing Marshes Partnership	Details on Lincolnshire Coastal Grazing Marshes Project priority habitat and grassland areas.
LCC	Information on Lincolnshire Coastal Country Park and the non-statutory designated sites within it.
LWT	Presentation: Highways for Wildlife – Defending and extending the UK's road verge network for biodiversity (Ref 10-4)
Lindsey Marsh Drainage Board	Information on water vole distribution in their area, barn owl nest box locations and the Lindsey Marsh Drainage Board BAP (Ref 10-5)
Magic	Statutory protected sites & priority habitats. Information for granted European Protected Species (EPS) licences
Witham Fourth District IDB	Witham Fourth Internal Drainage Board BAP 2010 (Ref 10-6)

Field Studies

2.4.2 Full details of methods, timings and limitations of field surveys undertaken to establish baseline data for the base scheme design and its immediate surrounds are provided in Appendices 10.1 to 10.11. These are summarised below.

Extended Phase 1 Habitat Survey

2.4.3 The survey was carried out in accordance with the Phase 1 habitat survey assessment methods (Ref 10-7) and the Guidelines for Preliminary Ecological Appraisal Ref (10-8). Habitat types were mapped and dominant vegetation species noted. Any invasive species were also recorded. In addition, field signs and potentially suitable habitats for legally protected species or species which are listed under the obligations of Section 41 (S41) of the Natural Environment and Rural Communities Act 2006 (NERC) (Ref 10-9), or are included in the Local Biodiversity Action Plans (LBAP) were mapped and noted, in order that they could be fed into the relevant detailed species survey or included within the assessment of the scheme as a whole.

2.4.4 The optimum time for extended Phase 1 surveys is April to mid-October. Surveys for the base scheme design were undertaken May 2016 for the landfall and during September and October 2016, and April and May 2017 along the proposed DC cable route.

Limitations

2.4.5 All surveys were undertaken within the appropriate time period. Access was possible to 86% of the study area (16.06 % in Route Section 1, 41.15 % in Route Section 2, 0.35 % in Route Section 3 and 12.43 % in Route Section 4).

Hedgerow Survey

2.4.6 Hedgerows within the base scheme design area were surveyed and target notes made as part of the extended Phase 1 habitat survey. Where species diversity and features of the hedgerow indicated it may qualify as 'Important' under the Hedgerow Regulations 1997 (Ref 10-10) (wildlife and landscape criteria), a survey in accordance with the Hedgerow Regulations was also undertaken. Hedgerow surveys were undertaken during the appropriate survey period between early April and June 2017 to ensure woodland ground flora was recorded when visible and identifiable.

Limitations

2.4.7 Although surveys began slightly earlier than the recommended optimum survey period of mid-April to mid-June, plant growth was sufficiently advanced to enable identification of spring woodland ground flora. Access was possible to 86 % (16.06 % in Route Section 1, 41.15 % in Route Section 2, 0.35 % in Route Section 3 and 12.43 % in Route Section 4) of the study area.

National Vegetation Classification Survey

2.4.8 As habitat surveys were undertaken from mid-April, grasslands which are crossed by the cable route were re-visited to determine whether they were floristically interesting enough to require NVC surveys. These repeat surveys were undertaken between 27th and 30th June 2017, where access was permitted.

2.4.9 None of the grasslands were of a quality to justify assessment under NVC methods therefore no NVC surveys were undertaken. The additional notes that were made on these grasslands are included within the extended Phase 1 Habitat survey (Appendix 10.4).

Great Crested Newt Survey

2.4.10 A sequential approach to great crested newt (GCN) surveys was agreed with stakeholders and implemented to (a) identify waterbodies (ponds and ditches), (b) assess their suitability for GCN, (c) determine presence or likely absence of GCN and, if present, (d) confirm the population size class. Full details of individual survey methods and limitations are detailed in Appendix 10.6.

2.4.11 Table 10. provides a summary of the survey scope according to distance from the base scheme design and the timing of the surveys.

Table 10.5 GCN Survey Scope and Timing

Proposed Landfall	Distance from proposed landfall		
	0-50m	51-250m	251-500m
Habitat Suitability Index (HSI) and Ditch Suitability index (DSI)	May 2016	May 2016	May 2016
Presence/absence (traditional and eDNA)	May 2016	May 2016	-
Population estimate (if GCN present)	April to June 2017	April to June 2017	-
Proposed DC cable route	**Distance from proposed DC cable route**		
	0-50m	51-250m	251-500m
Habitat Suitability Index (HSI) and Ditch Suitability index (DSI)	May 2016 May 2017	May 2016 May 2017	-
Presence/absence (traditional and eDNA)	April to June 2017	April to June 2017	-
Population estimate (if GCN present)	April to June 2017	-	-

2.4.12 Table 10. identifies the waterbodies (ponds and ditches) subject to GCN survey during the sequential survey approach within 250 m of the base scheme design (Figure 10.6).

Table 10.6 Waterbodies Subject to GCN Survey			
Survey Method	**Criteria**	**Pond Refs**	**Ditch Refs**
Preliminary Scoping	All waterbodies (ponds and ditches) identified on aerial/OS maps within survey areas (base scheme design area plus 250 m buffer).	P2, P4, P6, P7, P9-P11, P16, P17, P23, P25, P27, P31-P33, P52, P59, P68, P69, P71, P72, P75, P80, P81, P83, P85, P86, P88-P93, P96, P102, P106, P107, P109, P111, P112, P114, P141-P146, P153-P156, P158, P159, P161-P165, P168, P173, P174, P178, P181-P187, P190, P191, P198, P199, P200, P202 [***Total = 75 ponds***]	D1, D3-D8, D12-D15, D18, D24, D27, D29, D30, D32, D34-D38, D40-D50, D54, D55, D57, D59, D60-D62, D64, D66, D75, D79, D83, D84, D86, D87, D89, D90-D96, D99, D101-D106, D108-D110, D115, D130, D143, D158, D179, D182, D184, D186, D187, D189, D191, D192, D194, D195, D197, D264, D277, D282, D288, D295, D301, D302, D305, D306, D320, D321, D364, D373, D392, D396, D445, D470, D471, D473, D483, D487, D493, D499, D500, D520, D521, D526, D637, D725, D733, D735-D738, D742, D747, D749, D750, D752-D755, D757, D760-D764, D767, D768, D770, D771, D776-D780, D782 [***Total = 140 ditches***]
Waterbodies not accessible	Ponds and ditches for which permission to access for survey was not granted (no further survey possible within base scheme design area plus 250 m buffer).	P2, P6, P7, P9-P11, P16, P23, P27, P31-P33, P52, P71, P102, P106, P107, P109, P111, P112, P114, P142, P143, P144, P145, P154-P156, P158, P161-P165, P174, P198, P200 [***Total = 37 ponds***]	D5, D8, D15, D29, D31, D32, D35, D36, D40, D41, D45, D46, D49, D54, D96, D108, D109, D115, D725 [***Total = 19 ditches***]
Waterbodies not suitable for HSI/DSI assessment	Ponds and ditches accessed for HSI/DSI assessments but unsuitable for further survey e.g. no longer present, dry, completely vegetated (within base scheme design area plus 250 m buffer).	N/A	D1, D6, D7, D12, D14, D18, D50, D57, D86, D87, D89, D90-D93, D99, D103, D104, D184, D189, D194, D197, D277, D282, D288, D295, D305, D306, D392, D396, D445, D471, D483, D500, D520, D526, D733, D736, D742, D749, D757, D760, D767, D768, D770, D776, D778, D782 [***Total = 48 ditches***]

Table 10.6 Waterbodies Subject to GCN Survey			
Survey Method	**Criteria**	**Pond Refs**	**Ditch Refs**
HSI and DSI	All accessible waterbodies (ponds and ditches) identified on aerial/OS maps within survey areas (base scheme design area plus 250 m buffer).	P4, P17, P25, P59, P68, P69, P72, P75, P80, P81, P83, P85, P86, P88, P89, P90-P93, P96, P141, P146, P153, P159, P168, P173, P178, P181-P187, P190, P191, P199, P202 [***Total = 38 ponds***]	D3, D4, D13, D24, D27, D30, D34, D37, D38, D42-D44, D47, D48, D55, D59-D62, D64, D66, D75, D79, D83, D84, D94, D95, D101, D102, D105, D106, D110, D130, D143, D158, D179, D182, D186, D187, D191, D192, D195, D264, D301, D302, D320, D321, D364, D373, D470, D473, D487, D493, D499, D521, D637, D735, D737, D738, D747, D750, D752-D755, D761-D764, D771, D777, D779, D780 [***Total = 73 ditches***]
Waterbodies not carried forward	Waterbodies which were scoped out according to habitat assessment criteria (within base scheme design area plus 250 m buffer).	P4, P17, P25, P69, P90, P91, P141, P146, P153, P159, P173, P178, P181, P182, P185, P187, P190, P191, P199 [***Total = 19 ponds***]	D24, D27, D30, D34, D37, D42, D43, D47, D59, D66, D94, D179, D182, D187, D192, D195, D264, D301, D302, D470, D473, D487, D493, D521, D735, D738, D747, D750, D752-D755, D761, D762, D764, D771, D777, D779, D780 [***Total = 39 ditches***]
Waterbodies identified for further survey but not carried forward	Ponds and ditches accessed for HSI/DSI assessments for which permission to access for further survey was not granted (within base scheme design area plus 250 m buffer).	P183 [***Total = 1 pond***]	D4, D84, D101, D110 [***Total = 4 ditches***]

Table 10.6 Waterbodies Subject to GCN Survey			
Survey Method	**Criteria**	**Pond Refs**	**Ditch Refs**
Presence/absence (eDNA)	All accessible ponds within survey areas which returned 'Good' or 'Excellent' HSI scores. All accessible ditches within survey areas which returned positive or neutral scores (within base scheme design area plus 250 m buffer).	P72, P75, P80, P81, P83, P85, P86, P88, P92, P93, P168, P184, P186, P202 [***Total = 14 ponds***]	D3, D13, D44, D48, D55, D60-D62, D64, D75, D79, D83, D95, D102, D105, D106, D130, D143, D158, D186, D191, D320, D321, D364, D373, D737, D763 [***Total = 27 ditches***]
Presence/absence (traditional)	All waterbodies which returned a positive or inconclusive eDNA result. All waterbodies carried forward following HSI/DSI which were not suitable for eDNA sampling (within base scheme design area plus 250 m buffer).	N/A	D3, D55, D60, D62, D83, D95, D364, D373, D499 [***Total = 9 ditches***]
Population size class assessment (traditional)	All waterbodies confirmed to support GCN during presence/absence survey (eDNA/traditional).	N/A	D3, D83 [***Total = 2 ditches***]
Waterbodies requiring further survey	Waterbodies still requiring survey either to confirm presence/absence or because they are now within 250 m of the base scheme design.	P59, P68, P89, P92, P96 [***Total = 5 ponds***]	D38, D637 [***Total = 2 ditches***]

Limitations

2.4.13 In the field scoping, DSI and eDNA survey were not possible for 21 ditches (as detailed above in Table 10.6) due to the lack of agreed land access or confirmation of access prior to survey visits. These access constraints prevented survey of 15 % of ditches initially scoped within the 0-50 m

or 51-250 m of the base scheme design where GCN survey was required. Similarly in the field scoping, HSI and eDNA survey was not possible for 38 ponds (as detailed above in Table 10.6) due to the lack of agreed land access or confirmation of access prior to survey visits. These access constraints prevented survey of 51 % of ponds initially scoped within the 0-50 m or 51-250 m of the base scheme design where GCN survey was required.

2.4.14 Ponds P59, P68, P89 and P96 and ditches D38 and D637 were subject to suitability assessments and found to be suitable for GCN, based on the criteria set out in Table 10.6, but were scoped out of further GCN survey as they were initially located beyond the survey buffers of the base scheme design, as set out at Table 10.. However, following revisions to the base scheme design, these ponds and ditches subsequently fell within the 250 m survey buffer. Based on this combined proximity and suitability, pre-commencement survey of ponds P59, P68, P89 and P96 and ditches D38 and D637 will therefore be required as they were not possible to survey within the GCN breeding season during 2017.

2.4.15 Ditch 95 within Route Section 4 returned an 'inconclusive' eDNA result for GCN presence/absence. Traditional surveys to confirm presence/absence of GCN within D95 were not possible due to access permission being denied.

2.4.16 HSI and DSI surveys were not all undertaken within the optimum survey period of late April to September due to a combination of the Project programme and when access was available. Aquatic vegetation may not have had sufficient time to establish for an accurate macrophyte coverage assessment to be made. However, seasonality was taken into consideration by surveyors and remnant vegetation was used to estimate vegetation density during optimum survey periods. Ditches within the area are regularly dredged and vegetation cut so timing of the DSI is unlikely to have significant constraints for the ditch assessment.

2.4.17 Limitations regularly encountered when undertaking eDNA sampling and traditional surveys included: varying water levels and drying of waterbodies between surveys; presence of dense vegetation on banks and within ditches; and polluted waterbodies.

2.4.18 The ditches were generally unsuitable for bottle trapping due to their steep sides and shallow water and therefore torching, egg searching and hand netting were used as the three methods required to comply with the Natural England (Ref 10-11) guidelines. However, the steep banks and dense vegetation also on occasion prevented hand netting from being undertaken. Steep banks prevented safe access for egg searching at some ditches and dense vegetation reduced effectiveness of torch survey. These constraints to survey were unavoidable.

2.4.19 As a result, it has not been possible to employ three different methods of traditional GCN survey at every waterbody in accordance with guidelines and methods for establishing the presence or likely absence. Estimations of the population size class of GCN at these locations may therefore be limited. However data interpretation has considered survey limitations and a precautionary approach mitigation was adopted appropriate to the level of risk or uncertainty introduced by data limitations. Consequently, survey limitations encountered are not considered to limit the findings of the assessment.

Bat Survey

2.4.20 Bat surveys for the scheme have comprised two elements:

- Roost surveys – to determine the presence of roost sites or potential roost sites in areas where these may be lost or impacted by the scheme; and
- Activity surveys – to assess the connectivity and use of the landscape by commuting and foraging bats within selected areas of the base scheme design area.

2.4.21 The timings of bat surveys undertaken for the base scheme design are summarised in Table 10.7.

Table 10.7 Bat Survey Effort

Survey type	Proposed landfall	Proposed DC cable route
Ground based assessment of trees/ buildings	May 2016	February – March 2017
Aerial survey, if required	Not required	June 2017
Activity transect scoping visit	May 2016	February – March 2017
Activity transect surveys/statics	May and June 2017	May and June 2017

Roost Surveys

2.4.22 Trees are relatively sparsely distributed across many areas of the base scheme design and it has been the intention of route design to avoid trees where possible. However, trees are present within the survey area as woodland, hedgerow trees and isolated trees. As route design avoided being in close proximity to buildings only a very limited number are present within the survey area.

2.4.23 A preliminary daytime bat roost appraisal of trees was completed in May 2016 at the proposed landfall and between February 2017 - April 2017 along the proposed DC cable route. The trees and buildings were categorised in accordance with the criteria for roost suitability identified in the Bat Conservation Trust (BCT) Good Practice Guidelines (Ref 10-12).

2.4.24 For trees that were categorised as moderate or high and had the potential to be affected by the base scheme design, a further ground based inspection or aerial inspection was undertaken to further determine whether the trees supported suitable features for roosting bats in May and June 2017.

Activity Surveys

2.4.25 Temporary fragmentation effects arising as a consequence of the proposed DC cable route may have the potential to result in disruption to foraging and commuting bats. A review of satellite imagery, Phase 1 habitat survey results and observations made during ground based roost surveys was undertaken to assess the connectivity of the landscape, taking into account the field boundary network, watercourses and areas of woodland. Following this initial assessment a

scoping survey visit was undertaken to confirm areas of high connectivity and identify target survey areas for activity transects.

2.4.26 Based on the dominance of agricultural habitats, five walked transects were identified along the proposed DC cable route. One of these transects was unable to be completed due to lack of access. The activity surveys comprised a walked transect, completed over three evenings on 16th, 18th and 23rd May (visit 1) and 3rd, 5th and 12th July 2017 (visit 2). Both of these visits are reported in this chapter. At the time of writing, a third survey visit is to be carried out in August 2017, the findings of which will be submitted within a Supplementary Report to this ES. The transect surveys were supplemented by remote monitoring, whereby one static detector was deployed along each transect route for a minimum period of five consecutive nights of suitable weather coinciding with each transect survey. Findings from the first and second remote monitoring surveys (17th – 22nd May and 28th June – 4th July 2017) are reported within this chapter and findings from the third remote monitoring survey (August 2017) will be submitted within a Supplementary Report to this ES.

Limitations

2.4.27 Access was possible to 86 % (16.06 % in Route Section 1, 41.15 % in Route Section 2, 0.35 % in Route Section 3 and 12.43 % in Route Section 4) of the base scheme design for the ground based bat assessment.

2.4.28 Limitations to bat species identification based on recorded sonogrammes, are detailed within Appendix 10.7.

2.4.29 Access was not permitted into Route Section 2 in order to undertake Transect 2 or the static monitoring at this location.

2.4.30 The static detector deployed in Route Section 4 only recorded for four of the six nights deployed due to a technical fault.

2.4.31 On the first transect survey in Route Section 4, heavy rain was experienced near to the end of the survey. Bat activity tends to reduce during heavy rain and therefore the results of this survey may not provide an accurate reflection of activity in spring along this route.

2.4.32 Data interpretation took these limitations into account. Professional judgement was applied during the impact assessment, which took into account the survey findings in combination with consideration of desktop findings, roost survey findings, habitat structure and landscape connectivity.

Water Vole and Otter Survey

2.4.33 A total of 80 watercourses will be crossed by the proposed DC cable route and were considered to provide suitable habitat for water vole and/or otter following the extended Phase 1 habitat survey. Surveys of these watercourses were undertaken for the presence of water vole and otter. A buffer of 100 m upstream and downstream of each crossing point was applied.

2.4.34 Presence/absence water vole surveys were undertaken according to methods agreed with Natural England, whereby presence was confirmed within a watercourse once three field signs

were recorded within the surveyed reach. Survey techniques and timings were otherwise undertaken in accordance with the Water Vole Mitigation Guidelines (Ref 10-13) and Water Vole Conservation Handbook (Ref 10-14). The watercourses were simultaneously surveyed for evidence of otter activity in accordance with current methods (Ref 10-15). The identification of water vole and otter field signs was marked on maps and used to determine the presence/absence of the species.

2.4.35 Surveys were undertaken during September 2016, in a limited area of the proposed DC cable route where access was available, and in May and June 2017. Where a second survey visit is required, this will be undertaken in August 2017 and will be submitted within a Supplementary Report to this ES.

Limitations

2.4.36 All surveys were undertaken in suitable dry weather conditions and with no substantial rain in the few days preceding the surveys. Therefore no limitations were experienced.

2.4.37 Access to 86 % (16.06 % in Route Section 1, 41.15 % in Route Section 2, 0.35 % in Route Section 3 and 12.43 % in Route Section 4) of the base scheme design was possible to identify watercourses considered to have suitability for water vole and otter. Of the watercourses which were identified, access was possible to 87 % for survey.

Badger Survey

2.4.38 Field signs evidencing badger activity were recorded during the extended Phase 1 habitat survey over the 2016 and 2017 survey seasons. Detailed badger surveys were then subsequently undertaken in February - May 2017 across the base scheme design applying a 30 m buffer. Surveys were undertaken when vegetation was low, which also coincides with a peak in territorial activity. The survey method was based on the standard approach detailed in the Mammal Society publication *Surveying Badgers* (Ref 10-16) and used during the National Badger Survey (Ref 10-17). This systematic walkover included the recording of a range of field evidence including sett locations, latrines, runs, footprints, hairs and foraging evidence.

2.4.39 All evidence of badger activity was mapped, including the locations of setts, latrines, diggings, runs, footprints and hairs (Ref 10-18). The location of each sett entrance was photographed and plotted using GPS and a detailed description of the sett and surrounding habitat collated. General habitat conditions around each of the setts were also recorded. Setts were classified in accordance with Harris *et al*. (1989) (Ref 10-16) as either a main, annexe, subsidiary or outlier sett. An assessment of the level of activity of each sett was also undertaken.

Limitations

2.4.40 Access was possible to 86 % of the base scheme design and land within the 30 m buffer (16.06 % in Route Section 1, 41.15 % in Route Section 2, 0.35 % in Route Section 3 and 12.43 % in Route Section 4). This degree of accessibility is taken into account in the assessment

and the implementation of legal compliance measures will ensure that all areas of land will be subject to pre-construction surveys in order to assess potential constraints.

Winter Bird Survey

Proposed Landfall

2.4.41 An intertidal bird survey was undertaken within the selected landfall and 500 m buffer, from public rights of way and the shoreline. Survey methods were based on Wetland Bird Survey (WeBS) core count and low tide count methodology (Ref 10-19). Each survey visit started at high tide and ended at low tide or vice versa, covering a 7.5 hour period. The aim of the survey was to get complete coverage of the intertidal survey area during each state of tide (low, mid and high).

2.4.42 Survey visits were undertaken twice a month. Each survey comprised three, 2 hour survey periods (high tide, medium tide and low tide) during the 7.5 hour survey. The remaining time (1.5 hours in total) was spent walking from the final count location at the end of each 2 hour survey period, back to the beginning point for the next survey period, with any additional bird observations of interest noted during this period.

2.4.43 During each 2 hour period the surveyor carried out three intertidal bird counts from three evenly spaced locations throughout their survey area along the shore. Any remaining time within the 2 hour period was used to get as complete a picture of bird usage within the intertidal survey area as possible. Inland fields adjacent to the coast were also scanned for birds to record any primary species using these locations.

2.4.44 All primary species (waterbirds and seabirds, including all waders, wildfowl, raptors and any other species associated with The Wash Special Protection Area (SPA)/Ramsar, Gibraltar Point SPA/Ramsar or the Humber Estuary SPA/Ramsar) as well as Schedule 1 (WCA, 1981) (Ref 10-20) raptor species using the intertidal area within the survey area were recorded and mapped. Birds were recorded as far out to sea as possible.

2.4.45 Surveys were conducted between December 2014 to April 2015 and October 2015 to April 2016 in an adjacent area to the south of the proposed landfall and between January and April 2016 at the proposed landfall.

2.4.46 Proposed DC Cable Route

2.4.47 Surveys along the proposed DC cable route comprised a pre-determined point count and transect survey technique (Ref 10-21). Detailed methods are described in Appendix 10.10. Surveys were undertaken from public roads and footpaths.

2.4.48 The surveys recorded primary and secondary bird species as follows:

- Primary species included all waders, wildfowl, raptors and any other species associated with The Wash SPA//Ramsar, Gibraltar Point SPA/Ramsar or the Humber Estuary SPA/Ramsar, or Schedule 1 (WCA, 1981) (Ref 10-20) bird species.
- Secondary species included all other Birds of Conservation Concern (BoCC) (Ref 10-22) species.

2.4.49 All primary and secondary species were recorded and mapped directly on the survey map using British Trust for Ornithology (BTO) species codes and behaviour symbology. If a group of birds was recorded, the extent of that group of birds was recorded on the sheet. If any qualifying species for the Humber Estuary SPA or The Wash SPA were recorded, the time of the record was also noted to reduce the risk of double counting these species.

2.4.50 Surveys were conducted during the periods December 2014 to April 2015 and October 2015 to April 2016.

Limitations

2.4.51 Winter bird surveys were initiated in the 2014-2015 season and focussed on sections of the coast from Huttoft to Ingoldmells where it was considered that the cable would most likely come ashore. Surveys were progressed in parallel with the identification and assessment of alternative landfalls throughout the 2014-2015 and 2015-2016 winter bird survey periods. During the 2015-2016 survey period, the proposed landfall at Boygrift was identified as a new potential site. The winter bird surveys had not included direct coverage of all of this site (there is a small amount of overlap) for the full survey period, however they did include full survey of adjacent coastline to the south east. Due to the very similar habitats within these two adjacent survey areas it can be assumed (with some element of caution) that the wintering birds recorded during the first part of the winter period in the adjacent survey area to the south east would also have been present during this time within the proposed landfall survey area. Therefore, survey data for the adjacent survey area for 2014-2015 and for October to December 2015 are used for the assessment of effects of the base scheme design on wintering birds.

2.4.52 It is possible that if the usage of the site differs substantially during the early winter period and between years then this could have been missed. However, as part of the survey area at the proposed landfall, as well as the adjacent coastline to the south east, was recorded for the entire winter period for two seasons and due to the very similar habitats present, it is highly likely that the usage is representative of bird usage throughout the winter period and no limitations on the data are anticipated. Confirmation has been obtained from Natural England that the level of survey effort is acceptable for the proposed landfall.

2.4.53 Direct access to all lands along the proposed DC cable route was not possible during the winter bird surveys. Transect routes and point count locations were selected to ensure that all primary bird species would be detectable, but it is possible that that some secondary bird species could have been missed. However, it is considered that this is not a significant limitation to the survey.

2.4.54 No survey visits were undertaken within Route Section 2, due to changes in the route following the 2015/2016 winter bird surveys. However Route Section 2 lies within a largely different landscape type to the other three route sections surveyed, with fields smaller and much less favourable for the primary species targeted. Based on professional judgement, it is therefore considered that this is not a significant limitation to the survey.

Breeding Bird Survey

2.4.55 Breeding bird survey (BBS) transects were undertaken at selected sites along the proposed DC cable route based on review of satellite imagery and the results of the extended Phase 1 habitat survey. Detailed methods are described in Appendix 10.11.

2.4.56 The BBS employed a transect method, based on the BTO BBS method with mapping techniques applied as described for the BTO Common Bird Census (CBC) method (Ref 10-23). Visits were evenly spaced at approximately four weeks apart.

2.4.57 Bird species and activity patterns were recorded, within a 100 m buffer along each transect, using standard BTO symbology. Records of protected species or BoCC (Ref 10-22) were highlighted. Any trees within the survey area were checked for signs of occupation by owls and raptors.

2.4.58 In addition specialised surveys were undertaken where desktop records indicated that nesting Schedule 1 (WCA, 1981) (Ref 10-20) species were likely to be present within the study area and which could potentially be affected by the proposed works. This entailed marsh harrier and bearded tit surveys at Sea Bank Clay Pits SSSI (targeting Huttoft Bank Pit Nature Reserve). Marsh harrier surveys were undertaken according to the method described in Ref 10-16 and involved six survey visits targeting the early to mid-morning period between April and June 2016. Bearded tit and additional marsh harrier surveys involved vantage point (VP) surveys of four hours in duration. For Huttoft Bank Pit this involved a single VP location from the bird hide. All marsh harrier and bearded tit activity was recorded and mapped during the VP surveys.

2.4.59 Surveys at the proposed landfall (including Schedule 1 (WCA, 1981) (Ref 10-20) species surveys) were undertaken between April and June 2016 and along the proposed DC cable route between April and June 2017.

Limitations

2.4.60 Access for some of the BBS transects was inconsistent meaning full data was not always obtained on each survey visit. However, given the species recorded during the surveys, it is considered that an accurate representation of the breeding bird assemblage has been obtained and therefore no limitations were experienced.

Reptile Habitat Suitability Survey

2.4.61 Habitats with the potential to support reptiles were identified during the extended Phase 1 habitat survey. Suitable habitats along the proposed DC cable route are limited and all comprised only small areas and therefore targeted reptile surveys were not undertaken. However the potential for their presence has been taken into account in the assessment and is not considered to be a limitation.

2.5 Approach to Assessment

Assessment Guidance

2.5.1 The ecological assessment has been carried out with due consideration for the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (EcIA) (Ref 10-2424). The guidelines provide a robust framework for EcIA, which is then informed by the interpretation of contextual information and professional judgement.

Assessment Criteria

Importance of Receptors

2.5.2 The CIEEM EcIA guidance (Ref 10-24) confirms that detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. It is therefore necessary to determine which ecological features are sufficiently important (and potentially affected by the base scheme design). Decisions on relative importance consider quality, extent, rarity (including local rarity) and threats or declines of a feature. Relevant statutory and non-statutory designations, legislation and policies are taken account of, although not all populations of legally protected species show the same rarity or distribution, so contextual information is presented where relevant (for example, while GCN are afforded statutory protection at a European level, a small population situated within an optimal geographic location is unlikely to be of ecological value at a European level). Importance could also relate to the supportive function of the ecological feature (i.e. providing a buffer, connections or opportunities for expansion or climate change resilience of a neighbouring feature).

2.5.3 The importance of an ecological feature is identified within a defined geographical context, the scales relevant to the base scheme design and its ecological features are presented in Table 10.8. These criteria provide a framework for the assessment but specific site conditions, together with information on the local and wider context, may result in different criteria being applied.

Table 10.8 Geographic Context of Important Ecological Features

Geographic Context	Criteria
International and European	Designated or proposed/candidate Special Areas for Conservation (SAC), SPA and Ramsar Sites and their qualifying features, some of which may depend on land outside the designation boundaries. Candidate or proposed designations are treated as of equal value to fully designated sites. Under the National Planning Policy Framework (NPPF)) (Ref 10-25), land that is set aside as compensation for adverse effects of development on European Sites should also be regarded as of European value. Species populations or habitat areas (such as those listed in Annex I, II or IV of the Habitats Directive (Council Directive 92/43/EEC) (Ref 10-26) or Annex I of the Birds Directive (Directive 2009/147/EC) (Ref 10-27)) of international importance due to relative size, rarity or quality of the feature.

Table 10.8 Geographic Context of Important Ecological Features	
Geographic Context	**Criteria**
National	Designated or proposed SSSIs, National Nature Reserves (NNR), Marine Nature Reserves (MNR) and their qualifying features, some of which may depend on land outside the designation boundaries. A viable area of ancient woodland. Species populations or habitat areas (including legally protected or NERC Act 2006 (Ref 10-9) S41 species or habitats) of national importance due to relative size, rarity or quality of the feature.
County	Designated or proposed County Wildlife Sites (CWS), LWS,, Sites of Nature Conservation Importance (SNCI) and their qualifying features where they occur within the designation boundaries. 'Important' hedgerows (as described under the Hedgerows Regulations 1997 (Ref 10-10)) where these occur as an extensive network. Species populations or habitat areas (including legally protected or NERC Act 2006 (Ref 10-9) S41) or Nationally Scarce species or habitats of district or county importance due to relative size, rarity or quality of the feature. Sites should comfortably exceed SNCI criteria if these exist, but not meet SSSI selection criteria.
Local	Local Nature Reserves (LNR) and unless also designated at a higher level, and other nature conservation designations (under local planning policies). Green infrastructure designations where these contribute to local landscape connectivity and/or buffer other ecological features valued at least this geographic scale. Species populations or habitat areas (including legally protected or NERC Act 2006 (Ref 10-9) S41 species or habitats) of local importance due to relative size or quality. Features that appreciably enrich the local ecological resource, although these may themselves be common and widespread, such as long-established hedgerows, woodlands and ponds.

Characterisation of Impact

2.5.4 Although not necessary, it is good practice to describe potential impacts without and with mitigation. The base scheme design may result in multiple potential impacts on an important ecological feature. The CIEEM approach requires that only those that are likely to occur and have significant impacts need be assessed, although a precautionary approach to scoping potential impacts is recommended. The following characteristics are used to describe impacts:

- Positive or negative, although for the purposes of continuity with other chapters in this ES, the terms beneficial or adverse are used.
- Extent.
- Magnitude.
- Duration.

- Timing.
- Frequency.
- Reversibility.

2.5.5 The following four-point scale is used to express the degree of confidence with which the predicted impact may occur. This scale is also applied to the likely effectiveness of mitigation proposals.

- Certain/near certain.
- Probable.
- Possible.
- Extremely unlikely.

Assessing the Significance of Effects

2.5.6 Once an impact has been characterised it is necessary to determine if the effect is 'significant'. In the context of CIEEM EcIA guidance (Ref 10-24) a significant effect is one that either 'supports or undermines biodiversity conservation objectives for 'important ecological features''. This can include impacts on the structure and function of sites and habitats or the conservation status (i.e. the extent, distribution or abundance) of habitats and species. The decision on significance is made irrespective of the geographical scale at which the ecological feature is valued; if an effect is found not to be significant at the level at which the receptor has been valued, it may be significant at a more local level.

Climate Change

2.5.7 European guidance (Ref 10-2828) requires that EIA considers the effects of projects on climate change and on biodiversity. The EC guidance indicates that impacts which are only likely to be experienced in the next 20 years should be based on current weather patterns or near-future projections if available and relevant. Beyond 20 years, identified potential impacts (associated with operation of the Scheme) may need to consider the projected climate. This has been taken into account in the assessment of operational effects.

2.6 Assumptions or Limitations

2.6.1 The assessment is made on the best available data, based on the information that has been gathered from stakeholders, other data sources and the surveys undertaken. Some limitations to the surveys were identified and have been discussed in the relevant sections above and are identified in the relevant sections of Appendix 10. Access has not been possible to several areas along the proposed DC cable route for all surveys. Therefore the assessment has been undertaken based on the worst case following review of aerial imagery of the areas not accessed. In addition, the second visit for water vole and otter surveys along with the third visit for bat activity surveys still require completion due to their seasonal restrictions. Once surveys are completed the assessment will be updated where required and will be submitted within a Supplementary Report. However, the level of survey information gathered to date, taking into

account the embedded mitigation and legal compliance and good practice measures detailed in the Basis of Assessment (Section 3), is considered sufficient to allow a robust assessment of the base scheme design.

3 Basis of Assessment

3.1 The Proposed Underground Cable Design Assumptions

3.1.1 Cross reference should be made to The Proposed Underground Cable (ES-2-B.01, Chapter 5) which provides a full description of the underground cable design and construction from the landfall to the converter station.

3.1.2 The key design assumptions which underpin the ecological assessment for the base scheme design (comprising the proposed DC cable route and LoD, all temporary works compounds and areas required for drainage within the planning application boundary):

- Proposed landfall will be constructed using Horizontal Directional Drilling (HDD) from inland of the sea defence to the beach above Mean Low Water Spring (MLWS).
- Underground cable length of 67.16 km (13.04 km in Section 1, 16.85 km in Section 2, 22.06 km in Section 3 and 15.21 km in Section 4);
- Typical working width of 30 m, although some areas may need to be wider (up to 50m) for storage and placement of larger plant and equipment;
- Three Primary Temporary Construction Compounds (TCCs), six Secondary TCCs and 16 Temporary Works Areas (TWAs);
- Use of stock proof fencing to demarcate the DC cable working width;
- Majority of the proposed DC cable route will be installed by open cut/trenching methods, either for ducting to be installed prior to cable pulling at a later date or for direct laying of the cable, and fully reinstated to pre-existing conditions afterwards;
- Majority of road, rail and watercourse crossings will be undertaken using a trenchless installation method such as HDD or pipe-jacking, with temporary bridges or culverts used at watercourses to facilitate a temporary haul road;
- 82 dB maximum noise levels during construction at 20 m from HDD compounds locations;
- Installation of pre-construction drainage to mitigate for land drain severance;
- DC cable installation is anticipated to take 2-3 years, although construction will be sequential or at several places along the proposed DC cable route at one time, with each kilometre of DC cable being installed and reinstated over an approximate 4-5 month period;
- Landfall construction will take approximately four months for both cables to be installed over two visits;
- Construction will be throughout the year, but will take into account seasonal restrictions where required;
- Construction will usually be undertaken during daytime periods, although some activities such as HDD and cable jointing will require 24 hour working;

- Lighting during 24 hour construction and commissioning activities will comprise trailer mounted masts with generator sets which will typically be used to illuminate localised areas and will be directional.

3.2 Embedded Mitigation

3.2.1 The design process has been iterative throughout. Information derived from ecological surveys and the consultation process has been used, alongside other environmental survey data, to inform the strategic routeing and subsequent design of the base scheme design and working methods. The final layout, construction design and working methods avoid or (where this is not possible) minimise effects on important ecological features, including designated wildlife sites, priority habitats and habitats associated with protected species.

3.2.2 A range of embedded mitigation measures will be implemented for the duration of the construction phase which will be delivered through the implementation of a Construction Environmental Management Plan (CEMP). The measures relating to ecological features and which ensure compliance with relevant wildlife legislation and good practice are discussed below.

Embedded Habitat Mitigation:

3.2.3 Hedgerow, scrub and tree loss will be minimised by marking out and micro-siting construction activities with the Ecological Clerk of Works (EcCoW) prior to works commencing.

Habitat Reinstatement

3.2.4 During the latter stages of construction, the majority of habitats will be reinstated in-situ to their former condition. This will be delivered by the CEMP.

3.2.5 Grassland replacement would generally match the use of land prior to construction. Appropriate seed mixes will be determined in consultation with the landowners to seek to replicate current conditions. Where non-statutory designated sites are affected, reinstatement will also be discussed and agreed with LWT.

3.2.6 Replacement hedgerow planting will follow the existing landscape pattern. Hedgerow planting would include five locally appropriate native species (40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose). The planting specifications for hedgerows are outlined in the reinstatement plans (ES-3-B.01, Chapter 11, Landscape & Visual Amenity). Livestock fencing would be provided to safeguard planted specimens as appropriate. Where 'Important' hedgerows are crossed, reinstatement planting will ensure that the species diversity of the hedgerow is maintained including the planting of additional species if required.

3.2.7 Where open-cut crossings of watercourses/drains are undertaken, they will be backfilled and the natural channel form reinstated. As only short sections of watercourses/ditches are affected, it is intended that the banks will be allowed to re-colonise naturally, in agreement with stakeholders. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting.

3.2.8 Replacement planting would take time to establish. This assessment is based on 1-3 years for grassland, 2-4 years for new aquatic vegetation, 3-5 years for hedgerows and 15 years for trees, depending on the species and age-class planted. It is recognised that this describes the time for the sward, whips or standards to establish but longer periods would be required to allow semi-mature trees or hedgerows (e.g. those over 3 m high) to develop i.e. over 5 years for tall hedgerows. These timeframes for planting to establish broadly correspond to the timescales and feasibility for creation/restoration as set out in the national offsetting guidance (Ref 10-29). Hedgerows are listed as of 'Low' technical difficulty to recreate or restore.

3.2.9 Vegetation growth at 15 years (against which residual effects are determined) assumes hedgerow planting has reached a height of 1.5 m, understorey shrub planting at 4-6 m and native tree planting 7-10 m (depending on maintenance).

3.2.10 Management will be provided over a 15 year period to ensure reinstatement planting takes place and habitats establish as intended.

Embedded Badger Mitigation

3.2.11 Surveys identified a large number of badger setts in the base scheme area and surrounding land. The works have been designed to avoid direct impacts on badger setts where possible; with the strategic routeing and subsequent design of the proposed DC cable route, access roads and compounds. Where the location of the proposed DC route couldn't be moved, pinching of the LoD at key locations in close proximity to setts was undertaken. Specific attention has been made to retention of main badger setts which are deemed to be the most important sett type for each local badger clan. Changes to the LoD have allowed the retention of the main sett (Sett 46), with no works encroaching within 30 m of the sett entrances.

3.3 Legal Compliance and Good Practice during Construction

3.3.1 A range of measures to ensure legal compliance will be implemented for the duration of the construction phase, which will be delivered through the implementation of a CEMP. The measures relating to ecological features and which ensure compliance with relevant wildlife legislation and good practice are discussed below.

Pollution Prevention

3.3.2 The CEMP will include measures to ensure that site run-off and potential pollution events will be prevented from entering the surrounding drainage network in line with Environment Agency pollution prevention guidance notes and a range of good practice working methods. This will be achieved through the use of bunds to catch and divert runoff, drip trays to prevent any oil and fuel spillages spreading and the avoidance of storage of any materials in close proximity. Windblown dust will be minimised by using wheel washing and damping down, while net fencing will catch windblown rubbish. To address the risk of singular accidental events, mitigation measures include provision of spill kits and emergency response procedures. These measures will be effective upon commencement of construction.

Tree Protection

3.3.3 Appropriate tree protection measures will be implemented where required when works are in close proximity to woodland, hedgerows and trees and will be included in an Arboricultural Method Statement appended to the CEMP. These measures will accord with current standards (BS5837:2012 Trees in relation to design, demolition and construction – Recommendations (Ref 10-30)). All tree and hedgerow works will comply with BS3998:2010 'Tree Work – Recommendations' (Ref 10-31). These measures will minimise incidental damage and disturbance to the habitats and the species they support.

3.3.4 To restrict spread of tree pathogens, all equipment and machinery and vehicles used for tree, hedge and shrub removal will be cleaned, disinfected and used in accordance with current Forestry Commission biosecurity guidance and the EcCOW will advise on whether each working area requires 'red' or 'amber' level biosecurity precautions.

3.3.5 These measures will be effective upon commencement of construction.

Reptile Legal Compliance

3.3.6 As there is the potential for reptiles to be present within some areas of the base scheme design, Reasonable Avoidance Measures (RAMs) will be implemented during site clearance works to ensure no killing or injury to individual reptiles. RAMs will be delivered through the production of a method statement appended to the CEMP and will comprise staged vegetation removal. Initial strimming of vegetation to 300 mm followed by a later second cut to 150 mm and with both cuts proceeding in one direction will allow not only reptiles, but also amphibians and small mammals, such as hedgehog, to vacate the affected area. The areas will be left for a period of 24 hrs after the first and second cuts, after each of which the EcCOW will undertake a hand search to confirm the absence of reptiles. Following the second cut and hand search, vegetation will be strimmed to ground level, at which point full site clearance and levelling will then be undertaken. Any animals found during hand searching will be removed to alternative suitable habitat by the EcCOW. Site clearance affecting suitable reptile hibernation features (identified by the EcCOW) will avoid the hibernation period (November to early March inclusive).

3.3.7 In order to prevent reptiles using subsoil and topsoil piles for refuge or hibernation, the surfaces of the piles will be tamped down and consolidated to ensure individuals cannot access them. In addition, stored materials which could be used for refuge or hibernation by reptiles will be stored off the ground on pallets to prevent their access.

3.3.8 As mentioned in the first paragraph of this section on reptile legal compliance, the measures put in place will also serve to prevent killing or injury to other fauna, in particular amphibians and hedgehogs. These RAMs can therefore provide a multiple function and be implemented for this wider range of fauna.

3.3.9 These measures will be effective upon commencement of construction.

GCN Legal Compliance

3.3.10 Traditional GCN and eDNA surveys identified two waterbodies within the base scheme design and surrounding land with confirmed GCN presence: Ditch 3 in Route Section 1, where a positive eDNA result was obtained but no GCN were recorded during traditional surveys and Ditch 83 in Route Section 4 where one GCN was recorded during torch surveys. These watercourses are not crossed by the proposed DC cable route but do link with others which are crossed. Records for GCN were returned within 1 km of the base scheme design for Route Section 3 and Route Section 4. Overall GCN are present at a very low density within the base scheme design.

3.3.11 Due to the temporary nature of the potential impacts on GCN, the predominance of low quality habitats along the proposed DC cable route and trenchless crossings of the majority of watercourses it is probable that the risks of killing or injury of GCN are low. RAMs will be implemented during site clearance works to ensure no killing or injury to individuals and will follow the same method as set out in the Reptile Legal Compliance section above. Similarly, methods stated in the Reptile Legal Compliance section with respect to covering of trenches and storage of topsoil and subsoil piles and other materials will also apply to GCN.

3.3.12 In addition, clearance of vegetation providing potential hibernation habitat within or adjacent to ditches (such as dense scrub or tall ruderal vegetation) will be carried out during the GCN breeding season (mid-April to June inclusive) when GCN are likely to be in waterbodies. These works would be undertaken using RAMs and an EcCOW will confirm the absence of amphibians prior to clearance.

3.3.13 Smaller excavations within the base scheme design will be covered overnight to prevent entrapment of any GCN. If any open excavations are left uncovered these will be inspected by the EcCOW at the start of each working day to ensure no individuals are present, and to remove any that are trapped to a safe location, before works commence.

3.3.14 Should dewatering be required prior to the installation of temporary culverts, rescue of GCN and other amphibians will be undertaken at the same time as fish rescue implementation (see Fish Legal Compliance) during dewatering. Filters will be placed on pumps to prevent entrapment of individuals. Any animals found during the rescue will be removed to alternative suitable habitat by the EcCOW.

3.3.15 These measures will be effective upon commencement of construction.

Reasonable Avoidance Measures for Amphibians other than GCN

3.3.16 The measures described above for reptile and GCN legal compliance above will also apply to all other amphibians.

3.3.17 These measures will be effective upon commencement of construction.

Bat Legal Compliance

3.3.18 As a precaution, prior to site clearance, pre-construction surveys (tree climbing inspections and if necessary nocturnal surveys at the appropriate time of year) of all trees requiring works and

identified to have moderate or high bat roost potential will be undertaken. This will be carried out in advance of works throughout the duration of the project, allowing sufficient time for NE licences to be secured should roosts be identified in trees that require felling. If any additional roosts are identified, the proposed works will be reviewed to see if any adjustments can be made (the licensing process requires consideration as to whether there are any satisfactory alternatives), or whether compensation via the provision of bat boxes will be required.

3.3.19 The need for construction phase lighting is minimal. However, where necessary, lighting will be directed away from trees, hedgerows, woodland and watercourses to avoid the possibility of deterring bat activity. Lighting will comprise trailer mounted masts with generator sets and will be directional.

3.3.20 Losses of bat important foraging and commuting habitat across the base scheme area are relatively small. Exceptions include hedge removal which may have a temporary fragmentation effect on bats. As detailed in the embedded habitat mitigation text, replacement hedgerow planting will be undertaken in the first planting season following completion of construction and general ground reinstatement. Fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species. Therefore, where hedgerow removal exceeds 10 m, temporary fencing will be installed during reinstatement to provide continuity of the feature until hedgerow planting is established (approximately 3 to 5 years).

Water Vole and Otter Legal Compliance

3.3.21 Evidence of water vole and otter activity was identified during site surveys on a number of watercourses/drains crossed by the base scheme design.

3.3.22 Water vole home ranges expand and contract within and between years and otter home ranges are very large and may use watercourses at a low levels (on passage) without obvious field signs and therefore their distribution may change before construction activities commence. Therefore a pre-commencement water vole and otter survey will be carried out (between mid-April and September) at all watercourses/drains to be crossed, to update the existing baseline. Surveys will be sufficiently advanced of works to allow any mitigation or licensing requirements to be implemented. If either species has colonised the site and avoidance of impacts is not possible, NE will be contacted to agree a way forward in line with guidance current at the time.

3.3.23 Where no water vole burrows are identified during the pre-commencement survey, vegetation control will be undertaken to dissuade water voles from colonising the working area prior to commencement. Vegetation within the ditch and on both banks will be strimmed to bare ground, to at least to the top of the bank, and where tall vegetation extends beyond this point, up to 5 m from the top of the bank. Within the ditch, strimming will extend 5 m up and downstream from the working area. Arisings will be removed from the cleared area and stored more than 5 m from the top of the ditch banks.

3.3.24 Vegetation within the working area will be regularly strimmed to ensure that water voles are dissuaded from colonising the working area.

3.3.25 Where water voles are identified within the watercourse, displacement methods will be implemented immediately prior to the proposed DC cable installation process to ensure water voles are moved out of the area. Discussion with NE will confirm whether these works could be conducted under a Low Impact Licence. The Water Vole Mitigation Handbook 2016 (Ref 10-13) considers that displacement and vegetation management is appropriate for distances of up to 50 m. This is because water voles show high fidelity to their territories and therefore only small areas sections of habitat are suitable for displacement. In order to be effective displacement methods must be implemented between late February and early April to ensure that animals are moved prior to young being born, after which moving animals using this method is unlikely to be effective.

3.3.26 Prior to any displacement being undertaken, an assessment of adjoining habitat will be undertaken by an ecologist in order to ensure the suitability of the adjacent habitat to support displaced water vole. This will include consideration of water quality, existing water vole population and presence of predatory species. If adjacent vegetation is not considered to be suitable, vegetation management will be required to create suitable conditions.

3.3.27 An ecologist will then mark the presence of all water vole burrows within the working area and 5 m in each direction along the watercourse.

3.3.28 The working area and buffer will then be strimmed to bare ground, with vegetation being cut to the top of the bank, or where longer vegetation is present, 5 m from the top of the bank. Arisings will be removed from the strimmed area. Immediately following vegetation strimming the marked burrows will be inspected by an ecologist to ensure that burrows have not been blocked during vegetation cutting. Daily monitoring of the burrows will be undertaken for, a minimum of three days, until such a time that no evidence of water vole presence has been identified.

3.3.29 Burrows will then be removed using destructive searching methods. Burrows will be excavated using hand tools, either by an ecologist or under the supervision of an ecologist. Any animals captured will be transferred to adjacent suitable habitats or allowed to disperse. Following burrow destruction, any remaining vegetation will be stripped using a machine, under the supervision of an ecologist. Any water voles disturbed during this process will be captured and moved to adjacent habitats. The cleared area will be monitored for 2-4 hours for any further animal movements. Any water voles identified during this period will be captured and transferred to suitable adjacent habitats.

3.3.30 Following completion of the destructive search, installation works should be undertaken as soon as possible, or where this is not possible, water voles will continue to be excluded from the area through regular repeat vegetation control, or through installation of water vole proof fencing, where conditions allow.

3.3.31 There is potential for water voles to be impacted during removal of culverts and bridges used for haul road crossings and therefore a repeat of the displacement methods will be undertaken for 5 m each side of the crossing prior to removal.

3.3.32 Any excavations adjacent to watercourses that cannot be boarded or fenced overnight will have ramps installed to allow any otter that may become trapped to escape.

3.3.33 These measures will be effective upon commencement of construction.

Badger Legal Compliance

3.3.34 Fifteen setts fall within either the proposed DC cable route, LoD, access roads, compounds or within the 30 m buffer of these areas. Construction activities in proximity to these setts will be carried out under a Natural England licence to ensure no detrimental impact on the local badger clans. This includes the closure of five setts (S146, S10, S56, S79 & S135) and supervision of works within a 10-30 m buffer of six setts (S64, S66, S87, S112, S144 & S145). Additional site supervision will be required associated with the temporary drainage works in proximity of two setts (S9 & S59).

3.3.35 Pre-construction surveys will be undertaken to determine the presence of any setts that may have been constructed and any changes in extent or level of use during the interim period since surveys were completed. If site conditions change and avoidance is not possible the NE licence will be updated to include these changes with appropriate mitigation applied.

3.3.36 The acceptable working distance from a badger sett is generally 30 m but is dependent on the type, method, timing, duration and frequency of the works in addition to the status of the sett; recommendations for each sett will therefore be assessed on a case-by-case basis. Destruction of a badger sett will only be undertaken as a last resort. In most cases the badger sett will be protected from disturbance and potential damage by an exclusion zone marked out in advance of construction works commencing.

3.3.37 On the basis of current evidence, no main sett will be permanently or temporarily lost as a result of the development and therefore no artificial sett construction is proposed. However, in the unlikely event that a replacement sett is required, the construction of an artificial sett would be completed six months prior to the start of works to close the existing main sett.

3.3.38 Current proposals indicate the need for closure of six setts and reasonable avoidance measures to include supervision during excavation in the 10-30 m zone at eight setts. Disturbance to a badger sett will only be permitted under licence from 1st July – 30th November inclusive to avoid the period when badgers are likely to be breeding (December to June) and therefore are more susceptible to disturbance.

3.3.39 To exclude badgers from the affected setts, badger gates will be installed over each entrance and the sett. An establishment period of up to 7 days during which the gates will permit exit and entry will allow badgers to acclimatise to the gates. If appropriate, wire mesh will be installed across the sett area in conjunction with the gates to prevent alternative entrances being dug. The gates will then be set to exclude badgers and the sett will be then subject to a 21 day exclusion period. If at any point during the 21 day exclusion period a breach is apparent, repairs to the exclusion measures will be made and the 21 day monitoring period re-initiated. Once it is confirmed no badgers are present within a sett, the sett will be carefully excavated under the supervision of the licence holder. Destruction will be undertaken with a JCB or similar, commencing at approximately 30 m from the outer sett entrances and working towards the centre of the setts, cutting 0.5 m slices in a trench to a depth of 2 m. This will be carried out in such as manner to ensure that top soil and sub soil are not mixed. Exposed tunnels will be checked for recent badger activity. The sett will be destroyed from several directions, in the above manner, until only the central core of the sett remains. Once it is ensured that no badgers remain, the core

will also be destroyed and the entire area back-filled and made safe. Sett excavations should be concluded within one working day, as badgers may re-enter exposed tunnels and entrances.

3.3.40 Trenches or excavations near badger setts will not be left open overnight and will either be boarded or fenced off at the end of each day or egress ramps will be provided.

3.3.41 Excavated soil will be stored in an area agreed with the EcCOW and will not obstruct existing badger paths or interfere with any active setts by preventing access or egress.

3.3.42 Two-way badger gates will be installed within the stock proof fencing used to demarcate the DC cable route at main badger path crossing points and at other suitable intervals, to allow movement of badgers across the landscape.

3.3.43 These measures will be effective upon commencement of construction.

Breeding Bird Legal Compliance

3.3.44 Any tree and scrub vegetation removal, or tall ruderal vegetation removal or any works affecting tall marginal vegetation of watercourses will take place outside the bird nesting season (avoiding the period March to August inclusive). Where these measures are not possible and works need to be carried out during the bird breeding season, all areas to be affected will be checked for evidence of nesting birds a maximum of 24 hrs prior to the vegetation removal/tree felling works taking place. If any active bird nests are discovered these will be given a minimum standoff of 5 m (this may increase depending on species/proposed works and location) where no potentially disturbing works would take place until the young have fledged and the nest vacated. A second nesting bird check will then be undertaken to ensure the tree/vegetation does not contain any further active nests prior to felling/removal works taking place.

3.3.45 Retained trees and scrub adjacent to working areas will be protected from encroaching traffic using fencing (BS5837:2012) (Ref 10-30), this will minimise disturbance to nesting birds in retained habitat.

3.3.46 Any works affecting previously undisturbed areas of open fields (including any storage of materials, clearance of vegetation, or groundworks) carried out during the breeding bird season (March to August inclusive) will require a nesting bird check immediately prior to the works to ensure that there are no ground nesting birds present in the affected area. If active bird nests are located, the nest will be marked and all potentially disturbing works within at least 20 m of the nest location would be stopped until the active nest had been vacated. Prior to works in the area commencing a further nesting bird survey will be required to establish that no active bird nests were present within the area.

3.3.47 Impacts on birds nesting opportunistically in working areas will be minimised through an ecologist checking any sections of bare ground of more than 0.5 ha for active bird nests if these areas have been left undisturbed (more than 50 m from an active working area) for more than 1 week during the breeding season. If nesting birds are found, measures appropriate to the species, location and proposed works will be implemented as advised by the ecologist to ensure nests are not destroyed or disturbed while active.

3.3.48 These measures will be effective upon commencement of construction.

Fish Legal Compliance

3.3.49 Where de-watering is undertaken at watercourse crossings e.g. for the installation of temporary culverts, dams either side of the de-watered working area (sandbags, piling or other material) will be carefully installed under supervision of the EcCOW to avoid killing or injury of any fish that might be present. Fish rescue (netting) will be carried out as deemed appropriate by the EcCOW, in the latter stages of de-watering during installation/removal of water crossings. The rescue will be undertaken by specialists who are accredited under the 'Performing Section 30 Fish Health Checks Accreditation Scheme' (to meet the requirements of the EA under Section 30 of the Salmon & Freshwater Fisheries Act 1975) (Ref 10-32), and all data collated and submitted to the EA. Fish will be released into the adjacent channel (up or downstream release to be determined by the EcCOW on a case by case basis depending on the connectivity of the watercourse/tributary and the time of year).

CEMP

3.3.50 The CEMP is the delivery document for all ecological mitigation; it describes measures applicable to all construction activities:

- pre-construction surveys will be carried out to ensure baseline data remains up to date;
- an appropriately qualified EcCOW will be appointed. The role of the EcCOW is set out in the CEMP and the appointed person(s) would be a member of the Chartered Institute of Ecology and Environmental Management or hold equivalent accreditation;
- there will be a demarcation of the working areas (including storage areas and accesses), using appropriate fencing, to protect retained habitats and features;
- traps or wildlife exclusion fencing will be installed (and maintained), as required by protected species licences;
- clearance of trees, hedges, grassland and other habitats will take place under supervision and at the appropriate time of year, as appropriate to the site/species in question; and
- there will be prompt reinstatement of habitats to their former condition, including any measures to enhance species diversity.

3.3.51 The CEMP will include:

- Procedures for designated sites affected by the Proposed Development;
- General Method Statements for habitat protection;
- Species-specific Method Statements, addressing protected and priority species; and
- Provisions for tree protection including felling, pruning, pollarding, replacement tree and hedgerow planting, and use of protective fencing and root protection zones in accordance with BS5837:2012 (Ref 23-30)); and
- The approach to post-construction monitoring relating to reinstatement and mitigation activity including triggers for and details of appropriate remedial action.

4 Planning Policy and Legislative Considerations

4.1 Introduction

4.1.1 This section sets out the legislative and policy framework within which sites, habitats and species which have been identified by government and conservation organisations as the key focus for biodiversity conservation in the UK and which therefore are the focus of ecological assessment with respect to proposed developments.

4.2 Legislation

4.2.1 The key legislation relating to ecology and development which helps define what ecological features require consideration are summarised as follows:

- Conservation of Habitats and Species Regulations 2010 (as amended) (Ref 10-33) – conveys protection to select species (European Protected species (EPS)) and to the habitats on which they rely to complete their lifecycle e.g. GCN, bats, otter.
- Wildlife & Countryside Act 1981 (as amended) (Ref 10-20) – provides a national level of protection to specific animals and plants and controls the release of non-native species e.g. water vole, common reptiles, all breeding birds.
- Countryside & Rights of Way Act 2000 (Ref 10-34) – extends the protection of certain species from reckless as well as intentional acts. Part III requires that government departments have regard for the conservation of biodiversity, something that is extended by the NERC Act 2006.
- Natural Environment and Rural Communities Act 2006 (NERC) (Ref 10-9) – requires planning authorities and statutory undertakers to consider impacts on "habitats and species of principal importance for the conservation of biodiversity". S41 lists habitats e.g. coastal and floodplain grazing marsh and species e.g. skylark of principal importance, which are to be considered, irrespective of whether they are covered by other legislation. The S41 list was originally taken forward under the UK BAP (first published 1994) (Ref 10-35) but is now prioritised under the Biodiversity 2020 Strategy (Ref 10-3636).
- Hedgerows Regulations 1997(Ref 10-10) – protection of 'important' hedgerows from being uprooted or destroyed. Importance is determined based on adjacent land use, age, historic value and ecological value (specific criteria are set out).
- Protection of Badgers Act 1992 (Ref 10-37) – protection of badgers and their setts from killing, injury and certain acts of cruelty. Protection of setts from damage, obstruction or destruction.

4.3 National Policy

4.3.1 With respect to national policy, the key guidance is provided by The National Planning Policy Framework (2012) (NPPF) (Ref 10-25) Chapter 11: Conserving and Enhancing the Natural Environment (paragraphs 109 – 125) identifies the importance the Government places on development enhancing the natural environment by protecting and enhancing valued landscapes, geological conservation interests and soils. It recognises the wider benefits of ecosystems beyond their inherent value to wildlife. The NPPF emphasises the hierarchy of designations, the mitigation hierarchy and the principle that new development should result in no net loss of biodiversity.

4.3.2 Other national policy which supports the NPPF include: Circular 06/2005: Biodiversity and Geological Conservation (Ref 10-38); Making Space for Nature (Ref 10-39); The Natural Environment White Paper (10-40) and Biodiversity 2020: A strategy for England's wildlife and ecosystem services (10-36).

4.3.3 The National Policy Statement for Energy (EN1) (Ref 10-41) states that energy infrastructure projects must consider the potential for effects on European sites under the Habitat Regulations and that their Environmental Statements (ES) clearly assess the effects of the project on all levels of designated site, on protected species and habitats and on habitats and species identified as being of principal importance for the conservation of biodiversity. It recognises that there are many opportunities for building beneficial biodiversity as part of good project design in and around developments. Appropriate mitigation must also be included in the ES which reduces or avoids impacts where possible and restores and enhances biodiversity where practicable.

4.3.4 The National Policy Statement for Electricity Networks Infrastructure (EN5) (Ref 10-42) refers back to the general principles relating to biodiversity presented in EN1.

4.4 Local Policy

4.4.1 Local planning policy of relevance to nature conservation generally seeks to avoid effects on designated sites and protected habitats and species, whilst also seeking to ensure maintenance and creation of wildlife networks and no net loss of biodiversity. Local policies of relevance to the proposed DC cable route and its effects are listed below with more detail provided in the Planning Statement (Document Reference VKL-08-39-G500-029).

<u>East Lindsey District Council</u>

- East Lindsey Local Plan Alteration 1999 (Saved Policies, September 2007) (Ref 10-43) (ELLP)
  - Policy ENV19 (Local Sites of Nature Conservation Importance)
  - Policy ENV20 (Protection of Habitats)
  - Policy ENV21 (River Corridors)
  - Policy ENV24 (Protection of Open Spaces and Frontages)
- East Lindsey Core Strategy (Submissions Modifications Draft, March 2017) (Ref 10-44) (ELCS)

- Strategic Policy 24 (SP24 Biodiversity and Geodiversity)
- Strategic Policy 25 (SP25 Green Infrastructure)
- Strategic Policy 27 (SP27 Renewable and Low Carbon Energy)

Boston Borough Council

- Boston Borough Local Plan, Adopted 1999 (Saved Policies, 2007) (Ref 10-45) (BBLP)
  - Policy R5 (Witham Way Footpath and Nature Reserve)
  - Policy G2 (Wildlife and Landscape Resources)
  - Policy G4 (Safeguarding the Water Environment)
- South East Lincolnshire Local Plan 2011-2036 (Publication Version, 2017) (Ref 10-46) (SELLP)
  - Policy 24 (The Natural Environment)
  - Policy 27 (Climate change and Renewable and Low Carbon Energy)

North Kesteven District Council

- Central Lincolnshire Local Plan (Adopted, April 2017) (Ref 10-47) (NKLP)
  - Policy LP20 (Green Infrastructure Network)
  - Policy LP14 (Managing Water Resources and Flood Risk)
  - Policy LP16 (Protecting the Water Environment)
  - Policy LP21 (Biodiversity and Geodiversity)

South Holland District Council

- South Holland Local Plan 2006 (Saved Policies, 2009) (Ref 10-48) (SHLP)
  - Policy E1NA (Development and Sites of Local Biodiversity Interest)

4.5 Action Plans and Other Guidance

4.5.1 Additional guidance on habitats and species to be considered within the ecological assessment is provided by:

- The Lincolnshire Biodiversity Action Plan (BAP) 2011-2020 (Ref 10-22) which is delivered through the Lincolnshire Biodiversity Partnership. This focuses on aspects of the local ecology which are in need of protection or conservation. The habitat action plans of general relevance to the proposed DC cable route include habitats within each of the overarching themes of farmland and grassland, rivers and wetlands and trees and woodland. Species action plans of relevance include those for bats, farmland birds, freshwater fish, newts, water vole, greater water parsnip and invasive non-native species (see Appendix 10.3 for full details).
- Black Sluice Internal Drainage Board (IDB) who are responsible for management of water levels and flood risk in the southern part of the proposed DC cable route also have their

own BAP (Ref 10-1) which includes the broad habitats and species listed above and also European eel, otter, barn owl and grass snake.

- Lindsey Marsh Drainage Board BAP manage water levels and flood risk in the north eastern parts of the proposed DC cable route and have their own BAP (Ref 10-5). This includes habitats such as coastal and floodplain grazing marsh, hedgerows, ponds and drains as well as European eel, barn owl, grass snake and black poplar.
- Witham Fourth District IDB are responsible for management of water levels and flood risk in the central areas of the proposed DC cable route. Their BAP (Ref 10-6) includes hedgerows, lowland calcareous grassland, ponds, reedbeds and drains as well as European eel, Witham orb mussel, otter, bees and bee and southern marsh orchids.
- The Birds of Conservation Concern (BoCC) report (Ref 10-22) splits UK birds into three categories of conservation importance – red, amber and green. Red is the highest conservation priority, and includes species that are globally threatened, or have experienced historical UK population decline, a severe decline in UK breeding population, or a severe contraction of UK breeding range. Amber is the next most critical group, followed by green.

5 Baseline Conditions

5.1 Introduction

5.1.1 In order to describe and subsequently assess the impacts of the proposed DC cable route, it has been split into four sections. These comprise:

- Route Section 1 Proposed Landfall to Well High Lane;
- Route Section 2 Well High Lane to A16 (Keal Road);
- Route Section 3 A16 (Keal Road) to River Witham; and
- Route Section 4 River Witham to the Proposed Converter Station.

5.1.2 The baseline for each section is described below.

5.2 Route Section 1 Proposed Landfall to Well High Lane

Designated Wildlife Sites and Notable Habitats

5.2.1 Two internationally designated sites are present within 10 km of Route Section 1 of the proposed DC cable route; the Humber Estuary SPA, Humber Estuary Ramsar site and Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC which are congruent with each other. To take into account potential effects on overwintering bird populations the search was extended to include The Wash SPA/Ramsar site and Gibraltar Point SPA/Ramsar site. These sites are taken forward for assessment at the International/European level.

5.2.2 There is one nationally designated site present within 2 km of Route Section 1 of the proposed DC cable route; Sea Bank Clay Pits SSSI. This site is taken forward for assessment at the National level.

5.2.3 These are illustrated in Figure 10.2 and summarised in Table 10.9 below, with full details provided in Appendix 10.3.

Table 10.9 Statutory Designated Sites (Route Section 1)

Name	Description	Location
Sea Bank Clay Pits SSSI	A composite site comprising a series of isolated flooded clay workings of varying size, depth and topography, which are important for birds, aquatic invertebrate fauna and aquatic plants.	281 m south and 234 m north of the proposed landfall

Table 10.9 Statutory Designated Sites (Route Section 1)		
Name	**Description**	**Location**
Humber Estuary SPA	The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1 % or more of the Great Britain populations of several wintering and breeding species listed in Annex I. The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1 % or more of the biogeographical populations of several regularly occurring migratory species (other than those listed in Annex I) and by over 20,000 waterbirds in the non-breeding season.	7.9 km north west of the proposed landfall
Humber Estuary Ramsar site	**Ramsar criterion 1:** The site includes many wetland habitats characteristic of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar criterion 3:** Supports a breeding colony of grey seals *Halichoerus grypus* and natterjack toad *Bufo calamita.* **Ramsar criterion 5:** Supports assemblages of international importance for overwintering waterfowl. **Ramsar criterion 6:** Species/populations of passage and overwintering birds occurring at levels of international importance. **Ramsar criterion 8:** Acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*.	7.9 km north west of the proposed landfall
Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC	Annex I Habitats (primary reason): · Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) · Fixed coastal dunes with herbaceous vegetation (grey dunes) · Dunes with *Hippophae rhamnoides* · Humid dune slacks Annex I Habitats (qualifying feature): · Embryonic shifting dunes	7.9 km north west of the proposed landfall

Table 10.9 Statutory Designated Sites (Route Section 1)		
Name	**Description**	**Location**
The Wash SPA	The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1 % or more of the Great Britain populations of several wintering and breeding species listed in Annex I. The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds in the non-breeding season.	13.5 km south east of the DC cable route at Frithville as its closest point
The Wash Ramsar site	**Ramsar criterion 1:** The Wash is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels. **Ramsar criterion 3:** Inter-relationship and therefore high productivity between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. **Ramsar criterion 5:** Supports assemblages of international importance for overwintering waterfowl. **Ramsar criterion 6:** Species/populations of passage and overwintering birds occurring at levels of international importance.	13.5 km south east of the DC cable route at Frithville as its closest point
Gibraltar Point SPA	The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1 % or more of the Great Britain populations of several wintering and breeding species listed in Annex I. The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of several regularly occurring migratory species (other than those listed in Annex I).	19 km south and south east of the base scheme design at Dalby as its closest point

Table 10.9 Statutory Designated Sites (Route Section 1)		
Name	**Description**	**Location**
Gibraltar Point Ramsar site	**Ramsar criterion 1:** The dune and saltmarsh habitats present on the site are representative of all the stages of colonisation and stabilisation. There is a fine example of freshwater marsh. **Ramsar criterion 2:** Supports an assemblage of red data book and vulnerable wetland invertebrate species. **Ramsar criterion 5:** Supports assemblages of international importance for overwintering waterfowl. **Ramsar criterion 6:** Species/populations of passage and overwintering birds occurring at levels of international importance.	19 km south and south east of the base scheme design at Dalby as its closest point

5.2.4 There are 14 non-statutory designated sites within 1 km of Route Section 1 of the base scheme design, these sites include Local Wildlife Sites (LWS), Sites of Nature Conservation Interest (SNCI), Roadside Nature Reserves (RNR) and Lincolnshire Wildlife Trust (LWT) reserves. These features are taken forward for assessment at the County level of importance.

5.2.5 Two sites, Sandilands Golf Course and Dunes LWS and Firsby to Louth Dismantled Railway LWS are crossed by the proposed DC cable working width.

5.2.6 A summary of these sites is provided in Table 10.10, and presented in Figure 10.2 with full citations provided in Appendix 10.3.

Table 10.10 Non-Statutory Designated Sites (Route Section1)		
Name	**Description**	**Distance (m)**
Firsby to Louth Dismantled Railway SNCI	Composite site comprising a mix of open grassland, cuttings, embankments, scrub and woodland, being approximately 10km in length in total.	Crossed by base scheme design
Sandilands Golf Course and Dunes LWS	Main habitat: Coarse or rank grassland, improved grassland, sand dune, scrub - scattered / dense. Additional habitat: Drain, neutral grassland - unimproved / semi-improved, scrub - scattered / dense	Crossed by base scheme design at the proposed landfall

Table 10.10 Non-Statutory Designated Sites (Route Section1)		
Name	**Description**	**Distance (m)**
Rigsby Wood LWS, LWT reserve and Ancient Woodland	Main habitat: Ancient woodland, native and non-native plantation on ancient woodland site Additional habitat: Unimproved neutral grassland, ditch, stream, pond Additional features: Veteran tree, coppiced trees, dry ditches, seasonally wet/damp areas, structural diversity	Abuts western boundary of base scheme design at closest point
Rigsby Road Verges LWS	Main habitat: Neutral grassland, calcareous grassland	12 m west of base scheme design
Rigsby RNR	Adjacent to Rigsby Road Verges LWS and designated for calcareous grassland, hedgerow and scrub	12 m west of base scheme design
Sandilands Pit LWT reserve	Component part of Sea Bank Clay Pits SSSI as described above	295 m north of the base scheme design at the proposed landfall
Huttoft Bank Pit LWT reserve	Component part of Sea Bank Clay Pits SSSI as described above	324 m south of the proposed landfall
Ailby Plantation SNCI	Deciduous oak *Quercus robur* and ash *Fraxinus excelsior* woodland	325 m south east of base scheme design
Mother and Greenfield Woods LWS	Main reason for selection: Semi-natural woodland Additional habitat: Pond Additional features: Veteran/pollarded trees, standing/fallen dead wood, seasonally wet/damp areas, deep ditches	598 m north of the base scheme design
Hornby/Mother Woods Ancient Woodland	Ancient woodland, otherwise undesignated	683 m north and 594 m north of base scheme design
Windmill Lake SNCI	No citation data available.	796 m south of the base scheme design
Swinn Wood LWS and Ancient Woodland	Main habitat: Semi-natural woodland Additional habitat: Damp grassland, pond Additional features: Seasonally wet/damp areas	943 m north west of the base scheme design

Table 10.10 Non-Statutory Designated Sites (Route Section1)		
Name	**Description**	**Distance (m)**
Swinn Wood RNR	Adjacent to Swinn Wood Road Verges LWS. No citation data available.	943 m north west of the base scheme design
Swinn Wood Road Verges LWS	Main habitat: Semi-improved neutral grassland Additional habitat: Calcareous grassland, damp grassland Additional features: Tussocky vegetation, abundant nectar sources, seasonally wet/damp areas, ditches	962 m north west of the base scheme design

5.2.7 Eight S41 habitats of principal importance were identified during the desktop study by GLNP within 1 km of the base scheme design: ancient replanted woodland, ancient and semi-natural woodland, coastal sand dunes, lowland calcareous grassland, lowland meadows, lowland mixed deciduous woodland, reedbeds and peat and clay exposures. All the woodland priority habitats identified abut the base scheme design and the coastal sand dune habitat, which coincides with Sandilands Golf Course and Dunes LWS, is crossed by the base scheme design.

5.2.8 Seven S41 habitats of principal importance, which generally coincide with GLNP data but have lower levels of confidence in their quality, are identified by the government portal 'Magic' within 1 km of the base scheme design; coastal and floodplain grazing marsh, coastal sand dunes, deciduous woodland, good quality semi-improved grassland, lowland calcareous grassland, no main habitat but additional habitats present and reedbed. Coastal and floodplain grazing marsh and good quality semi-improved grassland priority habitats are crossed by the base scheme design, while deciduous woodland abuts the base scheme design.

5.2.9 S41 habitats which coincide with a designated site that may be affected are included within the relevant assessment for that site. Those which do not coincide with a designated site but intersect with or abut the base scheme design have been described within the extended Phase 1 habitat survey (Appendix 10.4) and are taken forward for assessment within the Habitats and Flora section, where relevant.

Habitats and Flora

5.2.10 Records for twenty four species of protected or notable flora were collated from the desktop study within 1 km of Route Section 1 of the base scheme design. These includes the Schedule 8 (WCA 1981) (Ref 10-20) species bluebell *Hyacinthoides non-scripta.*

5.2.11 The base scheme design in Route Section 1 is dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. Full details of the habitat survey results are provided in Appendix 10.4 with supporting plans provided in Figure 10.4 and photographs of representative habitats shown in Figure 10.5. The habitats recorded within the survey area include:

- Arable (124.21 ha);
- Modified neutral grassland (see Glossary for definition) (0.93 ha);
- Improved grassland (0.61 ha);
- Semi-improved neutral grassland (5.41 ha);
- Amenity grassland (1.73 ha);
- Standing water (wet ditches) (1330.71 m);
- Running water (0.69 ha);
- Dry ditches (3569.38 m);
- Species-rich hedgerows (553.53 m);
- Species-poor hedgerows (3095.96 m);
- Broad-leaved trees (72 individual trees, located outside of woodlands);
- Broad-leaved plantation woodland (0.20 ha);
- Semi-natural broad-leaved woodland (0.002 ha);
- Dense and scattered scrub (0.03 ha);
- Dune scrub (0.27 ha);
- Tall ruderal herbs (0.08 ha);
- Buildings (0.01 ha);
- Hard standing (1.58 ha); and
- Not surveyed due to limited access (27.02 ha).

5.2.12 Habitats across Route Section 1 that could not surveyed by means of direct access (27.02 ha) equate to 16 % of the total area within the redline boundary for Route Section 1 of the proposed DC cable route.

5.2.13 In line with CIEEM EcIA guidance (Ref 10-24) detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. The majority of the habitats within this section fall into this category. Only those habitats taken forward as important ecological features are described in the following paragraphs. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition any impacts on fauna as a result of habitat loss, degradation or fragmentation within the base scheme design are described in the relevant faunal section.

Hedgerows

5.2.14 Hedgerows are present sporadically along the Route Section 1 separating areas of arable farmland. The majority of hedgerows are well established, unmanaged and mostly species-poor and dominated by hawthorn. Hedgerows identified as species rich usually comprised blackthorn, dog rose, ash and elder with hawthorn dominant.

5.2.15 All hedgerows along Route Section 1 consist of native woody species and qualify as S41 NERC (2006) (Ref 10-9) habitats of principal importance. They are also included as action plan habitats

in the Lincolnshire BAP (Ref 10-2) and Lindsey Marsh Drainage Board BAP (Ref 10-5). One hedgerow (H20) qualified as important with respect to the Hedgerow Regulations 1997 (Ref 10-10) wildlife and landscape criteria.

5.2.16 All hedgerows are likely to have a supporting function to protected species such as amphibians, birds and foraging bats.

5.2.17 Due to general rarity in the area, the hedgerow network along Route Section 1 is an important ecological feature at the Local level.

Woodland and Trees

5.2.18 Lincolnshire County Council's online mapping system indicates that no trees on or immediately adjacent to the base scheme design are subject to Tree Preservation Orders.

5.2.19 Due to the open nature of the arable landscape tree cover is sparse. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present along Route Section 1, which supported species including hawthorn and blackthorn *Prunus spinose*, English oak *Quercus robur,* dogwood *Cornus sanguinea,* ash *Fraxinus excelsior,* field maple *Acer campestre,* sycamore *Acer pseudoplatanus* and hazel *Corylus avellana*

5.2.20 No significant woodland ground flora species and no Schedule 8 (WCA 1981) (Ref 10-20) protected plant species such as bluebell *Hyacinthoides non-scripta* were identified within any of the woodlands.

5.2.21 Scattered broad-leaved trees are infrequent across Route Section 1. Based on lidar data 72 individual trees were identified in Route Section 1 of the proposed DC cable route.

5.2.22 Taken as a whole, and due to its rarity within the area, the woodland and tree stock is taken forward in this assessment as an important ecological feature at the Local level.

Watercourses

5.2.23 Several watercourses are crossed by Route Section 1. These watercourses vary from significant wet drains (Boy Grift Drain and Wold Grift Drain) to individual field ditches which have been recorded as both wet and dry across the base scheme design. None of the drains across the base scheme design were recorded to have a flow although significant drains are expected to have a very slow flow.

5.2.24 A large majority of the ditches were dredged and contained very few aquatic plant species. Where ditches were not dredged, the aquatic component of the wet ditches supported a variety of marginal and emergent plant species including reed sweet grass *Glyceria maxima,* fool's watercress *Apium nodiflorum,* greater reedmace *Typha latifolia,* common reed *Phragmites australis,* reed canary-grass *Phalaris arundinacea,* fool's watercress *Apium nodiflorum,* great willowherb *Epilobium hirsutum.* Floating and submerged species included water starwort *Callitriche sp*. and water-crowfoot species *Ranunculus sp.*

5.2.25 The banks of the ditches typically supported terrestrial plant species of coarse grassland such as false oat-grass *Arrhenatherum elatius,* cock's foot *Dactylis glomerata* and cow parsley *Anthriscus sylvestris*. Herb species encountered included nettle *Urtica dioica* and great willowherb *Epilobium*

hirsutum. Scrub species often encountered included hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus agg*..

5.2.26 The S41 NERC (2006) (Ref 10-9) river category includes all natural and near-natural running water habitats and as such the drains within base scheme design do not qualify as habitats of principal importance. However, these habitats do qualify as the Lincolnshire BAP (Ref 10-2) and Lindsey Marsh Drainage Board BAP (Ref 10-5) habitat Rivers, Canals and Drains.

5.2.27 Watercourses are carried forward in the assessment as important ecological features at the Local level.

Great Crested Newt and other Amphibians

5.2.28 Common frog *Rana temporaria*, common toad *Bufo bufo* and smooth newt *Lissotriton vulgaris* each returned nine records within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2).

5.2.29 Full details of the habitat assessments of waterbodies within an initial 1.25 km buffer zone around the base scheme design and the amphibian data obtained from further GCN surveys within a 250 m buffer zone around the base scheme design are provided at Appendix 10.6 and Figure 10.6 with photographs of representative amphibian habitats shown in Figure 10.7.

5.2.30 A total of 16 ponds were identified for HSI assessment and 41 ditches for DSI assessment within 250 m of the base scheme design within Route Section 1. Of these, five ponds and 20 ditches were subject to habitat suitability assessments. Table 10.11 summarises the findings of the suitability assessments and further surveys, where applicable, to determine presence and population size class. GCN were only confirmed present in Ditch 3. Confirmation of presence was by means of eDNA survey only. Traditional pond survey methods did not detect the presence of GCN. A 'small' GCN population is therefore assumed in Ditch 3.

Table 10.11 Summary of GCN survey results for waterbodies with suitable GCN habitat within Route Section 1

Pond/Ditch Ref.	Distance from the Base Scheme Design	HSI/DSI Score	Presence/ Absence Results	Population Size Class Results
Ditches				
3	0-50 m	5	Present (eDNA confirmation)	Small (assumed, no GCN recorded during traditional surveys)
4	0-50 m	3	n/a (no access)	n/a
13	0-50 m	3	n/a (dried out)	n/a
101	0-50 m	00	n/a (no access)	n/a
102	51-250 m	33	Absent	n/a
105	00-50 m	0	n/a (dried out)	n/a

Table 10.11 Summary of GCN survey results for waterbodies with suitable GCN habitat within Route Section 1				
Pond/Ditch Ref.	**Distance from the Base Scheme Design**	**HSI/DSI Score**	**Presence/ Absence Results**	**Population Size Class Results**
106	0-50 m	3	Absent	n/a
110	0-50 m	5	n/a (no access)	n/a
130	51-250 m	5	Absent	n/a
143	0-50 m	5	Absent	n/a
158	0-50 m	5	Absent	n/a
186	0-50 m	1	Absent	n/a
191	0-50 m	1	Absent	n/a
Ponds				
202	51-250 m	0.72	Absent	n/a

5.2.31 Due to the limited number of amphibians recorded within Route Section 1 and the wider county and the limited amount of good quality aquatic habitat, the GCN population present within Ditch 3 and its interconnected habitats will be taken forward as an important ecological feature within the Local context.

Bats

5.2.32 Records of bats returned within 1 km of Route Section 1 of the base scheme design include brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus,* Daubenton's bat *Myotis daubentonii*, Nathusius' pipistrelle *Pipistrellus nathusii,* Natterer's bat *Myotis nattereri,* noctule bat *Nyctalus noctula,* soprano pipistrelle *Pipistrellus pygmaeus* and Brandt's bat *brandtii* (Appendix 10.3 and Figure 10.2).

5.2.33 Full details of the bat survey results are provided at Appendix 10.7 with trees showing bat roost potential identified in Figure 10.4 and activity surveys presented in Figures 10.8 – 10.9.

Roost surveys

Ground Based Assessment

5.2.34 The wider landscape within Route Section 1 of the proposed DC cable route is dominated by open, arable habitat and is intensively farmed, providing sub-optimal habitat for foraging bats. Hedgerows, ditches, dykes and drains within the wider landscape provide good foraging and commuting habitat. Buildings and trees with the wider area provide potential habitat for roosting bats, although these are generally lacking in this section. No buildings or built structures will be affected or influenced by the base scheme design.

5.2.35 Low numbers of individual trees and some small areas of plantation woodland areas occur within Route Section 1. Of these, only one tree with bat roost suitability was recorded within the base

scheme design. This is an oak tree (T10) with low bat roost suitability. The tree possesses a snag and this forms the only potential roost feature (PRF) on the tree. In line with current survey guidance, being of low roost suitability no further survey of T10 was required.

Activity Surveys

5.2.36 One transect route (Figure 10.8) was completed across Route Section 1; the transect route passes through arable land with a variety of large drains and smaller field ditches.

5.2.37 Bat activity was concentrated around a large drain and dyke and included a good number of contacts from common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle and big bat species, suggesting that these features provide key bat foraging and commuting habitat within the area.

5.2.38 One remote static bat detector was deployed along the transect route by a dyke. The static detector survey recorded contacts by pipistrelle bat species. Across a period of six consecutive nights in May 2017, an average of 57.9 bat passes were recorded by pipistrelle species per night, the majority of which were common pipistrelle and soprano pipistrelle, although a small number of Nathusius' pipistrelle were also present.

5.2.39 During a repeat deployment in summer (June/July 2017), the static detector only recorded pipistrelle contacts. Pipistrelle species activity levels were relatively high (193.8ppn). The majority of the pipistrelle activity was by common pipistrelle with occasional soprano pipistrelle.

5.2.40 The activity and static surveys indicate that the site is used by moderate numbers of at least four species of bat for foraging and dispersal. The majority of activity recorded was common pipistrelle and soprano pipistrelle. In light of this and following the categorisation process of Wray et al. (Ref 10-49), their protected status and inclusion as a Lincolnshire BAP priority group, bats are taken forward as an important ecological feature within the Local context.

Water Vole

5.2.41 Water voles are commonly recorded within the 1km buffer around the Route Section 1 of the base scheme design. 160 records were returned from within the 1 km buffer during the desktop study (Appendix 10.3 and Figure 10.2).

5.2.42 Full details of the water vole survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.2.43 Evidence of water vole activity was recorded at a total of nine locations along Route Section 1. This included a number of burrows, pathways and feeding remains.

5.2.44 Based on the results of the surveys, numerous records within the base scheme design and their protected status and inclusion as a Lincolnshire BAP priority species, water vole is taken forward as an important ecological feature within the Local context.

Otter

5.2.45 Seven records were returned for otter from within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2). These records originate from Boy Grift Drain and Huttoft Bank Pit LWS near the proposed landfall.

5.2.46 Full details of the otter survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.2.47 Evidence of otter was recorded at five locations along the Route Section 1.

5.2.48 Based on the results of the surveys, records within the base scheme design and their protected status, otter is taken forward as an important ecological feature within the Local context.

Badger

5.2.49 Twenty five records of badger were returned by the desktop study from within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Confidential Figure 10.3).

5.2.50 Full details of the badger survey results are provided in Confidential Appendix 10.9 and Confidential Figure 10.12. The summary below does not discuss explicit locations for the same reasons of badger welfare.

5.2.51 Four badger setts were identified within 30 m of the LoD associated with the proposed DC cable route within Route Section 1. None of these setts were considered to function as a main sett. All four setts showed some evidence of being currently active and all were located on bank sides and/or bank tops bordering arable fields..

5.2.52 The rural habitats across Route Section 1 and the wider area provide a large resource of high quality habitats suitable for use by badgers. Cover is generally limited with few hedgerows/scrub present across Route Section 1. As well as the setts being located in relatively open habitats, foraging routes, latrines and diggings were also generally found in the open, associated within the grassy field margins of the larger arable fields.

5.2.53 The network of ditches through the arable landscape provides dispersal routes and well-used paths are common in areas nearby to all active setts. It is considered that the deep ditches within the study area act as obstacles to badger movements. Badger paths were often clearly identifiable running alongside ditches with crossing points determined by bridges, culverts or shallower parts of the ditches. Dispersal routes are therefore likely to be well-used with movement restricted to suitable crossing points.

5.2.54 Badgers are known to be widespread both throughout the local area and across the UK. For the purposes of this assessment the badger population present within and adjacent to Route Section 1 is taken forward as a Locally important ecological feature.

Winter Birds

5.2.55 Sixty one records of winter bird species were returned within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2). Records of winter birds include Schedule 1 (WCA, 1981) (Ref 10-20) species brambling *Fringilla montifringilla*, black-tailed godwit *Limosa*

limosa, black-throated diver *Gavia arctica,* common scoter *Melanitta nigra,* fieldfare *Turdus pilaris*, hen harrier *Circus cyaneusm,* redwing *Turdus iliacus*, ruff *Calidris pugnax*, snow bunting *Plectrophenax nivalis,* scaup *Aythya maril* and whimbrel *Numenius phaeopus.*.

5.2.56 The sightings were predominately recorded from Huttoft Bank Pit and Sandilands Pit. The largest peak counts recorded were for common scoter*,* eider *Somateria mollisima,* knot *Caldris canutus,* whimbrel *and* wigeon *Anas penelope.*

5.2.57 Full details of the winter bird survey results are provided in Appendix 10.10 and Figures 10.13 – 10.14.

5.2.58 Generally low numbers of waders and wildfowl were recorded within 500 m of the base scheme design throughout the two years of winter bird surveys undertaken. The most abundant species recorded were wigeon and teal *Anas crecca*, with the largest number of any species recorded on any one occasion being 705 wigeon (visit 6, 2015/16). Wigeon are a qualifying feature of The Wash SPA.

5.2.59 Six hundred and sixty of the wigeon recorded within the peak count of wigeon were recorded on the Boy Grift Drain immediately adjacent to the base scheme design at the proposed landfall. Although this large number was recorded on one occasion, only 15 other wigeon were recorded in this location during the two winter seasons surveyed. The next largest group of wigeon recorded in Route Section 1 within 500 m of the base scheme design was 191 individuals, with the majority of other records much lower than this. These birds were almost all recorded at Huttoft Bank Pit LWT reserve, located 324 m south of the base scheme design.

5.2.60 Other species which are qualifying features of either The Wash SPA/Ramsar or the Humber Estuary SPA/Ramsar recorded during the winter bird surveys in this section included Bewick's swan (peak count: 5), whooper swan (peak count: 37), pink-footed goose (peak count: 2), gadwall (peak count: 5), pintail (peak count: 1), oystercatcher (peak count: 3), sanderling (peak count: 40), dunlin (peak count: 1), redshank (peak count: 2), ringed plover (peak count: 1) marsh harrier (peak count: 1) and golden plover (peak count: 88). The majority of these species were associated with Huttoft Bank Pit LWT reserve and the surrounding land, with wader species including ringed plover and sanderling within the intertidal area on the shoreline. Common scoter (peak count: 200) and red-throated diver (peak count: 1) were also recorded during the landfall winter bird survey, however these species were only recorded very occasionally and always more than 250 m from the proposed landfall location.

5.2.61 Although moderate numbers of golden plover were recorded on one occasion, apart from this count of 88 individuals, only three other golden plover were recorded in this area during the two seasons surveyed.

5.2.62 The only wader, wildfowl or raptor species recorded within the base scheme design was wigeon, with a total of 95 individuals recorded in this area on one occasion (2015/16 visit 8).

5.2.63 A total of four BoCC (Ref 10-22) and/or S41 (Ref 10-20) species were recorded within 500 m of the base scheme design during the two winter seasons surveyed. These species included black-headed gull, common gull, reed bunting and skylark. Only low numbers of each species were recorded.

5.2.64 Within the LoD, the only BoCC (Ref 10-22) and/or S41 (Ref 10-20) species recorded was black-headed gull, with a peak count of 38 individuals.

5.2.65 Due to the presence of regular usage of the survey area by small flocks of waders and wildfowl and very occasional moderate flocks of wildfowl potentially associated with The Wash SPA, the winter bird assemblage is taken forward as an important ecological feature within the Local context.

Breeding Birds

5.2.66 Twenty records of breeding bird species were returned within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2). The largest peak counts recorded are for sandwich tern *Sterna sandvicensis and* black-headed gull *Chroicocephalus ridibundus.* Schedule 1 (WCA, 1981) species recorded include hobby *Falco subbuteo,* little ringed plover *Charadrius dubius* and marsh harrier *circus aeruginosus,* barn owl *Tyto* alba, bittern *Botaurus stellaris*, peregrine *Falco peregrinus* and goshawk *Accipiter gentilis.* S41 species include lapwing *Vanellus vanellus*.

5.2.67 Full details of the BBS results are provided in Appendix 10.11 and Figures 10.15 – 10.17.

5.2.68 During the 2017 breeding bird survey a total of 57 bird species were recorded within Route Section 1. Twenty one priority bird species were recorded within Route Section 1, including 2 Schedule 1 (WCA, 1981) (Ref 10-20) species, 7 S41 species, 6 red listed BoCC (Ref 10-22) species and 13 amber listed BoCC species.

5.2.69 82 % of Route Section 1 was covered by the 2017 breeding bird survey, with the areas with greatest suitability for breeding birds targeted. It is therefore not necessary to apply a multiplication factor for this section to determine the number of pairs within the entire of Route Section 1.

5.2.70 Species determined to be probably breeding within the LoD of Route Section 1 include dunnock, grey partridge, house sparrow, linnet, reed bunting, skylark, song thrush, tree sparrow, yellowhammer and yellow wagtail.

5.2.71 Grey partridge, house sparrow, song thrush and tree sparrow were only recorded very occasionally within the LoD, with only a single pair of each of these species likely to breed within the LoD.

5.2.72 Two pairs of yellow wagtail were recorded to likely breed within the LoD in Route Section 1, however this ground nesting species was only recorded within one of the transects at the eastern edge of the route.

5.2.73 Dunnock was present in scrub throughout Route Section 1, with 10 pairs likely to nest within the LoD in the surveyed sections.

5.2.74 Reed bunting was recorded as likely to breed within vegetation within drains and ditches across Route Section 1, with 8 pairs likely to nest within wetland vegetation within the LoD in the surveyed sections.

5.2.75 Linnet was occasionally recorded, with two pairs likely to nest within scrub within the LoD in the surveyed sections.

5.2.76 Skylark was recorded in open arable fields throughout Route Section 1, with an estimated 17 pairs of skylark breeding within the LoD.

5.2.77 Yellowhammer was present throughout Route Section 1, with 7 pairs likely to nest within scrub within the LoD in the surveyed sections.

5.2.78 Due to the presence of a range of breeding priority bird species, breeding birds are taken forward for assessment at the Local level of importance.

Reptiles

5.2.79 Three records of grass snake *Natrix natrix* and one record of slow worm *Anguis fragilis* were returned from the desktop study within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2).

5.2.80 No reptiles were recorded incidentally during other surveys in Route Section 1. The dominant intensive agriculture of the area provides little opportunity for suitable habitats for reptiles. However, unmanaged field margins and the ditch and drain network do provide some suitable foraging and commuting habitats, although opportunities for hibernation and breeding are considered to be minimal. However, this habitat is limited in extent and any reptiles that are present are likely to be at low densities.

5.2.81 Due to the potential for their presence, their protected status and the inclusion of grass snake as a priority species in the Lindsey Marsh Drainage Board BAP (Ref 10-5), reptiles are taken forward for assessment at the Local level of importance.

Other Fauna

5.2.82 A number of other records were returned from the desktop study within 1 km of Route Section 1 of the base scheme design (Appendix 10.3 and Figure 10.2) which include the following S41 species; brown hare *Lepus europaeus,* Eurasian red squirrel *Sciurus vulgaris*, European eel *Anguilla anguilla* (also an Annex 1 species) (from within the base scheme design), small heath *Coenonympha pamphilus*,, wall *Lasiommata megera,* white admiral *Limenitis camilla,* blood-vein *Timandra comae,* cinnabar *Tyria jacobaeae and* shaded broad-bar *Scotopteryx chenopodiata.*

5.2.83 Incidental records of brown hare were recorded during other ecological surveys. The extensive arable nature of the area, interspersed with drains and unmanaged field margins provide ample suitable habitat for this species. Due to the presence of brown hare within 1 km of the base scheme design and the vulnerability of their young (leverets) to disturbance, this species is taken forward for assessment as an important ecological feature at the Local level.

5.2.84 Since European eel has been recorded from within the base scheme design, it is reasonable to assume that this species is likely to be present within the drainage network and will therefore be taken forward as an important ecological feature at the Local level.

5.2.85 The records for red squirrel come from over 500 m from the base scheme design. As no woodland will be significantly affected and due to the distance of this record from the base scheme design, red squirrel are not taken forward for assessment. Several butterfly and moth species have been recorded in Route Section 1, however the majority of habitats in this Route

Section are of low diversity, being predominantly intensive arable fields and therefore will not support diverse assemblages of invertebrates. For this reason, invertebrates are not taken forward for assessment.

Summary of Important Ecological Features

5.2.86 Table 10.12 provides a summary of the designated sites, habitats and fauna that have been identified as important ecological features in Route Section 1, which have the potential to be impacted by the base scheme design.

Table 10.12 Summary of Important Ecological Features in Route Section 1

Ecological Feature	Policy/Legislation	Ecological Value	Description
Humber Estuary SPA/Ramsar site	Conservation of Habitats and Species Regulations 2010 Ramsar Convention ELCS Policy 24	International and European	7.9 km north west of the proposed landfall
Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC	Conservation of Habitats and Species Regulations 2010 ELCS Policy 24	European	7.9 km north west of the proposed landfall
The Wash SPA/ Ramsar site	Conservation of Habitats and Species Regulations 2010 Ramsar Convention ELCS Policy 24	International and European	13.5 km south east of the DC cable route at Frithville as its closest point
Gibraltar Point SPA/Ramsar site	Conservation of Habitats and Species Regulations 2010 Ramsar Convention ELCS Policy 24	International and European	19 km south and south east of the base scheme design at Dalby as its closest point
Sea Bank Clay Pits SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	Composite site, 281 m south and 234 m north of the proposed landfall
Ailby Plantation SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	325 m south east of base scheme design

Table 10.12 Summary of Important Ecological Features in Route Section 1			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Firsby to Louth Dismantled Railway SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Crossed by base scheme design
Hornby/Mother Woods Ancient Woodland	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	683 m north and 594 m north of base scheme design
Huttoft Bank Pit LWT reserve	The Town and Country Planning Act 1990 ELCS Policy 24	County	324 m south of the proposed landfall
Mother and Greenfield Woods LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	598 m north of the base scheme design
Rigsby Road Verges LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	12 m west of base scheme design
Rigsby RNR	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	12 m west of base scheme design
Rigsby Wood LWS, LWT reserve and Ancient Woodland	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Abuts western boundary of base scheme design
Sandilands Golf Course and Dunes LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Crossed by base scheme design at the proposed landfall
Sandilands Pit LWT reserve	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	295 m north of the base scheme design at the proposed landfall

Table 10.12 Summary of Important Ecological Features in Route Section 1			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Swinn Wood LWS and Ancient Woodland	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	943 m north west of the base scheme design
Swinn Wood Road Verges LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	962 north west of the base scheme design
Swinn Wood RNR	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	943 m north west of the base scheme design
Windmill Lake SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	796 m south of the base scheme design
Hedgerows	Hedgerow Regulations 1997 British Standard 5837: 2012 Trees in relation to construction S41 NERC 2006 ELLP Policy 20 Lincolnshire BAP Lindsey Marsh Drainage Board BAP	Local	The majority of hedgerows within Route Section 1 are species-poor and dominated by hawthorn. One hedgerow qualified as Important under the Hedgerow Regulations
Woodland and Trees	ELLP Policy 20 British Standard 5837: 2012 Trees in relation to construction Lincolnshire BAP	Local	There are small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland and 72 trees/shrubs within Route Section 1 that represent a locally valuable woodland habitat resource
Watercourses	ELLP Policy 20 ELLP Policy 21 Lincolnshire BAP Lindsey Marsh Drainage Board BAP	Local	Boy Grift Drain and Wold Grift Drain, both significant watercourses, are present within Route Section 1 as well as several field ditches

Table 10.12 Summary of Important Ecological Features in Route Section 1			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
GCN and other amphibians	Annex 2 and 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) (9(5) only) for all except GCN S41 NERC Act 2006 ELCS Policy 24	Local	Small population of GCN in ditch D3 and records of common frog, common toad and smooth newt
Bats	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 (some) ELCS Policy 24 Lincolnshire BAP	Local	One tree with low bat potential located within base scheme design. Moderate activity by at least four species, mainly common pipistrelle and soprano pipistrelle associated with the drain network.
Water vole	Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP	Local	Water vole recorded at nine locations along Route Section 1
Otter	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24	Local	Otter recorded at five locations along Route Section 1
Badger	Protection of Badgers Act 1992 ELCS Policy 24	Local	One subsidiary sett and two outlier setts associated with the proposed DC cable route.

Table 10.12 Summary of Important Ecological Features in Route Section 1			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Wintering birds	S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP (Farmland birds)	Local	Generally low numbers of waders and wildfowl within 500m of base scheme design. Moderate flocks of waterfowl recorded on Boy Grift Drain.
Breeding birds	Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP (Farmland birds) Lindsey Marsh Drainage Board BAP (barn owl)	Local	Low numbers of breeding dunnock, grey partridge, house sparrow, linnet, skylark, song thrush, tree sparrow, yellowhammer and yellow wagtail.
Reptiles	Schedule 5 Wildlife & Countryside Act (1981) (9(1) part, 9(5)) S41 NERC Act 2006 ELCS Policy 24 Lindsey Marsh Drainage Board BAP	Local	Records of grass snake in the area. Limited suitable habitat along unmanaged field margins and the ditch and drain network. Likely to be present in low densities.
Brown hare	S41 NERC Act 2006 ELCS Policy 24	Local	Records of brown hare and sightings during ecological surveys.
European eel	S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP Lindsey Marsh Drainage Board BAP	Local	Records of European eel within 1 km of Route Section 1. Likely to be present in the larger drains.

5.3 Route Section 2 Well High Lane to A16 (Keal Road)

Designated Wildlife Sites and Notable Habitats

5.3.1 No internationally designated sites are present within 10 km of Route Section 2 of the base scheme design.

5.3.2 There are two nationally designated sites present within 2 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2). Of these, Mavis Enderby Valley SSSI, is the closest, being approximately 63 m west of the base scheme design at its closest point. Following scoping of SSSIs requested to be included by NE, two additional SSSIs from beyond the 2 km

buffer are included in the baseline description due to their potential hydrological links with land crossed by the base scheme design. These are Calceby Marsh SSSI and Swaby Valley SSSI.

5.3.3 A summary of these sites is provided in Table 10.13, with full citations provided in Appendix 10.3.

Table 10.13 Nationally Designated Sites (Route Section 2)

Name	Designation	Distance (m)
Mavis Enderby Valley SSSI	The steep valley sides support species-rich unimproved grassland, while the poorly-draining valley floor has developed as a marsh. In the north, is a series of alder carrs each with a different species composition. The valley is valuable for a variety of fauna, especially for breeding birds, due to the close juxtaposition of these habitats.	63 m west of the base scheme design
Jenkins Carr SSSI	A species rich example of alder carr, a habitat now rare in the area, with stream and swamp communities of regional importance	972 m east of the base scheme design
Calceby Marsh SSSI	Calceby Marsh is of national importance as an outstanding example of a base-rich marsh. This habitat type typically follows the distribution of calcareous springlines and streams, in this case Calceby Beck, a Lincolnshire Wolds chalk stream. Such areas of base-rich marsh are becoming increasingly scarce in the county, as elsewhere in England, through the effects of drainage and other agricultural improvements	2.6 km north west of the base scheme design
Swaby Valley SSSI	This glacial overflow valley supports two habitats now scarce in Lincolnshire - floristically diverse, lime-rich marsh and unimproved chalk turf. The marsh borders a stream bisecting the valley floor and the interest of the grassland is increased by the terraced nature of the slopes.	3.4 km north west of the base scheme design

5.3.4 There are 20 non-statutory designated sites within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2). The base scheme design crosses the A16 Road Verge, Dalby Bar LWS, East Keal Clay Pit LWS, Hocker Holt LWS and Wheeleabout Wood SNCI. It abuts Callow Carr LWS and ancient woodland, Manor Farm, Mavis Enderby LWS and Silver Pits, Ulceby SNCI.

5.3.5 A summary of these sites is provided in Table 10.14, with full citations provided in Appendix 10.3.

Table 10.14 Non-Statutory Designated Sites (Route Section 2)		
Name	**Description**	**Distance (m)**
East Keal Clay Pit LWS	Main habitat: acid grassland Additional habitat: scrub, neutral grassland, damp grassland/marsh, standing water Additional features: tussocky vegetation, structural diversity, anthills, bare ground, rock outcrops, steep slopes, seasonally wet/damp areas, earthworks/hummocky ground	Crossed by base scheme design
Hocker Holt LWS	Main habitat: wet woodland Additional habitat: semi-natural woodland, running water, springs Additional features: standing/fallen dead wood, steep slopes, damp areas.	Crossed by base scheme design
Wheelabout Wood SNCI	Main habitat: woodland Additional habitat: tall herb, marsh Additional features: ponds	Crossed by base scheme design
A16 Road Verge, Dalby Bar LWS	Main habitat: calcareous grassland	Within base scheme design on opposite side of the A16 to access track entrance
Callow Carr LWS and ancient woodland	Main habitat: Woodland	Abuts western boundary of base scheme design
Manor Farm, Mavis Enderby LWS	Main habitat: neutral grassland, coarse grassland Additional habitat: semi-natural woodland, wet woodland, acid grassland, scrub, drain/ditch/stream, flush, pond, lake, marsh, bracken Additional features: veteran trees, standing/fallen dead wood, scattered non-planted trees, planted specimen trees, Abundant nectar sources, tussocky vegetation, areas with prolonged flooding, bare ground, rock outcrops, seasonally damp areas, steep slopes, ROW, educational potential	Abuts western boundary of base scheme design
Silver Pits, Ulceby SNCI	Main habitat: woodland	Abuts southern boundary of base scheme design
Bluestone Heath Copse SNCI	Main habitat: woodland	2 m north of base scheme design

Table 10.14 Non-Statutory Designated Sites (Route Section 2)		
Name	**Description**	**Distance (m)**
Langton Sheepwalks LWS	Main habitat: neutral grassland, calcareous grassland, marsh	25 m west of base scheme design
Harrington Top Road Verge LWS	Main habitat: calcareous grassland	86 m west of the base scheme design
Smith's Wood SNCI	No citation available	115 m west of base scheme design
Keal Carr LWS	Main habitat: coarse or rank grassland Additional habitat: wet woodland, scrub, unimproved acid grassland, flush Additional features: planted specimen trees, patchy hedgerows, seasonally wet/damp areas	273 m east of base scheme design
Winceby Beck (Hagworthingham to Windsor Farm) LWS	No citation available	289 m west of base scheme design
Harrington Chalk Bank LWS	Main habitat: neutral grassland, calcareous grassland	297 m west of the base scheme design
River Lymn, Skendleby Tributary North SNCI	Habitat description: river, aquatic flora, pasture and wood.	432 m east of base scheme design
Well Vale Estate SNCI	Main habitat: woodland, parkland/grassland	652 m east of base scheme design
Southfield Farm Grassland LWS	Main habitat: Neutral grassland Additional habitat: damp grassland/marsh Additional features: standing/fallen dead wood, tussocky vegetation, structural diversity, bare ground, rock outcrops, south-facing slopes, seasonally wet/damp areas, earthworks/hummocky ground, species-poor hedgerows	686 m west of base scheme design
Church Carr SNCI	No citation available	689 m west of the base scheme design
Dexthorpe Plantation SNCI	No citation information available	785 m east of the base scheme design
Keal Carr South LWS	Main habitat: coarse or rank grassland Additional habitat: wet woodland, scrub, unimproved acid grassland, flush Additional features: planted specimen trees, patchy hedgerows, seasonally wet/damp areas	878 m east of base scheme design

5.3.6 Nine S41 habitats of principal importance were identified by GLNP during the desktop study within 1 km of the base scheme design: ancient replanted woodland; ancient and semi-natural woodland; lowland calcareous grassland; lowland dry acid grassland; lowland fens; lowland meadows; lowland mixed deciduous woodland; ponds; wet woodland; and traditional orchard, which generally coincide with the various designated sites described above. Woodland habitats and lowland calcareous grassland, lowland acid grassland and lowland meadows intersect with or abut the base scheme design.

5.3.7 Six S41 habitats of principal importance, which generally coincide with GLNP data but have lower levels of confidence in their quality, were identified on the governmental portal Magic within 1 km of the base scheme design: deciduous woodland; good quality semi-improved grassland; lowland calcareous grassland; lowland meadows; no main habitat but additional habitats present; and traditional orchard. Deciduous woodland is intersected by and abuts the base scheme design in several locations.

5.3.8 S41 habitats which coincide with a designated site that may be affected are included within the relevant assessment. Those which do not coincide with a designated site but intersect with or abut the base scheme design have been described within the extended Phase 1 habitat survey (Appendix 10.4) and are taken forward for assessment within the Habitats and Flora section where relevant.

Habitats and Flora

5.3.9 A record for cornflower *Centaurea cyanus* (S41 species) was return during the desktop study from within the base scheme design. Twenty nine records of protected or notable flora were returned within 1 km of Route Section 1 of the base scheme design. These include Schedule 8 WCA (1981) (Ref 10-20) species bluebell and S41 NERC (2006) (Ref 10-9) species great water-parsnip *Sium latifolium* (Appendix 10.3 and Figure 10.2).

5.3.10 The base scheme design in Route Section 2, although still predominantly intensively managed arable farmland, differs from the other sections in having more undulating topography, smaller field sizes and a greater number of hedgerows and woodland blocks. The habitats recorded within the survey area include:

- Arable (148.70 ha);
- Modified neutral grassland (0.0002ha);
- Improved grassland (1.74 ha);
- Semi-improved neutral grassland (6.03 ha);
- Standing water (wet ditches) (88.69m);
- Dry ditches (99.51m);
- Species-rich hedgerows (341.72 m)
- Species-poor hedgerows (2,655.05 m);
- Broad-leaved trees (1036 individual trees, located outside of woodlands);
- Broad-leaved plantation woodland (0.47 ha);

- Semi-natural broad-leaved woodland (0.002 ha);
- Coniferous plantation woodland (0.007 ha);
- Scattered scrub (accurate measure not possible);
- Bare ground and (0.13 ha);
- Hard standing (1.59 ha); and
- Not surveyed (111.04 ha).

5.3.11 Habitats that could not be surveyed across the Route Section 2 (111.04 ha) equate to 41 % of the total area within the base scheme design for Route Section 2 of the proposed DC cable route.

5.3.12 Full details of the habitat survey results are provided in Appendix 10.4 with supporting plans provided in Figure 10.4 and photographs of representative habitats shown in Figure 10.5. In line with CIEEM EcIA guidance (Ref 10-24) detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. The majority of the habitats within this section fall into this category. Only those habitats taken forward as important ecological features are described in the following paragraphs. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition any impacts on fauna as a result of habitat loss, degradation or fragmentation within the base scheme design are described in the relevant faunal section.

Hedgerows

5.3.13 Hedgerows are present sporadically along the Route Section 2 separating areas of arable farmland. The majority of hedgerows are well established and unmanaged. The hedgerows in this area are mostly species-poor and dominated by hawthorn. Hedgerows identified as species rich usually comprised blackthorn, dog rose, ash and elder with hawthorn dominant.

5.3.14 All hedgerows along Route Section 2 consist of native woody species and qualify as S41 NERC Act 2006 (Ref 10-9) habitats of principal importance and Lincolnshire BAP (Ref 10-2) habitat. All hedgerows are likely to have a supporting function to protected species such as amphibians, birds and foraging bats. The hedgerow network along Route Section 2 is an important ecological feature at the Local level.

Woodland and Trees

5.3.15 Lincolnshire County Council's online mapping system indicates that no trees on or immediately adjacent to the base scheme design are subject to Tree Preservation Orders.

5.3.16 Due to the open nature of the arable landscape tree cover is sparse. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present along the Route Section 2.

5.3.17 Six blocks of semi-natural broad-leaved woodland were identified either within Route Section 2 or immediately adjacent. Species typically found in these areas included hazel, field maple, elder, beech, ash, hawthorn, alder, dogwood, English oak and sycamore.

5.3.18 Only the woodland near Dalby is identified to contain both S41 NERC (2006) (Ref 10-9) deciduous woodland and GLNP lowland mixed deciduous woodland as well as the GLNP ancient replanted woodland (Ref 10-3). A small pocket of woodland which lies adjacent to the proposed DC Route Section 2 near East Keal is also identified as S41 NERC (2006) deciduous woodland. This area was dominated by alder and hazel and appeared to be part of a well-managed garden landscape.

5.3.19 A couple of additional parcels of S41 NERC (2006) (Ref 10-9) deciduous woodland are present in areas not yet surveyed. Some of these woodlands are also categorised as GLNP wet woodland.

5.3.20 One area of broad-leaved plantation woodland was noted within Route Section 2. This area lies in close proximity to the semi-natural woodland at Callow Carr. Species comprised sycamore *Acer pseudoplatanus,* field maple *Acer campestre,* ash *Fraxinus excelsior* and purging buckthorn *Rhamnus cathartica.*

5.3.21 No significant woodland ground flora species and no WCA8 protected plant species such as bluebell *Hyacinthoides non-scripta* were identified within any of the woodlands.

5.3.22 Based on lidar data 1036 individual trees were identified in Route Section 2 of the proposed DC cable route. This is likely to be an overestimation because the Phase 1 habitat criteria identifies hawthorn, blackthorn and some willow species as scrub whereas the Lidar data also includes every unsurveyed tree or shrub species within each hedgerow and woodland area as a separate tree further overestimating the number of trees within the survey area.

Taken as a whole, the woodland and tree stock is taken forward in this assessment as an important ecological feature at the Local level.

Watercourses

5.3.23 No significant watercourses are crossed in this section of the route, but both wet and dry field ditches are present within the survey area.

5.3.24 A large majority of the ditches were dredged and contained very little aquatic vegetation. Where ditches were not dredged, the aquatic component of the wet ditches supported a variety of marginal and emergent plant species including brooklime *Veronica beccabunga* and rosebay willowherb *Chamerion angustifolium.* No floating or submerged species were recorded; this is likely to be due to the low water levels present, even in wet ditches.

5.3.25 The banks of the ditches support terrestrial plant species including species of coarse grassland such as nettle *Urtica dioica*, false oat-grass *Arrhenatherum elatius,* cock's foot *Dactylis glomerata* and cow parsley *Anthriscus sylvestris*. Scrub species often encountered included hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus agg*..

5.3.26 The S41 river category includes all natural and near-natural running water habitats and as such the drains within base scheme design do not qualify as habitats of principal importance. However, these habitats do qualify as the Lincolnshire BAP (Ref 10-2) habitat rivers, canals and drains.

5.3.27 Watercourses are carried forward in the assessment as important ecological features at the Local level.

Great Crested Newt and other Amphibians

5.3.28 No pre-existing records of amphibians were returned within the base scheme design for Route Section 2. One hundred records of common toad, eight records of GCN, 30 records of common frog and six records of smooth newt were returned by the desktop study within 1 km of the base scheme design.

5.3.29 Full details of the habitat assessments of waterbodies within an initial 1.25 km buffer zone around the base scheme design and the amphibian data obtained from further GCN surveys within a 250 m buffer zone around the base scheme design are provided at Appendix 10.6 and Figure 10.6 with photographs of representative habitats presented in Figure 10.7.

5.3.30 A total of 32 ponds and eight ditches were identified from OS maps or satellite images within 250 m of the base scheme design in Route Section 2. Of these, 21 ponds and seven ditches were subject to detailed habitat suitability assessment, with the remaining scoped out due to lack of access or being permanently dry or absent. No ditches were subsequently identified for further survey due to poor suitability for breeding amphibians and/or distance to the base scheme design.

5.3.31 A total of 15 ponds were assessed to have 'Good' or 'Excellent' habitat suitability for GCN (Table 10.15). Of these further survey was carried out at nine ponds due to proximity to the base scheme design. No evidence of GCN was detected in ponds within influence of the base scheme design in Route Section 2.

5.3.32 Four ponds (P59, P68, P89 and P96) were not further surveyed for GCN despite having suitable aquatic habitat as due to a base scheme design revision they were originally located outside the 250 m buffer around the base scheme design. Since revision these four ponds are within 51-250 m of the base scheme design and will require pre-commencement survey to provide GCN presence/absence data in accordance with the agreed survey effort requirements.

Table 10.15 Summary of GCN survey results for waterbodies with suitable GCN habitat in Route Section 2

Pond Ref.	Distance from the Base Scheme Design	HSI Score	Presence/ Absence Results	Population Size Class Results
59	51-250 m	0.74	Unknown – previously scoped out due to distance, presence/absence survey to be completed 2018	n/a (outside 50m buffer)
68	51-250 m	0.76	Unknown – previously scoped out due to distance, presence/absence survey to be completed 2018	n/a (outside 50m buffer)

Table 10.15 Summary of GCN survey results for waterbodies with suitable GCN habitat in Route Section 2				
Pond Ref.	Distance from the Base Scheme Design	HSI Score	Presence/ Absence Results	Population Size Class Results
72	51-250 m	0.73	Absent	n/a
75	0-50 m	0.77	Absent	n/a
80	0-50 m	0.75	Absent	n/a
81	0-50 m	0.76	Absent	n/a
85	0-50 m	0.77	Absent	n/a
86	51-250 m	0.84	Absent	n/a
88	51-250 m	0.84	Absent	n/a
89	51-250 m	0.80	Unknown – previously scoped out due to distance, presence/absence survey to be completed 2018	n/a (outside 50m buffer)
92	51-250 m	0.78	Inconclusive (traditional surveys not permitted within 2017 breeding season)	n/a (outside 50m buffer)
93	51-250 m	0.82	Absent	n/a
96	51-250 m	0.71	Unknown – previously scoped out due to distance, presence/absence survey to be completed 2018	n/a (outside 50m buffer)
183	0-50 m	0.84	n/a (no access)	n/a
184	51-250 m	0.78	n/a (dried out)	n/a

5.3.33 Due to the limited number of amphibians recorded within Route Section 2 and the wider county and the limited amount of aquatic habitat, even if GCN populations are absent within Route Section 2 the aquatic habitat is of high ecological value. Ditches and drains provide foraging and commuting corridors supporting the dispersal of amphibians and may support other protected species such as common toad (S41 NERC Act 2006 (Ref 10-9)). Waterbodies within Route Section 2 are taken forward as an important ecological feature within the Local context as a result.

Bats

5.3.34 Pre-existing records for bats returned within 1 km of the base scheme design include brown long-eared bat, common pipistrelle, Daubenton's bat, noctule bat and soprano pipistrelle (Appendix 10.3 and Figure 10.2).

5.3.35 Full details of the bat survey results are provided at Appendix 10.7 and Figure 10.4 for trees with bat roost potential and Figures 10.8 and 10.9 for activity surveys.

5.3.36 As with Route Section 1, the wider landscape within Route Section 2 of the base scheme design is dominated by open, arable habitat which is intensively farmed, providing sub-optimal habitat for foraging bats. A number of patches of woodland are present within the wider landscape which provide potential foraging habitat and will function as stepping stones for bats commuting over the wider countryside. Hedgerows, ditches, dykes and drains, also provide good foraging and commuting habitat. Hedgerows and patches of woodland are more abundant within this section than other sections of the base scheme design. The areas of woodland and scattered trees and buildings in the surrounding area provide potential roosting habitat.

5.3.37 Four trees with moderate bat roost suitability (T30, T98, T101, T145) and 14 trees with low suitability were identified within the survey area (Appendix 10.7). Four of these trees, all with low suitability, are located within the LoD (T311, T312, T148 and T154) and are therefore assumed to require removal. The bat roost suitability of four additional trees within the base scheme design remains unconfirmed following ground-based assessment and further night time survey work would be required to establish the bat roost suitability of these trees. In light of the habitat features present within Route Section 2, the records of bat species obtained, their protected status and inclusion as a Lincolnshire BAP priority group, bats are taken forward as an important ecological feature within the Local context.

Water Vole

5.3.38 Thirteen pre-existing records for water vole were recorded within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2).

5.3.39 Full details of the water vole survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.3.40 No evidence of water vole activity was recorded during the surveys along Route Section 2.

5.3.41 Based on the likely connectivity between watercourses within the base scheme design, local records, their protected status and inclusion within the Lincolnshire BAP, water vole is taken forward as an important ecological feature within the Local context.

Otter

5.3.42 Nine pre-existing records for otter were returned within 1 km of Route Section 2 of the base scheme design. One additional pre-existing record for otter was located within the base scheme design (Appendix 10.3 and Figure 10.2)

5.3.43 Full details of the water vole survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.3.44 No evidence of otter activity was recorded during the surveys along Route Section 2.

5.3.45 Based on the likely connectivity between watercourses within the base scheme design, local records and their protected status, otter is taken forward as an important ecological feature within the Local context.

Badger

5.3.46 Badger activity is widespread within 1 km of Route Section 2 of the base scheme design, with 51 records being returned, six of which are from within the base scheme design. (Appendix 10.3 and Confidential Figure 10.3).

5.3.47 Full details of the badger survey results are provided in Confidential Appendix 10.9 and Figure 10.12. The summary below does not discuss explicit locations for reasons of welfare.

5.3.48 A single badger sett was identified within the badger survey area, located just on the 30 m buffer from the LoD for the proposed DC cable route within Route Section 2. The sett was categorised as a main sett and was located within a patch of woodland of the edge of a field. Numerous other setts were found in close proximity to the main sett, however all fell outside the 30 m buffer of the base scheme design. As within Route Section 1, the rural habitats across throughout Route Section 2 provide a large resource of high quality habitats suitable for use by badgers. The fields within Route Section 2 are generally of a smaller scale, in comparison to the other route sections, with more hedgerows and trees forming field boundaries which provide good foraging/commuting corridors for the local badger clans.

5.3.49 In addition there also appears to be a larger number of woodland pockets within the wider landscape, that are considered likely to provide better quality sett construction habitat than arable field margins. As the route has aimed to avoid woodland habitat, for the most part, this is likely to be why fewer setts were recorded within this Route Section than elsewhere along the cable route.

5.3.50 Route Section 2 contains a number of rivers and brooks which are likely to act as partial barriers to badger movement. However generally the watercourse network across Route Section 2 is limited and presents few obstacles to the local badger population.

5.3.51 Badgers are known to be widespread both throughout the local area and across the UK. For the purposes of this assessment the badger population present within and adjacent to Route Section 2 is taken forward as a Locally important ecological feature.

Winter Birds

5.3.52 Records of sixteen species of wintering birds were obtained within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2). Schedule 1 (WCA 1981 (Ref 10-20)) species include brambling, fieldfare, hen harrier *Circus cyaneus,* greenshank *Tringa nebularia,* merlin *Falco columbarius* and redwing. The largest peak counts were recorded for pink-footed goose *Anser brachyrhynchus* and redwing.

5.3.53 Full details of the winter bird survey results are provided in Appendix 10.10 and Figures 10.13 and 10.14

5.3.54 The area of land within Route Section 2 consists of smaller, more undulating fields than within the other sections, with taller field boundaries such as hedgerows and trees. As such, the habitat present in this section is of low value for species associated with the SPA and Ramsar sites considered, which prefer large, open fields with long sight lines. This section is therefore highly unlikely to support significant numbers of wintering bird species of interest with respect to these sites.

5.3.55 The land within this section is likely to support small flocks of other BoCC (Ref 10-22) and/or S41 species (Ref 10-9) during the winter period. The winter bird assemblage is taken forward as an important ecological feature within the Local context.

Breeding Birds

5.3.56 Thirty species pre-existing records for breeding birds were identified within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2). Schedule 1 (WCA, 1981) (Ref 10-20) species recorded include hobby and marsh harrier, with the majority of records originating from East Keal. Other Schedule 1 (WCA, 1981) species include barn owl, kingfisher *Alcedo atthis* and red kite *Milvus milvus.*

5.3.57 Full details of the BBS results are provided in Appendix 10.11 and Figures 10.15 – 10.17. Due to access limitations, the BBS covered only 18.5 % of Route Section 2.

5.3.58 During the 2017 BBS, a total of 28 bird species were recorded within Route Section 2. Ten priority bird species were recorded within Route Section 2, including six S41 (Ref 10-9) species, four red listed BoCC (Ref 10-22) species and six amber listed BoCC species.

5.3.59 Species determined to be probably breeding within the LoD of Route Section 2 include dunnock, reed bunting, skylark, song thrush and yellowhammer.

5.3.60 Reed bunting and yellowhammer were only recorded very occasionally within the LoD, with only a single pair of each of these species likely to breed within field margins in the LoD. Based on the suitability of the remaining area within Route Section 2 (not covered by the BBS), it is possible that another pair of each of these species breeds within the LoD outside of the areas covered by the survey, so using the precautionary principle it is considered that two pairs of each of these species nest within the LoD within Route Section 2.

5.3.61 Dunnock was present in a few patches of scrub within Route Section 2, with three pairs likely to nest within the LoD in the surveyed sections.

5.3.62 Skylark was recorded to nest within the open arable fields, with four pairs likely to breed in the LoD.

5.3.63 Song thrush is likely to nest in the few areas of trees and scrub within the LoD. It is likely that three pairs of song thrush nest in Route Section 2.

5.3.64 18.5 % of Route Section 2 was covered by the breeding bird survey, which would give a multiplication factor of 5.42 to extrapolate for the entire length of this Route Section. However this area was selected due to the greater habitat suitability for breeding birds. Therefore, due to

the habitat suitability available in the remaining unsurveyed areas, a weighting factor has been applied to the multiplication factor of 0.33 for species characteristic of open arable farmland, and 0.5 for other bird species. The recorded number of predicted pairs characteristic of open arable farmland have therefore been multiplied by 1.81 and pairs of other bird species multiplied by 2.71 to give the predicted number of pairs within Route Section 2.

5.3.65 Applying the weighting factor, it is predicted that 5 pairs of reed bunting, 4 pairs of yellowhammer, 8 pairs of dunnock, 7 pairs of skylark and 8 pairs of song thrush are likely to nest in Route Section 2.

5.3.66 Due to the presence of a range of breeding priority bird species, breeding birds are taken forward for assessment at the Local level of importance.

Reptiles

5.3.67 Three pre-existing records of grass snake were returned within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2).

5.3.68 A shed snake skin was recorded incidentally on the bank of pond P72 during an eDNA survey in this section. The smaller field systems, with greater density of hedgerows and woodland in addition to unmanaged field margins and watercourses do provide some suitable foraging and commuting habitats. These provide potential opportunities for hibernation and breeding considered to be higher than in other sections of the base scheme design. However, this habitat is still limited in extent and the reptiles that are present are likely to be at low densities.

5.3.69 Due to the potential for their presence, their protected status and the inclusion of grass snake as a priority species in the Lindsey Marsh Drainage Board and Witham Fourth IDB BAPs (Ref 10-5, Ref 10-6), reptiles are taken forward for assessment at the Local level of importance.

Other Fauna

5.3.70 Pre-existing records were returned within 1 km of Route Section 2 of the base scheme design (Appendix 10.3 and Figure 10.2) for a number of other S41 (Ref 10-9) species. These include; brown hare, west European hedgehog *Erinaceus europaeus,* European eel (Also Annex 1 species), brown/sea trout *Salmo trutta*, brown trout *Salmo trutta* subsp. f*ario*, wall, small heath and numerous moth species. One record each for brown hare and west European hedgehog are from within the base scheme design.

5.3.71 Incidental records of brown hare were recorded during other ecological surveys. The predominantly agricultural nature of the surrounding land with its unmanaged field margins, combined with the hedgerow and woodland network provide ample suitable habitat for this species. Due to the presence of brown hare within the basic scheme design and the vulnerability of their young (leverets) to disturbance, this species is taken forward for assessment as an important ecological feature at the Local level.

5.3.72 West European hedgehog has been recorded within the base scheme design. Based on the habitats present, it is likely that hedgehogs will be occupying the hedgerows, woodland and scrub within this section. Due to their tendency to curl up and remain in one place when threatened

and their vulnerability during hibernation, this species is taken forward for assessment as an important ecological feature at the Local level.

5.3.73 Since brown/sea trout and European eel have been recorded within 11 km of the base scheme design it is likely that these species may be present in watercourses that are crossed by the proposed DC cable route. Three ditches/drains present within Route Section 2 provide suitable habitat for European eel, and two rivers, which have faster flowing water may be utilised by brown/sea trout. For this reason, these species are taken forward for assessment as an important ecological feature at the Local level.

5.3.74 Several butterfly and numerous moth species have been recorded in Route Section 2, the majority of moth records being from a limited number of locations, including the near to the Mavis Enderby Valley SSSI, the woodland areas at Dalby and near to East Keal. The great majority of the desktop records of moths obtained for Route Section 2 are associated with wildlife sites that will not be impacted by the proposed works. Despite the more diverse landscape in this section, the habitats are of low structural and species diversity, and are unlikely to support diverse assemblages of invertebrates. For this reason, invertebrates are not taken forward for assessment.

Summary of Important Ecological Features

5.3.75 Table 10.16 provides a summary of the designated sites, habitats and fauna that have been identified as important ecological features in Route Section 2, which have the potential to be impacted by the base scheme design.

Table 10.16 Summary of Important Ecological Features in Route Section 2

Ecological Feature	Policy/Legislation	Ecological Value	Description
Mavis Enderby Valley SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	63 m west of the base scheme design
Keal Carr SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	265 m east of the base scheme design
Jenkins Carr SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	972 m east of the base scheme design
Calceby Marsh SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	2.6 km north west of the base scheme design
Swaby Valley SSSI	Wildlife and Countryside Act 1981 (as amended) ELCS Policy 24	National	3.4 km north west of the base scheme design

Table 10.16 Summary of Important Ecological Features in Route Section 2			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
East Keal Clay Pit LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Crossed by base scheme design
A16 Road Verge, Dalby Bar LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Within base scheme design on opposite side of the A16 to access track entrance
Hocker Holt LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Within base scheme design
Wheelabout Wood SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Within base scheme design
Callow Carr LWS and ancient woodland	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Abuts western boundary of base scheme design
Silver Pits, Ulceby SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Abuts southern boundary of base scheme design
Bluestone Heath Copse SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	2 m north of base scheme design
Manor Farm, Mavis Enderby LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	2 m west of base scheme design
Langton Sheepwalks LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	25 m west of base scheme design

Table 10.16 Summary of Important Ecological Features in Route Section 2			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Harrington Top Road Verge LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	86 m west of the base scheme design
Smith's Wood SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	115 m west of base scheme design
Keal Carr LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	273 m east of base scheme design
Winceby Beck (Hagworthingham to Windsor Farm) LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	289 m west of base scheme design
Harrington Chalk Bank LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	297 m west of the base scheme design
River Lymn, Skendleby Tributary North SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	432 m east of base scheme design
Well Vale Estate SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	652 m east of base scheme design
Southfield Farm Grassland LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	686 m west of base scheme design
Church Carr SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	689 m west of the base scheme design

Table 10.16 Summary of Important Ecological Features in Route Section 2			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Dexthorpe Plantation SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	785 m east of the base scheme design
Keal Carr South LWS	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	878 m east of base scheme design
Hedgerows	Hedgerow Regulations 1997 British Standard 5837: 2012 Trees in relation to construction S41 NERC 2006 ELLP Policy 20 Lincolnshire BAP	Local	The majority of hedgerows within the base scheme design are species-poor and dominated by hawthorn. Four hedgerows were identified as Important under the Hedgerow Regulations.
Woodland and Trees	ELLP Policy 20 British Standard 5837: 2012 Trees in relation to construction Lincolnshire BAP priority habitat when associated with hedgerows	Local	There are small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland and 1036 trees within the base scheme design that represent a locally valuable woodland habitat resource
Watercourses	ELLP Policy 20 ELLP Policy 21 Lincolnshire BAP priority habitat Black Sluice IDB BAP priority habitat	Local	Several field ditches are present across the base scheme design

Table 10.16 Summary of Important Ecological Features in Route Section 2			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
GCN and other amphibians	Annex 2 and 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) (9(5) only) for all except GCN S41 NERC Act 2006 ELCS Policy 24	Local	No GCN recorded but good numbers of common toad, common frog and smooth newt from desktop records.
Bats	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 (some) ELCS Policy 24 Lincolnshire BAP	Local	Four trees with low suitability (T30, T98, T101, T145) within LoD are assumed to require removal. Four trees with unconfirmed bat roost potential present. Blocks of woodland present within the base scheme design and ditches, hedgerows and trees provide commuting and foraging habitat for a number of species of bat.
Water vole	Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP	Local	No evidence of water vole identified during surveys, although suitable habitat exists and there are desktop records within base scheme design.
Otter	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24	Local	No evidence of otter identified during surveys, although suitable habitat exists and there are desktop records within base scheme design.
Badger	Protection of Badgers Act 1992 ELCS Policy 24	Local	One main sett associated with the proposed DC cable route.

Table 10.16 Summary of Important Ecological Features in Route Section 2			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Wintering birds	S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP (Farmland birds)	Local	Some small flocks of BoCC and/or S41 species likely to forage within base scheme design during the winter period.
Breeding birds	Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 Lincolnshire BAP (Farmland birds)	Local	Small numbers of reed bunting, yellowhammer, dunnock, skylark and song thrush likely to nest within base scheme design.
Reptiles (grass snake, common lizard)	Schedule 5 Wildlife & Countryside Act (1981) (9(1) part, 9(5)) S41 NERC Act 2006 ELCS Policy 24	Local	Records of grass snake in the area and a shed snake skin by pond P72. Limited suitable habitat along unmanaged field margins and the ditch and drain network. Likely to be present in low densities.
Brown hare	S41 NERC Act 2006 ELCS Policy 24	Local	Records of brown hare and sightings during ecological surveys.
West European hedgehog	S41 NERC Act 2006 ELCS Policy 24	Local	Records from within the base scheme design and suitable habitats will be crossed by the proposed DC cable route.
Fish (brown/sea trout, European eel)	S41 NERC Act 2006 ELCS Policy 24	Local	Records from within the base scheme design and watercourses likely to support these species will be crossed by the proposed DC cable route.

5.4 Route Section 3 A16 (Keal Road) to River Witham

Designated Wildlife Sites and Notable Habitats

5.4.1 No internationally designated sites are present within 10 km and no nationally designated sites are present within 2 km of Route Section 3 of the base scheme design.

5.4.2 There are four non-statutorily designated sites present within 1 km of Route Section 3 of the base scheme design (Table 10.17). Of these, Braygate Lane SNCI abuts the southern boundary of the base scheme design. Further details of the nature conservation sites are provided in Appendix 10.3.

Table 10.17 Non-Statutory Designated Sites (Route Section 3)		
Name	**Type**	**Distance (m)**
Braygate Lane SNCI	A track with wide verges bounded by drains	Abuts southern boundary of base scheme design
Hagnaby Lock Nature Reserve	An unused area of farmland that was flooded in 1995 by National Rivers Authority (now Environment Agency) to create a wetland used by wintering wildfowl.	138 m south of base scheme design
Langrick Pits SNCI	Small mesotrophic pond with central scrubby island and surrounding grassland	704 m south east of the base scheme design
West Fen Catchwater SNCI	A section of drain potentially with some invertebrate interest. No further detail supplied.	718 m east of the base scheme design

5.4.3 One S41 habitat of principal importance was identified by GLNP during the desktop survey as being located within 1 km of the base scheme design. This was traditional orchard which is present 945 m from the base scheme design.

5.4.4 Three S41 habitats of principal importance were identified on the government portal Magic (which generally has lower levels of confidence in their quality compared with GLNP) within 1 km of the base scheme design; coastal and floodplain grazing marsh, deciduous woodland and traditional orchard. Coastal and floodplain grazing marsh and deciduous woodland are intersected by and abut the base scheme design in one and several locations respectively.

5.4.5 S41 habitats which coincide with a designated site that may be affected are included within the relevant assessment. Those which do not coincide with a designated site but intersect with or abut the base scheme design have been described within the extended Phase 1 habitat survey (Appendix 10.4) and are taken forward for assessment within the Habitats and Flora section where relevant.

Habitats and Flora

5.4.6 The desktop study confirmed that two protected or notable flowering plant species were previously recorded within the site boundary of the base scheme design; cornflower (S41 NERC 2006 (Ref 10-9)) and sainfoin *Onobrychis viciifolia*. Seventeen pre-existing records for protected or notable flora were returned within 1 km of Route Section 1 of the base scheme design, including S41 species great water-parsnip (Appendix 10.3 and Figure 10.2).

5.4.7 The base scheme design in Route Section 3 is dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. No protected or invasive species of plant were recorded during the habitat survey. The habitats recorded within the survey area include:

- Arable (456.06 ha);
- Modified neutral grassland (3.43 ha);
- Improved grassland (3.80 ha);

- Semi-improved neutral grassland (19.36 ha);
- Tall ruderal herbs (0.04 ha);
- Standing water (wet ditches) (0.85 ha and 9583.42 m);
- Dry ditches (3925.65 m);
- Running water (1.08 ha);
- Swamp (0.04 ha);
- Species-rich hedgerows (484.58 m);
- Species-poor hedgerows (6577 m);
- Broad-leaved trees (1,068 individual trees located outside of woodlands);
- Semi-natural broad-leaved woodland (1.62 ha);
- Scattered scrub (accurate measure not possible);
- Bare ground and (1.75 ha);
- Hard standing (2.23 ha); and
- Not surveyed due to access constraints (1.71 ha).

5.4.8 The 1,068 trees is likely to be a large overestimation as this is based on Lidar data which also includes shrubs and scrub such as hawthorn, blackthorn and some willow species.

5.4.9 Habitats across Route Section 3 that could not be surveyed by direct access (1.71 ha) equate to 0.35 % of the total area within base scheme design for Route Section 3 of the proposed DC cable route.

5.4.10 Full details of the habitat survey results are provided in Appendix 10.4 with supporting plans provided in Figure 10.4 and photographs of representative habitats shown in Figure 10.5.

5.4.11 In line with CIEEM EcIA guidance (Ref 10-24)) detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. The majority of the habitats within this section fall into this category. Only those habitats taken forward as important ecological features are described in the following paragraphs. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition any impacts on fauna as a result of habitat loss, degradation or fragmentation within the base scheme design are described in the relevant faunal section.

Hedgerows

5.4.12 Hedgerow habitat is present sporadically along the Route Section 3 separating areas of arable farmland. The majority of hedgerows are well established and unmanaged. The hedgerows in this area are mostly species-poor and dominated by hawthorn. Hedgerows identified as species rich usually comprised blackthorn, dog rose, ash and elder with hawthorn dominant.

5.4.13 All hedgerows along Route Section 3 consist of native woody species and qualify as S41 NERC (2006) (Ref 10-9) habitats of principal importance and Lincolnshire BAP (Ref 10-2) habitat. Two hedgerows within the planning application boundary qualify as important with respect to the wildlife and landscape criteria of the Hedgerow Regulations 1997. All hedgerows are likely to

have a supporting function to protected species such as amphibians, birds and foraging bats. The hedgerow network along Route Section 3 is an important ecological feature at the Local level.

Woodland and Trees

5.4.14 Lincolnshire County Council's online mapping system indicates that no trees on or immediately adjacent to the base scheme design are subject to Tree Preservation Orders.

5.4.15 Due to the open nature of the arable landscape tree cover is sparse. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present along the Route Section 3.

5.4.16 One area of broad-leaved plantation woodland was noted across Route Section 3 near to Medlam Bridge. It is described to be a recent plantation of less than 20 years old with poor groundflora. Tree species comprised Hazel *Corylus avellana* elder *Sambucus nigra* beech *Fagus sylvatica* cherry species *Prunus sp* oak species *quercus sp.* and poplar species *Populus sp.*

5.4.17 Five blocks of semi-natural broad-leaved woodland were identified adjacent to the base scheme design. Species typically found in these areas included goat willow, crack willow, elder, ash, hawthorn, blackthorn, English oak and sycamore.

5.4.18 No habitats along the route were identified as containing any NERC Act 2006 (Ref 10-9) S41 or GLNP priority woodland habitat. A single small pocket of woodland which lies adjacent to Route Section 3 near Carrington was identified as NERC Act 2006 (Ref 10-9) S41 Deciduous Woodland.

5.4.19 No significant woodland ground flora species and no Schedule 8 (Ref 10-20) protected plant species such as bluebell were identified within any of the woodlands.

5.4.20 Scattered broad-leaved trees are infrequent across Route Section 3 with only twenty-eight individual trees present.

5.4.21 Taken as a whole, the woodland and tree stock is taken forward in this assessment as an important ecological feature at the Local level.

Watercourses

5.4.22 Several watercourses are crossed by Route Section 3. These watercourses vary from significant wet drains (Medlam Drain, Newham Drain, Castle Dike, Howbridge Drain/West Fen Drain and the River Witham) to individual field ditches which have been recorded as both wet and dry across the base scheme design. None of the drains across the base scheme design were recorded to have a flow (apart from the River Witham) although significant drains are expected to have a very slow flow.

5.4.23 A large majority of the ditches were dredged and contained very little aquatic plant species. Where ditches were not dredged, the aquatic component of the wet ditches supported a variety of marginal and emergent plant species including common reed *Phragmites australis,* greater reedmace *Typha latifolia,* lesser pond-sedge *Carex acutiformis,* reed sweet-grass *Glyceria maxima,* reed canary-grass *Phalaris arundinacea* and rosebay willowherb *Chamerion angustifolium.*

5.4.24 Floating and submerged species included fool's watercress *Apium nodiflorum,* floating sweet-grass *Glyceria fluitans,* branched bur-reed *Sparganium erectum,* water-plantain *Alisma plantago-aquatilis*, broad-leaved pondweed *Potamogeton natans,* common duckweed *Lemna minor* and water horsetail *Equisetum fluviatile.*

5.4.25 The banks of the ditches support terrestrial plant species including species of coarse grassland such as nettle, false oat-grass, cock's foot and cow parsley. Scrub species often encountered included hawthorn and bramble.

5.4.26 The NERC Act 2006 (Ref 10-9) S41 River category includes all natural and near-natural running water habitats and as such the drains within the base scheme design do not qualify as habitats of principal importance, with the exception of the River Witham. However, these other habitats do qualify as the Lincolnshire BAP habitat Rivers, Canals and Drains BAP and Witham Fourth District IDB habitat Rivers, Canals and Drains.

5.4.27 Watercourses are carried forward in the assessment as important ecological features at the Local level.

Great Crested Newt and other Amphibians

5.4.28 Two pre-existing records of common frog, four records of common toad and one record of GCN were returned within 1 km of the base scheme design during the desktop study (Appendix 10.3 and Figure 10.2).

5.4.29 Full details of the habitat assessments of waterbodies within an initial 1.25 km buffer zone around the base scheme design and the amphibian data obtained from further GCN surveys within a 250 m buffer zone around the base scheme design are provided at Appendix 10.6 and Figure 10.6 with photographs of representative habitats in Figure 10.7.

5.4.30 A total of 24 ponds and 54 ditches were identified on maps or aerials within 250 m of the base scheme design in Route Section 3. Of these, ten ponds and 25 ditches were subject to detailed habitat suitability assessment, with the remainder scoped out due to access constraints or because the waterbodies were proved to be dry or not present. Due to a combination of their suitability scores and proximity to the base scheme design, nine ditches and three ponds were subsequently identified for further survey to determine presence/absence and, where appropriate, population size class. The findings of these further surveys are summarised in Table 10.18. No GCN were recorded in any of the ponds or ditches taken forward for further survey.

Table 10.18 Summary of GCN survey results within waterbodies with suitable GCN habitat within Route Section 3				
Pond/ Ditch Ref.	**Distance from Base Scheme Design**	**HSI/DSI Score**	**Presence/ Absence Results**	**Population Size Class Results**
Ditches				
38	51-250 m	5	Unknown (previously scoped out from further survey due to distance but now within 250m; survey proposed 2018)	n/a (outside 50m buffer)
44	0-50 m	5	Absent	n/a
48	0-50 m	5	Absent	n/a
55	51-250 m	5	Absent	n/a
320	0-50 m	5	n/a (dried out)	n/a
321	51-250 m	5	n/a (dried out)	n/a
364	0-50 m	1	Absent	n/a
373	51-250 m	1	Absent	n/a
763	51-250 m	3	n/a (dried out)	n/a
Ponds				
83	0-50 m	0.87	Absent	n/a
168	51-250 m	0.74	Absent	n/a
186	0-50 m	0.74	Absent	n/a

5.4.31 Ditch 38 will require pre-commencement survey to provide GCN presence/absence data in accordance with the agreed survey effort requirements. However, given the connectivity of Ditch 38 with Ditch 44 and Ditch 48 which cross the proposed DC cable route and returned 'negative' eDNA results, it is considered unlikely that Ditch 38 is a receptor for GCN.

5.4.32 Due to the limited number of amphibians recorded within Route Section 3 and the wider county and the limited amount of good quality aquatic and terrestrial habitat for amphibians, even if GCN populations are absent within Route Section 3 the ditch habitats are of high ecological value. Ditches and drains provide foraging and commuting corridors supporting the dispersal of amphibians and may support other protected species such as common toad (S41 NERC Act 2006 (Ref 10-9)). Waterbodies within Route Section 3 are taken forward as an important ecological feature within the Local context as a result.

Bats

5.4.33 Pre-existing records of bats returned within 1 km of Route Section 3 of the base scheme design include brown long-eared bat, common pipistrelle, Daubenton's bat, Natterer's bat, noctule bat and soprano pipistrelle. Brown-long eared bats, pipistrelle bats and bats not identified to species

level have been previously recorded within the base scheme design (Appendix 10.3 and Figure 10.2).

5.4.34 Full details of the bat survey results are provided at Appendix 10.7 and Figure 10.4 for trees with bat roost potential and Figures 10.8 and 10.9 for activity surveys.

5.4.35 The wider landscape within Route Section 3 of the proposed underground cable route is dominated by open arable habitat which is intensively farmed and generally provides sub-optimal habitat for foraging bats. However, patches of woodland within the wider landscape provide potential foraging habitat and stepping stones for bats commuting through the landscape. Hedgerows, ditches, dykes and drains also provide good foraging and commuting habitat. The areas of woodland and scattered trees in the surrounding area provide potential roosting habitat.

5.4.36 One tree within the base scheme design (T223) was assessed to be of high roost suitability. This was a willow with multiple cavities. One tree within the base scheme design (T303) possessed moderate roost suitability and five trees (T189, T193, T194, T206 and T233) were of low suitability. Roost suitability of one tree remained unconfirmed following the ground-based assessment and will require further assessment to determine roost potential (T223).

5.4.37 The transect route through Route Section 3 passed through arable land with a variety of large drains and smaller field ditches. The north eastern end of the transect route incorporated habitats within Hagnaby Lock Nature Reserve.

5.4.38 During the spring activity transect (May 2017), bat activity was distributed along the route with concentrations in activity in the northeast at Hagnaby Lock. Bat species recorded were, in order of relative abundance, common pipistrelle, soprano pipistrelle and brown long-eared bat. During the summer visit (June/July 2017), common pipistrelles and noctule bats were recorded. Common pipistrelles were recorded in the north of the route near to a ditch and a line of scattered scrub. Noctule was only recorded on one occasion.

5.4.39 The static detector was deployed within an arable field approximately 30m from a large ditch for the spring and summer monitoring periods. The detector recorded contacts by pipistrelle bat species, noctule and brown long eared bat. Nightly averages of 3.3 bat passes by pipistrelle species, 0.3 passes by noctules and 0.3 passes by brown long eared were recorded during spring.

5.4.40 The activity and static surveys indicate that the base scheme design is used by moderate numbers of at least four species of bat for foraging and dispersal. In light of this and categorisation using Wray et al. (Ref 10-49), their protected status and inclusion as a Lincolnshire BAP priority group, bats are taken forward as an important ecological feature within the Local context.

Water Vole

5.4.41 Two pre-existing water vole records were returned within 1 km of Route Section 3 of the base scheme design (Appendix 10.3 and Figure 10.2). No pre-existing records for water vole were identified from the desktop study from within the base scheme design.

5.4.42 Full details of the water vole survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.4.43 Evidence of water vole activity was recorded at a total of seven locations along Route Section 3. This included a number of used/disused burrows and feeding remains.

5.4.44 Based on the results of the surveys, records of water vole in the wider area and their protected status and inclusion as a Lincolnshire BAP priority group, water vole is taken forward as an important ecological feature within the Local context.

Otter

5.4.45 One pre-existing record was returned for otter within 1 km of Route Section 3 of the base scheme design (Appendix 10.3 and Figure 10.2).

5.4.46 Full details of the otter survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.4.47 Evidence of otter activity (spraints) was recorded at one location along Route Section 3.

5.4.48 Based on the results of the surveys, records from within the wider area and their protected status, otter is taken forward as an important ecological feature within the Local context.

Badger

5.4.49 Seven pre-existing records of badger were returned within 1 km of the Route Section 3 of the base scheme design. (Appendix 10.3 and Confidential Figure 10.3).

5.4.50 Full details of the badger survey results are provided in Confidential Appendix 10.9 and Figure 10.12. The summary below does not discuss explicit locations for welfare reasons.

5.4.51 Seven badger setts (two main, two subsidiary and three outlier setts) were located within 30 m of the LoD for the proposed DC cable route within Route Section 3. All seven setts showed evidence of being currently active and all were constructed within bankside habitats.

5.4.52 The large expanse of arable land present within the wider area offers good foraging opportunities for local badger clans, with a range of readily available food sources in close proximity to setts.

5.4.53 The network of ditches through the arable landscape provide dispersal routes and well-used paths are common in areas nearby to all active setts. The deep ditches within the study area are likely to act as obstacles to badger movements, with badger paths often clearly identifiable running alongside ditches with crossing points determined by bridges, culverts or shallower parts of the ditches. Dispersal routes are therefore likely to be well-used with movement restricted to suitable crossing points.

5.4.54 Badgers are known to be widespread both throughout the local area and across the UK. For the purposes of this assessment the badger population present within and adjacent to Route Section 3 is taken forward as a Locally important ecological feature.

Winter Birds

5.4.55 Twenty nine pre-existing records for wintering bird species were returned within 1 km of Route Section 3 of the base scheme design. Records included WCA 1981 (Ref 10-20) Schedule 1 (WCA, 1981) species *black-tailed godwit,* fieldfare *Turdus pilaris*, hen harrier *Circus cyaneus,* redwing *Turdus iliacus*, ruff *Calidris pugnax*, greenshank *Tringa nebularia* and whimbrel *Numenius phaeopusI* (Appendix 10.3 and Figure 10.2). Most records originated from Hagnaby Lock Nature Reserve. Species with the greatest peak count records included fieldfare, greylag goose A*nser anser,* pink-footed goose, teal *Anas creccacrecca* and wigeon.

5.4.56 Full details of the winter bird survey results are provided in Appendix 10.10 and Figures 10.13 and 10.14.

5.4.57 Nine species were recorded during the winter bird surveys that are listed as qualifying features of The Wash SPA/Ramsar or the Humber Estuary SPA/Ramsar. These were bar tailed godwit (peak count: 1), black tailed godwit (peak count: 1), curlew (peak count: 200), gadwall (peak count: 8), golden plover (peak count: 223), pink-footed goose (peak count: 200), redshank (peak count: 19), shelduck (peak count: 19) and wigeon (peak count: 240).

5.4.58 The majority of curlew, gadwall, shelduck and wigeon were recorded at Hagnaby Lock Nature Reserve located approximately 200 m south of a proposed access route within this section. Pink-footed geese were only recorded on one occasion during all the winter survey visits, with a group of 200 birds recorded approximately 200 m from the base scheme design.

5.4.59 Within the base scheme design, three species were recorded that are listed as qualifying features of The Wash SPA/Ramsar or the Humber Estuary SPA/Ramsar. These were curlew (peak count: 3) and redshank (peak count: 2). Of these species, only redshank was recorded on more than one occasion and these birds were associated with the River Witham.

5.4.60 A total of 24 BoCC (Ref 10-22) and/or NERC Act 2006 (Ref 10-9) S41 species were recorded within 500 m of the base scheme design during the two winter seasons surveyed. The most abundant species recorded within 500 m of the base scheme design were black headed gull (peak count: 420), common gull (peak count: 1,106), fieldfare (peak count: 550), linnet (peak count: 120), redwing (peak count: 210) and starling (peak count: 1,300).

5.4.61 Within the base scheme design, a total of 11 BoCC (Ref 10-22) and/or NERC Act 2006 (Ref 10-9) S41 species were recorded. For the majority of these species only low numbers were recorded, although moderate numbers of black headed gull (peak count 250), fieldfare (peak count: 100) and common gull (peak count: 315) were occasionally recorded.

5.4.62 Due to the regular use of the Hagnaby Lock Nature Reserve and the River Witham by low numbers of birds which are listed as qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar, the winter bird assemblage is taken forward as an important ecological feature within the Local context.

Breeding Birds

5.4.63 Thirty five species of breeding birds have been historically recorded within 1 km of Route Section 3 of the base scheme design (Appendix 10.3 and Figure 10.2). Schedule 1 (WCA, 1981) (Ref

10-20) species records returned by the desktop study include hobby, little ringed plover and marsh harrier, barn owl, kingfisher, peregrine, red kite. NERC Act 2006 (Ref 10-9) S41 species include lapwing.

5.4.64 Full details of the BBS results are provided in Appendix 10.11 and Figures 10.15 – 10.17.

5.4.65 During the 2017 BBS, a total of 47 bird species were recorded within Route Section 3. Twenty one priority bird species were recorded within Route Section 3, including three Schedule 1 species (WCA, 1981 (Ref 10-20)), eight S41 species (NERC Act 2006 (Ref 10-9)), seven red listed BoCC species (Ref 10-22) and 14 amber listed BoCC species.

5.4.66 Species determined to be probably breeding within the LoD of Route Section 3 include dunnock, linnet, reed bunting, skylark and yellowhammer:

- Dunnock was only recorded very occasionally within the LoD, with only a single pair of this species likely to breed within Route Section 3 in patches of scrub.
- Linnet was occasionally recorded, with two pairs likely to nest within scrub within the LoD in the surveyed sections.
- Reed bunting was recorded as likely to breed within vegetation within drains and ditches across Route Section 3, with four pairs likely to nest within wetland vegetation within the LoD in the surveyed sections.
- Skylark were recorded to breed within the open arable fields through which Route Section 3 passes. It is likely that 11 pairs of skylark nested within the LoD within the survey area.
- Yellowhammer was recorded occasionally in Route Section 3, with four pairs likely to nest within scrub within the LoD in the surveyed sections.

5.4.67 Approximately 44 % of Route Section 3 was covered by the BBS. , which would give a multiplication factor of 2.28 to extrapolate for the entire length of this Route Section. However this area was selected due to the greater habitat suitability for breeding birds. Therefore, a weighting factor has been applied to the multiplication factor, of 0.5. The recorded number of predicted pairs of priority bird species have therefore been multiplied by 1.14 to give the predicted number of pairs within Route Section 3.

5.4.68 Applying the weighting factor, it is predicted that 1 pair of dunnock, 2 pairs of linnet, 5 pairs of reed bunting, 13 pairs of skylark and 5 pairs of yellowhammer are likely to nest in Route Section 3.

5.4.69 Due to the presence of a range of breeding priority bird species, breeding birds are taken forward for assessment at the Local level of importance.

Reptiles

5.4.70 No records of reptiles were returned within 1 km of Route Section 3 of the base scheme design.

5.4.71 No reptiles were recorded incidentally during other surveys in Route Section 3.

5.4.72 The lack of desktop records does not confirm absence of a species and therefore, since these habitats are similar to those in other sections where reptiles have been recorded, it is considered

that this species group has the potential to be present in low numbers. For this reason, along with their protected status and the inclusion of grass snake as a priority species in the Witham Fourth IDB BAP, reptiles are taken forward at the Local level of importance.

Other Fauna

5.4.73 Pre-existing records were returned within 1 km of Route Section 3 of the base scheme design (Appendix 10.3 and Figure 10.2) for a number of NERC Act 2006 (Ref 10-9) S41 species. These include: brown hare; west European hedgehog; European eel *Anguilla anguillaanguilla;* spined loach *Cobitis taenia*; wall *Lasiommata megera*; small heath *Coenonympha pamphilus;* cinnabar *Tyria jacobaeae;* grey dagger *Acronicta psi;* and blood-vein *Timandra comae.* Pre-existing records for European eel, spined loach, brown hare and west European hedgehog were returned from within the base scheme design.

5.4.74 Incidental records of brown hare were recorded during other ecological surveys. The predominantly agricultural nature of the surrounding land with its unmanaged field margins, hedgerow and woodland network provide ample suitable habitat for this species. Due to the presence of brown hare within the basic scheme design and the vulnerability of their young (leverets) to disturbance, this species is taken forward for assessment as an important ecological feature at the Local level.

5.4.75 West European hedgehog has been historically recorded within the base scheme design; it is likely that they occupy the hedgerows bases, woodland and scrub within this section. Due to their tendency to curl up and remain in one place when threatened and their vulnerability during hibernation, this species is taken forward for assessment as an important ecological feature at the Local level.

5.4.76 Since European eel and spined loach have been recorded within the base scheme design it is likely that these species may be present in watercourses that are crossed by the proposed DC cable route. For this reason, these species are taken forward for assessment as an important ecological feature at the Local level.

5.4.77 Several butterfly and numerous moth species have been recorded in Route Section 3, the majority of moth records originating from a limited number of locations. The habitats are generally of low structural and species diversity in this section, and are unlikely to support diverse assemblages of invertebrates. For this reason, invertebrates are not taken forward for assessment.

Summary of Important Ecological Features

5.4.78 Table 10.19 provides a summary of the designated sites, habitats and fauna that have been identified as important ecological features in Route Section 3 which have the potential to be impacted by the base scheme design.

Table 10.19 Summary of Important Ecological Features in Route Section 3			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Braygate Lane SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	Abuts southern boundary of base scheme design
Hagnaby Lock Nature Reserve	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	138 m south of base scheme design
Langrick Pits SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	704 m south east of the base scheme design
West Fen Catchwater SNCI	The Town and Country Planning Act 1990 ELCS Policy 24 ELLP Policy 19	County	718 m east of the base scheme design
Hedgerows	Hedgerow Regulations 1997 British Standard 5837: 2012 Trees in relation to construction S41 NERC 2006 ELLP Policy 20 Lincolnshire BAP Black Sluice IDB BAP	Local	The majority of hedgerows within the base scheme design are species-poor and dominated by hawthorn. Two hedgerows were identified as Important under the Hedgerow Regulations.
Woodland and Trees	ELLP Policy 20 British Standard 5837: 2012 Trees in relation to construction Lincolnshire BAP priority habitat when associated with hedgerows	Local	There are small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland and 1068 trees/shrubs within the base scheme design that represent a locally valuable woodland habitat resource
Watercourses	ELLP Policy 20 ELLP Policy 21 BBLP Policy G2 (R. Witham) SLLP Policy 24 (R. Witham) Lincolnshire BAP Black Sluice IDB BAP	Local	Several significant watercourses (Medlam Drain, Newham Drain, Castle Dike, Howbridge Drain/West Fen Drain and the River Witham) and field ditches are present across the base scheme design

Table 10.19 Summary of Important Ecological Features in Route Section 3			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
GCN and other amphibians	Annex 2 and 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) (9(5) only) for all except GCN S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	No GCN recorded but small numbers of common toad and common frog and one record of GCN from desktop records.
Bats	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 (some) ELCS Policy 24 BBLP Policy G2 SLLP Policy 24 Lincolnshire BAP	Local	One tree with high roost suitability (T223), one with moderate (T303) and five with low suitability located in base scheme design. One tree remaining with unconfirmed suitability (T229). Moderate activity by at least four species, mainly common pipistrelle and soprano pipistrelle associated with the drains.
Water vole	Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24 Lincolnshire BAP	Local	Water vole presence was recorded at seven locations within Route Section 3.
Otter	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	Otter activity was recorded at one location within Route Section 3.

Table 10.19 Summary of Important Ecological Features in Route Section 3			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Badger	Protection of Badgers Act 1992 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	Two main setts, two subsidiary setts and three outlier setts associated with the proposed DC cable route.
Wintering birds	S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24 Lincolnshire BAP (Farmland birds)	Local	Regular use of the Hagnaby Lock Nature Reserve and the River Witham by low numbers of birds which are also qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar.
Breeding birds	Wildlife & Countryside Act (1981) S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24 Lincolnshire BAP (Farmland birds) Black Sluice IDB BAP (Farmland birds, barn owl)	Local	Low numbers of breeding dunnock, linnet, reed bunting, skylark and yellowhammer.
Reptiles (grass snake, common lizard)	Schedule 5 Wildlife & Countryside Act (1981) (9(1) part, 9(5)) S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	No records or sightings within this section, but since similar limited habitats to other Route Sections are present, reptiles assumed to be present in low numbers.
Brown hare	S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	Records of brown hare and sightings during ecological surveys.
West European hedgehog	S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	Records from within the base scheme design and suitable habitats will be crossed by the proposed DC cable route.

Table 10.19 Summary of Important Ecological Features in Route Section 3			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Fish (European eel, spined loach)	Annex 2 Habitats Directive (spined loach) S41 NERC Act 2006 ELCS Policy 24 BBLP Policy G2 SLLP Policy 24	Local	Records from within the base scheme design and watercourses likely to support these species will be crossed by the proposed DC cable route.

5.5 Route Section 4 River Witham to the Proposed Converter Station

Designated Wildlife Sites and Notable Habitats

5.5.1 No internationally designated sites are present within 10 km and no nationally designated sites are present with 2 km of the base scheme design in Route Section 4.

5.5.2 Seven non-statutory designations are present within 1 km of the base scheme design (Table 10.20). The base scheme design crosses three of these sites, as follows: Great Hale Eau LWS; Old Forty Foot Drain to South Forty Foot Drain LWS; and South Forty Foot Drain LWS. Site details are provided in Appendix 10.3 and locations presented in Figure 10.2.

Table 10.20 Non-Statutory Designated Sites (Route Section 4)		
Name	**Description**	**Distance (m)**
Broadhurst Drain East LWS	Main habitat: Coarse or rank grassland, Drain, Neutral grassland - semi-improved	627 m west of the base scheme design
Great Hale Eau LWS	Main habitat: Drain Additional habitat: Scrub, Neutral grassland, Coarse or rank grassland	Crossed by the base scheme design
Mill Drain LWS	Main habitat: Coarse or rank grassland, Drain, Neutral grassland - semi-improved Additional habitat: Coarse or rank grassland, Scrub - scattered / dense	631 m west of the base scheme design
Old Forty Foot Drain LWS	Main habitat: Coarse or rank grassland, Drain Additional habitat: Linear reedbed, Scrub - scattered	616 m west of the base scheme design
Old Forty Foot Drain to South Forty Foot Drain LWS	Main habitat: Coarse or rank grassland, Drain	Crossed by the base scheme design

Table 10.20 Non-Statutory Designated Sites (Route Section 4)		
Name	**Description**	**Distance (m)**
South Forty Foot Drain LWS	Main habitat: Semi-improved neutral grassland, Drain, Coarse or rank grassland Additional habitat: Scattered scrub, Semi-improved calcareous grassland, Reedbed	Crossed by the base scheme design
Willow Farm Drain LWS	Main habitat: Coarse or rank grassland, Drain Additional habitat: Scrub - scattered	631 m west of the base scheme design

5.5.3 Three S41 habitats of principal importance were identified on the governmental portal Magic within 1 km of the base scheme design: coastal and floodplain grazing marsh; deciduous woodland; and no main habitat but additional habitats present. Coastal and floodplain grazing marsh is crossed by and abuts the base scheme design in three locations.

5.5.4 S41 habitats which are within a designated site that may be affected are included within the relevant assessment. Those which do not coincide with a designated site but intersect with or abut the base scheme design have been described within the extended Phase 1 habitat survey (Appendix 10.4) and are taken forward for assessment within the Habitats and Flora section where relevant.

Habitats and Flora

5.5.5 No records for protected or notable flora were returned within 1km of Route Section 4 of the base scheme design.

5.5.6 The base scheme design in Route Section 4 is dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. The habitats recorded within the survey area include:

- Arable (313.6 ha);
- Modified neutral grassland (0.41 ha);
- Semi-improved neutral grassland (11.84 ha);
- Tall ruderal herbs (0.07 ha);
- Standing water (wet ditches) (0.94 ha & 4295.99 m);
- Dry ditches (5071.38 m);
- Running water (0.74 ha);
- Species-poor hedgerows (451.64 m);
- Broad-leaved trees (317 individual trees not located within woodlands);
- Broad-leaved plantation woodland (0.0003 ha);
- Scattered scrub (accurate measure not possible);
- Bare ground (1.57 ha);
- Hard standing (1.37 ha); and

- Not surveyed due to access constraints (46.92 ha).

5.5.7 Habitats across Route Section 4 which could not be directly accessed for survey (46.92 ha) equates to approximately 12 % of the total area within the base scheme design for Route Section 4 of the proposed DC cable route.

5.5.8 Full details of the habitat survey results are provided in Appendix 10.4 with supporting plans provided in Figure 10.4 and photographs of representative habitats shown in Figure 10.5.

5.5.9 In line with CIEEM EcIA guidance (Ref 10-24)) detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. The majority of the habitats within this section fall into this category. Only those habitats taken forward as important ecological features are described in the following paragraphs. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition any impacts on fauna as a result of habitat loss, degradation or fragmentation within the base scheme design are described in the relevant faunal section.

Hedgerows

5.5.10 Hedgerow habitat is present sporadically along the Route Section 4 separating areas of arable farmland. The majority of hedgerows are well established and unmanaged. The hedgerows in this area are all species-poor and dominated by hawthorn.

5.5.11 All hedgerows along Route Section 4 consist of native woody species and qualify as S41 NERC Act 2006 (Ref 10-9) habitats of principal importance and Lincolnshire BAP (Ref 10-2) habitat. They do not qualify as important with respect to the Hedgerow Regulations 1997, but are likely to have a supporting function to protected species such as amphibians, birds and foraging bats. The hedgerow network along Route Section 4 is an important ecological feature at the Local level.

Woodland and Trees

5.5.12 Lincolnshire County Council's online mapping system indicates that no trees on or immediately adjacent to the base scheme design are subject to Tree Preservation Orders.

5.5.13 Due to the open nature of the arable landscape tree cover is generally sparse. Small areas of broad-leaved plantation woodland are present along the Route Section 4. Two blocks of broad-leaved plantation woodland are located within and adjacent to the base scheme design respectively. One woodland is described to be a recent plantation of approximately 20 years old with poor ground flora. Tree species comprised predominantly of hawthorn and wild privet. The other is a small copse of sycamore, cypress and cherry with an understory of elder and hawthorn.

5.5.14 No significant woodland ground flora species and no Schedule 8 (WCA 1981) (Ref 10-20) protected plant species such as bluebell were identified within any of the woodlands.

5.5.15 Scattered broad-leaved trees are infrequent across Route Section 4.

5.5.16 Taken as a whole, the woodland and tree stock is taken forward in this assessment as an important ecological feature at the Local level.

Watercourses

5.5.17 Several watercourses are crossed by the Route Section 4. These vary from significant wet drains (Gill Syke, Skerth Drain, Labour in Vain Drain, Great Hale Eau and South Forty Foot Drain) to wet and dry field drains. None of the drains across the base scheme design were recorded to have a flow during the habitat survey, although the more significant drains are expected to have a very slow flow.

5.5.18 A large majority of the ditches were dredged and contained very little aquatic plant species. Where ditches were not dredged, the aquatic component of the wet ditches supported a variety of marginal and emergent plant species including common reed *Phragmites australis,* greater reedmace *Typha latifolia,* reed sweet-grass *Glyceria maxima,* lesser pond-sedge *Carex acutiformis* and rosebay willowherb *Chamerion angustifolium.*

5.5.19 Floating and submerged species recorded from some watercourses included floating sweet-grass *Glyceria fluitans* and lesser water-parsnip *Berula erecta.*

5.5.20 The banks of the ditches support terrestrial plant species including species of coarse grassland such as nettle, false oat-grass, cock's foot and cow parsley. Scrub species encountered often included hawthorn and bramble.

5.5.21 The NERC Act 2006 (Ref 10-9) S41 river category includes all natural and near-natural running water habitats and as such the drains within base scheme design do not qualify as habitats of principal importance. However, these habitats do qualify as the Lincolnshire BAP (Ref 10-2) habitat rivers, canals and drains and Black Sluice IDB BAP (Ref 10-1) habitat drains.

5.5.22 Watercourses are carried forward in the assessment as important ecological features at the Local level.

Great Crested Newt and other Amphibians

5.5.23 Four pre-existing records for common frog, one record for smooth newt and five records for GCN were returned within 1 km of the base scheme design of Route Section 4 (Appendix 10.3 and Figure 10.2).

5.5.24 Full details of the habitat assessments of waterbodies within an initial 1.25 km buffer zone around the base scheme design and the amphibian data obtained from further GCN surveys within a 250 m buffer zone around the base scheme design are provided at Appendix 10.6 and Figure 10.6 with photographs of representative habitats in Figure 10.7.

5.5.25 Three ponds and 37 ditches were identified on OS maps or aerials within 250 m of the base scheme design in Route Section 4. Of these, two ponds and 21 ditches were subject to detailed habitat suitability assessment, with the remainder being scoped out due to lack of access or because the waterbody was dry or no longer present. Twelve ditches were subsequently identified with suitability scores meeting the thresholds for further survey. The findings are summarised Table 10.21.

Table 10.21 Summary of GCN survey results for waterbodies with suitable GCN habitat within Route Section 4				
Ditch Ref.	**Distance from the Base Scheme Design**	**DSI Score**	**Presence/ Absence Results**	**Population Size Class Results**
Ditches				
60	0-50 m	1	Absent	n/a
61	51-250 m	1	n/a (dried out)	n/a
62	51-250 m	1	Absent	n/a
64	0-50 m	1	Absent	n/a
75	0-50 m	5	n/a (dried out)	n/a
79	0-50 m	5	Absent	n/a
83	0-50 m	3	Present	Small (peak count 1 adult)
84	0-50 m	5	n/a (no access)	n/a
95	0-50 m	3	Inconclusive (further survey required 2018)	n/a (no access possible following eDNA survey)
97	251-500 m	1	n/a (outside 250m buffer)	n/a
499	0-50 m	3	Absent	n/a
637	0-50 m	5	Unknown (previously scoped out due to distance but now requires survey 2018)	n/a (not possible to survey during 2017 breeding season)
737	0-50 m	5	Absent	n/a

5.5.26 A small population of GCN was recorded within Ditch 83 (peak count: 1 adult). A single common toad (S41) was recorded in Ditch 64 during torch surveys. Four common frogs were recorded within Route Section 4 in Ditch 60 and Ditch 83. A single smooth newt was also recorded within Ditch 83 during torch survey.

5.5.27 Due to the limited number of amphibians recorded within Route Section 4 and the wider county and the limited amount of good quality aquatic habitat, the GCN population present within Ditch 83 and its interconnected habitats will be taken forward as an important ecological feature within the Local context.

Bats

5.5.28 Pre-existing records of bats returned within 1 km of Route Section 4 of the base scheme design include pipistrelle bat species and bats that were not identified to species level (Appendix 10.3 and Figure 10.2).

5.5.29 Full details of the bat survey results are provided at Appendix 10.7 and Figure 10.4 for trees with bat roost potential and Figures 10.8 and 10.9 for bat activity surveys.

5.5.30 The wider landscape within Route Section 4 is dominated by open arable habitat that is intensively farmed, providing sub-optimal habitat for foraging bats. There is one patch of woodland in the wider landscape within 1 km of the base scheme design and two blocks of broad-leaved plantation woodland within and adjacent to the base scheme design which provide potential foraging habitat. Hedgerows, ditches, dykes and drains present also provide good foraging and commuting habitat. Woodland, scattered trees and buildings in the wider area provide potential roosting habitat.

5.5.31 Two trees within the base scheme design have moderate roost suitability. These were a willow located within the LoD (T286) and a white willow located within a hedgerow (T287). One tree within the base scheme design had low roost suitability (T277).

5.5.32 During the transect survey at transect 4, brown-long eared bat was the only bat recorded on this transect on the first visit, with one contact at New Cut Drain. In July (visit 2) common pipistrelle and Nathusius' pipistrelle were recorded, with common pipistrelle being the most abundant species. Common pipistrelle were distributed across the route, however Nathusius' pipistrelle were only recorded near to the Gill Syke drain at the eastern end of the transect.

5.5.33 At transect 4, the static detector was deployed on Sutterton Bridge. The detector recorded bat contacts by pipistrelle bat species, with 552 bat passes recorded per night across 4 nights.

5.5.34 At transect 5, the static detector was deployed within a group of trees. The detector recorded bat contacts by pipistrelle bat species, myotis species and brown long eared. Across 6 nights, 58 bat passes were made by pipistrelle species, with 2.6 bat passes made by myotis species and 0.3 bat passes made by brown long-eared bat per night.

5.5.35 During the transect survey at transect 5, bat activity was recorded throughout the southern section of the transect, to which there was access. Habitats comprised South Forty Foot Drain, Old Sixteen Foot Drain, small ditches and edges of arable fields. 16 contacts were made in total throughout the transect, including 6 contacts along Old Sixteen Foot Drain, 2 contacts along South Forty Foot Drain, and 8 along the smaller drains and edges of arable fields. All bats recorded were common pipistrelle.

5.5.36 Two trees with moderate roost suitability and one with low suitability are located within the base scheme design in Route Section 4; one tree with moderate suitability is within the LoD. The activity and static surveys indicate that the habitats within the base scheme design are used by moderate numbers of at least five species of bat for foraging and dispersal. The majority of activity recorded was common pipistrelle and soprano pipistrelle. In light of this and categorisation using Wray et al. (Ref 10-49), their protected status and inclusion as a Lincolnshire BAP priority group, bats are taken forward as an important ecological feature within the Local context.

Water Vole

5.5.37 Numerous pre-existing records for water voles were identified from within 1km of Route Section 4 of the base scheme design. Seventy one records originated from within the base scheme design, and ten further records were returned within the 1 km buffer (Appendix 10.3 and Figure 10.2).

5.5.38 Full details of the water vole survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.5.39 Evidence of water vole activity (burrows/pathways) was recorded at one location along Route Section 4.

5.5.40 Based on the extent of suitable habitat for this species, confirmation of presence, numerous records within the base scheme design and their protected status and inclusion as a Lincolnshire BAP priority species, water vole is taken forward as an important ecological feature within the Local context.

Otter

5.5.41 Three pre-existing records for otter were identified within 1 km of Route Section 4 of the base scheme design. Two further records for otter were identified within the base scheme design, both originating from the South Forty Foot Drain (Appendix 10.3 and Figure 10.2).

5.5.42 Full details of the otter survey results are provided in Appendix 10.8 and Figure 10.10, with supporting photographs presented in Figure 10.11.

5.5.43 No evidence of otter activity was recorded along Route Section 4 during the surveys.

5.5.44 Based on the inter-connectivity and suitability of watercourses within the base scheme design, pre-existing records and their protected status, otters are taken forward as an important ecological feature within the Local context.

Badger

5.5.45 Badger activity is widespread within 1 km of Route Section 4 of the base scheme design, with 154 pre-existing records being returned from the desktop study (Appendix 10.3 and Confidential Figure 10.3).

5.5.46 Full details of the badger survey results are provided in Confidential Appendix 10.9 and Figure 10.12. The summary below does not discuss explicit locations for welfare reasons.

5.5.47 Nine badger setts (two main, two annexe, one subsidiary and four outlier setts) were identified within 30 m of the base scheme design in Route Section 4. With the exception of one outlier sett, which was found to be flooded at the time of survey, all remaining setts showed evidence of being currently active. The rural habitats across Route Section 4 and the wider area provide a large resource of high quality habitats suitable for use by badgers. The majority of the setts were located along the tops of ditch/drain banks. One outlier sett that was located within the centre of an arable field.

5.5.48 Cover is generally limited across Route Section 4. In addition to the setts being located in generally open habitats, foraging routes, latrines and diggings were also found associated within the grassy field margins of the larger arable fields. Where hedgerows/trees were found to be present, there were often field signs of badgers.

5.5.49 The network of ditches through the arable landscape provide dispersal routes and well-used paths are common in areas nearby to all active setts. The deep ditches are likely to act as obstacles to badger movements, with badger paths often clearly identifiable running alongside ditches with crossing points determined by bridges, culverts or shallower parts of the ditches. Dispersal routes are therefore likely to be well-used with movement restricted to suitable crossing points.

5.5.50 Badgers are known to be widespread both throughout the local area and across the UK. For the purposes of this assessment the badger population present within and adjacent to Route Section 4 is taken forward as a Locally important ecological feature.

Winter Birds

5.5.51 Twelve species of wintering birds have been previously recorded within 1 km of Route Section 4 of the base scheme design (Appendix 10.3 and Figure 10.2). Schedule 1 (WCA, 1981) (Ref 10-20) species recorded were brambling *Fringilla montifringilla*, fieldfare *Turdus pilaris,* greenshank *Tringa nebularia* and whimbrel *Numenius phaeopusI.* The largest peak counts were recorded for fieldfare, pink-footed goose *Anser brachyrhynchus* and teal *Anas creccal.*

5.5.52 Full details of the winter bird survey results are provided in Appendix 10.10 and Figures 10.13 and 10.14

5.5.53 Species which are qualifying features of either The Wash SPA/Ramsar or the Humber Estuary SPA/Ramsar recorded during the winter bird surveys across Route Section 4 were gadwall (peak count: 2), golden plover (peak count: 91), hen harrier (peak count: 1), marsh harrier (peak count: 1), pink-footed goose (peak count: 280) and wigeon (peak count: 6).

5.5.54 Although moderate numbers of pink-footed goose were recorded, these were only recorded on two occasions and on one of these occasions the birds were recorded only just within 500 m of the base scheme design. The majority of golden plover were also recorded at least 400 m from the base scheme design.

5.5.55 The only wader, wildfowl or raptor species recorded within the base scheme design were barn owl, buzzard, kestrel, golden plover, lapwing, mallard, mute swan, sparrowhawk, teal and wigeon, with golden plover recorded on two occasions with a peak count of total of 31 individuals and six wigeon recorded on only one occasion. Small groups of wildfowl were regularly recorded along the length of the South Forty Foot Drain.

5.5.56 A total of 20 BoCC (Ref 10-22) and/or NERC Act 2006 (Ref 10-9) S41 species were recorded within 500 m of the base scheme design during the two winter seasons surveyed. The most abundant species recorded within 500m of the base scheme design were black headed gull (peak count: 450), fieldfare (peak count: 850), linnet (peak count: 83), and starling (peak count: 70).

5.5.57 Barn owl was regularly recorded to the west of the South Forty Foot Drain near to Ferry Farm.

5.5.58 Within the base scheme design itself a total of 11 BoCC (Ref 10-22) and/or NERC Act 2006 (Ref 10-9) S41 species were recorded. For the majority of these species, only low numbers were recorded, although moderate numbers of fieldfare (peak count 250) were occasionally recorded.

5.5.59 Due to regular use of the South Forty Foot Drain by wildfowl and regular use of fields within 500 m of the base scheme design by low numbers of birds which are listed as qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar, the winter bird assemblage is taken forward as an important ecological feature within the Local context.

Breeding Birds

5.5.60 Nineteen species of breeding birds have been previously recorded within 1 km of Route Section 4 of the base scheme design (Appendix 10.3 and Figure 10.2). Schedule 1 (WCA, 1981 (Ref 10-20)) species previously recorded were hobby and marsh harrier, barn owl and kingfisher.

5.5.61 Full details of the BBS results are provided in Appendix 10.11 and Figures 10.15 – 10.17.

5.5.62 During the 2017 BBS, a total of 29 bird species were recorded within Route Section 4. Of these, 16 priority bird species were recorded within Route Section 4, including five NERC Act 2006 (Ref 10-9) S41 species, four red listed BoCC (Ref 10-22) species and 12 amber listed BoCC species. No Schedule 1 species (WCA, 1981) (Ref 10-20) were recorded.

5.5.63 Species determined to be probably breeding within the LoD of Route Section 4 include reed bunting, skylark and yellowhammer:

- Reed bunting was recorded as likely to breed within vegetation within drains and ditches across Route Section 4, with five pairs likely to nest within wetland vegetation within the LoD in the surveyed sections.
- Skylark was recorded to breed within the open arable fields through which Route Section 4 passes. It is likely that eight pairs of skylark nested within the LoD within the survey area.
- Yellowhammer was recorded occasionally in Route Section 4, with two pairs likely to nest within scrub within the LoD in the surveyed sections.

5.5.64 44.5 % of Route Section 4 was covered by the breeding bird survey, which would give a multiplication factor of 2.25 to extrapolate for the entire length of this Route Section. However this area was selected due to the greater habitat suitability for breeding birds. Therefore, due to the habitat suitability available in the remaining unsurveyed areas, a weighting factor has been applied to the multiplication factor, of 0.33 for species characteristic of open arable farmland, and 0.5 for other bird species. The recorded number of predicted pairs characteristic of open arable farmland have therefore been multiplied by 1.81 and pairs of other bird species multiplied by 1.13 to give the predicted number of pairs within Route Section 4.

5.5.65 Applying the weighting factor, it is predicted that 6 pairs of reed bunting, 9 pairs of skylark and 2 pairs of yellowhammer are likely to nest in Route Section 4.

5.5.66 Due to the presence of a range of breeding priority bird species, breeding birds are taken forward for assessment at the Local level of importance.

Reptiles

5.5.67 No pre-existing records of reptiles were returned within 1km of Route Section 4 of the base scheme design.

5.5.68 A dead grass snake was recorded within the base scheme design to the east of South Forty Foot Drain and a common lizard *Zootoca vivipara* was observed to the north east of Bicker Fen Substation during habitat surveys in September 2016. A snake was observed in an unmanaged field margin approximately 2 km south west of the River Witham during non-ecological surveys. It assumed to be a grass snake, given the immediate environs and also that the closest known adder population is from Woodhall Spa approximately 16 km to the north.

5.5.69 The intensively farmed arable fields provide little opportunity for suitable habitats for reptiles. However, unmanaged field margins and the extensive ditch and drain network do provide suitable foraging and commuting habitats, although opportunities for hibernation and breeding may be limited. However, this habitat is limited in extent and any reptiles that are present are likely to be at low densities.

5.5.70 The observation of grass snake and common lizard within and in the vicinity, respectively, of the base scheme design confirms that these species are present. The overall extent and distribution of suitable habitats in the base scheme design is such that densities are likely to be low overall, with localised distributions focussed on the microhabitats of higher suitability, namely the field margins and ditch/hedgerow network. Taking their protected status and the inclusion of grass snake as a priority species in the Black Sluice IDB BAP (Ref 10-1) into account, reptiles are taken forward for assessment at the Local level of importance.

Other Fauna

5.5.71 Records were returned within 1 km of Route Section 4 of the base scheme design (Appendix 10.3 and Figure 10.2) for a number of NERC Act 2006 (Ref 10-9) S41 species. These include: brown hare*;* west European hedgehog*;* European eel *Anguilla Anguilla;* spined loach Cobitis *taenia;* white admiral *Limenitis Camilla;* and small heath *Coenonympha pamphilus*. Thirty records of European eel and twenty six records of spined loach were returned from within the base scheme design.

5.5.72 Incidental records of brown hare were recorded during other ecological surveys. The predominantly agricultural nature of the surrounding land with its unmanaged field margins, combined with the hedgerow and woodland network provide ample suitable habitat for this species. Due to the presence of brown hare within the basic scheme design and the vulnerability of their young (leverets) to disturbance, this species is taken forward for assessment as an important ecological feature at the Local level.

5.5.73 West European hedgehog has been previously recorded within 1 km of the base scheme design. It is likely that they are present within the base scheme design, occupying bases of hedgerows and in woodland and scrub within this section. Due to their tendency to curl up and remain in one place when threatened and their vulnerability during hibernation, this species is taken forward for assessment as an important ecological feature at the Local level.

5.5.74 Since European eel and spined loach have been recorded within the base scheme design it is likely that these species may be present in watercourses that are crossed by the proposed DC cable route. For this reason, these species are taken forward for assessment as an important ecological feature at the Local level.

5.5.75 Several butterfly species have been recorded in Route Section 4. The majority of moth records originate from a limited number of locations. The habitats are generally of low structural and species diversity in this section, and are unlikely to support diverse assemblages of invertebrates. For this reason, invertebrates are not taken forward for assessment.

Summary of Important Ecological Features

5.5.76 Table 10.22 provides a summary of the designated sites, habitats and fauna that have been identified as important ecological features in Route Section 4, which have the potential to be impacted by the base scheme design.

Table 10.22 Summary of Important Ecological Features in Route Section 4

Ecological Feature	Policy/Legislation	Ecological Value	Description
Old Forty Foot Drain to South Forty Foot Drain LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	Crossed by the base scheme design
South Forty Foot Drain LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21 SELLP Policy 24	County	Crossed by the base scheme design
Great Hale Eau LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	Crossed by the base scheme design
Old Forty Foot Drain LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	616 m west of the base scheme design
Broadhurst Drain East LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	627 m west of the base scheme design

Table 10.22 Summary of Important Ecological Features in Route Section 4			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Mill Drain LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	631 m west of the base scheme design
Willow Farm Drain LWS	The Town and Country Planning Act 1990 CLLP Policy 16 CLLP Policy 21	County	631 m west of the base scheme design
Hedgerows	Hedgerow Regulations 1997 British Standard 5837: 2012 Trees in relation to construction S41 NERC 2006 BBLP Policy G2 CLLP Policy LP21 Lincolnshire BAP Black Sluice IDB BAP	Local	The majority of hedgerows within the base scheme design are species-poor and dominated by hawthorn. No important hedgerows were identified.
Woodland and Trees	British Standard 5837: 2012 Trees in relation to construction BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP priority habitat when associated with hedgerows	Local	There are small areas of broad-leaved plantation woodland and 317 trees/shrubs within the base scheme design that represent a locally valuable woodland habitat resource
Watercourses	BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP Black Sluice IDB BAP	Local	Several significant watercourses (Gill Syke, Skerth Drain, Labour in Vain Drain, Great Hale Eau and South Forty Foot Drain) and field ditches are present across the base scheme design

Table 10.22 Summary of Important Ecological Features in Route Section 4			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
GCN and other amphibians	Annex 2 and 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) (9(5) only) for all except GCN S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Black Sluice IDB BAP priority species (newts)	Local	Records for common frog, smooth newt and GCN within 1 km of the base scheme design in this section. One GCN recorded in Ditch 83.
Bats	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 (some) BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP Black Sluice IDB BAP	Local	Two trees with moderate bat roost potential (T286 and T287) and one with low potential (T277) within the base scheme design. Moderate activity of at least five species, mainly common pipistrelle and soprano pipistrelle associated with the Forty Foot Drain and Old Sixty Foot Drain.
Water vole	Schedule 5 Wildlife & Countryside Act (1981) S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP Black Sluice IDB BAP	Local	Water vole were recorded at one location within Route Section 4.

Table 10.22 Summary of Important Ecological Features in Route Section 4			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Otter	Annex 4 Habitats Directive Conservation of Habitats and Species 2010 Schedule 5 Wildlife & Countryside Act (1981) BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 S41 NERC Act 2006 Black Sluice IDB BAP	Local	No evidence of otter identified during surveys, although suitable habitat exists and records returned within base scheme design.
Badger	Protection of Badgers Act 1992 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21	Local	Two main setts, two annexe setts, one subsidiary and four outlier setts associated with the proposed DC cable route.
Wintering birds	S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP (Farmland birds) Black Sluice IDB BAP (Farmland birds, barn owl)	Local	Regular usage of the South Forty Foot Drain by wildfowl and regular use of fields within 500 m of the base scheme design by low numbers of birds which are also qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar.
Breeding birds	Wildlife & Countryside Act (1981) S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Lincolnshire BAP (Farmland birds) Black Sluice IDB BAP (Farmland birds, barn owl)	Local	Small numbers of S41/BoCC species characteristic of surrounding landscape likely to nest within base scheme design, including reed bunting, skylark and yellowhammer.

Table 10.22 Summary of Important Ecological Features in Route Section 4			
Ecological Feature	**Policy/Legislation**	**Ecological Value**	**Description**
Reptiles (grass snake, common lizard)	Schedule 5 Wildlife & Countryside Act (1981) (9(1) part, 9(5)) S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21 Black Sluice IDB BAP priority species (grass snake)	Local	Grass snake and common lizard observed within vicinity of Bicker Fen; snake (species undetermined) recorded south west of River Witham and therefore assumed present at low densities.
Brown hare	S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21	Local	Small numbers observed in the area and records from within 1 km.
Fish (European eel, spined loach)	S41 NERC Act 2006 BBLP Policy G2 SELLP Policy 24 CLLP Policy LP21	Local	High number of records for both species within 1 km, therefore assumed present in watercourses.

5.6 Baseline Projection

5.6.1 An integral part of ecological impact assessment is to consider the predicted trends of each of the ecological features if no development and mitigation were to be carried out.

5.6.2 With respect to the predominantly agricultural use of land within the base scheme design, there is no indication that in the absence of development the use and therefore management of these areas would alter. Therefore, the ecological value of these areas would be expected to remain at its existing level.

5.6.3 The small patches of woodland, occasional trees, if left undeveloped and unmanaged, would be expected to mature and increase in structural complexity. These changes would benefit the majority of faunal groups since this habitat resource is so limited in the area.

5.6.4 It is likely that the network of ditches and drains will continue to be managed similarly to current practices. They will continue to provide potential connectivity for several species, including terrestrial and aquatic species through the agricultural landscape.

5.6.5 In June 2009, the UK Climate Projections 2009 (UKCP09) (Ref 10-50) were published on behalf of the Department for Environment and Rural Affairs (Defra) and the Department for Energy and Climate Change (DECC). The projections report in 30 year intervals, up to the 2020s, 2050s, and 2080s for three scenarios of emissions (low, medium, and high) based on work published by the Intergovernmental Panel on Climate Change (IPCC) (Ref 10-51).

5.6.6 The projections suggest that all areas of the UK will get warmer, more so in the summer than in the winter. It is possible that in the 2080s mean temperatures across the UK will have increased

by between 1.8 and 3.1°C in the winter and 2.5 and 4.2°C in the summer. The greatest increases will be in southern England with the smallest increases in northern Scotland.

5.6.7 By the 2080s, winter rainfall could increase by as much as 33 % in some parts of the UK whilst summer rainfall could decrease by 40 % in other areas. Sea levels around the UK could rise by between 12 and 76 cm between 1990 and 2095.

5.6.8 Specifically, within the East Midlands temperatures are expected to rise by 2.2°C in winter, which is higher than most parts of England, and 2.5°C in the summer by the 2080's. By the 2050s, the indications are that rainfall will increase by up to 33 % in the winter and by 13 % in the summer.

6 Potential Impacts

6.1 Overview of Potential Impacts

Temporary Impacts

6.1.1 For the purposes of this EIA, temporary impacts are typically those which are short-term or occur during the construction phase only. This includes effects resulting from construction traffic, noise and vibration from construction plant and machinery, dust generation and site runoff as well as effects resulting from temporary loss of land. It also includes other temporary effects caused by access or compounds such as the potential for killing or injury, fragmentation of commuting routes for a range of fauna and disturbance and displacement from areas normally used for foraging and/or refuge.

Longer Term, Operational and Permanent Impacts

6.1.2 For the purposes of this EIA operational, longer term and permanent impacts are those which would occur as a result of the base scheme design's construction, land take or as a result of its operation. With respect to the proposed DC cable route, there will be no permanent loss of land and no operational effects which would be considered to significantly affect the ecological resource of the area.

6.1.3 Longer term effects will comprise the time taken for certain reinstated habitats such as trees and hedgerows to reach the functional equivalent of the habitats that were originally lost.

6.1.4 For both the temporary impacts and longer term, operational and permanent impacts, a range of embedded mitigation, legal compliance and good practice measures are described in the Basis of Assessment (Section 3). These measures will be implemented as part of the base scheme design. As it is certain these measures will be applied to the base scheme design, pre-mitigation impacts are assessed after taking these measures into account.

6.2 Route Section 1 Proposed Landfall to Well High Lane

Temporary Impacts

Designated Wildlife Sites and Notable Habitats

6.2.1 Due to their distance from the base scheme design, it is certain that no temporary direct or indirect impacts are anticipated for the physical areas designated as the Humber Estuary SPA/Ramsar site, Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, The Wash SPA/Ramsar site and The Wash SPA/Ramsar site. Temporary impacts associated with wintering bird features for these sites are considered within the wintering birds section below.

6.2.2 The two composite parts of Sea Bank Clay Pits SSSI (Huttoft Bank Pit and Sandilands Pit LWT reserves) are a moderate distance from the base scheme design and no direct impacts will occur.

6.2.3 It is extremely unlikely that any indirect impacts to the habitats of the site will occur with respect to degradation or pollution of habitats, taking into account the embedded pollution prevention measures, however there is the potential for disturbance to some fauna associated with these sites including wintering and breeding birds. These impacts are discussed in the relevant sections below.

6.2.4 With the exception of Huttoft Bank Pit and Sandilands Pit LWT reserves which are discussed above, it is certain that no direct or indirect temporary impacts including degradation or pollution effects will occur on any of the non-statutory designated sites, due to their distance from the base scheme design and embedded pollution prevention measures, with the exception of the following: Firsby to Louth Dismantled Railway SNCI; Rigsby Wood LWS, LWT reserve and Ancient Woodland; and Sandilands Golf Course and Dunes LWS. Discussion of the potential impacts on these sites is presented in Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 1)Table 10.23Table 10. below.

6.2.5 With the exception of the NERC Act 2006 (Ref 10-9) S41 coastal and sand dune priority habitat which is congruent with Sandilands Golf Course and Dunes LWS, no other S41 priority habitats will be directly or indirectly affected by construction activities.

6.2.6 The potential for degradation of the habitats for which all these sites are designated as a result of water or airborne pollution, dust and debris will be avoided due to the inclusion of embedded pollution prevention measures in the CEMP. Therefore no temporary impacts as a result of these aspects of construction are predicted.

Table 10.23 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 1)

Site (Ecological Value)	Potential Impact	Significance
Firsby to Louth Dismantled Railway SNCI (County)	It is certain that the DC cable route will cross this site using open-cut methods where there is a gap in the trees and scrub. The longer term impacts are discussed in relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the SNCI. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the site are predicted.	**Not significant**

Table 10.23 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 1)		
Site (Ecological Value)	**Potential Impact**	**Significance**
Sandilands Golf Course and Dunes LWS (County) (including S41 coastal sand dune priority habitat)	This site will be crossed as part of the proposed landfall. The majority of the associated works at this point are the HDD beneath the designation. Construction traffic may need to access the beach, but this will be done via the existing access through the site and will not affect valued habitats. It is possible that accidental encroachment by construction traffic will occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the site is predicted.	**Not significant**
Rigsby Wood LWS (County)	This site abuts the western boundary of the base scheme design. It is possible that accidental encroachment by construction traffic will occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the site is predicted.	**Not significant**

Habitats and Flora

Hedgerows

6.2.7 There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off as well as accidental encroachment on habitats by construction traffic. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities and impacts will be extremely unlikely to occur. Taking into account the embedded mitigation, effects on hedgerows are **not significant**.

Woodland and Trees

6.2.8 As discussed for hedgerows, there is the potential for temporary degradation of the habitats. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities. Taking into account the embedded mitigation prior to

assessment it is extremely unlikely that impacts associated with temporary degradation will occur and therefore effects on woodland and trees are **not significant**.

Watercourses

6.2.9 Several temporary culverts will be required across watercourses along the proposed DC cable route. There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. It is extremely unlikely that impacts associated with temporary degradation will occur and therefore, effects on watercourses are **not significant**.

6.2.10 Where culverts are installed into wet ditches for temporary access, disruption to the flow of watercourses during construction will be short-term with the flow reinstated once the culverts are in place. Given the current management regimes ongoing for these ditches, involving regular dredging and cutting, the installation of the culverts is extremely unlikely to have a significant effect on the ecological features of these watercourses. Therefore the effects will be **not significant.**

Great crested Newt and other Amphibians

6.2.11 The proposed construction works within Route Section 1 will result in the short term temporary loss of amphibian terrestrial and potentially aquatic habitat within the base scheme area. Ditch 3 supports a small population of GCN and runs parallel to and within 250 m of the LoD. The ditch intersects with the Wold Grift Drain, which will be crossed by a trenchless method but will still require a temporary bridge/culvert for the temporary construction haul road.

6.2.12 Construction works will result in the short term temporary loss of amphibian terrestrial and aquatic habitat, particularly where drains and hedgerows are crossed. Given the small temporary losses and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.2.13 Temporary fragmentation impacts may occur where watercourses and suitable terrestrial habitat (hedgerows, scrub, coarse grassland) are crossed by the proposed DC cable route and where temporary bridges/culverts are required. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies. However, given the temporary nature of any barriers to movement and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.2.14 There is the potential for killing or injury of amphibians during site clearance of suitable habitats and installation of temporary bridges/culverts at watercourse crossings, particularly GCN in close proximity to Ditch 3. There is the potential for amphibians to use soil piles and stored materials for refuge and hibernation which could result in killing or injury when these are moved. These effects could lead to a significant adverse effect at the Site level if unmitigated. However, RAMs are embedded into the scheme and will be employed during vegetation clearance and construction site management of soils and materials. As a result of the embedded RAMs, it is

extremely unlikely that impacts associated with construction will lead to killing or injury of GCN and other amphibians. Therefore the effects on amphibians with respect to killing and injury are certain to be **not significant**.

Bats

6.2.15 One tree with low bat roosting potential is located within the base scheme design. It is not currently known whether this tree can be retained within the design. A reasonable a worst case assumes that this tree will require removal. As this tree only contains low potential for roosting bats, it is only likely to support individuals or small numbers for short periods. Embedded mitigation measures, including using soft-felling methods to fell the tree would ensure that bats are not injured or harmed and any low numbers of bats present would likely easily relocate to other nearby bat roost features. The loss of this one possible roost site feature is unlikely to affect the overall availability of bat roost features present in the wider landscape. Loss of this tree would therefore not result in a significant adverse effect on roosting bats. The temporary effects on roosting bats during construction are **not significant**.

6.2.16 At least four species of bat, mostly common and soprano pipistrelles, use the habitats within the base scheme design for foraging and commuting. The larger drains appear to be of particular value for bats crossing through the landscape. It is certain that all the ditches/drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide. A total of 16 sections of hedgerow will be required to be removed to facilitate cable installation in Route Section 1, totalling 824 m of hedgerow. Since fragmentation effects, including potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, it is probable that temporary fragmentation impacts could affect a small numbers of bats during construction. However, embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population. Therefore temporary fragmentation impacts associated with hedgerow removal will be removed and the effect on the local bat population is near certain to be **not significant.**

6.2.17 Bats foraging or commuting within the immediate vicinity of construction works may be disturbed by construction lighting, if required for night time working. It is only possible that this effect will occur, since the majority of night time working would take place during the winter (as a consequence of shorter day light hours). Bats will not be active during this time and would therefore not be affected by the lighting, if needed to maintain working day lengths. Lighting of work areas during construction is only anticipated for specific activities which will be of short duration and intermittent throughout the construction period. It is unlikely that this will cause any significant effects to the foraging and commuting activities of the local bat population. Overall, the effects of temporary lighting on bats during construction are considered **not significant**.

Water Vole

6.2.18 Many of the ditches and drains along Route Section 1 provide suitable habitat for water vole and whilst only nine ditches were found to support water vole, there is a high degree of inter-connectivity between the ditches and water voles are a mobile species. Furthermore individual territory size and population densities commonly fluctuate between seasons. It is certain that all the ditches/drains suitable for water vole will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is certain not to lead to a significant loss of suitable habitats or of fragmentation effects for water voles. Therefore it is considered that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.2.19 It is possible that killing or injury of water voles during installation of temporary bridges/culverts may occur. However, embedded mitigation will ensure pre-construction surveys are undertaken to confirm their presence and, under licence where necessary to comply with wildlife legislation, displacement of water vole from the area of the temporary bridges/culverts will be undertaken prior to the construction works commencing. Therefore it is certain the effects of killing or injury on water vole as a result of temporary bridges/culverts for temporary haul roads will be **not significant**.

Otter

6.2.20 A number of the ditches and drains along Route Section 1 provide suitable habitat for otter. Otter activity was recorded in five locations along Route Section 1 although no holts or resting places were present. There is a high degree of inter-connectivity between the ditches and otters are likely to utilise these habitats for dispersal and foraging. It is certain that the all the ditches/drains with otter activity will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for otter. Therefore it is certain the effects of temporary habitat loss on otter as a result of temporary bridges/culverts for temporary haul roads is **not significant**.

6.2.21 It is extremely unlikely that killing or injury of otters during installation of temporary bridges/culverts will occur. It is unlikely that holts or resting places would be established in proposed crossing locations before construction begins. However, it is certain that embedded mitigation comprising pre-construction surveys will enable baseline data to be updated and licensed works to be implemented in advance of construction commencing, in the unlikely event that otters are subsequently found to in occupation. There is also the potential for otters to become trapped in excavations where these are close to watercourse crossings. However, embedded mitigation will be certain to ensure excavations are covered over at night or alternatively that ramps provided to prevent entrapment. Therefore it is certain the potential for

injury of otter as a result of construction activities and temporary bridges/culverts will be **not significant**.

Badger

6.2.22 The proposed DC cable route, temporary access roads and temporary construction compounds have been designed to minimise impacts upon the local badger population. However, due to the prevalence of activity across the base scheme design, construction will unavoidably result in the closure of two badger setts. Two setts (S146, an outlier sett and S10, a subsidiary sett) will be impacted directly by the proposed working area for the cable route and LoD. Although both setts were found to be active at the time of survey, due to the nature of outlier/subsidiary setts, the activity levels are likely to change across the year and are therefore not considered as valuable to the local clan as a main sett. It is certain that the embedded mitigation measures, including the closure of setts through Natural England licence, will ensure that no detrimental impact on badgers is encountered and therefore the effect is considered to be **not significant**.

6.2.23 A third sett is also located within 30 m of LoD for the DC cable route. However works proposed within 30 m of this sett are limited to temporary drainage works, which have been designed to avoid the sett. Embedded mitigation will ensure the limited works within proximity to the sett are supervised and implemented in a manner that avoids risk to the integrity of the sett or disturbance of badgers which may be in occupation at the time of works. It is near certain that this sett will not be impacted and therefore potential disturbance effects for this sett are considered to be **not significant**.

6.2.24 It is possible that killing, injury or entrapment of badgers (e.g. from site traffic and by falling into excavations) during the construction period, particularly during the proposed DC cable installation, may occur. Excavations will be covered or fenced off at night, or ramps will be provided to prevent entrapment of badgers during construction. It is near certain that this will prevent killing and injury due to entrapment and therefore the effect on the badger clan is **not significant** within Route Section 1.

6.2.1 It is certain that temporary foraging habitat loss will occur as a result of construction of the temporary construction compounds and installation of the proposed DC cables. However ample alternative foraging habitat within the wide expanse of landscape is available in the immediate area therefore it is certain that this impact will not lead to significant effects on the badger clan. The effects of temporary habitat loss on the local badger clan are therefore **not significant** within Route Section 1.

6.2.2 It is possible that the construction of temporary access roads and installation of the proposed DC cable route will cause temporary fragmentation impacts. These fragmentation impacts would be exacerbated where the design of any security fencing during construction may impede badger movement. However, the installation of two-way badger gates into demarcation fencing on known badger dispersal routes along the proposed DC cable route will prevent fragmentation impacts on the local badger clan and their movements. Taking into account the embedded mitigation, it is near certain that effects on the local badger clan as a result of fragmentation impacts will be **not significant** within Route Section 1.

Winter Birds

6.2.3 The proposed construction works could result in the short term temporary loss of land within the working area of the cable route during the winter period. It would also likely result in the displacement of some birds within 500 m of the working area through both noise and visual disturbance generated by the construction works.

6.2.4 The majority of habitats of value to wintering birds in this section is at Huttoft Bank Pit LWT reserve. Due to the distance of Huttoft Bank Pit LWT reserve from the base scheme design (approximately 400 m) it is unlikely that species using this area would suffer significant displacement from the proposed works, as the greatest noise levels generated at the HDD compound would only equate to 50 dB at this point (low noise disturbance level for waterbirds). However some birds which are qualifying features of The Wash SPA/Ramsar, including Bewick's swan and whooper swan, were also recorded to the north of the reserve on land within 200 m of the base scheme design. Maximum noise levels at 200 m from the HDD compound would be 57 dB, which could result in a disturbance response from these birds. It is possible that these birds could be subject to low levels of disturbance and displacement during temporary construction works at the closest locations to this area if carried out during the winter period.

6.2.5 The large numbers of wigeon recorded at Boy Grift Drain were only recorded in this location on one occasion during the winter bird surveys, indicating only irregular use of this habitat. Given the temporary nature and short duration of the works within any given locale along the route, it is therefore highly unlikely that the adjacent works would cause significant disturbance/displacement effects to this species.

6.2.6 Due to the potential for some low levels of disturbance and displacement on low numbers of SPA/Ramsar species, this is characterised as a **significant adverse at the Local level**.

Breeding Birds

6.2.7 During construction works there is the potential for temporary displacement effects due to visual disturbance effects caused by the workers as well as temporary habitat loss from temporary compounds. This is likely to result in the temporary displacement of low numbers of a range of priority bird species including dunnock (10 pairs), linnet (2 pairs), grey partridge (1 pair), house sparrow (1 pair), reed bunting (8 pairs), skylark (17 pairs), song thrush (1 pair), tree sparrow (1 pair), yellow wagtail (2 pairs) and yellowhammer (7 pairs).

6.2.8 Due to the temporary nature of the works and the short distance over which these species are likely to be displaced, as well as the abundance of other suitable habitat for these species in the nearby area, it is likely that this impact would be minimal. Therefore the potential impact of temporary displacement is **not significant**.

6.2.9 There is the potential for damage or destruction of a number of active bird nests during any vegetation clearance works carried out during the breeding season. However, in compliance with wildlife legislation, embedded mitigation comprising nesting bird checks during vegetation clearance, if implemented within the nesting season, will ensure damage or destruction of nests is avoided. Therefore the impact on breeding birds with respect to killing and injury will be **not significant**.

Reptiles

6.2.10 The majority of the construction works fall within low quality reptile habitat i.e. arable land. Unmanaged field margins, vegetated banks of drains (both of which are common in the wider area) and hedgerows provide better quality habitat which could support reptiles. Due to the prevalence of these habitats in the wider area, the temporary losses of small localised areas are highly unlikely to impede reptile dispersal or significantly reduce forage availability. Therefore it is near certain that the potential effect of temporary habitat losses upon the integrity and survivability of the local reptile populations is **not significant**.

6.2.11 It is possible that killing or injury of small numbers of reptiles during vegetation clearance works may occur. However, in compliance with wildlife legislation, embedded mitigation comprising RAMs during vegetation clearance (as will also be implemented for amphibians) will ensure killing or injury of reptiles is certain to be avoided. Therefore the effect will be **not significant**.

Brown Hare

6.2.12 The landscape containing the base scheme design is, broadly speaking, homogeneous and the extent of suitable habitats for brown hare that would be affected is proportionally very small. Temporary losses which will be incurred as a result of construction of the proposed DC cable route will not lead to a significant loss of suitable habitats or of fragmentation effects. Therefore the potential impact of temporary habitat loss and fragmentation is extremely unlikely to affect the brown hare population and therefore effects are **not significant**.

6.2.13 Due to their sensitivity to noise and visual activity it is anticipated that adult brown hare would suffer from localised perturbation once construction activities commence, the consequence of which is that they would be unlikely to be killed or injured as a result. Immature brown hare (leverets), however, would remain susceptible to possible killing or injury during initial site clearance, depending on the timing of this activity, as they are left alone in forms during the day and may be reluctant to move. Leverets are therefore at risk of responding too late to potential dangers. It is also possible for hares to become trapped in excavations associated with construction activities, which may cause distress or injury. However embedded mitigation identified for other species will be certain to ensure excavations are covered over and/or egress ramps provided in order to prevent entrapment. Overall there remains a possibility for killing or injury of small numbers of leverets and the effect is therefore categorised as a **significant adverse at the Local level**.

European Eel

6.2.14 The numerous ditches and drains within Route Section 1 provide suitable habitat for European eel. It is certain that the majority of drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Only two crossings will be undertaken by open cut methods and these are small ditches that are of low suitability for European eel. Therefore it is certain the effects of temporary habitat loss on European eel as a result of open cut crossings and bridges/culverts for temporary haul roads will be **not significant**.

6.2.15 Migratory species such as the European eel are particularly sensitive during the migration seasons of spring and autumn. If open-cut construction across watercourses should fall within these periods, migration may be delayed in the short-term whilst dry working is underway. Although, eels are known to travel overland for moderate distances, it is unlikely that they would cross the construction working width, which being stripped of vegetation would not provide suitable habitat for eels to move across. The two crossings which will be open cut as small, being only 2 m wide and 0.5 m deep. These are extremely unlikely to support European eel, when other more suitable drains are available and therefore it is certain that possible fragmentation effects during construction activities are **not significant**.

Longer Term, Operational and Permanent Impacts

Designated Wildlife Sites and Notable Habitats

6.2.16 Due to their distance from the base scheme design and lack of any direct or indirect impacts, no longer term, operational or permanent impacts are anticipated to occur at Humber Estuary SPA/Ramsar site, Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, The Wash SPA/Ramsar site and Gibraltar Point SPA/Ramsar site.

6.2.17 No longer term or permanent impacts are predicted to occur on the Sea Banks Clay Pits SSSI (Huttoft Bank Pit and Sandilands Pit LWT reserves). Once operational, no impacts on this SSSI are predicted to occur.

6.2.18 No longer term, operational or permanent impacts are predicted for the non-statutory designated sites or priority habitats which fall within 1 km of Route Section 1, with the exception of Firsby to Louth Dismantled Railway SNCI.

6.2.19 As the proposed DC cable route will cross Firsby to Louth Dismantled Railway SNCI using open-cut methods, the works will result in small losses of scrub and grassland within a maximum 30 m wide section will re-establish once works are complete. This equates to longer term temporary loss to approximately 1 % of the designation associated with the time taken for habitats to re-establish. As the site is designated, reinstatement will comprise natural regeneration rather than re-seeding in order to prevent the introduction of plant species which would not ordinarily be present in the locality. Re-establishment of vegetation is probable within 2-4 years for grassland and up to 5 years for scrub. Therefore over the longer term, effects following temporary losses will be **not significant**.

Habitats and Flora

Hedgerows

6.2.20 Route Section 1 contains a total of 3649.5 m of native hedgerow across 29 individual sections. A total of 553.5 m species-rich intact hedgerow, 2206.3 m species-poor intact hedgerow, 815.4 m species-poor defunct hedgerow and 74.2 m species-poor intact hedgerow with trees were recorded.

6.2.21 Assuming the worst case scenario of the working corridor covering the entire working width of 30 m (on average), installation of the proposed DC cable route will result in the total loss of 823.8

m of native hedgerow across 16 individual sections. This loss comprises approximately 213.5 m species-rich intact hedgerow, 437.0 m of species-poor intact hedgerow, 50.3 m species-poor intact hedgerow with trees and 123.1 m of species-poor defunct hedgerow.

6.2.22 It is probable that the losses calculated above are an over estimation as hedgerow crossings, where adjacent to drains, will be trenchless. Therefore less hedgerow will in fact require removal to facilitate construction of a temporary haul road. Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 160 m of hedgerow would require removal.

6.2.23 The embedded habitat reinstatement plan will deliver in-situ replacement of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. The gap-planting can be expected establish and mature after approximately 5 years and hedgerows will be returned to their pre-construction functionality. Therefore, in the longer term, it is near certain that the effects of construction on hedgerows is considered to be **not significant**.

Woodland and Trees

6.2.24 Route Section 1 lies adjacent to one area of semi-natural broad-leaved woodland. This parcel forms the edge of a larger parcel west of Wold Grift Drain. It is certain that construction will not result in any loss of this habitat.

6.2.25 One area of linear broad-leaved plantation woodland is crossed by the DC route at the Sutton Branch Line Walkway and Conservation Area. Construction will result in the certain loss of 0.05 ha of this habitat as this will be crossed via open cut methods.

6.2.26 It is possible that 22 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. This is based on Lidar data, which is likely to be an overestimation as discussed in Appendix 10.4. However it is anticipated that the majority of these trees will be retained through micro-siting during construction.

6.2.27 The permanent easement means that woodland and tree habitats cannot be replaced in-situ. Permanent loss of these woodland habitats represents a **significant adverse effect at the Local Level.**

6.2.28 The reinstatement plan allows for replacement of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant**.

6.2.29 It is possible that woodland and trees will be affected by the base scheme design for pre-construction land drainage. Tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8” trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established

within 5-10 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant.**

Watercourses

6.2.30 Route Section 1 crosses 17 watercourses and field ditches. The majority of these features will be crossed using trenchless measures which will impact bankside habitats.

6.2.31 Two ditches, will be crossed using open cut measures. These two ditches and a further eleven trenchless crossings will also require a temporary culvert. The rest of the ditches and watercourses will be crossed using a temporary bridge.

6.2.32 Based on the worst case scenario of the working corridor for these crossings covering the entire working width of 55 m (on average), this will result in the possible temporary loss of 839.29 m of bankside habitat. However it is extremely unlikely the full length of the working area will impact bankside habitats. It is probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 170 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 170 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna. Therefore it is certain that the long-term effect on watercourse habitats is **not significant**.

6.2.33 Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation can expect to be re-established within 2-4 years. Therefore, over the longer term, effects following temporary losses will be not significant.

6.2.34 It is probable that permanent outfalls will be installed in association with the base scheme design for pre-construction land drainage. The small area of habitat permanently lost as a result of construction is estimated to be approximately $3m^2$ and as bankside habitats are abundant within the local area it is certain that this permanent loss will be **not significant**.

Great Crested Newt and other Amphibians

6.2.35 No operational or permanent impacts are anticipated for GCN and other amphibians.

6.2.36 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which amphibians can utilise during the re-establishment period, these longer term impacts are considered to be **not significant**.

Bats

6.2.37 No longer term, operational or permanent impacts are predicted to affect trees identified to have suitability for roosting bats.

6.2.38 Construction across field boundaries such hedgerows and drains has the potential to cause fragmentation effects on commuting and foraging bats as the continuity of the feature is interrupted. This effect will continue where hedgerows have been removed, until the reinstatement has reached functional capability, approximately 5 years. Temporary fencing will ensure they are functional while the planting establishes and matures. Therefore the longer-term impact of fragmentation taking into account embedded mitigation is considered to be **not significant**.

Water Vole

6.2.39 No operational or permanent impacts are anticipated for water vole.

6.2.40 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Otter

6.2.41 No operational or permanent impacts are anticipated for otter.

6.2.42 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Badger

6.2.43 No operational or permanent impacts are anticipated for badger.

6.2.44 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of habitats within the locality which badgers can utilise during the re-establishment period, and the fact that no main badger sett will be lost during the construction phase, these longer term impacts are certain to be **not significant** in Route Section 1.

Winter Birds

6.2.45 No operational or permanent impacts are anticipated for wintering birds.

6.2.46 The predominant terrestrial habitat utilised by wintering birds is the arable land which is crossed by the proposed DC cable route. This is likely to be fully re-established within 1 year and therefore no longer term impacts on winter birds are anticipated.

Breeding Birds

6.2.47 No operational or permanent impacts are anticipated for breeding birds.

6.2.48 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside and grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which breeding birds can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

Reptiles

6.2.49 No operational or permanent impacts are anticipated for reptiles.

6.2.50 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which reptiles can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

Brown Hare

6.2.51 No operational or permanent impacts are anticipated for brown hare.

6.2.52 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 1 year for arable land, 2-4 years for grassland, up to 5 years for hedgerows. However, given the prevalence of similar habitats within the locality which brown hare can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

European Eel

6.2.53 No longer term impacts are anticipated for European eel with respect to habitat recovery, as water flow will not have been affected for the watercourse crossings.

6.2.54 European eels are electrosensitive and respond to magnetic fields in the environment. This ability is a consequence of the European eel possessing significant magnetically sensitive material (magnetite) within their skeletal structure, which is commonly thought to be used for direction finding using the Earth's geomagnetic field. Research on unburied subsea cables (Westerberg & Lagenfelt (2008) (Ref 10-52)) has suggested that there may be slight changes in swimming ability when eels are in close proximity to the cables, but that this does not affect their migratory behaviour.

6.2.55 The possible effect of EMF from the proposed DC cable is recognised. However, given the expected low strength of the magnetic fields at ground level, and based on research, it is not anticipated that EMF would affect European eel migratory behaviour and therefore it is certain the effects would be **not significant**.

Summary of Potential Impacts

6.2.56 The following Table 10.24 provides a summary of the construction and longer term, operational and permanent identified as a result of the proposed DC cable route in Route Section 1.

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Construction Impacts				
Humber Estuary SPA/Ramsar site	International / European	7.9 km from the base scheme design, no direct or indirect impacts anticipated for the physical designated area. Impacts associated with wintering bird features are considered below.	**No impact**	**No**
Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC	International / European	7.9 km from the base scheme design, no direct or indirect impacts anticipated for the habitat features for which this site is designated.	**No impact**	**No**
The Wash SPA/Ramsar site	International / European	13.5 km from the base scheme design, no direct or indirect impacts anticipated for the physical designated area. Impacts associated with wintering bird features are considered below.	**No impact**	**No**
Gibraltar Point SPA/Ramsar site	International / European	19 km from the base scheme design, no direct or indirect impacts anticipated for the physical designated area. Impacts associated with wintering bird features are considered below.	**No impact**	**No**
Sea Bank Clay Pits SSSI (including Huttoft Bank Pit and Sandilands Pit LWT reserves)	National	324 m south and 295 m north of the proposed landfall. No direct impacts. Possible indirect impacts as a result of degradation or pollution of habitats. However, certain embedded pollution prevention measures will prevent this. Impacts associated with wintering and breeding birds is discussed below.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Firsby to Louth Dismantled Railway SNCI	County	DC route will cross this site at a gap in the trees and scrub. With respect to temporary impacts, possible accidental encroachment by construction traffic on the retained parts of the SNCI may occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features and pollution prevention measures implemented.	**Not significant**	**No**
Rigsby Road Verges LWS	County	Site is adjacent to base scheme design, with possible accidental encroachment by construction traffic. However, certain that CEMP will ensure demarcation of working areas and sensitive features and pollution prevention measures implemented.	**Not significant**	**No**
Rigsby RNR	County	Site is adjacent to base scheme design, with possible accidental encroachment by construction traffic. However, certain that CEMP will ensure demarcation of working areas and sensitive features and pollution prevention measures implemented.	**Not significant**	**No**
Rigsby Wood LWS, LWT reserve and Ancient Woodland	County	Site is adjacent to base scheme design, possible accidental encroachment by construction traffic. However, certain that CEMP will ensure demarcation of working areas and sensitive features and pollution prevention measures implemented.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Sandilands Golf Course and Dunes LWS (including S41 coastal sand dune priority habitat)	County	Site will be crossed using HDD to install the DC cables. Construction traffic may need to access the beach via existing access through the site and will not affect habitats. Possible accidental encroachment by construction traffic. However, certain that CEMP will ensure demarcation of working areas in order to protect retained habitats and features and pollution prevention measures implemented.	**Not significant**	**No**
All other non-statutory designated sites	County	Distance and lack of hydrological links means the remaining non-statutory sites within 1 km of Route Section 1 will not be directly or indirectly impacted, taking into account certain embedded pollution prevention measures.	**No impact**	**No**
Hedgerows	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Woodland and Trees	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Watercourses – Field ditches	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. It is certain that disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place	**Not significant**	**No**
Great Crested Newts and other Amphibians	Local	Prevalence of similar habitats in the vicinity of the base scheme design available for use by these species during construction. Therefore no impacts due to habitat loss.	**Not significant**	**No**
		No fragmentation effects as a result of construction since abundant suitable habitat available.	**Not significant**	**No**
		Embedded reasonable avoidance measures during vegetation clearance will ensure no killing or injury.	**Not significant**	**No**
Bats	Local	There is one tree with low potential to support roosting bats. Soft-felling felling techniques used on this tree to ensure no impacts on roosting bats.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Two ditches and 11 trenchless crossings require a temporary culvert for the construction haul road. 16 sections of hedgerow required to be removed to facilitate cable installation totalling 824 m of hedgerow. Embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population.	**Not significant**	**No**
		Lighting during construction anticipated to be intermittent and of short duration during construction and therefore is not anticipated to impact on foraging and commuting bats.	**Not significant**	**No**
Water vole	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during installation of temporary bridges/culverts may occur. Embedded mitigation via pre-construction surveys and displacement under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Otter	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Extremely unlikely that killing or injury during installation of temporary bridges/culverts and possible that entrapment in excavations may occur. Embedded mitigation via pre-construction surveys and mitigation under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Badger	Local	Loss of one outlier sett and one subsidiary sett. Natural England badger licence to cover these works.	**Not significant**	**No**
		Risk of killing or injury to badgers in the event that badger falls into/becomes entrapped within excavations. Trenches covered/fenced off at night will prevent killing or injury.	**Not significant**	**No**
		Temporary loss of badger foraging habitat.	**Not significant**	**No**
		Temporary fragmentation impacts associated with the installation of the proposed DC cable. Provision of two-way badger gates will prevent fragmentation.	**Not significant**	**No**
Wintering birds	Local	Low levels of disturbance and displacement on low numbers of SPA/Ramsar species within 200 m of HDD compound.	**Significant adverse at the Local level**	**Yes**
Breeding birds	Local	Certain temporary loss of nesting and foraging habitat. However ample alternative nesting and foraging habitat available and therefore certain that no significant effects will occur.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		There is the potential for damage or destruction of nests of several species during vegetation clearance and construction activities. Embedded mitigation via nesting bird checks during the breeding season will ensure damage and destruction of nests is prevented.	**Not significant**	**No**
Reptiles	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs certain to ensure this impact is prevented.	**Not significant**	**No**
Brown Hare	Local	Certain temporary loss of potential suitable habitat. However certain that ample availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		It is possible that killing or injury of young hares (leverets) during site clearance may occur, and of individuals that may get trapped in excavations. Certain embedded mitigation will prevent entrapment, but leverets still at risk leading to potential significant effects.	**Significant adverse at the Local level**	**Yes**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
European eel	Local	Certain that majority of drains being crossed by trenchless techniques, with temporary bridge or culvert installed through which flow is maintained. Therefore certain that temporary habitat loss will not lead to significant effects.	**Not significant**	**No**
		Possible fragmentation effects during migration as a result of open-cut crossings. The two open cut crossings are small ditches unlikely to support eel. Therefore certain that effects are extremely unlikely.	**Not significant**	**No**
Longer Term, Operational and Permanent Impacts				
Humber Estuary SPA/Ramsar site	International / European	7.9 km from the base scheme design, no longer term, operational or permanent impacts will occur. Impacts associated with wintering bird features are considered below.	**No impact**	**No**
Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC	International / European	7.9 km from the base scheme design, no longer term, operational or permanent impacts will occur on the habitat features for which this site is designated.	**No impact**	**No**
The Wash SPA/Ramsar site	International / European	13.5 km from the base scheme design, no longer term, operational or permanent impacts will occur. Impacts associated with wintering bird features are considered below.	**No impact**	**No**
Gibraltar Point SPA/Ramsar site	International / European	19 km from the base scheme design, no longer term, operational or permanent impacts will occur. Impacts associated with wintering bird features are considered below.	**No impact**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Sea Bank Clay Pits SSSI (including Huttoft Bank Pit and Sandilands Pit LWT reserves)	National	No longer term, operational or permanent impacts anticipated.	**No impact**	**No**
Firsby to Louth Dismantled Railway SNCI	County	Longer term impact of time taken for habitats to re-establish following open cut crossing of the site by natural regeneration, approximately 2-4 years.	**Not significant**	**No**
All other non-statutory designated sites	County	No longer term, operational or permanent impacts anticipated.	**No impact**	**No**
Hedgerows	Local	Probable temporary loss of 160 m of hedgerow habitat. However, embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction and near certain re-establishment after 5 years.	**Not significant**	**No**
Woodland and Trees	Local	Certain loss of up to 0.05 ha of broad-leaved plantation woodland and possible loss of 22 trees. Reinstatement of woodland and trees in-situ will not be possible over the proposed DC cable permanent easement.	**Significant adverse at the Local level**	**Yes**
		The reinstatement plan allows for replacement of woodland and tree habitats lost, near certain to reach 7–10 m after 15 years. The longer term effects of this design mitigation will lead to an overall increase in woodland and tree cover within the area.	**Not significant**	**No**
Watercourses	Local	Probable temporary loss of approximately 170 m of bankside habitat which will be reinstated through natural colonisation and will be near certain re-established within 2-4 years.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		It is probable that permanent outfalls will be installed in association with the pre-construction land drainage. This will result in the permanent loss of a small amount of bankside habitat, but given the amount of available similar habitat it is certain there will be no significant effect.	**Not significant**	**No**
Great Crested Newt and other Amphibians	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on amphibians.	**Not significant**	**No**
Bats	Local	No operational or permanent impacts predicted. Potential for fragmentation effects where hedgerows removed, but temporary fencing will be in place until hedgerow plantings have reached functional maturity.	**Not significant**	**No**
Water vole	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on water vole.	**Not significant**	**No**
Otter	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on otter.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Badger	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on badger.	**Not significant**	**No**
Wintering birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats, but this will occur within 1 year for farmland, therefore no effects on wintering birds.	**No impact**	**No**
Breeding birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on breeding birds.	**Not significant**	**No**
Reptiles	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on reptiles	**Not significant**	**No**
Brown Hare	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on brown hare.	**Not significant**	**No**

Table 10.24 Summary of Potential Impacts – Route Section 1				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
European eel	Local	No longer term effects related to construction will occur. Possible operational EMF effects, however predicted to be low strength therefore certain it would not affect European eel.	**Not significant**	**No**

6.3 Route Section 2 Well High Lane to A16 (Keal Road)

Temporary Impacts

Designated Wildlife Sites and Notable Habitats

6.3.1 It is certain that no direct impacts will occur to any of the three SSSIs within 2 km or the two additional SSSIs which are further than 2 km from the base scheme design.

6.3.2 The potential for degradation of the habitats for which all the SSSIs are designated due to water or airborne pollution, dust and debris will be avoided due to the certain inclusion of embedded prevention measures in the CEMP. Therefore any temporary effects as a result of these aspects of construction are **not significant**.

6.3.3 However, it is possible that indirect impacts arising from changes to the hydrological regime as a result of construction may affect those sites which support wetland habitats and are downstream of the base scheme design, namely Keal Carr SSSI (which includes Keal Carr LWS, Keal Carr South LWS), Jenkins Carr SSSI, Calceby Marsh SSSI and Swaby Valley SSSI. However, it is certain that embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore any effects will be **not significant**.

6.3.4 Of the 20 non-statutory sites within 1 km of Route Section 2 of the base scheme design, there is the potential for temporary impacts to eight of these sites. These are described in more detail in Table 10.25.

6.3.5 As with the SSSIs, the potential for degradation of the habitats for which all the non-statutory sites are designated due to water or airborne pollution, dust and debris will be avoided due to the certain inclusion of embedded prevention measures in the CEMP. Therefore any temporary effects as a result of these aspects of construction are **not significant**.

Table 10.25 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 2)

Site (Ecological Value)	Potential Impact	Significance
A16 Road Verge, Dalby Bar LWS (County)	This site comprises the road verge opposite the entrance to a temporary access track. Possible that large construction machinery could encroach onto this verge in order to gain access to the temporary track, leading to damage and degradation of the calcareous grassland which it supports. Near certain that embedded design of access will ensure vehicles do not need to encroach on the verge in order to turn into the access track. Therefore near no significant effects will occur.	**Not significant**

Table 10.25 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 2)		
Site (Ecological Value)	**Potential Impact**	**Significance**
Bluestone Heath Copse SNCI (County)	This site is 2 m north of the western boundary of the base scheme design at a pinchpoint on the DC cable route. It is possible that damage to tree roots due to soil compaction and to tree branches due to construction activities may occur. However, certain embedded tree protection mitigation will ensure that trees and their root protection zones are adequately protected in line with BS5837 (Ref 10-30). Therefore certain there is no potential for an adverse effect on the integrity of this site in the longer term.	**Not significant**
Callow Carr LWS (County)	May be crossed by base scheme design for pre-construction land drainage. The longer term impacts are discussed in relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the site are predicted.	**Not significant**
Hocker Holt LWS	May be crossed by base scheme design for pre-construction land drainage. The longer term impacts are discussed in relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the site are predicted.	**Not significant**
Manor Farm, Mavis Enderby LWS	This site abuts the western boundary of the base scheme design. It is possible that accidental encroachment by construction traffic will occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the site is predicted.	**Not significant**

Table 10.25 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 2)		
Site (Ecological Value)	**Potential Impact**	**Significance**
River Lymm, Skendlebury Tributary North SNCI	It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site which supports wetland habitats and is downstream of the base scheme design. Certain embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore no effects are predicted.	**Not significant**
Silver Pits, Ulceby SNCI	Abuts southern boundary of base scheme design. It is possible that accidental encroachment by construction traffic will occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the site is predicted.	**Not significant**
Wheelabout Wood SNCI	May be crossed by base scheme design for pre-construction land drainage. The longer term impacts are discussed in relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the site are predicted.	**Not significant**

Habitats and Flora

Hedgerows

6.3.6 There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off as well as accidental encroachment on habitats by construction traffic. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities and impacts will be extremely unlikely to occur. Taking into account the embedded mitigation, effects on hedgerows are **not significant**.

Woodland and Trees

6.3.7 As discussed for hedgerows, there is the potential for temporary degradation of the habitats. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities. Taking into account the embedded mitigation prior to assessment it is extremely unlikely that impacts associated with temporary degradation will occur and therefore effects on woodland and trees are **not significant**.

Watercourses

6.3.8 According to the crossing schedule Route Section 2 crosses six watercourses and field ditches. One of these ditches will be crossed using open cut measures and will also require a temporary culvert. The rest of the ditches and watercourses will be crossed using a temporary bridge.

6.3.9 All of these features currently lie within an area that has not being surveyed so at this time it is not possible to discuss detailed habitat calculations. These will be appended to the ES in a separate document once surveys have been completed.

6.3.10 It is however probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 60 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 60 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna. Therefore it is certain that the effect on watercourse habitats is **not significant**.

6.3.11 Several temporary culverts will be required across watercourses along the proposed DC cable route. There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. It is extremely unlikely that impacts associated with temporary degradation will occur and therefore, effects on watercourses are **not significant**.

6.3.12 Where culverts are installed for temporary access, disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place and is extremely unlikely to have a significant effect on the ecological features of these watercourses. Therefore the effects will be **not significant.**

Great crested Newt and other Amphibians

6.3.13 The proposed construction works within Route Section 2 will result in the short term temporary loss of amphibian terrestrial habitat within the working area of the proposed DC cable route. A limited number of waterbodies within this Route Section were identified as having suitable GCN breeding habitat and absence of GCN was recorded in the waterbodies taken forward for further survey. No ditches or drains will be crossed by the proposed DC cable route in Route Section 2 which have GCN suitability and no ponds intersect with the LoD.

6.3.14 Construction works will result in the short term temporary loss of amphibian terrestrial and aquatic habitat, particularly where drains and hedgerows are crossed. Given the small temporary losses and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.3.15 With respect to temporary fragmentation impacts, this has the potential to occur where watercourses and suitable terrestrial habitat (hedgerows, scrub, coarse grassland) are crossed by the proposed DC cable route and where temporary bridges/culverts are required. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies. However, given the temporary nature of any barriers to movement and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.3.16 There is the potential for killing or injury of amphibians during site clearance of suitable habitats and installation of temporary bridges/culverts at watercourse crossings. There is the potential for amphibians to use soil piles and stored materials for refuge and hibernation which could result in killing or injury when these are moved. These effects could lead to a significant adverse effect at the Site level if unmitigated. However, RAMs are embedded into the scheme and will be employed during vegetation clearance and construction site management of soils and materials. As a result of the embedded RAMs, it is extremely unlikely that impacts associated with construction will lead to killing or injury of amphibians. Therefore the effects on amphibians with respect to killing and injury are certain to be **not significant**.

Bats

6.3.17 Four trees within the base scheme design hold moderate roost potential trees (T30, T98, T101, T145). These trees could support larger numbers of bats or for longer periods, but are unlikely to be suitable for high conservation status roosts. It is not currently known whether these trees can be retained within the design and therefore as a worst case scenario it is possible that these trees will be lost. Although roosts were not confirmed as present during surveys, these trees retain the potential to support roosting bats. Loss of these potential roost would be permanent and could limit roosting opportunities in the locality with the possibility that this could affect FCS of local bat populations. Therefore the effect of loss of these four trees on the local bat population would be significant adverse at the Local level. In addition there are four additional trees with unconfirmed bat roost potential that would require further inspection if these trees are to be affected.

6.3.18 Embedded legal compliance measures would ensure that pre-construction surveys confirmed the presence or not of roosting bats prior to removal. Replacement roost boxes would be installed in suitable locations regardless of whether bats are found to be present in order to ensure the potential for roosting bats is maintained. If bats are found to be present then a NE Derogation Licence will be required to undertake removal of the tree. For the 14 trees with low bat roost potential. It is unlikely that bats roost within these trees and embedded mitigation measures, including using soft-felling methods to carry out any necessary felling works would ensure that bats are not affected. These measures would be certain to ensure that effects on the bat population will be **not significant**

6.3.19 It is likely that a number of species of bat, including common pipistrelle and soprano pipistrelle use the habitats, particularly the hedgerows, woodland and larger drains, for foraging and commuting. One of these ditches will be crossed using open cut measures and will also require a temporary culvert. The rest of the ditches and watercourses will be crossed using a temporary bridge. A total of 19 sections of hedgerow will be required to be removed to facilitate cable installation in Route Section 2, totalling 858 m of hedgerow. Since fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, it is probable that temporary fragmentation impacts will occur for a small numbers of bats during construction. However, embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population. Therefore temporary fragmentation impacts associated with hedgerow removal will be removed and the effect on the local bat population is near certain to be **not significant.**

6.3.20 Lighting of work areas during construction is only anticipated for specific activities which will be of short duration and intermittent throughout the construction period. The effects of temporary lighting on foraging bats during construction are **not significant**.

Water Vole

6.3.21 No evidence of water vole was recorded within Route Section 2 during the surveys however, consideration is given to both the presence of desktop records within the base scheme design and connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/ drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for water vole. Therefore it is certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.3.22 It is possible that killing or injury of water vole during installation of temporary bridges/culverts may occur. However, embedded mitigation, will ensure pre-construction surveys are undertaken to confirm their presence and where necessary and in compliance with wildlife legislation, under licence, displacement of water vole from the area of the temporary bridges/culverts will be undertaken. Therefore it is certain the effects of killing or injury on water vole as a result of temporary bridges/culverts for temporary haul roads will be **not significant**.

Otter

6.3.23 No evidence of otter activity was recorded along Route Section 2 during the surveys however, consideration is given to connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/ drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide and through which water flow

will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for otter. Therefore it is certain the effects of temporary habitat loss on otter as a result of temporary bridges/culverts for temporary haul roads is **not significant**.

Badger

6.3.24 The proposed DC cable route, temporary access roads and temporary construction compounds, have been designed to ensure as limited impact as possible is encountered on the local badger population. Due to a commitment from NGVL to avoid the loss of any main badger setts, the LoD in the vicinity of the main sett (S46) has been pinched to ensure no works encroach within 30 m of the sett extent. All other setts in the wider area of Route Section 2 lie over 30 m from the edge of the LoD. There is therefore no impact on badger setts within Route Section 2 of the base scheme design.

6.3.25 It is possible that killing, injury or entrapment of badgers (e.g. from site traffic and by falling into excavations) during the construction period, particularly during the proposed DC cable installation, may occur. Trenches will be covered or fenced off at night, or egress ramps will be provided to prevent entrapment of badgers during construction. It is near certain that this will prevent killing and injury due to entrapment and therefore the effect on the badger clan is **not significant** within Route Section 2.

6.3.26 It is certain that temporary foraging habitat loss will occur as a result of construction of the temporary construction compounds and installation of the proposed DC cables. However ample alternative foraging habitat within the wide expanse of landscape is available in the immediate area therefore it is certain that this impact will not lead to significant effects on the badger clan. The effects of temporary habitat loss on the local badger clan are therefore **not significant** within Route Section 2.

6.3.27 It is possible that the construction of temporary access roads and installation of the proposed DC cable route will cause temporary fragmentation impacts. These fragmentation impacts would be exacerbated where the design of any security fencing during construction may impede badger movement. However, the provision of two-way badger gates within demarcation fencing along the proposed DC cable route will prevent fragmentation impacts on the local badger clan and their movements. Taking into account the embedded mitigation it is near certain that effects on the local badger clan as a result of fragmentation impacts will be **not significant** within Route Section 2.

Winter Birds

6.3.28 The proposed construction works could result in the short term temporary loss of land within the base scheme design during the winter period and could also likely result in the displacement of small number of BoCC (Ref 10-22) birds within 500 m of the working area. Due to the temporary nature of the potential displacement and the abundance of similar habitat within the nearby area this impact will be **not significant**.

Breeding Birds

6.3.29 During construction works there is the potential for temporary displacement effects due to visual disturbance effects caused by the workers as well as temporary habitat loss from temporary compounds. This is likely to result in the temporary displacement of low numbers of a range of priority bird species including dunnock (8 pairs), reed bunting (5 pairs), skylark (7 pairs), song thrush (8 pairs) and yellowhammer (4 pairs).

6.3.30 Due to the temporary nature of the works and the short distance over which these species are likely to be displaced, as well as the abundance of other suitable habitat for these species in the nearby area, it is likely that this impact would be minimal. Therefore the potential impact of temporary displacement is **not significant**.

Reptiles

6.3.31 The majority of the construction works fall within low quality reptile habitat i.e. arable land. Unmanaged field margins, vegetated banks of drains (both of which are common in the wider area) and hedgerows provide better quality habitat which could support reptiles. Due to the prevalence of these habitats in the wider area, their temporary loss is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for reptiles. Therefore it is near certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.3.32 It is possible that killing or injury of small numbers of reptiles during vegetation clearance works may occur. However, in compliance with wildlife legislation, embedded mitigation comprising RAMs during vegetation clearance (as will also be implemented for amphibians) will ensure killing or injury of reptiles is certain to be avoided. Therefore the effect will be **not significant**.

Brown Hare

6.3.33 The landscape containing the base scheme design is, broadly speaking, homogeneous and the extent of suitable habitats for brown hare that would be affected is proportionally very small. Temporary losses which will be incurred as a result of construction of the proposed DC cable route will not lead to a significant loss of suitable habitats or of fragmentation effects. Therefore the potential impact of temporary habitat loss and fragmentation is extremely unlikely to affect the brown hare population and therefore effects are **not significant**.

6.3.34 Due to their sensitivity to noise and activity it is anticipated that adult brown hare would suffer from localised perturbation once construction activities commence, the consequence of which is that they would be unlikely to be killed or injured as a result. Immature brown hare (leverets), however, would remain susceptible to possible killing or injury during initial site clearance, depending on the timing of this activity, as they are left alone in forms during the day and may be reluctant to move; they are therefore at risk of late response to potential danger. It is also possible for hares to become trapped in excavations associated with construction activities, which may cause distress or injury. However embedded mitigation identified for other species will be certain to ensure excavations are covered over and/or egress ramps provided in order to prevent entrapment. Overall there remains a possibility for killing or injury of small numbers of leverets and the effect is therefore categorised as a **significant adverse at the Local level**.

West European Hedgehog

6.3.35 The majority of the construction works fall within habitats which would be unsuitable for hedgehog i.e. arable land. Hedgerows, woodland and scrub provide better quality habitat for hedgehog. It is certain that only limited areas of these habitat types will be temporarily lost as a result of construction. Sufficient similar habitat is available for hedgehog to utilise and therefore temporary losses are not considered to lead to a significant loss of suitable habitats or of fragmentation effects. Therefore it is near certain that the potential effect of temporary habitat loss and fragmentation on hedgehog is **not significant**.

6.3.36 Due to their tendency to curl up and remain in one place when threatened and their vulnerability during hibernation, it is possible that killing or injury of small numbers of hedgehogs during vegetation clearance works may occur. However embedded mitigation identified for other species (Reptile RAMs) will also apply to hedgehog and will be certain to ensure that killing or injury is avoided. Therefore the effect will be **not significant**.

European Eel and Brown/Sea Trout

6.3.37 Only three ditches/drains are present within Route Section 2 provide suitable habitat for European eel, and two rivers, which have faster flowing water may be utilised by brown/sea trout. It is certain that all but one drain will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Therefore it is certain the effects of temporary habitat loss on these fish as a result of bridges/culverts for temporary haul roads will be **not significant**.

6.3.38 Migratory species such as the European eel and brown/sea trout are particularly sensitive during the migration seasons of spring and autumn. If open-cut construction across watercourses should fall within these periods, migration may be delayed in the short-term whilst dry working is underway. Although, eels are known to travel overland for moderate distances, it is unlikely that they would cross the construction working width, which being stripped of vegetation would not provide suitable habitat for eels to move across. The drain which will be open cut is described as small and possibly not even present, subject to survey, and therefore is extremely unlikely to support either fish species. Therefore it is certain that possible fragmentation effects during construction activities on the local European eel and brown/sea trout population are **not significant**.

Longer Term, Operational and Permanent Impacts

Designated Wildlife Sites and Notable Habitats

6.3.39 No longer term or permanent impacts are predicted to occur on any of the SSSIs taken forward for assessment in this Route Section. Once operational, no impacts on any of the SSSIs are predicted to occur.

6.3.40 No operational or permanent impacts are predicted for any of the non-statutory designated sites or priority habitats which fall within 1 km of Route Section 2.

6.3.41 It is possible that longer term impacts will occur on three non-statutory sites. These are described in more detail in Table 10.26 below.

Table 10.26 Potential Longer Term Impacts on Non-Statutory Designated Sites (Route Section 2)

Site (Ecological Value)	Potential Impact	Significance
East Keal Clay Pit LWS	It is possible that this site will be crossed by the base scheme design for pre-construction land drainage. A tracked vehicle, requiring a 10 m wide working area, will install drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Embedded habitat reinstatement will be certain to ensure that grassland is reseeded with similar species mix to that lost. Therefore it is probable that there is no adverse effect on the integrity of the site in the longer term.	**Not significant**
Hocker Holt LWS	It is possible that this site will be crossed by the base scheme design for pre-construction land drainage. As this is a wooded site it is possible to reduce the working area to 5 m for the tracked vehicle, which will install unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Approximately 225 m^2 (1.6 %) of woodland may be lost to facilitate this. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years. Therefore it is probable that there is no adverse effect on the integrity of the site in the longer term.	**Not significant**

Table 10.26 Potential Longer Term Impacts on Non-Statutory Designated Sites (Route Section 2)		
Site (Ecological Value)	**Potential Impact**	**Significance**
Wheelabout Wood SNCI	It is possible that this site will be crossed by the base scheme design for pre-construction land drainage. As this is a wooded site it is possible to reduce the working area to 5 m for the tracked vehicle, which will install unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Approximately 500 m^2 (2.9 %) of woodland may be lost to facilitate this. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years. Therefore it is probable that there is no adverse effect on the integrity of the site in the longer term.	**Not significant**

Habitats and Flora

6.3.42 Hedgerows

6.3.43 Route Section 2 contains a total of 2996.77 m of native hedgerow across 29 individual sections. A total of 341.72 m species-rich intact hedgerow, 2073.46 m species-poor intact hedgerow, 482.07 m species-poor defunct hedgerow and 99.51 m species-poor intact hedgerow with trees were recorded.

6.3.44 Assuming the worst case scenario of the working corridor covering the entire working width of 30 m (on average), installation of the proposed DC cable route will result in the total loss of 857.99 m of native hedgerow across 19 individual sections. This loss comprises approximately 119.68 m species-rich intact hedgerow, 530.17 m of species-poor intact hedgerow, 30.64 m species-poor intact hedgerow with trees and 177.50 m of species-poor defunct hedgerow. None of the hedgerows directly affected by the proposed DC cable route met the criteria for 'Important' under the Hedgerow Regulations (Ref 10-10).

6.3.45 It is probable that the losses calculated above are an over estimation as hedgerow crossings, where adjacent to drains, will be trenchless. Therefore less hedgerow will in fact require removal to facilitate construction of a temporary haul road. Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 190 m of hedgerow would require removal.

6.3.46 The embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will be returned to their pre-construction functionality. Therefore, in the longer term, it is near certain that the effects of construction on hedgerows is considered to be **not significant**.

Woodland and Trees

6.3.47 Six blocks of semi-natural broad-leaved woodland occur along Route Section 2. It is certain that this woodland habitat will not be impacted by the construction of the proposed DC Cable Route.

6.3.48 One area of broad-leaved plantation woodland is crossed by Route Section 2. It is not anticipated that this woodland will be impacted by the construction of the DC Cable Route. However, it is possible that construction will result in the loss of 0.11 ha of this habitat.

6.3.49 It is possible that 214 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. This is based on lidar data, which is likely to be an overestimation as discussed in the appendix. However it is anticipated that the majority of these trees will be retained through micro-siting during construction.

6.3.50 The permanent easement means that woodland and tree habitats cannot be replaced across Route Section 2. Permanent loss of these habitats represents a **significant adverse effect** at the Local Level.

6.3.51 The reinstatement plan allows for replacement of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant**.

6.3.52 It is possible that woodland and trees will be affected by the base scheme design for pre-construction land drainage. It is certain that tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant.**

Watercourses

6.3.53 Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation can expect to be re-established within 2-4 years. Therefore, over the longer term, effects following temporary losses will be **not significant**.

6.3.54 It is probable that permanent outfalls will be installed in association with the base scheme design for pre-construction land drainage. The small area of habitat permanently lost as a result of construction is estimated to be approximately $3m^2$ and as bankside habitats are abundant within the local area it is certain that this permanent loss will be **not significant**.

Great crested Newt and other Amphibians

6.3.55 No operational or permanent impacts are anticipated for GCN and other amphibians.

6.3.56 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which amphibians can utilise during the re-establishment period, these longer term impacts are considered to be **not significant**.

Bats

6.3.57 No longer term, operational or permanent effects are predicted with respect to the trees identified as having potential for roosting bats.

6.3.58 It is probable that there will be longer term fragmentation impacts following completion of construction, which could lead to significant effects on the local bat population. As part of the embedded design mitigation it is certain that, the hedgerows affected by the cable installation will be reinstated and would be established and matured after approximately 5 years, when functionality as linear commuting corridors would be returned. Additional temporary fencing will ensure hedgerows are functional while the planting establishes and matures. Therefore it is near certain that the effect on commuting and foraging bats with respect to hedgerow losses will be **not significant**.

Water Vole

6.3.59 No operational or permanent impacts are anticipated for water vole.

6.3.60 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Otter

6.3.61 No operational or permanent impacts are anticipated for otter.

6.3.62 Longer term effects along the riparian corridor are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridge crossings and culverts, typically 2-4 years. Water flow will not have been affected for the majority of watercourse crossings. However, given the prevalence of similar habitats within the locality which otter can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Badger

6.3.63 No operational or permanent impacts are anticipated for badger.

6.3.64 Longer terms effects will be limited to the time taken for suitable habitats to reinstate, typically 2-4 years for grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which badgers can utilise during the re-establishment period, and the fact that no main badger sett will be lost these longer term impacts are certain to be **not significant** in Route Section 2.

Winter Birds

6.3.65 No operational or permanent impacts are anticipated for wintering birds.

6.3.66 The predominant terrestrial habitat utilised by wintering birds is the arable land which is crossed by the proposed DC cable route. This is likely to be fully re-established within 1 year and therefore no longer term impacts on winter birds are anticipated.

Breeding Birds

6.3.67 No operational or permanent impacts are anticipated for breeding birds.

6.3.68 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside and grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which breeding birds can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**

Reptiles

6.3.69 No operational or permanent impacts are anticipated for reptiles.

6.3.70 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which reptiles can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

Brown Hare

6.3.71 No operational or permanent impacts are anticipated for brown hare.

6.3.72 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 1 year for arable land, 2-4 years for grassland, up to 5 years for hedgerows. However, given the prevalence of similar habitats within the locality which brown hare can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

West European Hedgehog

6.3.73 No operational or permanent impacts are anticipated for west European hedgehog.

6.3.74 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 3 to 5 years for scrub and up to 5 years for hedgerows. However, given the prevalence of similar

habitats within the locality which hedgehog can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

European Eel and Brown/Sea Trout

6.3.75 No longer term impacts are anticipated for European eel or brown/sea trout with respect to habitat recovery as water flow will not have been affected for the majority of watercourse crossings.

6.3.76 With respect to operational impacts, certain fish species including European eel are electrosensitive and respond to magnetic fields in the environment. Some species such as European eel, have significant magnetically sensitive material (magnetite) within their skeletal structure which is commonly thought to be used for direction finding using the Earth's geomagnetic field. Research (Westerberg & Lagenfelt (2008) (Ref 10-52)) on unburied subsea cables has suggested that there may be slight changes in swimming ability when eels are in close proximity to the cables but that this does not affect their migratory behaviour.

6.3.77 The possible effect of EMF from the proposed DC cable is recognised. However, given the expected low strength of the magnetic fields at ground level, and based on research, it is not anticipated that EMF would affect European eel migratory behaviour and therefore it is certain the effects would be **not significant**.

Summary of Potential Impacts

6.3.78 The following Table 10.27 provides a summary of the construction and longer term, operational and permanent identified as a result of the proposed DC cable route in Route Section 2.

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Construction Impacts				
All non-statutory designated sites	County	Possible degradation of habitats as a result of pollution and emissions. Certain implementation of embedded pollution prevention measures will ensure no significant effects.	**Not significant**	**No**
A16 Road Verge, Dalby Bar LWS	County	Possible encroachment leading to damage to grassland verge. Near certain embedded design of the access will ensure no encroachment. Therefore no significant effects.	**Not significant**	**No**
Callow Carr LWS and ancient woodland	County	Possible damage to tree branches and roots due to construction activities. Certain embedded tree protection measures will prevent this. Therefore no significant effects.	**Not significant**	**No**
East Keal Clay Pit LWS	County	Site may be crossed by pre-construction drainage, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**
Hocker Holt LWS	County	Site may be crossed by pre-construction drainage, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
River Lymm, Skendlebury Tributary North SNCI	County	Possible hydrological impacts on wetland habitats. However, certain embedded hydrology mitigation will ensure consistent run-off rates ensuring no significant effects.	**Not significant**	**No**
Silver Pits, Ulceby SNCI	County	Abuts base scheme design. Possible encroachment by construction traffic. Certain implementation of demarcation of retained habitats via CEMP. Therefore no significant effects.	**Not significant**	**No**
Wheelabout Wood SNCI	County	Site may be crossed by pre-construction drainage, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**
Hedgerows	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Woodland and Trees	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Watercourses – Field ditches	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. It is certain that disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place	**Not significant**	**No**
Great Crested Newts and other Amphibians	Local	Prevalence of similar habitats in the vicinity of the base scheme design available for use by these species during construction. Therefore no impacts due to habitat loss.	**Not significant**	**No**
		No fragmentation effects as a result of construction since abundant suitable habitat available.	**Not significant**	**No**
		Embedded reasonable avoidance measures during vegetation clearance will ensure no killing or injury.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Bats	Local	Four trees with moderate bat roost potential present within base scheme design. If these trees are to be affected pre-construction surveys would confirm whether or not bat roosts were present prior to removal. Bat boxes would be installed regardless of whether bats are present or not. If bats present then a NE derogation licence would be obtained to undertake removal of tree. For 14 trees with low bat potential, soft-felling felling techniques used on this tree to ensure no impacts on roosting bats.	**Not significant**	**No**
		One ditch will require a temporary culvert for the construction haul road. The remaining watercourses will be crossed by temporary bridges. 19 sections of hedgerow required to be removed to facilitate cable installation totalling 858 m of hedgerow. Embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population.	**Not significant**	**No**
		Lighting during construction anticipated to be intermittent and of short duration during construction and therefore is not anticipated to impact on foraging and commuting bats.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Water vole	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during installation of temporary bridges/culverts may occur. Embedded mitigation via pre-construction surveys and displacement under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Otter	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Extremely unlikely that killing or injury during installation of temporary bridges/culverts and possible that entrapment in excavations may occur. Embedded mitigation via pre-construction surveys and mitigation under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Badger	Local	Risk of killing or injury to badgers in the event that badger falls into/becomes entrapped within excavations. Trenches covered/fenced off at night will prevent killing or injury.	**Not significant**	**No**
		Temporary loss of badger foraging habitat.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Temporary fragmentation impacts associated with the installation of the proposed DC Cables. Provision of two-way badger gates will prevent fragmentation.	**Not significant**	**No**
Wintering birds	Local	Temporary potential displacement to abundant suitable habitat within nearby area.	**Not significant**	**No**
Breeding birds	Local	There is the potential for some temporary displacement effects on breeding birds over short distances during the construction period. Due to the low level of displacement and availability of nearby suitable habitat within the species affected, this impact would not be significant.	**Not significant**	**No**
		There is the potential for damage or destruction of nests of several species during vegetation clearance and construction activities. Embedded mitigation via nesting bird checks during the breeding season will ensure damage and destruction of nests is prevented.	**Not significant**	**No**
Reptiles	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs certain to ensure this impact is prevented.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Brown Hare	Local	Certain temporary loss of potential suitable habitat. However certain that ample availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		It is possible that killing or injury of young hares (leverets) during site clearance may occur, and of individuals that may get trapped in excavations. Certain embedded mitigation will prevent entrapment, but leverets still at risk leading to potential significant effects.	**Significant adverse at the Site level**	**Yes**
West European hedgehog	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs for other species certain to also ensure this impact is prevented.	**Not significant**	**No**
European eel and brown/sea trout	Local	Certain that three of four of drains and two rivers being crossed by trenchless techniques, with temporary bridge or culvert installed through which flow is maintained. Therefore certain that temporary habitat loss will not lead to significant effects.	**Not significant**	**No**
		Possible fragmentation effects during migration as a result of open-cut crossings. The one open cut crossing is a small ditches unlikely to support eel. Therefore certain that effects are extremely unlikely.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Longer Term, Operational and Permanent Impacts				
All SSSIs (Calceby Marsh SSSI, Keal Carr SSSI, Jenkins Carr SSSI, Mavis Enderby Valley SSSI, Swaby Valley SSSI)	National	No longer term, operational or permanent impacts anticipated.	**No impact**	**No**
East Keal Clay Pit LWS	County	Possible longer term impact from installation of land drainage. Limited disturbance and embedded habitat reinstatement using suitable seed mix means its probable that no adverse effect on site integrity.	**Not significant**	**No**
Hocker Holt LWS	County	Possible longer term impact from installation of land drainage. Loss of approximately 1.6 % of the woodland. Drainage design will enable replanting of shallow rooted native trees and shrubs. Probable that no adverse effect on site integrity.	**Not significant**	**No**
Wheelabout Wood SNCI	County	Possible longer term impact from installation of land drainage. Loss of approximately 2.9 % of the woodland. Drainage design will enable replanting of shallow rooted native trees and shrubs. Probable that no adverse effect on site integrity.	**Not significant**	**No**
All other non-statutory designated sites	County	No longer term, operational or permanent impacts anticipated.	**No impact**	**No**
Hedgerows	Local	Probable temporary loss of 190 m of hedgerow habitat. However, embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction and near certain re-establishment after 5 years.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Woodland and Trees	Local	Possible loss of up to 0.11 ha of broad-leaved plantation woodland and possible loss of 214 trees. Reinstatement of woodland and trees in-situ will not be possible over the proposed DC cable permanent easement.	**Significant adverse at the Local level**	**Yes**
		The reinstatement plan allows for replacement of woodland and tree habitats lost, near certain to reach 7–10 m after 15 years. The longer term effects of this design mitigation will lead to an overall increase in woodland and tree cover within the area.	**Not significant**	**No**
Watercourses	Local	Probable temporary loss of approximately 60 m of bankside habitat which will be reinstated through natural colonisation and will be near certain re-established within 2-4 years.	**Not significant**	**No**
		It is probable that permanent outfalls will be installed in association with the pre-construction land drainage. This will result in the permanent loss of a small amount of bankside habitat, but given the amount of available similar habitat it is certain there will be no significant effect.	**Not significant**	**No**
Great Crested Newt and other Amphibians	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on amphibians.	**Not significant**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Bats	Local	No operational or permanent impacts predicted. Potential for fragmentation effects where hedgerows removed, but temporary fencing will be in place until hedgerow plantings have reached functional maturity.	**Not significant**	**No**
Water vole	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on water vole.	**Not significant**	**No**
Otter	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on otter.	**Not significant**	**No**
Badger	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on badger.	**Not significant**	**No**
Wintering birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats, but this will occur within 1 year for farmland, therefore no effects on wintering birds.	**No impact**	**No**

Table 10.27 Summary of Potential Impacts – Route Section 2				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Breeding birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on breeding birds.	**Not significant**	**No**
Reptiles	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on reptiles	**Not significant**	**No**
Brown Hare	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on brown hare.	**Not significant**	**No**
West European hedgehog	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on hedgehog.	**Not significant**	**No**
European eel and brown/sea trout	Local	No longer term effects related to construction will occur. Possible operational EMF effects, however predicted to be low strength therefore certain it would not affect European eel.	**Not significant**	**No**

6.4 Route Section 3 A16 (Keal Road) to River Witham

Temporary Impacts

Designated Wildlife Sites and Notable Habitats

6.4.1 No direct effects will occur on the four non-statutory wildlife sites within Route Section 3.

6.4.2 It is possible that degradation of the habitats for which all these sites are designated as a result of water or airborne pollution, dust and debris will occur. However, this is certain to be avoided due to the inclusion of embedded prevention measures in the CEMP. Therefore any temporary effects as a result of these aspects of construction are **not significant**.

6.4.3 Other potential temporary impacts are discussed below in Table 10.28.

Table 10.28 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 3)

Site (Ecological Value)	Potential Impact	Significance
Braygate Lane SNCI (County)	This site comprises the road verges and drains which abut the base scheme design. It is possible accidental encroachment by construction traffic and therefore damage to these habitats will occur. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the site are predicted.	**Not significant**
Hagnaby Lock Nature Reserve	It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site which supports wetland habitats and is downstream of the base scheme design. Certain embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore no effects are predicted.	**Not significant**
Langrick Pits SNCI	It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site which supports wetland habitats and is downstream of the base scheme design. Certain embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore no effects are predicted.	**Not significant**

Table 10.28 Potential Temporary Impacts on Non-Statutory Designated Sites (Route Section 3)		
Site (Ecological Value)	**Potential Impact**	**Significance**
West Fen Catchwater SNCI	It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site which supports wetland habitats and is downstream of the base scheme design. Certain embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore no effects are predicted.	**Not significant**

Habitats and Flora

Hedgerows

6.4.4 There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off as well as accidental encroachment on habitats by construction traffic. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities and impacts will be extremely unlikely to occur. Taking into account the embedded mitigation, effects on hedgerows are **not significant**.

Woodland and Trees

6.4.5 As discussed for hedgerows, there is the potential for temporary degradation of the habitats. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities. Taking into account the embedded mitigation prior to assessment it is extremely unlikely that impacts associated with temporary degradation will occur and therefore effects on woodland and trees are **not significant**.

Watercourses

6.4.6 Several temporary culverts will be required across watercourses along the proposed DC cable route. There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. It is extremely unlikely that impacts associated with temporary degradation will occur and therefore, effects on watercourses are **not significant**.

6.4.7 Where culverts are installed for temporary access, disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place and is extremely unlikely to have a significant effect on the ecological features of these watercourses. Therefore the effects will be **not significant.**

Great Crested Newt and other Amphibians

6.4.8 The proposed construction works within Route Section 3 will result in the short term temporary loss of amphibian terrestrial and aquatic habitat within the working area of the proposed DC cable route. No GCN have been recorded in Route Section 3 during surveys.

6.4.9 Construction works will result in the short term temporary loss of amphibian terrestrial and aquatic habitat, particularly where drains and hedgerows are crossed. Given the small temporary losses and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.4.10 With respect to temporary fragmentation impacts, this has the potential to occur where watercourses and suitable terrestrial habitat (hedgerows, scrub, coarse grassland) are crossed by the proposed DC cable route and where temporary bridges/culverts are required. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies. However, given the temporary nature of any barriers to movement and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.4.11 There is the potential for killing or injury of amphibians during site clearance of suitable habitats and installation of temporary bridges/culverts at watercourse crossings. There is the potential for amphibians to use soil piles and stored materials for refuge and hibernation which could result in killing or injury when these are moved. These effects could lead to a significant adverse effect at the Site level if unmitigated. However, RAMs are embedded into the scheme and will be employed during vegetation clearance and construction site management of soils and materials. As a result of the embedded RAMs, it is extremely unlikely that impacts associated with construction will lead to killing or injury of amphibians. Therefore the effects on amphibians with respect to killing and injury are certain to be **not significant**.

Bats

6.4.12 One tree within the base scheme design holds high roost potential (T223) and one tree was assessed as holding moderate potential for roosting bats (T303). These trees could support larger numbers of bats or for longer periods. It is not currently known whether these trees can be retained within the design and therefore as a worst case scenario it is possible that these trees will be lost. Although roosts were not confirmed as present during surveys, these trees retain the potential to support roosting bats. Loss of these potential roost would be permanent and could limit roosting opportunities in the locality with the possibility that this could affect FCS of local bat populations. Therefore the effect of loss of these two trees on the local bat population would be significant adverse at the Local level. In addition one additional tree has unconfirmed bat roost potential that would require further inspection if it is to be affected.

6.4.13 Embedded legal compliance measures would ensure that pre-construction surveys confirmed the presence or not of roosting bats prior to removal. Replacement roost boxes would be installed in suitable locations regardless of whether bats are found to be present in order to ensure the potential for roosting bats is maintained. If bats are found to be present then a NE Derogation Licence will be required to undertake removal of the tree. For the five trees with low bat roost potential it is unlikely that bats roost within these trees and embedded mitigation measures, including using soft-felling methods to carry out any necessary felling works would ensure that bats are not affected. These measures would be certain to ensure that effects on the bat population will be **not significant**.

6.4.14 At least four species of bat, most commonly common pipistrelle and soprano pipistrelle use the habitats, particularly the larger drains, for foraging and commuting. Nine ditches will require a temporary culvert. A further 36 ditches including one watercourse will also be crossed using a temporary bridge. A total of 19 sections of hedgerow will be required to be removed to facilitate cable installation in Route Section 3, totalling 1,100 m of hedgerow. Since fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, it is probable that temporary fragmentation impacts will occur for a small numbers of bats during construction. However, embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population. Therefore temporary fragmentation impacts associated with hedgerow removal will be removed and the effect on the local bat population is near certain to be **not significant.**

6.4.15 Lighting of work areas during construction is only anticipated for specific activities which will be of short duration and intermittent throughout the construction period. The effects of temporary lighting on foraging bats during construction are **not significant**.

Water Vole

6.4.16 Water vole activity was recorded at seven locations within Route Section 3 during the surveys. In addition, consideration is given to both the presence of records in the base scheme design and connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/ drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide and through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for water vole. Therefore it is certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.4.17 It is possible that killing or injury of water vole during installation of temporary bridges/culverts may occur. However, embedded mitigation, will ensure pre-construction surveys are undertaken to confirm their presence and where necessary and in compliance with wildlife legislation, under licence, displacement of water vole from the area of the temporary bridges/culverts will be undertaken. Therefore it is certain the effects of killing or injury on water vole as a result of temporary bridges/culverts for temporary haul roads will be **not significant**.

Otter

6.4.18 Evidence of otter activity was recorded at one location along Route Section 3 during the surveys. Consideration is also given to connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/ drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide and through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for otter. Therefore it is certain the effects of temporary habitat loss on otter as a result of temporary bridges/culverts for temporary haul roads is **not significant**.

6.4.19 It is extremely unlikely that killing or injury of otter during installation of temporary bridges/culverts will occur unless holts or resting places are established in crossing locations before construction begins. Certain embedded mitigation comprising pre-construction surveys will enable baseline data to be updated and licenced works to be developed if otter are found to be present. There is also the potential for otter to become entrapped in excavations where these are close to watercourse crossings. However, embedded mitigation will be certain to ensure excavations are covered over at night and/or egress ramps provided in order to prevent entrapment. Therefore it is certain the potential for injury of otter as a result of construction activities and temporary bridges/culverts will be **not significant**.

Badger

6.4.20 The proposed DC cable route, temporary access roads and temporary construction compounds, have been designed to ensure as limited impact as possible is encountered on the local badger population. However construction will result in the closure of one outlier badger sett (sett S56); which will be impacted directly by the proposed working area for the cable route. Although the outlier sett was found to be active at the time of survey, due to the nature of outlier setts the activity levels are likely to change across the year and are therefore not considered as valuable to the local clan as a main sett. . It is certain that the embedded mitigation measures, including the closure of setts through Natural England licence, will ensure that no detrimental impact on badgers is encountered and therefore the effect is considered to be **not significant**.

6.4.21 Based on the location of setts S64, S66, S144, S145 in relation to the proposed DC cable route it has been determined that all four setts can be retained through the construction period, however it is possible that construction works will encroach within the 30 m buffer zone from the sett entrances if the working area extends into the LoD. The extent of the LoD is located within 15 m of S64, 10 m of S66, 10 m from S144 and 15 m from S145. Therefore there is a possible risk of damaging tunnels during construction and works will be undertaken via a Natural England licence, although this risk is considered to be low and **not significant**.

6.4.22 There is one sett (S59) located well outside the LoD (over 30 m) but within the redline boundary, associated with temporary drainage works. S59 is a main sett that extends along the length of the ditch with works proposed within 10 m of the sett entrances, however the possible impact is considered to be minimal limited to an 8” trench. Temporary ditch drainage works associated with

the construction works, also lie within 15 m buffer of S145. Temporary drainage works will be designed to avoid the sett and therefore it is certain that the sett will not be impacted and therefore considered to be **not significant**.

6.4.23 The large main sett located along the River Witham (S75) is positioned across the width of the proposed DC cable route. However due to the size of the river the proposals for the cable installation in this area involve the use of HDD. As the depth of the HDD will have to be significantly lower than the depth of the river bed, it is assumed that this method of installation will also travel beneath the main badger sett located within the river banks. Therefore the impact to the main badger sett (S75) is restricted only to temporary disturbance during the HDD installation and it is near certain that this impact will not lead to significant effects on the badger clan. The effects on the main sett S75 is therefore **not significant**.

6.4.24 It is possible that killing, injury or entrapment of badgers (e.g. from site traffic and by falling into excavations) during the construction period, particularly during the proposed DC cable installation, may occur. Trenches will be covered or fenced off at night, or egress ramps will be provided to prevent entrapment of badgers during construction. It is near certain that this will prevent killing and injury due to entrapment and therefore the effect on the badger clan is **not significant** within Route Section 3.

6.4.25 It is certain that temporary foraging habitat loss will occur as a result of construction of the temporary construction compounds and installation of the proposed DC cables. However ample alternative foraging habitat within the wide expanse of landscape is available in the immediate area therefore it is certain that this impact will not lead to significant effects on the badger clan. The effects of temporary habitat loss on the local badger clan are therefore **not significant** within Route Section 3.

6.4.26 It is possible that the construction of temporary access roads and installation of the proposed DC cable route will cause temporary fragmentation impacts. These fragmentation impacts would be exacerbated where the design of any security fencing during construction may impede badger movement. However, the provision of two-way badger gates within demarcation fencing along the proposed DC cable route will prevent fragmentation impacts on the local badger clan and their movements. Taking into account the embedded mitigation it is near certain that effects on the local badger clan as a result of fragmentation impacts will be **not significant** within Route Section 3.

Winter Birds

6.4.27 The proposed construction works could result in the short term temporary loss of land within the LoD of the cable route during the winter period. It would also likely result in the displacement of some birds within 500 m of the working area through both noise and visual disturbance generated by the construction works.

6.4.28 There could be some minor disturbance effects from traffic using the access road to the Secondary TCC (S3) located 200m north of Hagnaby Fen, however due to the existing road in this location this temporary impact is considered to be **not significant**.

6.4.29 There is the potential for low numbers of birds which are also qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar, to be disturbed and potentially displaced from the River Witham by the construction works if undertaken during the winter period.

6.4.30 This is characterised as a significant adverse effect at the Local level.

Breeding Birds

6.4.31 During construction works there is the potential for temporary displacement effects due to visual disturbance effects caused by the workers as well as temporary habitat loss from temporary compounds. This is likely to result in the temporary displacement of low numbers of a range of priority bird species including dunnock (1 pair), linnet (2 pairs), reed bunting (5 pairs), skylark (13 pairs) and yellowhammer (5 pairs).

6.4.32 Due to the temporary nature of the works and the short distance over which these species are likely to be displaced, as well as the abundance of other suitable habitat for these species in the nearby area, it is likely that this impact would be minimal. Therefore the potential impact of temporary displacement is **not significant.**

Reptiles

6.4.33 The majority of the construction works fall within low quality reptile habitat i.e. arable land. Unmanaged field margins, vegetated banks of drains (both of which are common in the wider area) and hedgerows provide better quality habitat which could support reptiles. Due to the prevalence of these habitats in the wider area, their temporary loss is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for reptiles. Therefore it is near certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.4.34 It is possible that killing or injury of small numbers of reptiles during vegetation clearance works may occur. However, in compliance with wildlife legislation, embedded mitigation comprising RAMs during vegetation clearance (as will also be implemented for amphibians) will ensure killing or injury of reptiles is certain to be avoided. Therefore the effect will be **not significant**.

Brown Hare

6.4.35 The landscape containing the base scheme design is, broadly speaking, homogeneous and the extent of suitable habitats for brown hare that would be affected is proportionally very small. Temporary losses which will be incurred as a result of construction of the proposed DC cable route will not lead to a significant loss of suitable habitats or of fragmentation effects. Therefore the potential impact of temporary habitat loss and fragmentation is extremely unlikely to affect the brown hare population and therefore effects are **not significant**.

6.4.36 Due to their sensitivity to noise and activity it is anticipated that adult brown hare would suffer from localised perturbation once construction activities commence, the consequence of which is that they would be unlikely to be killed or injured as a result. Immature brown hare (leverets), however, would remain susceptible to possible killing or injury during initial site clearance, depending on the timing of this activity, as they are left alone in forms during the day and may be

reluctant to move; they are therefore at risk of late response to potential danger. It is also possible for hares to become trapped in excavations associated with construction activities, which may cause distress or injury. However embedded mitigation identified for other species will be certain to ensure excavations are covered over and/or egress ramps provided in order to prevent entrapment. Overall there remains a possibility for killing or injury of small numbers of leverets and the effect is therefore categorised as a **significant adverse at the Local level**.

West European Hedgehog

6.4.37 The majority of the construction works fall within habitats which would be unsuitable for hedgehog i.e. arable land. Hedgerows, woodland and scrub provide better quality habitat for hedgehog. It is certain that only limited areas of these habitat types will be temporarily lost as a result of construction. Sufficient similar habitat is available for hedgehog to utilise and therefore temporary losses are not considered to lead to a significant loss of suitable habitats or of fragmentation effects. Therefore it is near certain that the potential effect of temporary habitat loss and fragmentation on hedgehog is **not significant**.

6.4.38 Due to their tendency to curl up and remain in one place when threatened and their vulnerability during hibernation, it is possible that killing or injury of small numbers of hedgehogs during vegetation clearance works may occur. However embedded mitigation identified for other species (Reptile RAMs) will also apply to hedgehog and will be certain to ensure that killing or injury is avoided. Therefore the effect will be **not significant**.

European Eel and Spined Loach

6.4.39 Approximately 46 drains and/or rivers are present within Route Section 3, including Hagnaby Beck, West fen catchwater Drain and the River Witham which all provide suitable habitat for European eel and spined loach. It is certain that all watercourse crossings will utilise trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Therefore it is certain the effects of temporary habitat loss on these fish as a result of bridges/culverts for temporary haul roads will be **not significant**.

6.4.40 Migratory species such as the European eel are particularly sensitive during the migration seasons of spring and autumn. Since all crossings will be trenchless and water flow will be maintained during construction, it is certain that possible fragmentation effects during construction activities on the local European eel population are **not significant**.

Longer Term, Operational and Permanent Impacts

Designated Wildlife Sites and Notable Habitats

6.4.41 No longer term, operational or permanent impacts are anticipated to occur at Braygate Lane SNCI, Hagnaby Lock Nature Reserve, Langrick Pits SNCI or West Fen Catchwater SNCI.

Habitats and Flora

Hedgerows

6.4.42 Route Section 3 contains a total of 7061.91 m of native hedgerow across 46 individual sections. A total of 29.93 m species-rich intact hedgerow, 454.65 m species-rich intact hedgerow with trees, 4580.99 m species-poor intact hedgerow, 431.08 m species-poor intact hedgerow with trees and 1565.26 m species-poor defunct hedgerow.

6.4.43 Assuming the worst case scenario of the working corridor covering the entire working width of 30 m (on average), installation of the proposed DC cable route will result in the total loss of 1099.76 m of native hedgerow across 19 individual sections. This loss comprises approximately 55.07 m species-rich intact hedgerow with trees, 826.77 m species-poor intact hedgerow and 217.92 m species-poor defunct hedgerow. Two of the hedgerows directly affected by the proposed DC cable route met the criteria for 'Important' under the Hedgerow Regulations (Ref 10-10).

6.4.44 It is probable that the losses calculated above are an over estimation as hedgerow crossings, where adjacent to drains, will be trenchless. Therefore less hedgerow will in fact require removal to facilitate construction of a temporary haul road. Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 190 m of hedgerow would require removal.

6.4.45 The embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will be returned to their pre-construction functionality. Therefore, in the longer term, it is near certain that the effects of construction on hedgerows is considered to be **not significant**.

Woodland and Trees

6.4.46 Three blocks of semi-natural broad-leaved woodland occur along Route Section 3. It is not anticipated that this woodland will be impacted by the construction of the DC Cable Route. However, it is possible that construction will result in the loss of 0.01 ha of this habitat.

6.4.47 One area of broad-leaved plantation woodland is crossed by Route Section 3. It is certain that this woodland will not be impacted by the construction of the DC Cable Route.

6.4.48 It is possible that 274 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. This is based on lidar data, which is likely to be an overestimation as discussed in the appendix. However it is anticipated that the majority of these trees will be retained through micro-siting during construction.

6.4.49 The permanent easement means that woodland and tree habitats cannot be replaced across Route Section 3. Permanent loss of these habitats represents a **significant adverse effect** at the Local Level.

6.4.50 The reinstatement plan allows for replacement of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the

proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant**.

6.4.51 It is possible that woodland and trees will be affected by the base scheme design for pre-construction land drainage. It is certain that tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant.**

Watercourses

6.4.52 Route Section 3 crosses 28 watercourses and field ditches. All of these features will be crossed using trenchless measures which will impact bankside habitats.

6.4.53 Of these ditches nine will also require a temporary culvert. A further 18 ditches including one watercourse will also be crossed using a temporary bridge. The River Witham is noted as a Restricted Crossing.

6.4.54 Based on the worst case scenario of the working corridor for these crossings covering the entire working width of 55 m (on average), this will result in the possible temporary loss of 1394.53 m of bankside habitat. However it is extremely unlikely the full length of the working area will impact bankside habitats. It is probable that only a 10m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 280m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 280 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna. Therefore it is certain that the effect on watercourse habitats is **not significant**.

6.4.55 Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation can expect to be re-established within 2-4 years. Therefore, over the longer term, effects following temporary losses will be **not significant**.

6.4.56 It is probable that permanent outfalls will be installed in association with the base scheme design for pre-construction land drainage. The small area of habitat permanently lost as a result of construction is estimated to be approximately 3m^2 and as bankside habitats are abundant within the local area it is certain that this permanent loss will be **not significant**.

Great Crested Newt and other Amphibians

6.4.57 No operational or permanent impacts are anticipated for GCN and other amphibians.

6.4.58 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which amphibians can utilise during the re-establishment period, these longer term impacts are considered to be **not significant**.

Bats

6.4.59 No longer term, operational or permanent effects are predicted with respect to the trees identified as having potential for roosting bats.

6.4.60 Construction across field boundaries such hedgerows and drains has the potential to cause fragmentation effects on commuting and foraging bats as the continuity of the feature is interrupted. This effect will continue where hedgerows have been removed, until the reinstatement has reached functional capability, approximately 5 years. Additional temporary fencing will ensure they are functional while the planting establishes and matures. Therefore the longer-term impact of fragmentation taking into account embedded mitigation is considered to be **not significant**.

Water Vole

6.4.61 No operational or permanent impacts are anticipated for water vole.

6.4.62 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term e are certain to be **not significant**.

Otter

6.4.63 No operational or permanent impacts are anticipated for otter.

6.4.64 Longer term effects along the riparian corridor are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridge crossings and culverts, typically 2-4 years. Water flow will not have been affected for the majority of watercourse crossings. However, given the prevalence of similar habitats within the locality which otter can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Badger

6.4.65 No operational or permanent impacts are anticipated for badger.

6.4.66 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which badgers can utilise

during the re-establishment period, and the fact that no main badger sett will be lost these longer term impacts are certain to be **not significant** in Route Section 3.

Winter Birds

6.4.67 No operational or permanent impacts are anticipated for wintering birds.

6.4.68 The predominant terrestrial habitat utilised by wintering birds is the arable land which is crossed by the proposed DC cable route. This is likely to be fully re-established within 1 year and therefore no longer term impacts on winter birds are anticipated.

6.4.69

Breeding Birds

6.4.70 No operational or permanent impacts are anticipated for breeding birds.

6.4.71 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside and grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which breeding birds can utilise during the re-establishment period, these longer term impacts are certain to be **not significant.**

Reptiles

6.4.72 No operational or permanent impacts are anticipated for reptiles.

6.4.73 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which reptiles can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

Brown Hare

6.4.74 No operational or permanent impacts are anticipated for brown hare.

6.4.75 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 1 year for arable land, 2-4 years for grassland, up to 5 years for hedgerows. However, given the prevalence of similar habitats within the locality which brown hare can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

West European Hedgehog

6.4.76 No operational or permanent impacts are anticipated for west European hedgehog.

6.4.77 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 3 to 5 years for scrub and up to 5 years for hedgerows. However, given the prevalence of similar habitats within the locality which hedgehog can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

European Eel and Spined Loach

6.4.78 No longer term impacts are anticipated for European eel or spined loach with respect to habitat recovery as water flow will not have been affected at the watercourse crossings.

6.4.79 With respect to operational impacts, certain fish species including European eel are electrosensitive and respond to magnetic fields in the environment. Some species such as European eel, have significant magnetically sensitive material (magnetite) within their skeletal structure which is commonly thought to be used for direction finding using the Earth's geomagnetic field. Research (Westerberg & Lagenfelt (2008) (Ref 10-52)) on unburied subsea cables has suggested that there may be slight changes in swimming ability when eels are in close proximity to the cables but that this does not affect their migratory behaviour.

6.4.80 The possible effect of EMF from the proposed DC cable is recognised. However, given the expected low strength of the magnetic fields at ground level, and based on research, it is not anticipated that EMF would affect European eel migratory behaviour and therefore it is certain the effects would be **not significant**.

Summary of Potential Impacts

6.4.81 The following Table 10.29. provides a summary of the construction and longer term, operational and permanent identified as a result of the proposed DC cable route in Route Section 3.

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Construction Impacts				
All non-statutory designated sites	County	Possible degradation of habitats as a result of pollution and emissions. Certain implementation of embedded pollution prevention measures will ensure no significant effects.	**Not significant**	**No**
Braygate Lane SNCI	County	Possible encroachment leading to damage to grassland verge. Near certain embedded design of the access will ensure no encroachment. Therefore no significant effects.	**Not significant**	**No**
Hagnaby Lock Nature Reserve	County	Possible hydrological impacts on wetland habitats. However, certain embedded hydrology mitigation will ensure consistent run-off rates ensuring no significant effects.	**Not significant**	**No**
Langrick Pits SNCI	County	Possible hydrological impacts on wetland habitats. However, certain embedded hydrology mitigation will ensure consistent run-off rates ensuring no significant effects.	**Not significant**	**No**
West Fen Catchwater SNCI	County	Possible hydrological impacts on wetland habitats. However, certain embedded hydrology mitigation will ensure consistent run-off rates ensuring no significant effects.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Hedgerows	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Woodland and Trees	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Watercourses – Field ditches	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. It is certain that disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Great Crested Newts and other Amphibians	Local	Prevalence of similar habitats in the vicinity of the base scheme design available for use by these species during construction. Therefore no impacts due to habitat loss.	**Not significant**	**No**
		No fragmentation effects as a result of construction since abundant suitable habitat available.	**Not significant**	**No**
		Embedded reasonable avoidance measures during vegetation clearance will ensure no killing or injury.	**Not significant**	**No**
Bats	Local	One tree with high bat roost potential (T223) and one tree with moderate bat roost potential (T303) present within base scheme design. If these trees are to be affected pre-construction surveys would confirm whether or not bat roosts were present prior to removal. Bat boxes would be installed regardless of whether bats are present or not. If bats present then a NE derogation licence would be obtained to undertake removal of tree. For 5 trees with low bat potential, soft-felling felling techniques used on this tree to ensure no impacts on roosting bats.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		One ditch will require a temporary culvert and a further 36 watercourses will be crossed by temporary bridges. 19 sections of hedgerow required to be removed to facilitate cable installation totalling 1,100 m of hedgerow. Embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population.	**Not significant**	**No**
		Lighting during construction anticipated to be intermittent and of short duration during construction and therefore is not anticipated to impact on foraging and commuting bats.	**Not significant**	**No**
Water vole	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during installation of temporary bridges/culverts may occur. Embedded mitigation via pre-construction surveys and displacement under licence certain to ensure this impact is prevented.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Otter	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Extremely unlikely that killing or injury during installation of temporary bridges/culverts and possible that entrapment in excavations may occur. Embedded mitigation via pre-construction surveys and mitigation under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Badger	Local	Loss of one outlier sett. Natural England badger licence to cover these works.	**Not significant**	**No**
		Works to be undertaken within 10 – 30 m buffer from two outlier and two subsidiary setts. Natural England licence to cover these works. Temporary drainage works within 15 m of one main and one outlier sett. HDD under one main sett.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Risk of killing or injury to badgers in the event that badger falls into/becomes entrapped within excavations. Trenches covered/fenced off at night will prevent killing or injury.	**Not significant**	**No**
		Temporary fragmentation impacts associated with the installation of the proposed DC cable. Provision of two-way badger gates will prevent fragmentation.	**Not significant**	**No**
Wintering birds	Local	There is the potential for small numbers of waders and wildfowl to be displaced from the River Witham if works undertaken during winter period.	**Significant adverse at the Local level**	**Yes**
Breeding birds	Local	There is the potential for some temporary displacement effects on breeding birds over short distances during the construction period. Due to the low level of displacement and availability of nearby suitable habitat within the species affected, this impact would not be significant.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		There is the potential for damage or destruction of nests of several species during vegetation clearance and construction activities. Embedded mitigation via nesting bird checks during the breeding season will ensure damage and destruction of nests is prevented.	**Not significant**	**No**
Reptiles	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs certain to ensure this impact is prevented.	**Not significant**	**No**
Brown Hare	Local	Certain temporary loss of potential suitable habitat. However certain that ample availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		It is possible that killing or injury of young hares (leverets) during site clearance may occur, and of individuals that may get trapped in excavations. Certain embedded mitigation will prevent entrapment, but leverets still at risk leading to potential significant effects.	**Significant adverse at the Site Level**	**Yes**
West European hedgehog	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs for other species certain to also ensure this impact is prevented.	**Not significant**	**No**
European eel and Spined Loach	Local	Certain that all 46 (approximately) drains/rivers being crossed by trenchless techniques, with temporary bridge or culvert installed through which flow is maintained. Therefore certain that temporary habitat loss will not lead to significant effects.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Certain that all watercourse crosisngs are trenchless and therefore certain that fragmentation effects are extremely unlikely.	**Not significant**	**No**
Longer Term, Operational and Permanent Impacts				
All non-statutory sites (Braygate Lane SNCI, Hagnaby Lock Nature Reserve, Langrick Pits SNCI or West Fen Catchwater SNCI)	County	No longer term, operational or permanent impacts anticipated.	**No impact**	**No**
Hedgerows	Local	Probable temporary loss of 190 m of hedgerow habitat. However, embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction and near certain re-establishment after 5 years.	**Not significant**	**No**
Woodland and Trees	Local	Possible loss of up to 0.01 ha of broad-leaved plantation woodland and possible loss of 274 trees. Reinstatement of woodland and trees in-situ will not be possible over the proposed DC cable permanent easement.	**Significant adverse at the Local level**	**Yes**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		The reinstatement plan allows for replacement of woodland and tree habitats lost, near certain to reach 7–10 m after 15 years. The longer term effects of this design mitigation will lead to an overall increase in woodland and tree cover within the area.	**Not significant**	**No**
Watercourses	Local	Probable temporary loss of approximately 280.00 m of bankside habitat which will be reinstated through natural colonisation and will be near certain re-established within 2-4 years.	**Not significant**	**No**
		It is probable that permanent outfalls will be installed in association with the pre-construction land drainage. This will result in the permanent loss of a small amount of bankside habitat, but given the amount of available similar habitat it is certain there will be no significant effect.	**Not significant**	**No**
Great Crested Newt and other Amphibians	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on amphibians.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Bats	Local	No operational or permanent impacts predicted. Potential for fragmentation effects where hedgerows removed, but temporary fencing will be in place until hedgerow plantings have reached functional maturity.	**Not significant**	**No**
Water vole	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on water vole.	**Not significant**	**No**
Otter	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on otter.	**Not significant**	**No**
Badger	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on badger.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Wintering birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats, but this will occur within 1 year for farmland, therefore no effects on wintering birds.	**No impact**	**No**
Breeding birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on breeding birds.	**Not significant**	**No**
Reptiles	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on reptiles	**Not significant**	**No**
Brown Hare	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on brown hare.	**Not significant**	**No**

Table 10.29 Summary of Potential Impacts – Route Section 3				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
West European hedgehog	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on hedgehog.	**Not significant**	**No**
European eel and Spined Loach	Local	No longer term effects related to construction will occur. Possible operational EMF effects, however predicted to be low strength therefore certain it would not affect European eel.	**Not significant**	**No**

6.5 Route Section 4 River Witham to the Proposed Converter Station

Temporary Impacts

Designated Wildlife Sites and Notable Habitats

6.5.1 Three LWSs (Great Hale Eau LWS, Old Forty Foot Drain to South Forty Foot Drain LWS and South Forty Foot Drain LWS) are crossed by the base scheme design. These longer term impacts are described in the relevant section below. However, all three of these LWSs will be crossed by trenchless techniques. It is possible that accidental encroachment by construction traffic will occur on the retained parts of these LWSs. However, as set out in the CEMP, it is certain that working areas will be demarcated in order to protect retained habitats and features. Therefore no adverse effect on the integrity of the retained parts of the sites are predicted and are considered to be **not significant**.

6.5.2 All of the seven LWSs within the base scheme design in Route Section 4 are hydrologically linked. It is possible that indirect impacts arising from changes to the hydrological regime as a result of construction may affect these sites. However, it is certain that embedded hydrology mitigation (ES-2-B.04, Chapter 8, Water Resources & Hydrology) will ensure run-off rates remain consistent with baseline conditions and therefore any effects will be **not significant**.

6.5.3 Likewise, it is possible that degradation or pollution of the habitats for which all these sites are designated as a result of water or airborne pollution, dust and debris may occur. This is particularly the case for the Great Eau LWS as a Temporary Works Area (T14) is located adjacent to it. However, it is certain this will be avoided due to the inclusion of embedded pollution prevention measures in the CEMP. Therefore no temporary impacts as a result of these aspects of construction are predicted and effects are **not significant**.

Habitats and Flora

Hedgerows

6.5.4 There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off as well as accidental encroachment on habitats by construction traffic. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities and impacts will be extremely unlikely to occur. Taking into account the embedded mitigation, effects on hedgerows are **not significant**.

Woodland and Trees

6.5.5 As discussed for hedgerows, there is the potential for temporary degradation of the habitats. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities. Taking into account the embedded mitigation prior to

assessment it is extremely unlikely that impacts associated with temporary degradation will occur and therefore effects on woodland and trees are **not significant**.

Watercourses

6.5.6 Several temporary culverts will be required across watercourses along the proposed DC cable route. There is the potential for temporary degradation of the habitats as a result of wind blown dust, debris, emissions and site run-off. Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse effects associated with construction activities and emissions from construction traffic. It is extremely unlikely that impacts associated with temporary degradation will occur and therefore, effects on watercourses are **not significant**.

6.5.7 Where culverts are installed for temporary access, disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place and is extremely unlikely to have a significant effect on the ecological features of these watercourses. Therefore the effects will be **not significant.**

Great crested Newts and other Amphibians

6.5.8 Short term temporary loss of amphibian terrestrial and aquatic habitat within the working area of the proposed DC cable route will occur as a result of the proposed construction works within Route Section 4. One GCN has been recorded during torch survey of Ditch 83, which links with a drain being crossed by the proposed DC cable. Other ditches with suitable habitat for GCN intersect with the LoD.

6.5.9 Construction works will result in the short term temporary loss of amphibian terrestrial and aquatic habitat, particularly where drains and hedgerows are crossed. Given the small temporary losses and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.5.10 With respect to temporary fragmentation impacts, this has the potential to occur where watercourses and suitable terrestrial habitat (hedgerows, scrub, coarse grassland) are crossed by the proposed DC cable route and where temporary bridges/culverts are required. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies. However, given the temporary nature of any barriers to movement and the availability of similar habitats within the area it is extremely unlikely that significant effects would occur. Therefore it is certain this effect is **not significant**.

6.5.11 There is the potential for killing or injury of amphibians during site clearance of suitable habitats and installation of temporary bridges/culverts at watercourse crossings. There is the potential for amphibians to use soil piles and stored materials for refuge and hibernation which could result in killing or injury when these are moved. These effects could lead to a significant adverse effect at the Site level if unmitigated. However, RAMs are embedded into the scheme and will be employed during vegetation clearance and construction site management of soils and materials. As a result of the embedded RAMs, it is extremely unlikely that impacts associated with construction will lead to killing or injury of amphibians. Therefore the effects on amphibians with respect to killing and injury are certain to be **not significant**.

Bats

6.5.12 Two trees within the base scheme design hold moderate roost potential trees (T286 and T287). These trees could support larger numbers of bats or for longer periods, but are unlikely to be suitable for high conservation status roosts. It is not currently known whether these trees can be retained within the design and therefore as a worst case scenario it is possible that these trees will be lost. Although roosts were not confirmed as present during surveys, these trees retain the potential to support roosting bats. Loss of these potential roost would be permanent and could limit roosting opportunities in the locality with the possibility that this could affect FCS of local bat populations. Therefore the effect of loss of these four trees on the local bat population would be significant adverse at the Local level.

6.5.13 Embedded legal compliance measures would ensure that pre-construction surveys confirmed the presence or not of roosting bats prior to removal. Replacement roost boxes would be installed in suitable locations regardless of whether bats are found to be present in order to ensure the potential for roosting bats is maintained. If bats are found to be present then a NE Derogation Licence will be required to undertake removal of the tree. For the one tree with low bat roost potential (T277) it is unlikely that bats roost within this tree and embedded mitigation measures, including using soft-felling methods to carry out any necessary felling works would ensure that bats are not affected. These measures would be certain to ensure that effects on the bat population will be **not significant.**

6.5.14 At least five species of bat, most commonly common pipistrelle and soprano pipistrelle use the habitats, particularly the larger drains, for foraging and commuting. One ditch will be crossed using open cut measures and will also require a temporary bridge crossing. A further 34 ditches including one watercourse will also be crossed using a temporary bridge. Two other ditches will require a temporary culvert. A total of 3 sections of hedgerow will be required to be removed to facilitate cable installation in Route Section 1, totalling 165 m of hedgerow. Since fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, it is probable that temporary fragmentation impacts will occur for a small numbers of bats during construction. However, embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population. Therefore temporary fragmentation impacts associated with hedgerow removal will be removed and the effect on the local bat population is near certain to be **not significant.**

6.5.15 There is the potential that bats using the area for foraging and commuting will be affected by construction lighting, if required for night time working. It is only possible that this will occur, since the majority of night time working would take place during the bat hibernation period in the winter. Lighting of work areas during construction is only anticipated for specific activities which will be of short duration and intermittent throughout the construction period. It is unlikely that this will cause any significant effects to the foraging and commuting activities of the local bat population and therefore the effects are considered **not significant**.

Water Vole

6.5.16 A single occurrence of water vole activity were recorded within Route Section 4 during the surveys. In addition, consideration is given to both the presence of records in the base scheme design and connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/ drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide and through which water flow will be maintained. Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for water vole. Therefore it is certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.5.17 It is possible that killing or injury of water vole during installation of temporary bridges/culverts may occur. However, embedded mitigation, will ensure pre-construction surveys are undertaken to confirm their presence and where necessary and in compliance with wildlife legislation, under licence, displacement of water vole from the area of the temporary bridges/culverts will be undertaken. Therefore it is certain the effects of killing or injury on water vole as a result of temporary bridges/culverts for temporary haul roads will be **not significant**.

Otter

6.5.18 No evidence of otter activity was recorded along Route Section 4 during the surveys, although desktop records were returned from within the base scheme design. Consideration is however, given to connectivity between the network of water courses throughout the entirety of the proposed DC cable route. It is certain that the majority of ditches/drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide and through which water flow will be maintained. . Due to the prevalence of these habitats in the wider area, the small scale temporary losses associated with installation of temporary bridges/culverts is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for otter. Therefore it is certain the effects of temporary habitat loss on otter as a result of temporary bridges/culverts for temporary haul roads is **not significant**.

6.5.19 It is extremely unlikely that killing or injury of otter during installation of temporary bridges/culverts will occur unless holts or resting places are established in crossing locations before construction begins. Certain embedded mitigation comprising pre-construction surveys will enable baseline data to be updated and licenced works to be developed if otter are found to be present. There is also the potential for otter to become entrapped in excavations where these are close to watercourse crossings. However, embedded mitigation will be certain to ensure excavations are covered over at night and/or egress ramps provided in order to prevent entrapment. Therefore it is certain the potential for injury of otter as a result of construction activities and temporary bridges/culverts will be **not significant**.

Badger

6.5.20 The proposed DC cable route, temporary access roads and temporary construction compounds, have been designed to ensure as limited impact as possible is encountered on the local badger population. However construction will result in the closure of two badger setts (setts S79 & S135); sett S135 being located at point the DC cable route connects to the converter station, while sett S79 will be impacted directly by the proposed working area for the cable route. Although all setts were found to be active at the time of survey, due to the nature of outlier/annexe setts the activity levels are likely to change across the year and are therefore not considered as valuable to the local clan as a main sett. It is certain that the embedded mitigation measures, including the closure of setts through Natural England licence, will ensure that no detrimental impact on badgers is encountered and therefore the effect is considered to be **not significant**.

6.5.21 Based on the location of sett S87 & S112 in relation to the proposed DC cable route it has been determined that these two setts can be retained through the construction period, however it is certain that construction works will encroach within the 15-30 m zone from the sett entrances. Therefore there is a possible risk of damaging tunnels during construction and works will be undertaken via a Natural England licence, although this risk is considered to be low and **not significant**.

6.5.22 Based on the location of setts S78, S89, S92, S95 and S119 in relation to the DC cable route it has been determined that the setts are likely to be retained through the construction period, although the setts do lie within the base scheme design. However works proposed in proximity to the sett (within 30 m) are restricted to temporary drainage works, which will be designed to avoid the setts and therefore it is near certain that the five setts will not be impacted and therefore considered to be **not significant**.

6.5.23 It is possible that killing, injury or entrapment of badgers (e.g. from site traffic and by falling into excavations) during the construction period, particularly during the proposed DC cable installation, may occur. Trenches will be covered or fenced off at night, or egress ramps will be provided to prevent entrapment of badgers during construction. It is near certain that this will prevent killing and injury due to entrapment and therefore the effect on the badger clan is **not significant** within Route Section 4.

6.5.24 It is certain that temporary foraging habitat loss will occur as a result of construction of the temporary construction compounds and installation of the proposed DC cables. However ample alternative foraging habitat within the wide expanse of landscape is available in the immediate area therefore it is certain that this impact will not lead to significant effects on the badger clan. The effects of temporary habitat loss on the local badger clan are therefore **not significant** within Route Section 4.

6.5.25 It is possible that the construction of temporary access roads and installation of the proposed DC cable route will cause temporary fragmentation impacts. These fragmentation impacts would be exacerbated where the design of any security fencing during construction may impede badger movement. However, the provision of two-way badger gates within demarcation fencing along the proposed DC cable route will prevent fragmentation impacts on the local badger clan and their movements. Taking into account the embedded mitigation it is near certain that effects on

the local badger clan as a result of fragmentation impacts will be **not significant** within Route Section 4.

Winter Birds

6.5.26 The proposed construction works could result in the short term temporary loss of land within the LoD of the cable route during the winter period. It would also likely result in the displacement of some birds within 500 m of the working area through both noise and visual disturbance generated by the construction works.

6.5.27 Small groups of wildfowl were regularly recorded along the length of the South Forty Foot Drain throughout the winter bird survey. Some of these species are also qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar, although these species were not recorded in the section of this watercourse directly adjacent to the base scheme design. As the South Forty Foot Drain is well screened by existing banks and vegetation it is only likely that species using this location would only be exposed to very low levels of disturbance where the works directly border this watercourse.

6.5.28 Due to the potential for some low levels of disturbance and displacement on low numbers of wildfowl species, this is characterised as a **significant adverse effect at the Local level.**

Breeding Birds

6.5.29 During construction works there is the potential for temporary displacement effects due to visual disturbance effects caused by the workers as well as temporary habitat loss from temporary compounds. This is likely to result in the temporary displacement of low numbers of a range of priority bird species including reed bunting (6 pairs), skylark (9 pairs) and yellowhammer (2 pairs).

6.5.30 Due to the temporary nature of the works and the short distance over which these species are likely to be displaced, as well as the abundance of other suitable habitat for these species in the nearby area, it is likely that this impact would be minimal. Therefore the potential impact of temporary displacement is **not significant.**

Reptiles

6.5.31 The majority of the construction works fall within low quality reptile habitat i.e. arable land. Unmanaged field margins, vegetated banks of drains (both of which are common in the wider area) and hedgerows provide better quality habitat which could support reptiles. Due to the prevalence of these habitats in the wider area, their temporary loss is not considered to lead to a significant loss of suitable habitats or of fragmentation effects for reptiles. Therefore it is near certain that the potential effect of temporary habitat loss and fragmentation is **not significant**.

6.5.32 It is possible that killing or injury of small numbers of reptiles during vegetation clearance works may occur. However, in compliance with wildlife legislation, embedded mitigation comprising RAMs during vegetation clearance (as will also be implemented for amphibians) will ensure killing or injury of reptiles is certain to be avoided. Therefore the effect will be **not significant**.

Brown Hare

6.5.33 The landscape containing the base scheme design is, broadly speaking, homogeneous and the extent of suitable habitats for brown hare that would be affected is proportionally very small. Temporary losses which will be incurred as a result of construction of the proposed DC cable route will not lead to a significant loss of suitable habitats or of fragmentation effects. Therefore the potential impact of temporary habitat loss and fragmentation is extremely unlikely to affect the brown hare population and therefore effects are **not significant**.

6.5.34 Due to their sensitivity to noise and activity it is anticipated that adult brown hare would suffer from localised perturbation once construction activities commence, the consequence of which is that they would be unlikely to be killed or injured as a result. Immature brown hare (leverets), however, would remain susceptible to possible killing or injury during initial site clearance, depending on the timing of this activity, as they are left alone in forms during the day and may be reluctant to move; they are therefore at risk of late response to potential danger. It is also possible for hares to become trapped in excavations associated with construction activities, which may cause distress or injury. However embedded mitigation identified for other species will be certain to ensure excavations are covered over and/or egress ramps provided in order to prevent entrapment. Overall there remains a possibility for killing or injury of small numbers of leverets and the effect is therefore categorised as a **significant adverse at the Site level**.

European Eel and Spined Loach

6.5.35 Approximately 36 drains and/or rivers are present within Route Section 4, including the Great Eau and South Forty Foot Drain which all provide suitable habitat for European eel and spined loach. It is certain that all watercourse crossings except one which may be open cut, will utilise trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained. Therefore it is certain the effects of temporary habitat loss on these fish as a result of bridges/culverts for temporary haul roads will be **not significant**.

6.5.36 Migratory species such as the European eel are particularly sensitive during the migration seasons of spring and autumn. If open-cut construction across watercourses should fall within these periods, migration may be delayed in the short-term whilst dry working is underway. Although, eels are known to travel overland for moderate distances, it is unlikely that they would cross the construction working width, which being stripped of vegetation would not provide suitable habitat for eels to move across. It is certain that all but one watercourse crossing will be crossed using a trenchless technique. One crossing which is classed as medium in size may be open cut. It is possible that this drain could support European eel although other more suitable drains are available and therefore it is probable that possible fragmentation effects during construction activities are **not significant**.

6.5.37 Due to the possible open cut method to be used on one drain which may support European eel, it is possible that killing or injury to individuals may occur. In order to prevent this, embedded fish rescue measures is certain to be implemented during installation of dams and the latter stages of de-watering. This is certain to prevent killing and injury to eels and therefore any effects will be **not significant**.

Longer Term, Operational and Permanent Impacts

Designated Wildlife Sites and Notable Habitats

6.5.38 No operational or permanent impacts are predicted for the seven LWSs within Route Section 4.

6.5.39 Three LWSs (Great Hale Eau LWS, Old Forty Foot Drain to South Forty Foot Drain LWS and South Forty Foot Drain LWS) will be directly impacted as they are crossed by the base scheme design. However, all three of these LWSs will be crossed by trenchless techniques. These are discussed in more detail in Table 10.30 below.

Table 10.30 Potential Longer Term Impacts on Non-Statutory Designated Sites (Route Section 4)

Site (Ecological Value)	Potential Impact	Significance
Great Hale Eau LWS (County)	Certain to be crossed by the base scheme design using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be required across the drain which will require a 10 m wide temporary bridge (0.6 % of the length of the LWS) to be placed across it. Certain embedded reinstatement will comprise natural recolonization (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation will be re-established within 2-4 years. Therefore no longer term effects on integrity of the site.	**Not significant**
Old Forty Foot Drain to South Forty Foot Drain LWS (County)	Crossed by the base scheme design using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be required across the drain which will require a 10 m wide temporary bridge (1 % of the length of the LWS) to be placed across it. Certain embedded reinstatement will comprise natural recolonization (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation will be re-established within 2-4 years. Therefore no longer term effects on integrity of the site.	**Not significant**

Table 10.30 Potential Longer Term Impacts on Non-Statutory Designated Sites (Route Section 4)		
Site (Ecological Value)	**Potential Impact**	**Significance**
South Forty Foot Drain LWS (County)	Crossed by the base scheme design using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be required across the drain which will require a 10 m wide temporary bridge (<0.1 % of the length of the LWS) to be placed across it. Certain embedded reinstatement will comprise natural recolonization (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation will be re-established within 2-4 years. Therefore no longer term effects on integrity of the site.	**Not significant**

Habitats and Flora

Hedgerows

6.5.40 Route Section 4 contains a total of 451.64 m of native hedgerow across 36 individual sections. A total of 252.63 m species-poor intact hedgerow and 199.01 m species-poor defunct hedgerow were recorded.

6.5.41 Assuming the worst case scenario of the working corridor covering the entire working width of 30 m (on average), installation of the proposed DC cable route will result in the total loss of 164.95 m of native hedgerow across 3 individual sections. This loss comprises approximately 109.95 m of species-poor intact hedgerow and 55.00 m of species-poor defunct hedgerow. None of the hedgerows in this section met the criteria for 'Important' under the Hedgerow Regulations (Ref 10-10).

6.5.42 It is probable that the losses calculated above are an over estimation as hedgerow crossings, where adjacent to drains, will be trenchless. Therefore less hedgerow will in fact require removal to facilitate construction of a temporary haul road. Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 30 m of hedgerow would require removal.

6.5.43 The embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will be returned to their pre-construction functionality. Therefore, in the longer term, it is near certain that the effects of construction on hedgerows is considered to be **not significant**.

Woodland and Trees

6.5.44 One block of broad-leaved plantation woodland lies adjacent to Route Section 4. It is certain that this woodland will not be impacted by the construction of the DC Cable Route.

6.5.45 It is possible that 98 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. This is based on lidar data, which is likely to be an overestimation as discussed in the appendix. However it is anticipated that the majority of these trees will be retained through micro-siting during construction.

6.5.46 The permanent easement means that woodland and tree habitats cannot be replaced across Route Section 4. Permanent loss of these habitats represents a **significant adverse effect** at the Local Level.

6.5.47 The reinstatement plan allows for replacement of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant**.

6.5.48 It is possible that woodland and trees will be affected by the base scheme design for pre-construction land drainage. It is certain that tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8” trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years. Therefore, in the longer term, it is near certain that the effects of construction on woodland and trees is considered to be **not significant.**

Watercourses

6.5.49 Route Section 4 crosses 20 watercourses and field ditches. The majority of these features will be crossed using trenchless measures and will not impact the watercourse/ditch habitats.

6.5.50 One of these ditches will be crossed using open cut measures and will also require a temporary bridge crossing. A further 17 ditches including one watercourse will also be crossed using a temporary bridge. Two other ditches will require a temporary culvert and South Forty Foot Drain is noted as a Restricted Crossing.

6.5.51 Based on the worst case scenario of the working corridor for these crossings covering the entire working width of 55 m (on average), this will result in the possible temporary loss of 1143.64m of bankside habitat. However it is extremely unlikely the full length of the working area will impact bankside habitats. It is probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 200 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 200 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna. Therefore it is certain that the effect on watercourse habitats is **not significant**.

6.5.52 Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain that bankside and aquatic vegetation can expect to be re-established within 2-4 years. Therefore, over the longer term, effects following temporary losses will be **not significant**.

6.5.53 It is probable that permanent outfalls will be installed in association with the base scheme design for pre-construction land drainage. The small area of habitat permanently lost as a result of construction is estimated to be approximately $3m^2$ and as bankside habitats are abundant within the local area it is certain that this permanent loss will be **not significant**.

Great Crested Newts and other Amphibians

6.5.54 No operational or permanent impacts are anticipated for GCN and other amphibians.

6.5.55 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which amphibians can utilise during the re-establishment period, these longer term impacts are considered to be **not significant**.

Bats

6.5.56 No longer term, operational or permanent effects are predicted with respect to the trees identified as having potential for roosting bats.

6.5.57 Construction across field boundaries such hedgerows and drains has the potential to cause fragmentation effects on commuting and foraging bats as the continuity of the feature is interrupted. This effect will continue where hedgerows have been removed, until the re-establishment has reached functional capability, approximately 5 years. Additional temporary fencing will ensure they are functional while the planting establishes and matures. Therefore the longer-term impact of fragmentation taking into account embedded mitigation is considered to be **not significant.**

Water Vole

6.5.58 No operational or permanent impacts are anticipated for water vole.

6.5.59 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Otter

6.5.60 No operational or permanent impacts are anticipated for otter.

6.5.61 Longer term effects are those associated with vegetation recovery on ditch/drain banks following removal of temporary bridges/culverts. Regeneration is however, anticipated to be relatively rapid, typically 2-4 years for bankside vegetation. However, given the prevalence of similar habitats within the locality which water vole can utilise during the re-establishment period, these longer term effects are certain to be **not significant**.

Badger

6.5.62 No operational or permanent impacts are anticipated for badger.

6.5.63 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which badgers can utilise during the re-establishment period, and the fact that no main badger sett will be lost these longer term impacts are certain to be **not significant** in Route Section 4.

Winter Birds

6.5.64 No operational or permanent impacts are anticipated for wintering birds.

6.5.65 The predominant terrestrial habitat utilised by wintering birds is the arable land which is crossed by the proposed DC cable route. This is likely to be fully re-established within 1 year and therefore no longer term impacts on winter birds are anticipated.

Breeding Birds

6.5.66 No operational or permanent impacts are anticipated for breeding birds.

6.5.67 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside and grassland vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which breeding birds can utilise during the re-establishment period, these longer term impacts are certain to be **not significant.**

Reptiles

6.5.68 No operational or permanent impacts are anticipated for reptiles.

6.5.69 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 2-4 years for bankside vegetation, up to 5 years for hedgerows and up to 15 years for woodland. However, given the prevalence of similar habitats within the locality which reptiles can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

Brown Hare

6.5.70 No operational or permanent impacts are anticipated for brown hare.

6.5.71 Longer terms effects will be limited to the time taken for suitable habitats to re-establish, typically 1 year for arable land, 2-4 years for grassland, up to 5 years for hedgerows. However, given the prevalence of similar habitats within the locality which brown hare can utilise during the re-establishment period, these longer term impacts are certain to be **not significant**.

European Eel

6.5.72 No longer term impacts are anticipated for European eel with respect to habitat recovery as water flow will not have been affected for the majority of watercourse crossings.

6.5.73 With respect to operational impacts, certain fish species including European eel are electrosensitive and respond to magnetic fields in the environment. Some species such as European eel, have significant magnetically sensitive material (magnetite) within their skeletal structure which is commonly thought to be used for direction finding using the Earth's geomagnetic field. Research (Westerberg & Lagenfelt (2008) (Ref 10-52)) on unburied subsea cables has suggested that there may be slight changes in swimming ability when eels are in close proximity to the cables but that this does not affect their migratory behaviour.

6.5.74 The possible effect of EMF from the proposed DC cable is recognised. However, given the expected low strength of the magnetic fields at ground level, and based on research, it is not anticipated that EMF would affect European eel migratory behaviour and therefore it is certain the effects would be **not significant**.

Summary of Potential Impacts

6.5.75 The following Table 10.31 provides a summary of the construction and longer term, operational and permanent identified as a result of the proposed DC cable route in Route Section 4.

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Construction Impacts				
All non-statutory LWSs (Broadhurst Drain East LWS, Great Hale Eau LWS, Mill Drain LWS, Old Forty Foot Drain LWS, Old Forty Foot Drain to South Forty Foot Drain LWS, South Forty Foot Drain LWS, Willow Farm Drain LWS)	County	Possible hydrological impacts on wetland habitats. However, certain embedded hydrology mitigation will ensure consistent run-off rates ensuring no significant effects.	**Not significant**	**No**
All non-statutory LWSs (Broadhurst Drain East LWS, Great Hale Eau LWS, Mill Drain LWS, Old Forty Foot Drain LWS, Old Forty Foot Drain to South Forty Foot Drain LWS, South Forty Foot Drain LWS, Willow Farm Drain LWS)	County	Possible degradation of habitats as a result of pollution and emissions. Certain implementation of embedded pollution prevention measures will ensure no significant effects.	**Not significant**	**No**
Great Hale Eau LWS	County	Site will be crossed by base scheme design, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**
Old Forty Foot Drain to South Forty Foot Drain LWS	County	Site will be crossed by base scheme design, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**
South Forty Foot Drain LWS	County	Site will be crossed by base scheme design, with possible accidental encroachment onto retained areas. Certain that CEMP will ensure demarcation of working areas and sensitive features implemented. Therefore no significant effects.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Hedgerows	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded hedgerow protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Woodland and Trees	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. Embedded tree protection measures will ensure (with near certainty) retained habitats are protected during construction activities.	**Not significant**	**No**
Watercourses – Field ditches	Local	Embedded pollution prevention measures implemented through the CEMP will prevent (with near certainty) adverse impacts associated with construction activities and emissions from construction traffic. It is certain that disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place	**Not significant**	**No**
Great Crested Newts and other Amphibians	Local	Prevalence of similar habitats in the vicinity of the base scheme design available for use by these species during construction. Therefore no impacts due to habitat loss.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		No fragmentation effects as a result of construction since abundant suitable habitat available.	**Not significant**	**No**
		Embedded reasonable avoidance measures during vegetation clearance will ensure no killing or injury.	**Not significant**	**No**
Bats	Local	Two trees with moderate bat roost potential present within base scheme design (T286 and T287). If these trees are to be affected pre-construction surveys would confirm whether or not bat roosts were present prior to removal. Bat boxes would be installed regardless of whether bats are present or not. If bats present then a NE derogation licence would be obtained to undertake removal of tree. For the one tree with low bat potential (T277), soft-felling felling techniques used on this tree to ensure no impacts on roosting bats.	**Not significant**	**No**
		One ditch will be crossed using open cut measures and will also require a temporary bridge crossing. 34 ditches including one watercourse will be crossed using a temporary bridge. Two other ditches will require a temporary culvert. Three sections of hedgerow required to be removed to facilitate cable installation totalling 165 m of hedgerow. Embedded mitigation will ensure that temporary fencing will be placed across the hedgerow gaps each night to ensure that these linear features remain functional for the local bat population	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Lighting during construction anticipated to be intermittent and of short duration during construction and therefore is not anticipated to impact on foraging and commuting bats.	**Not significant**	**No**
Water vole	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during installation of temporary bridges/culverts may occur. Embedded mitigation via pre-construction surveys and displacement under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Otter	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Extremely unlikely that killing or injury during installation of temporary bridges/culverts and possible that entrapment in excavations may occur. Embedded mitigation via pre-construction surveys and mitigation under licence certain to ensure this impact is prevented.	**Not significant**	**No**
Badger	Local	Loss of one outlier sett and one annexe sett. Natural England badger licence to cover these works.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		Works to be undertaken within 10 – 30 m buffer from one outlier sett and one subsidiary sett. Natural England licence to cover these works. Temporary drainage works to potentially encroach within 30m of five badger setts, although to be designed to avoid impacts.	**Not significant**	**No**
		Risk of killing or injury to badgers in the event that badger falls into/becomes entrapped within excavations. Trenches covered/fenced off at night will prevent killing or injury.	**Not significant**	**No**
		Temporary loss of badger foraging habitat.	**Not significant**	**No**
		Temporary fragmentation impacts associated with the installation of the proposed DC cable. Provision of two-way badger gates will prevent fragmentation.	**Not significant**	**No**
Wintering birds	Local	Small groups of waders and wildfowl could be temporarily displaced from Forty Foot Drain.	**Significant minor adverse effect at the Local level**	**Yes**
Breeding birds	Local	There is the potential for some temporary displacement effects on breeding birds over short distances during the construction period. Due to the low level of displacement and availability of nearby suitable habitat within the species affected, this impact would not be significant.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
		There is the potential for damage or destruction of nests of several species during vegetation clearance and construction activities. Embedded mitigation via nesting bird checks during the breeding season will ensure damage and destruction of nests is prevented.	**Not significant**	**No**
Reptiles	Local	Certain temporary loss of potential foraging and refuge habitat. However certain that limited extent of these habitats and availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		Possible that killing or injury during vegetation clearance and construction activities may occur. Embedded mitigation via RAMs certain to ensure this impact is prevented.	**Not significant**	**No**
Brown Hare	Local	Certain temporary loss of potential suitable habitat. However certain that ample availability of alternative habitat means no significant effects will occur.	**Not significant**	**No**
		It is possible that killing or injury of young hares (leverets) during site clearance may occur, and of individuals that may get trapped in excavations. Certain embedded mitigation will prevent entrapment, but leverets still at risk leading to potential significant effects.	**Significant adverse at the Local level**	**Yes**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
European Eel and Spined Loach	Local	Certain that all but one drain being crossed by trenchless techniques, with temporary bridge or culvert installed through which flow is maintained. Therefore certain that temporary habitat loss will not lead to significant effects.	**Not significant**	**No**
		Possible fragmentation effects during migration as a result of open-cut crossings. One open cut crossing of a medium ditch which could support eel, although other more suitable drains in the area. Probable that fragmentation effects are extremely unlikely.	**Not significant**	**No**
		Possible that killing or injury during open cut crossing may occur. Embedded fish rescue measures certain to ensure this impact is prevented.	**Not significant**	**No**
Longer Term, Operational and Permanent Impacts				
All non-statutory sites (Broadhurst Drain East LWS, Great Hale Eau LWS, Mill Drain LWS, Old Forty Foot Drain LWS, Old Forty Foot Drain to South Forty Foot Drain LWS, South Forty Foot Drain LWS, Willow Farm Drain LWS)	County	No operational or permanent impacts anticipated	**No impact**	**No**
Great Hale Eau LWS	County	Crossed using trenchless technique, with 10 m wide temporary bridge. Longer term effects with respect to temporary habitat loss which will recover via natural recolonization and bank stabilisation if needed within 2-4 years. Therefore no significant longer term effects on integrity of the site.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Old Forty Foot Drain to South Forty Foot Drain LWS	County	Crossed using trenchless technique, with 10 m wide temporary bridge. Longer term effects with respect to temporary habitat loss which will recover via natural recolonization and bank stabilisation if needed within 2-4 years. Therefore no significant longer term effects on integrity of the site.	**Not significant**	**No**
South Forty Foot Drain LWS	County	Crossed using trenchless technique, with 10 m wide temporary bridge. Longer term effects with respect to temporary habitat loss which will recover via natural recolonization and bank stabilisation if needed within 2-4 years. Therefore no significant longer term effects on integrity of the site.	**Not significant**	**No**
Hedgerows	Local	Probable temporary loss of 30 m of hedgerow habitat. However, embedded habitat reinstatement plan allows for in-situ replacement of the hedgerow habitat following construction and near certain re-establishment after 5 years.	**Not significant**	**No**
Woodland and Trees	Local	No loss of woodland habitats and possible loss of 98 trees. Reinstatement of woodland and trees in-situ will not be possible over the proposed DC cable permanent easement.	**Significant adverse at the Local level**	**Yes**
		The reinstatement plan allows for replacement of woodland and tree habitats lost, near certain to reach 7–10 m after 15 years. The longer term effects of this design mitigation will lead to an overall increase in woodland and tree cover within the area.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Watercourses	Local	Certain temporary loss of approximately 200 m of bankside habitat which will be reinstated through natural colonisation and will be near certain re-established within 2-4 years.	**Not significant**	**No**
		It is probable that permanent outfalls will be installed in association with the pre-construction land drainage. This will result in the permanent loss of a small amount of bankside habitat, but given the amount of available similar habitat it is certain there will be no significant effect.	**Not significant**	**No**
Great Crested Newt and other Amphibians	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on amphibians.	**Not significant**	**No**
Bats	Local	No operational or permanent impacts predicted. Potential for fragmentation effects where hedgerows removed, but temporary fencing will be in place until hedgerow plantings have reached functional maturity.	**Not significant**	**No**
Water vole	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on water vole.	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Otter	Local	No operational or permanent impacts predicted. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on otter.	**Not significant**	**No**
Badger	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on badger.	**Not significant**	**No**
Wintering birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats, but this will occur within 1 year for farmland, therefore no effects on wintering birds.	**No impact**	**No**
Breeding birds	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means no effects on breeding birds.	**Not significant**	**No**
Reptiles	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on reptiles	**Not significant**	**No**

Table 10.31 Summary of Potential Impacts – Route Section 4				
Description of Receptor	**Value**	**Description of Potential Impact**	**Significance**	**Significant**
Brown Hare	Local	No operational or permanent impacts are anticipated. Longer term effects associated with recovery time of reinstated habitats. However, presence of similar habitats in the area means certain that no effects on brown hare.	**Not significant**	**No**
European eel and Spined Loach	Local	No longer term effects related to construction will occur. Possible operational EMF effects, however predicted to be low strength therefore ceratin it would not affect European eel.	**Not significant**	**No**

6.6 Decommissioning Impacts

6.6.1 The anticipated operational life of the base scheme design is approximately 40 years, although it is likely that its life will be extended beyond this as a result of refurbishment and plant replacement. In the event that Viking Link ceases operation the base scheme design would be decommissioned. It is currently assumed that the DC cables and associated infrastructure would be removed; the cables could be left in-situ but removal is the likely worst case scenario.

6.6.2 In broad terms, the effects associated with decommissioning would reflect those described for the construction phase and similar mitigation would apply. It is, however recognised that the significance of effects would depend on the future land use i.e. the nature and extent of habitats which would be present at the time of the decommissioning process and so too the ecological value of these and associated fauna. However, it is anticipated that agriculture will still be the dominant land use in this area.

6.6.3 Habitats most immediately affected would be those located in the immediate vicinity of the underground cable route.

6.6.4 Appropriate ecological surveys would be carried out prior to decommissioning in accordance with best practice guidance at that time. As with the construction phase, mitigation would be delivered through sensitive working practices (including alignment of access routes and seasonal constraints), subject to Method Statements and licensing where appropriate.

6.6.5 As part of habitat reinstatement following decommissioning, opportunities for ecological enhancement, particularly in terms of habitat connectivity across the local landscape, would be reviewed as part of the mitigation strategy.

7 Mitigation

7.1 Overview of Mitigation

7.1.1 This section sets out the ecological mitigation measures that will be delivered as part of the planning application which are in addition to those already described as design or embedded mitigation, or as legal compliance within the Basis of Assessment (Section 3).

7.1.2 The majority of potential ecological impacts have been addressed through the embedded ecological mitigation or the requirement for legal compliance during construction activities primarily to avoid killing and injury to protected species.

7.1.3 Additional mitigation is included below for wintering birds and brown hare which although it is a NERC Act 2006 (Ref 10-9) S41 species of principal importance is not legally protected.

Wintering Birds

7.1.4 To prevent significant temporary disturbance to wintering birds during construction, particularly those which are also qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar, visual and acoustic screening will be erected in key locations along the proposed DC cable route. Specific details are described in the relevant Route Section.

Brown Hare

7.1.5 As there is the potential for brown hare leverets to be present within the proposed DC cable route, Reasonable Avoidance Measures (RAMs) will be produced and implemented during site clearance works to ensure no killing or injury to individuals. A walkover of the construction areas by a suitably qualified ecologist, prior to initial site clearance, will enable leverets to be located and flushed out of the area. Any adult hares within the site would also disperse due to the presence of human activity. This will apply to all Route Sections.

7.2 Route Section 1 Proposed Landfall to Well High Lane

Wintering Birds

7.2.1 To prevent significant disturbance to wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit LWT reserve. The screening will provide a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2m in height and will likely consist of Heras fencing with an acoustic quilt attached, such as SOUNDEX C1/1 or a suitable equivalent.

7.3 Route Section 2 Well High Lane to A16 (Keal Road)

7.3.1 No additional mitigation is required in Route Section 2, further to that detailed for brown hare above which applies to all route sections.

7.4 Route Section 3 A16 (Keal Road) to River Witham

Wintering Birds

7.4.1 In order to prevent significant disturbance to wintering birds, if works are carried out within 200 m of the River Witham during the winter period (October to March), visual and acoustic screening will be installed between the works and the River Witham. The screening will be installed as close to the works as possible and will be of sufficient length to screen all of the works carried out. If the works move closer to the river, the screening will be moved with the works. The screening will be a minimum of 2m in height, and will likely consist of heras fencing with an acoustic quilt attached, such as SOUNDEX C1/1 or a suitable equivalent.

7.5 Route Section 4 River Witham to the Proposed Converter Station

Winter Birds

7.5.1 In order to prevent significant disturbance to wintering birds, if works are carried out within 200 m of the South Forty Foot Drain during the winter period (October to March), visual and acoustic screening will be installed between the works and this watercourse. The screening will be installed as close to the works as possible and will be of sufficient length to screen all of the works carried out. As the works move alongside the river, the screening will be moved with the works, ensuring that all active works with 200m of the watercourse are sufficiently screened at all times during the period October to March. The screening will be a minimum of 2m in height, and will likely consist of heras fencing with an acoustic quilt attached, such as SOUNDEX C1/1 or a suitable equivalent.

8 Residual Effects

8.1 Overview of Residual Effects

8.1.1 The following sections describe the residual effects on ecological receptors where a potential significant effect is identified, following the application of additional mitigation.

8.2 Route Section 1 Proposed Landfall to Well High Lane

Temporary Impacts

Wintering Birds

8.2.1 Following the installation of acoustic and visual screening between the works and Huttoft Bank Pit Nature Reserve and nearby fields, it is certain the residual effects on winter birds will be reduced to **not significant.**

Brown Hare

8.2.2 The use of RAMs to ensure young leverets are flushed from areas to be cleared will be certain to ensure no loss or injury to individuals and will ensure the residual effect of construction on brown hare is reduced to **not significant.**

8.3 Route Section 2 Well High Lane to A16 (Keal Road)

Temporary Impacts

Brown Hare

8.3.1 The use of RAMs to ensure young leverets are flushed from areas to be cleared will be certain to ensure no loss or injury to individuals and will ensure the residual effect of construction on brown hare is reduced to **not significant**.

8.4 Route Section 3 A16 (Keal Road) to River Witham

Temporary Impacts

Winter Birds

8.4.1 Following the installation of acoustic and visual screening between the works and the River Witham, it is certain that residual effects on winter birds will be reduced to **not significant**.

Brown Hare

8.4.2 The use of RAMs to ensure young leverets are flushed from areas to be cleared will be certain to ensure no loss or injury to individuals and will ensure the residual effect of construction on brown hare is reduced to **not significant**.

8.5 Route Section 4 River Witham to the Proposed Converter Station

Temporary Impacts

Winter Birds

8.5.1 Following the installation of acoustic and visual screening between the works and the South Forty Foot Drain, it is certain that residual effects on winter birds will be reduced to **not significant**.

Brown Hare

8.5.2 The use of RAMs to ensure young leverets are flushed from areas to be cleared will be certain to ensure no loss or injury to individuals and will ensure the residual effect of construction on brown hare is reduced to **not significant.**

8.6 Consideration of Climate Change Effects on Biodiversity

8.6.1 EU guidance (Ref 10-53) requires that EIA considers the effects of projects on climate change and on biodiversity. Although the guidance document treats the two topics as separate issues, it notes that there are interactions between climate change and biodiversity, and advises that assessment of permanent effects of a project, and the mitigation thereof, should take account of climate change projections applicable to the nature and scale of development.

8.6.2 The EU guidance indicates that effects which are only likely to be experienced in the next 20 years should be based on current weather patterns or near-future projections if available and relevant. In relation to biodiversity, all significant effects of the base scheme design are experienced in this timeframe. The assessment of residual effects finds that affected habitats would have been reinstated. However, there are three material considerations pertinent to climate change and biodiversity that the assessment of longer-term effects must take into account.

8.6.3 Firstly, how projects might be assessed in terms of their effects on the 'manageability' of the Natura 2000 network (Ref 10-54). With respect to the base scheme design, the Humber Estuary SPA/Ramsar site and Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC are located within 10 km. However no impacts are predicted upon these Natura 2000 sites or the species and habitats that they support. Therefore the base scheme design will not contribute to existing pressures on Natura 2000 sites, affect the ability for site managers to maintain dialogue with a range of stakeholders, constrain the possibility of adaptive management plans for the sites themselves, or constrain future monitoring of climate change effects on biodiversity within the sites.

8.6.4 Secondly, the EIA Guidance requires developers to ensure that their designs and mitigation measures are resilient to projected climate change. In this case, the principal mitigation for the construction-phase vegetation removal is prompt reinstatement. Hedgerow and other woodland and tree reinstatement planting will be planted in accordance with guidance set out by Forestry Commission's UK Forestry Standard concerning Forests and Climate Change (2011) (Ref 10-55).

8.6.5 Thirdly, the EU guidance for assessing the impact of development on the manageability of Natura 2000 sites is transferable to a consideration of the impact on general manageability of biodiversity in the area of the base scheme design. This can be assessed in terms of management of the network of designated sites, bearing in mind Government commitments to maintain SSSIs in favourable condition and for the majority of non-statutory sites to be actively managed.

8.6.6 Overall, six SSSIs and 45 non-statutory designated sites were identified within potential influence of the base scheme design. No direct impacts on the SSSIs will occur and potential indirect temporary impacts during construction will be not significant once embedded mitigation and good practice measures are taken into account. Of the 45 non-statutory sites, up to eight may be directly impacted and an additional 15 have the potential to be indirectly impacted during construction. Embedded mitigation with respect to habitat reinstatement, pollution prevention measures and maintenance of the hydrological regime will ensure that all the potential impacts are reduced to not significant. Where habitat reinstatement involving re-establishment of trees and potentially woodland is required this will become not significant in the longer term, within approximately 10-15 years.

8.6.7 The base scheme design will not contribute to existing pressures on these sites once reinstatement is complete. No constraints to information sharing and the ability for site managers to maintain dialogue with a range of stakeholders will occur.

8.6.8 The base scheme design will not constrain the possibility of adaptive management plans for the majority of these sites or for the land immediately around it. However, there are some limitations with respect to associated wayleave agreements which restricts the planting of trees and woodland over the proposed DC cable route.

8.6.9 Lastly, the operation of the proposed DC cable will not constrain future monitoring of climate change effects on biodiversity within these sites.

8.6.10 Climate change may cause changes in distribution of fauna with certain species moving north as temperatures warm, as is being seen with certain species such as the Dartford warbler. Reinstatement of the watercourse and hedgerow network within the base scheme design will ensure migration corridors are available along which fauna can move.

8.6.11 The potential long-term effects of the base scheme design, taking into account all design and embedded mitigation, have been considered as to whether they are resilient in a changing climate with respect to biodiversity. In summary, the base scheme design would be constructed and reinstated, with habitats re-established within 10 to 15 years of commencement. The reinstatement plans (ES-3-B.01, Chapter 11, Landscape & Visual Amenity) utilise species which take account of climate change predictions and therefore the embedded mitigation is likely to be resilient for the operational life of the base scheme design.

8.6.12 Residual implications of climate change on the decommissioning stage are unlikely. Mitigation during decommissioning would reflect that proposed during construction, informed by updated baseline surveys at the time. Licensing, Method Statements and an EcCOW would be employed as appropriate, and as required by the statutory nature conservation body under the terms of any licences or consents required to implement the works.

8.7 Decommissioning Effects

8.7.1 The residual effects of decommissioning will be similar and no worse than those described for construction, following the assessment of current baseline surveys and implementation of the required mitigation.

9 Monitoring

9.1 Construction Phase Monitoring

9.1.1 Prior to construction commencing, an Ecological Clerk of Works (EcCOW) will be appointed.

9.1.2 Where required, pre-construction surveys will be undertaken to update the baseline and inform the need for measures to ensure legal compliance and licensing. This is of particular relevance for trees with bat roost suitability that will be affected by construction activities, water voles, otters and badgers.

9.1.3 Where mitigation works are required in advance of the commencement of construction, for example the closure of badger setts under licence, or the displacement of water voles from sections of watercourse, their implementation and satisfactory completion will be monitored by the EcCOW.

9.1.4 The key role of the EcCoW during construction activities will be to monitor the implementation of habitat and species protection Method Statements, to ensure their legal compliance including but not limited to, protection of trees and other habitats, nesting bird checks, RAMs for amphibians and reptiles and ongoing requirements for protected species licences.

9.1.5 Monitoring of birds will be carried out within Route Section 1 during any works undertaken within 500 m of the shoreline during the winter period (October to March inclusive). This will include supervision of installation of visual and acoustic screening between the works and Huttoft Bank Pit, and monthly visits during the winter period during construction works to monitor the usage of Huttoft Bank Pit and the surrounding land by wintering birds which are qualifying features of The Wash SPA/Ramsar and/or the Humber Estuary SPA/Ramsar. If a clear reduction of usage of Huttoft Bank Pit or the surrounding land by wintering birds is observed during construction works, the disturbance control measures will be re-evaluated.

9.2 Operational Phase Monitoring

9.2.1 Operational phase monitoring will relate to the establishment of habitat reinstatement works and landscape planting in addition to any post-completion mitigation monitoring requirements such as may be required by protected species licences.

9.2.2 The reinstatement plans are provided in ES-3-B.01, Chapter 11, Landscape & Visual Amenity.

9.2.3 Detailed monitoring of habitat recovery will be undertaken in non-statutory sites which have been directly affected, with the implementation of remedial measures if required.

9.2.4 Other post-construction monitoring will include monitoring of the fencing used to maintain flyways for bats along hedgerows until reinstatement planting is established, screening for wintering birds and implementation of remedial measures to maintain the integrity of these measures.

10 Cumulative Effects

10.1 Inter-project Cumulative Effects

Scope of Inter-project Cumulative Assessment

10.1.1 An inter-project cumulative effect is interpreted as a situation where two or more separate development projects both have the same impact receptor (e.g. loss of woodland habitat) and when both / all of the developments are implemented this would result a more substantial impact on this same receptor.

10.1.2 A long-list of potentially relevant projects / plans considered cumulatively alongside the base scheme design is identified in the standalone Cumulative Assessment chapter (ES-2-B.12, Chapter 16) and is summarised in Table 10.32 with respect to ecology. The assessment of cumulative effects has been based on the assessment completed for the base scheme design set out in this chapter and, where available, the respective planning application documentation prepared for these other projects. This assessment is therefore limited to information that is available for other projects. All the projects listed in the long-list have accompanying planning documentation, although the level of supporting ecological information varies according to the scheme complexity.

10.1.3 Each plan or project on the long-list was appraised on the basis of the project type, status, and temporal and spatial scales involved relevant to the basis scheme design. Additionally, the nature of the development and its positioning has been considered and those projects positioned within the footprints of pre-existing developments or on ecologically poor sites are scoped out in favour of those sited on potentially sensitive or ecologically valuable habitats. Professional judgement has been applied in this process.

10.1.4 Based on the above criteria the long-list of plans or projects considered for cumulative impact assessment was reduced to only those where a potential cumulative impact may be anticipated with the base scheme design.

10.1.5 Following preliminary assessment of each project on the long-list, only one project was found to be spatially and temporally relevant to the base scheme design. The onshore elements of the Triton Knoll Offshore Windfarm are, at least partially, located within the zone of influence of the base scheme design and are likely (adopting a reasonable worst case) to have an overlapping construction period with the base scheme design. Consequently, the onshore elements of Triton Knoll have the potential to give rise to cumulative ecological effects in combination with the base scheme design.

Table 10.32 Summary of Cumulative Projects / Plans Assessed

Application Ref	Development Proposal	Distance from base scheme design	Planning Status	Ecological Assessment Submitted With Development Proposal	Potential for Cumulative Effects
S/054/01504/16	Westville Recycling Centre, Northlands Road, Westville, Boston, PE22 7HR. Change of use of land to form an extension to existing yard to use under Class B8: Storage & Distribution	0.4 km North	Granted 19/9/2016	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. No ecological report or other ecological information is included with the application or subsequent planning documentation. No consultation response from Natural England or other ecological stakeholders could be found. No conditions were applied relating to biodiversity; a planning condition requiring SUDS was applied to maintain quality of surface waters.	Possible overlap in construction periods with base scheme design. The project is sited within existing development. No ecological impacts were anticipated as a result of this proposed development. There is therefore no potential for cumulative ecological impacts to arise in combination with the base scheme design or other projects.
S/203/01106/15	Land off Folly Lane, Stickney, Boston. Installation of 19,230no. 5MW solar panels to a maximum height of 2.7m to create a solar farm and to include	0 km West	Full consent granted 17/9/2015 Construction commenced 6/12/2015 Construction complete 31/3/2016 Non-Material	Application form states no protected or priority species, designated sites, important habitats or other biodiversity features but confirms the presence of trees/hedges within and adjacent to or near the proposed development. Preliminary Ecological Appraisal included within the submitted Environmental Report.	Site is currently operational. No temporal overlap would occur. It is presumed all recommended mitigation was implemented in accordance with planning application documents. No post-construction impacts were anticipated. There is therefore no

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	associated works and construction of a vehicular access. With non-material amendments incl. alterations to solar panel layout & height, change to number. & positions of substations, change in route of access track etc.		Amendments Granted 3/5/2016	No statutory sites reported within 5km. West Fen Catchwater SNCI is located 1.3km east; no adverse impact was predicted. A beneficial effect was predicted in respect of habitats (conversion arable to diverse grassland). Negligible effects were predicted for nesting birds during construction and operation (construction ground works were to avoid nesting season to ensure legal compliance). No impacts during construction or operation were predicted to arise on bats, otter/water vole (standard pollution prevention measures recommended). RAMs were recommended for amphibians & reptiles during construction; negligible residual impacts during construction and beneficial effect during operation (more diverse habitat for foraging & refuge) were predicted. No impact on invertebrates were predicted during construction and negligible impacts were predicted during operation (matt frames were recommended for panels and enhancements delivered for foraging & shelter opportunities).	potential for cumulative ecological impacts to arise in combination with the base scheme design or other projects.

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				Natural England consultation does not refer to designated sites and refers the LPA to standing advice in respect of protected species. One ecological planning condition was applied requiring pre-commencement mitigation strategy for badgers; all information relating to badgers remains confidential, however the general indication contained within available documentation implies low impact (pre-construction site check with precautionary measures applied during construction with use of raised sections of fencing/gates to maintain access across the site. (No details relating to discharge of this condition are apparent on the planning portal). A planning condition requiring flood resilience was also applied.	
S/168/01773/14	Hagnaby Farm, Back Lane, Stickford, Boston, PE22 8EW. Siting of 3 no. containers with flues to provide housing for 9 no. biomass boilers	0.1 km West	Granted 11/11/2014	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. No ecological report or other ecological information is included with the application or	The project is sited within existing development. No ecological impacts were anticipated as a result of this proposed development. Based on the nature of the project, no pathways exist that would give rise to

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	and to include 9 no. buffer tanks to provide heating for the existing poultry units			subsequent planning documentation. No consultation response from Natural England or other ecological stakeholders could be found. No planning conditions were applied relating to biodiversity.	cumulative ecological impacts to arise in combination with the base scheme design or other projects.
S/204/01679/16	Land at Poplar Farm, Mill Lane, Keal Cotes, Spilsby, PE23 4AJ. Erection of a poultry unit, 2 no. feed silos and construction of a vehicular and a pedestrian access, in accordance with the amended plan received by the Local Planning Authority on 3rd October 2016.	0.2 km North	Granted 27/10/2016 Application for approval of details reserved by condition dated 6th April 2017.	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. The Environmental Report submitted contains no ecological information or assessment. No consultation response from Natural England or other ecological stakeholders could be found. No planning conditions were applied relating to biodiversity.	No ecological impacts were anticipated as a result of this project. Based on the nature of the project, no pathways exist that would give rise to cumulative ecological impacts to arise in combination with the base scheme design or other projects.
S/045/01700/16	Woodlands, Glebe Farm, Hundlbey, Spilsby. Environmental Impact Assessment (E.E.C.	0.4 km East	Screening Opinion dated 02/09/2016	Screening Opinion only. No application details are available, except for an annotated aerial plan indicating intended woodland/scrub compartments. Annotated aerial illustrates the creation of 9 hectares of	No information regarding programme or timing is available. It is possible there may be an overlap in the construction programme with the base scheme

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	Directive 85/337/E.E.C. as amended by Council Directive 97/11E.C.) for a screening opinion with respect to the creation of 9 hectares of woodland			woodland adjacent to (surrounding a spur of) Keal Carr SSSI; the new woodland is proposed to comprise dense scrub; scattered scrub; woodland edge; unplanted area for natural colonisation; high forest/canopy woodland; coppice with standards; oak and pine; and open wildflower meadow. The Screening Opinion identifies a likely impact on Keal Carr SSSI, but provides no further clarification in respect of potential effects. No consultation response from Natural England was found within the planning documentation. The Screening Opinion concludes that no is EIA required, as the proposal will not result in significant effects on the environment and the proposal is of only local importance. No related planning application appears to have been submitted.	design. However, based on the nature of the proposals, it is anticipated that construction methods would preserve the integrity of the SSSI and that post-construction local beneficial ecological effects would result for the SSSI and a variety of species that would utilise the new habitats (e.g. bats, nesting birds, badgers, invertebrates). There is unlikely to be significant temporal overlap in the post-construction establishment periods however, and consequently no significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other projects.
N/119/01383/13	Land at Dale Farm, Mavis Enderby, Spilsby. Environmental Impact Assessment (E.E.C.	0.9 km West	Screening Opinion dated 06/08/2013	Screening only. Screening opinion concludes no EIA is required on the basis that the site does not lie within a sensitive area. No related planning application appears to	No information regarding programme or timing is available. It is possible there may be an overlap in the construction programme with the base scheme

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	Directive 85/337/E.E.C. as amended by Council Directive 97/11E.C.) for a screening opinion with respect to the development of a 2 MW solar park.			have subsequently been submitted.	design. However, based on project description and typical design and construction methods for projects of this nature, no significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other projects.
N/098/01711/15	Sutterby House Farm, Sutterby Lane, Sutterby, LN11 8RB. Installation of ground mounted 122 kwp solar arrays consisting of 460 panels within 3 rows to a maximum height of 2.4 m, including associated works	0.8 km West	Granted 11/11/2015	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. No ecological report or other ecological information is included with the application or subsequent planning documentation. No consultation response from Natural England could be found; a document entitled "Natural England comments" contained within the planning documents was actually a response from Lincolnshire Wolds Joint Advisory Committee (LWJAC), into which Natural England had been copied. No objections appear to have been raised regarding ecology (concerns relate only to	Based on grant of planning permission (requiring commencement within three years) and likely timescales for construction based on nature of development, there is assumed to be no temporal overlap between this development and the base design scheme. No ecological impacts were anticipated as a result of this development. Based on typical design and construction methods for projects of this nature, no significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				visual amenity and permissive routes). A planning condition was applied requiring native tree planting and wildflower seeding in addition to gap planting a hedgerow (to minimise impacts on visual amenities).	projects.
N/098/01313/15	Langton Grange Farm, Langton Road, Langton by Spilsby, PE23 4PT. Installation of 192 no. 50 kW ground mounted solar panels to a maximum height of 2.4 m.	0.2 km West	Granted 24/08/2015	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. No ecological report is included with the application or subsequent planning documentation. The D&A Statement includes the following statement: "*Ecology – The land is of limited ecological value. Existing trees and hedgerows will be retained; habitats, if any, would not be affected and the panels themselves provide shelter to any species using the land in the future*." Natural England consultation response confirms there will be no impact on statutory sites (although reference is made to refer the LPA to the SSSI IRZs, but with no further clarification). The LPA is referred to	Based on grant of planning permission (requiring commencement within three years) and likely timescales for construction based on nature of development, there is assumed to be no temporal overlap between this development and the base design scheme. No ecological impacts were anticipated as a result of this development. Based on typical design and construction methods for projects of this nature, no significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other projects.

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				standing advice re protected species. No planning conditions were applied relating to biodiversity.	
N/163/00245/15	Marriages Specialist Foods, Bluestone Heath Road, Driby Top, LN13 0BT. To construct a solar farm comprising construction and operation over a 25 year period of a 1.5 MW ground mounted solar array (6000 panels) with a maximum overall height of 2.3 m together with support structures. Erection of fencing to a maximum height of 2.0 m. Installation of 250 kw roof mounted solar array on 4 no. existing buildings for a 25 year	0.9 km North North West	Granted 31/03/2015	A previous Screening Opinion (N/163/00295/15) dated 25/02/2015 concluded that "Whilst the proposed solar park might fall within the definition of an industrial installation taking it within Schedule Two of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, the proposal falls well short of the criteria listed in the PPG for such development. The site lies within a sensitive area (AONB), but it is part and parcel of an existing large grain store and milling complex where views are limited due to contours and tree screening and always within the context of the existing development. In the circumstances it is concluded that the proposal does not constitute development for which an EIA is required". The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no	Based on grant of planning permission for the solar farm (requiring commencement within three years) and likely timescales for construction based on nature of development, there is assumed to be no temporal overlap between this development and the base design scheme. Based on typical design and construction methods for similar solar park projects, no significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other projects. This cumulative assessment is based on the project description for which planning permission has been granted. The inclusion of the excerpt ecological chapter referring to the installation of a

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	period.			trees or hedges are present on or adjacent or near to the proposed development. An "Ornithology and Ecology Report" is included within the planning documentation; however, this report appears to be a chapter (entitled “Chapter 8”) that has been extracted from another larger document and contains no front cover, project description or other explanatory context. The report is dated 2013 and it assesses impacts expressly in respect of a single turbine - the report contains information relating to the proposed solar farm development which forms the subject of the planning application; no other documents or plans elsewhere in the application documents could be found that refer to a wind turbine. [Negligible impacts concluded during construction. No impacts significant at population level predicted during operation on the local ornithological assemblage or designated areas present within 20 km). "Low risk" to bats identified, with pipistrelle bats identified as most likely species to be found foraging within open arable land (mitigation provided	single turbine is presumed to be in error, considering planning permission granted does not include construction of such a feature.

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Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				by ensuring blade tips >50 m from 'key ecological features'). Beneficial effects "could" be delivered - but there is no affirmation that the measures recommended are included in proposals, and no other documents associated with the application refer to these measures. The D&A Statement does not include description of a proposed turbine (but refers to planning having been previously refused for a turbine in 2011, prior to the date of the ecology report). The consented planning permission does not include a description of a turbine installation. Natural England's response references only solar panels and advises that a condition be applied for a Landscape and Biodiversity Management Plan. The LPA is referred to Natural England's standing advice for protected species. A condition has been applied to planning consent for Landscape and Biodiversity Management Plan, owing to sensitivities of the AONB.	
N/116/01460/	Proposed Overhead	0.7 km	Application	Habitat report confirms no designated site	No information regarding

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
13	Power Line A, Hagnaby Lane, Hagnaby. Application to Secretary of State for new 11kV OHL as part of wider refurbishment by Western Power Distribution.	North	certification is dated 19th July 2013. Completed certification response from LPA could not be found.	<1 km. No habitats of ecological value and no impacts predicted on protected species (roosting bats, water vole, reptiles, GCN). Precautionary working (Tool box talk) recommend in respect of badgers. Construction activities to be completed outside of the nesting bird season to ensure legal compliance. Natural England response confirms no likely impact on designated sites, but advises of possible impacts on protected species - no further clarification given and LPA is referred to standing advice for protected species.	programme or timing is available. However, based on the timing of the application, it is unlikely there would be temporal overlap between projects. No significant ecological effects were anticipated to result from the proposed development. No significant cumulative ecological impacts are therefore anticipated to arise in combination with the base scheme design or other projects.
N/089/01982/15	Land off Crawcroft Lane, Huttoft, Alford. Erection of a free range poultry unit, provision of 2 no. feed silos and construction of a hard standing and access road in accordance with amended plan received by the Local Planning Authority on	0.1 km South	Granted 21/01/2016	The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. Environmental Report contains no ecological information. The D&A contains no ecological information but states (referring to the Environmental Report) "the development will not give rise to any significant adverse environmental effects". No consultation response from Natural	Possible overlap in construction periods may occur. Proposal will include removal of approximately 25 m native hedgerow and culverting of the associated drain to facilitate construction of the new poultry unit. The proximity of the project is such that the same populations of species (e.g. water vole, badger, bats) would be utilising these habitat features. However, the scale of the

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	8th December 2015.			England. Condition relating to tree planting scheme (for visual amenity) and external building lighting plan (for light pollution) to be approved by LPA. No further details in respect of these matters are available; no application for discharge of these conditions apparent on portal.	proposed project, in combination with the proposed hedgerow and tree mitigation planting (which will screen the new unit and maintain habitat continuity), is such that no significant cumulative ecological effects are anticipated to arise in combination with the base scheme design or other projects.
N/089/02430/14	Overhead Power Line Rebuild Adjoining Yarlsgate Farm, Huttoft Road, Sutton on Sea. Application to Secretary of State for replacement 11kV OHL as part of wider refurbishment by Western Power Distribution.	0 km South	Response letter dated 14/01/2015	LPA endorses application (subject to one pole in respect to proximity to footpath/footbridge) and confirms no EIA required. Comments from Drainage Board require 10 m vertical and 8 m horizontal clearance from banktop of watercourses. Natural England advised disturbance to birds (marsh harrier, bittern and reed bed nesting birds cited) possible (site located 600 m from Sea Bank Clay Pits SSSI) - two conditions - construction methods to ensure no materials/run off etc can enter the SSSI and work should be completed outside of the nesting season.	Considering timescale of LPA response it is unlikely there would be temporal overlap between projects. Based on LPA endorsement of the application, and assuming the recommendations set out by Natural England were implemented, no significant ecological effects would be anticipated. No significant cumulative ecological impacts are therefore anticipated to arise in combination with the base scheme design or other projects.

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
S/054/01504/16	Triton Knoll Offshore Wind Farm. Principal onshore elements include approximately 60 km of underground cables with associated access routes, landfall infrastructure, an Intermediate Electrical Compound, a new Substation and works within the existing Bicker Fen Substation.	At landfall: 3.2 km South At furthest point: 14.5 km South East At connection: 0 km	DCO made on 5th September 2016 and came into force on 27th September 2016.	ES Chapter for Terrestrial Ecology predicts negligible impacts upon LWS network, Lincolnshire Coastal Grazing Marsh Project Priority Field Sites, badgers, water voles, bats, birds and reptiles as a consequence of embedded mitigation prior to and during construction. A negligible/minor beneficial effect upon hedgerows was predicted. No impacts were predicted on ecological receptors for operation or decommissioning and no significant cumulative impacts were predicted to arise between the construction of the Triton Knoll Electrical System and other known or planned activities. Approximately 50 % of the PDB could not be accessed for survey; baseline data was extrapolated from desktop returns and aerial photography. Pre-commencement surveys were proposed for all areas in which access could not be achieved for habitats, badgers, bat roosts in trees, water voles, otters and GCN. Natural England agreed with the Applicant's approach to the ecological assessment. With the inclusion of Requirement 20	The onshore Triton Knoll elements are of broadly similar scale to the base design scheme. At least partial overlap in construction programmes would therefore be anticipated, although implementation for both projects is likely to be sequential. The anticipated effects from the Triton Knoll onshore elements are similar to those anticipated from the base scheme design and relate to temporary loss of hedgerows and watercourses and effects upon water voles, badgers, nesting birds, amphibians and reptiles. Whilst mitigation for both projects reduce construction effects to negligible and no significant residual effects are anticipated for either project, overall there is a potential for cumulative ecological impacts to affect receptors.

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				(European protected species) in Part 3 of Schedule 1 to the Order recommended to the Secretary of State, which provides for pre-construction surveys to establish the presence of any European or protected species, the ExA determined that the approach to ecological surveys had been adequate. The Secretary of State agreed. The Secretary of State concluded that the Development, with mitigation in place, will not have an adverse effect on the integrity of any European site either alone or in-combination with other plans or projects. The Application was accepted for examination by the Planning Inspectorate on 21 May 2015. The examination of the Application began on 3 September 2015 and was completed on 3 March 2016. The Secretary of State decided under section 114 of the Planning Act 2008 to make with modifications an Order granting development consent for the proposals in the Application.	
17_0165_FUL	Six Hundreds Farm Buildings Six	0.5 km West	Granted 6th April 2017	The Proposed Development is for the construction of one new grain store to	The project is sited within existing development. While demolition of

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	Hundreds Drove East Heckington Sleaford Lincolnshire PE20 3QA. Erection of one new grain store.			replace the existing bin crop storage within an operational farm yard. The application form states no protected or priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. Although the proposal requires the demolition of the existing building, no ecological report or other ecological information is included within Design & Access Statement or other application documentation. No consultation response from Natural England or other ecological stakeholders could be found. No planning conditions were applied relating to biodiversity.	the existing building is required, this is large prefabricated barn structure. Planning documentation states no trees or landscaping is located within proximity, implying the building is likely to be isolated. No ecological impacts were anticipated as a result of this proposed development. Based on the nature of the project, no pathways exist that would give rise to cumulative ecological impacts to arise in combination with the base scheme design or other projects.
15_0416_S36	Land At Six Hundred Farm Six Hundred Drove East Heckington Lincolnshire. Heckington Fen Wind Farm – Variation of	0 km West	District Council objected to the 2012 application on the grounds of visual amenity and cumulative impacts with the (then)	The application for a variation to the S36 consent and Deemed Consent related primarily to increasing rotor diameter from 90m to 103m and changes to the locations and footprints of the proposed substation and access tracks. Planning documentation supporting the	The proposed wind farm is located adjacent to the base scheme design in the west. At least partial overlap in construction programmes might be anticipated. There may also be overlap in ecological receptors

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	Electricity Act Consent in regards an application (dated 2012) for the erection of 22 wind turbines with associated infrastructure and new vehicular access from the A17		proposed Bicker Wind Farm. SoS granted S36 consent at Appeal. No objection made against 2015 application for variation of S36 Consent and Deemed Consent, however concern highlighted about proposed rewording of conditions. Concern regarding wording of conditions reiterated in January 2017 consultation and strong recommendation that SoS commission independent noise assessment.	variation application included ES Addendums for the Ecology and Ornithology Chapters. Otter may potentially be present in the wet drains and dykes, although no evidence was confirmed. Further survey was recommended, with any required mitigation being carried out under licence supervised by an ecologist. No negative impact was predicted for otters as a result of the original application or proposed variation. Safety lighting may be utilised in the construction compound; this was not deemed likely to result in a significant effect on bats due to the lack of roosts or potential roost habitat and the bat species recorded. No significant negative effects were predicted on any other non-avian ecological receptor during construction. For avian receptors, the variation to the proposed scheme is not anticipated to give rise to significant construction or disturbance impacts. Collision risks for marsh harrier and golden plover were recalculated according to the increase in rotor swept area. Neutral	during construction and the same populations are likely to be relevant to both schemes, due to proximity. However, construction and operational impacts differ between schemes. Neither scheme is predicted to give rise to significant construction related effects. Numerous ditch crossings are proposed within the Heckington Fen Wind Farm Site, however, ditch crossings within the base scheme design, including Skerth Drain, will be constructed using trenchless methods and therefore the base scheme design will not give rise to cumulative impacts upon the ditch habitat or species utilising these habitats during construction. No trees or hedgerows within the combined site areas will be affected by either scheme during construction and wildlife corridors (namely Skerth

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				operational effects were predicted upon marsh harrier as a consequence of collision risk. A negative impact of minor significance was predicted upon golden plover as a consequence of collisions during operation; this did not alter the conclusions of the original impact assessment. No mitigation was deemed to be required. Ecological or ornithological factors do not appear to have formed the basis to any objections to the original application or subsequent applications for variation. Three conditions relating to Ecology were applied to the original consent. Condition 16 requires a scheme for protected species surveys and subsequent survey results and mitigation requirements to be submitted to and approved by the LPA. Condition 17 requires a survey specification for nesting bird checks, including methods and a schedule for the surveys and mitigation measures to be submitted to and approved by the LPA. Condition 18 requires an Ecological Enhancement Plan be submitted to and approved by the LPA. All three	Drain, Head Dike and Holland Dike) will remain functional throughout the construction phases of both schemes. Consequently, while there may potentially be overlap in construction periods and ecological receptors, the embedded mitigation implemented as part of the base scheme design will avoid significant cumulative ecological effects arising. While some residual operational impacts upon ecological receptors are likely as a consequence of the Heckington Fen Wind Farm, no longer term or operational effects will result from the base scheme design. There are no pathways whereby the base scheme design would give rise to cumulative operational effects. Overall, no significant cumulative ecological effects are anticipated to arise in combination with the

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
				conditions require approval of details by the LPA prior to commencement and implementation in accordance with the approved details.	base scheme design.
B_13_0357	Land adjacent to, Sellars Farm, Sutterton Drove, Amber Hill, Boston, Lincolnshire Rebuild approximately 1.29 km of 11 kv OHL on the existing route with wooden poles for support.	0 km North North West	Boston Borough Council resolved that it would raise no objections to the scheme on 28 October 2013.	No ecological report or other ecological information is included with the consultation request to the Council. No consultation response from Natural England or other ecological stakeholders could be found associated with the consultation request. No planning conditions were recommended by the Council relating to biodiversity.	Although the proposed rebuild overlaps with the base scheme design, considering timescale of LPA response it is unlikely there would be temporal overlap between projects. Based on LPA endorsement of the application with no recommendations made or concerns raised in respect of biodiversity, no significant ecological effects would be anticipated. No significant cumulative ecological impacts are therefore anticipated to arise in combination with the base scheme design or other projects.
S_096_00333_16	Laburnum House, Main Road, Langrick, Boston, Lincolnshire.	0.3 km South East	Scoping opinion dated 18/03/2016 confirms the	The scheme is at the scoping stage only. No EIA application could be identified and consequently no detailed ecological	No information regarding programme or timing is available. It is possible there may be an

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	PE22 7AN. Scoping opinion for new poultry unit, comprising six to eight sheds to provide a 250-300 k bird unit.		required scope for EIA and content for the Environmental Statement	information could be found in respect of this proposed development. The proposed site is identified as within a block of arable to the rear of the existing farmstead. The scheme is identified as outline only but the incorporation of landscaping in association with the scheme is confirmed as being easily delivered. The scheme is identified as Schedule 1 under the EIA Regulations and an Environmental Assessment is proposed to include investigation of population, flora, fauna, soil, water, air and landscape and which identifies appropriate mitigation and alternatives. Consultation response from Natural England provides standing advice to the scope and content of the EIA in respect of nature conservation designations, protected species and habitats and species of principal importance in addition to landscape, access, soil, air and cumulative effects.	overlap in the construction programme with the base scheme design. However, based on project description, scale, location and typical design and construction methods for projects of this nature, in addition to the requirement for EIA and identification of mitigation, including those relating to potential cumulative effects, it would not be anticipated that the proposed scheme would result in residual significant effects during construction or operation. No significant cumulative ecological impacts are anticipated to arise in combination with the base scheme design or other projects.
S_096_00870_14	Land At Laburnum House, Main Road, Langrick, Boston,	0.2 km North West	Non-material amendment granted 28/04/2014 subject	The non-material amendment sought only to reword a condition on the existing permission to clarify that feedstock materials	No information regarding programme or timing is available. However, based on the timing of

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
	Lincolnshire. Application for non-material amendment to amend the wording of a condition applied to (E)S96/2043/13 (construction of a 499 kW anaerobic digestion plant) relating to the nature of feedstock materials.		to a new condition (relating to feedstock materials). (Original consent granted 05/12/2013)	could be used from off the farm. An ecological report describing the findings and recommendations of a habitat survey, assessment for protected species and a great crested newt survey were provided in support of the original application. Construction of the proposed development was anticipated to have a negligible ecological impact on habitats or protected species. Best practice measures for avoidance were recommended. The committee report confirms consultation response was received from Natural England, who advised the proposal was unlikely to affect statutorily protected sites or landscapes or great crested newts; the Council was referred to standing advice in respect of protected species. No conditions relating to ecology were imposed upon the original consent. A condition requiring the implementation of a landscape scheme (and subsequent 10yr maintenance plan) was applied in the interests of preserving visual amenity.	the grant of the original consent, it is unlikely there would be temporal overlap between projects. No significant ecological effects were anticipated to result from the proposed development. The non-material amendment pertinent to this application has no bearing upon ecological resources. No significant cumulative ecological impacts are therefore anticipated to arise in combination with the base scheme design or other projects.
S_096_01235	Langriville Farm,	1.6 km	Granted 17/09/2014	The application form states no protected or	The project is sited within existing

Table 10.32 Summary of Cumulative Projects / Plans Assessed					
Application Ref	**Development Proposal**	**Distance from base scheme design**	**Planning Status**	**Ecological Assessment Submitted With Development Proposal**	**Potential for Cumulative Effects**
_14	Langrick Road, New York, Lincoln, Lincolnshire. LN4 4XH. Erection of 16no. biomass boilers with associated fuel silos to heat existing poultry units.	North West		priority species, designated sites, important habitats or other biodiversity features and no trees or hedges are present on or adjacent or near to the proposed development. A desk-based ecological assessment was included in the Planning, Design and Access Statement submitted with the application. This assessment concluded there were no sites designated for nature conservation in or within proximity to the site, the site itself is already developed thereby being of low ecological value and the proposed development was of small scale and would not result in the loss or destruction of any existing habitat feature. No consultation response from Natural England or other ecological stakeholders could be found. No planning conditions were applied relating to biodiversity.	development. No ecological impacts were anticipated as a result of this proposed development. Based on the nature of the project, no pathways exist that would give rise to cumulative ecological impacts to arise in combination with the base scheme design or other projects.

Inter-project Cumulative Effects

10.1.6 Taking into consideration the spatial and temporal scales involved, the siting and nature of proposals, only one project is assessed to have the potential to give rise to cumulative ecological effects in combination with the base scheme design, this being the onshore elements for the Triton Knoll Offshore Windfarm.

10.1.7 In the absence of mitigation for Triton Knoll onshore elements, there will be temporary hedgerow and ditch loss and temporary habitat losses, disturbance and/or risk of killing water voles, badgers, reptiles and nesting birds. Impacts on bats pre-mitigation was assessed to be negligible in light of embedded mitigation and pre-mitigation impacts on wintering birds and GCN were also considered to be negligible. However, approximately 50 % of the study area could not be accessed for survey and this therefore creates some uncertainties regarding the magnitude of impacts. Pre-commencement surveys are proposed in those areas that were inaccessible for habitats, GCN, water voles, reptiles, bats and badgers.

10.1.8 Open-cut trenching is proposed to be used during the crossing of the majority of the minor field drains/ditches for Triton Knoll. The working corridor would be narrowed to 30 m for open cut ditch crossings where protected species (namely, water voles) are identified. For hedgerow crossings, working widths will again be narrowed to 30 m and cut brash will be placed within the hedgerow breaks to maintain their linear structure and function as ecological corridors. It was agreed with Natural England that water vole exclusion and translocation would not be required for the ditch crossings, but that displacement by habitat manipulation would be implemented for all bankside and fringe vegetation along ditches within the route corridor plus 5 m buffer either side. No GCN were found within 250 m (within the surveyed areas) and only low populations of reptiles were anticipated and consequently RAMs focussing on displacement will be implemented prior to and during construction. No barn owl nests were identified (within the surveyed areas) and RAMs are proposed to avoid disturbance of nesting birds. The placement of cut brash into hedgerow breaks would maintain commuting function for bats and avoidance/RAMs are proposed in the event a bat roost is subsequently identified within 15 m of works. One badger sett may be affected (within the surveyed areas) and RAMs are proposed which include maintaining access between setts and foraging/watering habitats and avoiding entrapment in excavations.

10.1.9 Post-mitigation, negligible/minor positive residual construction effects on hedgerows are predicted for Triton Knoll and all other residual construction effects on ecological receptors were assessed to be negligible. No operational ecological effects were predicted on ecological receptors.

10.1.10 As a worst case scenario, should Triton Knoll and Viking Link be constructed at the same time, there could be a resulting increase in the magnitude of the impacts identified by the ecological assessments completed for the individual projects.

10.1.11 Taking into account spatial scales and the ecology of those receptors affected by both projects pre-mitigation, a 5 km buffer is considered to be an appropriate precautious distance at which to determine effects upon populations. Similar effects occurring more than 5 km are considered

likely to impact separate populations of the species involved and, consequently, would not give rise to significant cumulative effects.

10.1.12 When applying a 5 km buffer to the proposed scheme design, there is approximately a 50 % overlap between the two schemes at their southern ends, these being the sections from Stickney, approximately, to the terminal connection points at Bicker Fen (Route Sections 3 and 4). This comprises approximately 21.5 km of the base scheme design and 22.2 km of the Triton Knoll route. Intervening distances between the projects along these southern sections vary from 3.4 km apart to 0 km.

10.1.13 Within this portion of the route of the base scheme design, only 12 hedgerows will be affected by temporary breaks to facilitate cable trenching. Further, trenchless crossings for all ditches and drains are proposed for the base scheme design. In combination with the embedded and additional mitigation measures for both schemes, the proportional cumulative increase in temporary effects upon hedgerows and watercourses is therefore considered not significant.

10.1.14 Despite the uncertainties in the magnitude of pre-mitigated construction effects upon some protected species arising as a consequence of survey access limitations for Triton Knoll, the negligible cumulative increase in temporary habitat effects that would result should both schemes be constructed simultaneously will not give rise to significant cumulative impacts upon species receptors identified to occupy or utilise those habitats.

10.1.15 Subsequently, there is no requirement for further mitigation and no additional cumulative impacts will arise.

10.2 Intra-project Cumulative Effects

Scope of Intra-project Cumulative Assessment

10.2.1 For the purposes of this assessment, an intra-project cumulative effect is interpreted as a situation where separate elements of the same project i.e. the Offshore Scheme and the proposed DC cable route have the same impact receptor e.g. wintering birds and this would result in a more substantial impact on this same receptor.

10.2.2 The potential for intra-project cumulative effects are most likely to occur in the intertidal area. In line with the inter-project cumulative assessment a precautionary approach is taken and ecologically important features which are common to both the Offshore Scheme and the proposed DC cable route are considered.

Intra-project Cumulative Effects

10.2.3 The only location where the Onshore Scheme could impact bird species that also use the area affected by offshore works (marine environment) is the landfall location. Both the Onshore and Offshore scheme have considered potential impacts on birds at this location and have concluded that there would be no significant impact on bird species as a result of the landfall works. The only species which could be affected by both Onshore and Offshore works are red-throated diver and common scoter and assessments of both schemes conclude that there will be no significant impacts on either of these species. The offshore project includes an assessment of any potential

impacts on the Greater Wash pSPA (a marine SPA), including the qualifying species common scoter and red-throated diver, and no significant impacts are predicted. There will therefore be no intra-project cumulative effects.

11 Summary of Assessment

11.1 Summary

Overview of Baseline Conditions

Route Section 1 Proposed Landfall to Well High Lane

11.1.1 Four internationally designated sites are considered with respect to the base scheme design: Humber Estuary SPA/Ramsar site, Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, The Wash SPA/Ramsar site and Gibraltar Point SPA/Ramsar site. One nationally designated site, Sea Bank Clay Pits SSSI is located within 500 m of the base scheme design. There are 14 non-statutory designated sites within 1 km of Route Section 1, two of which are crossed: Sandilands Golf Course and Dunes LWS and Firsby to Louth Dismantled Railway LWS. Eight S41 habitats of principal importance were identified by GLNP within 1 km of Route Section 1 while seven were identified on the Magic portal.

11.1.2 The base scheme design in Route Section 1 is dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. Hedgerows are present sporadically; most are generally well established and unmanaged, species-poor and dominated by hawthorn. One hedgerow (H20) qualified as important with respect to the Hedgerow Regulations 1997 (Ref 10-10), wildlife and landscape criteria. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present. Scattered broad-leaved trees are infrequent across Route Section 1. Several watercourses are crossed and vary from significant wet drains (Boy Grift Drain and Wold Grift Drain) to individual field ditches which have been recorded as both wet and dry across the base scheme design.

11.1.3 Records were returned for common frog, common toad and smooth newt for Route Section 1. Following scoping and habitat suitability assessments, 13 drains and one pond were surveyed for GCN. A small population recorded in one drain (D3).

11.1.4 One tree with low bat potential located within base scheme design. Route Section 1 is used by moderate numbers of at least four species of bat, including three species of pipistrelle, which use the various drains and ditches present for foraging and dispersal.

11.1.5 Water voles are commonly recorded within 1 km of Route Section 1. Water voles were recorded at nine watercourses within the base scheme design during surveys. Seven records for otter were returned within 1 km of the base scheme design and evidence of otter was recorded at five locations during surveys.

11.1.6 Badgers are prevalent across Route Section 1, with field evidence of badger foraging and commuting activity recorded. One subsidiary sett and two outlier badger setts were recorded within 30 m of the proposed DC cable route.

11.1.7 Generally low numbers of waders and wildfowl within 500 m of base scheme design. Moderate flocks of waterfowl recorded on Boy Grift Drain, including groups of wigeon and teal. Most of the waterfowl recorded were located at Huttoft Bank Pit LWT reserve, located 324 m south of the

base scheme design. Only very low numbers of wader species were recorded on the intertidal area near to the proposed landfall.

11.1.8 Route Section 1 supports a range of breeding bird species characteristic of open arable farmland prevalent within the wider area. Land within the base scheme design supports low numbers of breeding dunnock, grey partridge, house sparrow, linnet, skylark, song thrush, tree sparrow, yellowhammer and yellow wagtail.

11.1.9 Three records of grass snake and one record of slow worm were returned within 1 km of Route Section 1.

11.1.10 Records and incidental sightings of brown hare were recorded and European eel are also known to be present in Route Section 1.

Route Section 2 Well High Lane to A16 (Keal Road)

11.1.11 No internationally designated sites are present within 10 km of Route Section 2. Five nationally designated SSSIs (three within 2 km) are considered in this Route Section, none of which are directly affected. Twenty non-statutory designated sites are located within 1 km, four of which it may coincide with: A16 Road Verge, Dalby Bar LWS, East Keal Clay Pit LWS, Hocker Holt LWS and Wheeleabout Wood SNCI. Nine S41 habitats of principal importance were identified by GLNP within 1 km of Route Section 2 while six identified on the Magic portal.

11.1.12 Habitats in Route Section 2, although still predominantly intensively managed arable farmland, differs from the other sections in having more undulating topography, smaller fields and a greater number of hedgerows and woodland blocks. Hedgerows are present occasionally. Most are well established but species-poor, dominated by hawthorn. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present along the Route Section 2. Scattered broad-leaved trees are occasional across Route Section 2. No significant watercourses are crossed in this section of the route but individual field ditches which have been recorded as both wet and dry are present.

11.1.13 Good numbers of records of common toad, common frog and smooth newt were returned from within 1 km of the base scheme design. No GCN were recorded during surveys of drains and ponds within Route Section 2.

11.1.14 Four trees with low suitability within LoD are assumed to require removal. Four trees with unconfirmed bat roost potential present. Route Section 2 contains a number of hedgerows, ditches and patches of woodland that are likely to be used by at least four species of bat for foraging and dispersal.

11.1.15 No water vole or otter were recorded during surveys but desktop records for both species were returned for this Section.

11.1.16 Badgers are less prevalent across Route Section 2 than further north, although field evidence of badger foraging and commuting activity was recorded across the section. One main badger sett lies within 30 m of the proposed DC cable route within Route Section 2.

11.1.17 Route Section 2 is likely to support small wintering flocks of BoCC and/or S41 passerine bird species, which forage within the base scheme design during the winter period. This section is

more enclosed than the other route sections and so is highly unlikely to support any large groups of waders or wildfowl.

11.1.18 Route Section 2 supports a range of breeding bird species characteristic of fields bounded by hedgerows and ditches with scattered trees present. Land within the base scheme design supports low numbers of breeding reed bunting, yellowhammer, dunnock, skylark and song thrush.

11.1.19 Records of grass snake are known form Route Section 2 and a snake skin was recorded at pond P72.

11.1.20 Records for brown hare, west European hedgehog, European eel and brown/sea trout were all returned for this Section. Brown hare were also sighted during other surveys.

Route Section 3 A16 (Keal Road) to River Witham

11.1.21 No internationally or nationally designated sites are present within 10 km and 2 km respectively of the base scheme design in Route Section 3. There are four non-statutory designated sites present within 1 km, of which, Braygate Lane SNCI abuts the southern boundary of the base scheme design. One S41 habitat of principal importance was identified by GLNP within 1 km of Route Section 3 and three were identified on the Magic portal.

11.1.22 Habitats in Route Section 3, like Route Section 1, are dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. Hedgerow habitat is present sporadically along the Route Section 3 the majority being well established and unmanaged, mostly species-poor and dominated by hawthorn. Due to the open nature of the arable landscape tree cover is sparse. Small areas of semi-natural broad-leaved woodland and broad-leaved plantation woodland are present along the Route Section 3. Scattered broad-leaved trees are occasional across Route Section 3. A high number of watercourses are crossed by the Route Section 3 which vary from significant wet drains (Medlam Drain, Newham Drain, Castle Dike, Howbridge Drain/West Fen Drain and the River Witham) to individual field ditches which have been recorded as both wet and dry across the base scheme design.

11.1.23 A small number of recorded of common toad, common frog and one record of GCN were returned within 1 km of the base scheme design in Route Section 3. No GCN were recorded during surveys in this section.

11.1.24 One tree with high roost suitability, one with moderate and five with low suitability located in base scheme design. Route Section 3 is used by moderate numbers of at least four species of bat, including common pipistrelle, soprano pipistrelle, noctule and brown-long-eared bat. Bats use the various drains and ditches as well as woodland patches and scattered trees present for foraging and dispersal.

11.1.25 Water vole were recorded during surveys on seven watercourses in Route Section 3, while otter was recorded at one location.

11.1.26 Badgers are prevalent across Route Section 3, with field evidence of badger foraging and commuting activity recorded. Two main setts, two subsidiary setts and three outlier badger setts associated with the proposed DC cable route, lie within Route Section 3.

11.1.27 Hagnaby Lock Nature Reserve and the River Witham were recorded to be used by a range of wader and wildfowl species, including curlew, redshank, gadwall, shelduck and wigeon. Elsewhere within the base scheme design, only low numbers of wintering birds were recorded.

11.1.28 Route Section 3 supports a range of breeding bird species characteristic of open arable farmland with ditches, prevalent within the wider area. Land within the base scheme design supports low numbers of breeding dunnock, linnet, reed bunting, skylark and yellowhammer.

11.1.29 No records or sightings of reptile were recorded in Route Section 3, however limited suitable habitat is present and similar to that found in other sections of the proposed DC cable route. Records for brown hare, west European hedgehog, European eel and spined loach were all returned for this Section. Brown hare were also sighted during other surveys.

Route Section 4 River Witham to the Proposed Converter Station

11.1.30 No internationally or nationally designated sites are present within 10 km and 2 km respectively of the base scheme design in Route Section 4. There are seven non-statutory designated sites present within 1 km, of which, the base scheme design crosses three: Great Hale Eau LWS, Old Forty Foot Drain to South Forty Foot Drain LWS and South Forty Foot Drain LWS. Three S41 habitats of principal importance were identified on the Magic portal within 1 km of Route Section 4.

11.1.31 The base scheme design in Route Section 4, like Route Sections 1 and 3, is dominated by intensive arable farmland dissected by drains of varying sizes which are heavily managed. Hedgerows are present occasionally along Route Section 4. The majority are well established and they are all species-poor and dominated by hawthorn. Small areas of broad-leaved plantation woodland are present and scattered broad-leaved trees are infrequent, with only 317 individual trees present. Several watercourses are crossed by Route Section 4, which vary from significant wet drains (Gill Syke, Skerth Drain, Labour in Vain Drain, Great Hale Eau and South Forty Foot Drain) to individual field ditches which have been recorded as both wet and dry across the base scheme design.

11.1.32 Records for common frog, smooth newt and GCN were returned from within 1 km of the base scheme design in this section. A small population of GCN is supported at ditch D83.

11.1.33 Two trees with moderate bat roost potential and one with low potential within the base scheme design. Route Section 4 is used by moderate numbers of at least five species of bat, including three species of pipistrelle, brown long-eared bat and a *Myotis* species. Bats use the South Forty Foot Drain and Old Sixteen Foot Drain, as well as the various small ditches for foraging and dispersal.

11.1.34 Good numbers of water vole records were returned from within 1 km of Route Section 4, with water vole recorded from only one watercourse during surveys. Three records for otter were returned within the 1 km buffer, but no evidence was recorded from watercourses affected by the base scheme design.

11.1.35 Badgers are prevalent across Route Section 4, with field evidence of badger foraging and commuting activity recorded. Two main setts, two annex setts, one subsidiary sett and four outlier setts associated with the proposed DC cable route, lie within Route Section 4.

11.1.36 Regular usage of the South Forty Foot Drain was recorded by small groups of wintering wildfowl. Regular use of fields within 500 m of the base scheme design during winter was recorded by low numbers of wader species such as lapwing and golden plover and moderate sized flocks of some passerine species such as fieldfare.

11.1.37 Route Section 4 supports a range of breeding bird species characteristic of open arable farmland with ditches, prevalent within the wider area. Land within the base scheme design supports low numbers of breeding reed bunting, skylark and yellowhammer.

11.1.38 No records of reptiles were returned within 1 km of Route section 4. However a dead grass snake was observed to the east of South Forty Foot Drain and a common lizard was observed to the north east of Bicker Fen Substation during habitat surveys.

11.1.39 Records for brown hare, west European hedgehog, European eel and spined loach were all returned for this Section. Brown hare were also sighted during other surveys.

Overview of Residual Effects

11.1.40 A summary of the residual effects which occur as a result of construction and operation of the proposed DC cable route is presented in Table 10.33. Table 10.33

Residual Effects in East Lindsey District Council

11.1.41 Route Section 1, Route Section 2 and the majority of Route Section 3 (comprising 51.6 km) are all located in East Lindsey District Council. Residual effects which have been identified in these sections relate to winter birds at Huttoft Bank Pit LWT reserve and the River Witham (east side) where acoustic barriers will ensure that effects on wintering birds are not significant and to brown hare where RAMs will ensure that leverets vacate the area prior to vegetation clearance and reduce potential effects to not significant.

Residual Effects in Boston Borough Council

11.1.42 The majority of Route Section 4 and the very small part of Section 3 to the west of the River Witham (comprising 9.78 km) are located in Boston Borough Council. Residual effects which have been identified in these sections relate to winter birds at the River Witham (west side) and South Forty Foot Drain (east side) where acoustic barriers will ensure that effects on wintering birds are not significant and to brown hare where RAMs will ensure that leverets vacate the area prior to vegetation clearance and reduce potential effects to not significant.

Residual Effects in North Kesteven District Council

11.1.43 A small part of Route Section 4 (comprising 4.8 km) is located in North Kesteven District Council. Residual effects which have been identified in these sections relate to winter birds at the South Forty Foot Drain (west side) where acoustic barriers will ensure that effects on wintering birds are not significant and to brown hare where RAMs will ensure that leverets vacate the area prior to vegetation clearance and reduce potential effects to not significant

Residual Effects in South Holland District Council

11.1.44 The southern end of Route Section 4 (comprising 0.98 km) is located in South Holland District Council. Residual effects which have been identified in this section relate to brown hare where RAMs will ensure that leverets vacate the area prior to vegetation clearance and reduce potential effects to not significant.

Table 10.33 Summary of Assessment: Ecology (Underground Cable)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Route Section 1				
Temporary Impacts				
Wintering Birds	Local	Following installation of acoustic and visual screening between working areas and Huttoft Bank Pit Nature Reserve, certain that the impact of construction activities on wintering birds will be reduced.	**Not significant**	**No**
Brown Hare	Local	Certain no residual effects predicted to occur once RAMs used to ensure no killing injury to leverets during site clearance.	**Not significant**	**No**
Route Section 2				
Temporary Impacts				
Brown Hare	Local	Certain no residual effects predicted to occur once RAMs used to ensure no killing injury to leverets during site clearance.	**Not significant**	**No**
Route Section 3				
Temporary Impacts				
Wintering Birds	Local	Following installation of acoustic and visual screening between working areas and the River Witham, certain that the impact of construction activities on wintering birds will be reduced.	**Not significant**	**No**
Brown Hare	Local	Certain no residual effects predicted to occur once RAMs used to ensure no killing injury to leverets during site clearance.	**Not significant**	**No**

Table 10.33 Summary of Assessment: Ecology (Underground Cable)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Route Section 4				
Temporary Impacts				
Wintering Birds	Local	Following installation of acoustic and visual screening between working areas and the River Witham, certain that the impact of construction activities on wintering birds will be reduced.	**Not significant**	**No**
Brown Hare	Local	Certain no residual effects predicted to occur once RAMs used to ensure no killing injury to leverets during site clearance.	**Not significant**	**No**

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