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## Norfolk Vanguard Offshore Wind Farm

# Outline Landscape and Ecological Management Strategy (tracked changes)

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| For and on behalf of Norfolk Vanguard Limited<br><br>Approved by: Ruari Lean and Rebecca Sherwood<br><br>Date: 2nd May 2019 |

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| For and on behalf of Royal HaskoningDHV<br><br>Drafted by: Gordon Campbell<br><br>Approved by: Jon Allen<br><br>Date: 2nd May 2019 |

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## Tables

# Glossary of Acronyms

| | |
|---|---|
| AONB | Area of Outstanding Natural Beauty |
| BAP | Biodiversity Action Plan |
| BCT | Bat Conservation Trust |
| CIA | Cumulative Impact Assessment |
| CIRIA | Construction Industry Research and Information Association |
| CoCP | Code of Construction Practice |
| CRoW | Countryside and Rights of Way Act |
| CWS | County Wildlife Site |
| dB | Decibel |
| DCO | Development Consent Order |
| Defra | Department for Environment, Food and Rural Affairs |
| EcIA | Ecological Impact Assessment |
| ECoW | Ecological Clerk of Works |
| EIA | Environmental Impact Assessment |
| EMP | Ecological Management Plan |
| EPS | European Protected Species |
| ES | Environmental Statement |
| ha | Hectare |
| HDD | Horizontal Directional Drilling |
| HSI | Habitat Suitability Index |
| HVAC | High Voltage Alternating Current |
| HVDC | High Voltage Direct Current |
| JNCC | Joint Nature Conservation Committee |
| LBAP | Local Biodiversity Action Plan |
| LNR | Local Nature Reserve |
| LwA | Sound power level |
| m | Metre |
| NBSG | Norfolk Barbastelle Study Group |
| NNR | National Nature Reserve |
| NPP | Norfolk Ponds Project |
| NWT | Norfolk Wildlife Trust |
| OLEMS | Outline Landscape Environmental Management Strategy |
| PEIR | Preliminary Environmental Information Report |
| PMoW | Precautionary Method of Working |
| pSPA | Potential Special Protection Area |
| RNR | Roadside Nature Reserve |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| SuDS | Sustainable Drainage System |
| TN | Target Note |
| UK BAP | UK Biodiversity Action Plan |
| UKHPI | UK Habitat of Principal Importance |

## Glossary of Terminology

| | |
|---|---|
| Cable Relay Station | Primarily comprised of an outdoor compound containing reactors (also called inductors, or coils) and switchgear to increase the power transfer capability of the cables under the HVAC technology scenario as considered in the PEIR. This is no longer required for the project as the HVDC technology has been selected. |
| Indicative mitigation planting | Areas identified for mitigation planting at the onshore project substation and Necton National Grid substation. |
| Landfall | Where the offshore cables come ashore at Happisburgh South |
| Mobilisation area | Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment. |
| Mobilisation zone | Area within which the mobilisation area will be located. |
| National Grid new / replacement overhead line tower | New overhead line towers to be installed at the National Grid substation. |
| National Grid overhead line modifications | The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines |
| National Grid substation extension | The permanent footprint of the National Grid substation extension |
| National Grid temporary works area | Land adjacent to the Necton National Grid substation which would be temporarily required during construction of the National Grid substation extension. |
| Necton National Grid substation | The existing 400kV substation at Necton, which will be the grid connection location for Norfolk Vanguard |
| Onshore cable corridor | 200m wide onshore corridor within which the onshore cable route would be located as submitted for PEIR. |
| Onshore cable route | The 45m easement which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction. |
| Onshore cables | The cables which take the electricity from landfall to the onshore project substation |
| Onshore project area | All onshore electrical infrastructure (landfall; onshore cable route, accesses, trenchless crossing technique (e.g. Horizontal Directional Drilling (HDD)) zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modification) |

| | |
|---|---|
| Onshore project substation | A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage. |
| Onshore project substation temporary construction compound | Land adjacent to the onshore project substation which would be temporarily required during construction of the onshore project substation. |
| Running track | The temporary track within the onshore cable route which the construction traffic would use to access workfronts |
| The project | Norfolk Vanguard Offshore Wind Farm, including the onshore and offshore infrastructure |
| Trenchless crossing zone (e.g. HDD) | Temporary areas required for trenchless crossing works. |
| Workfront | The approximate 150m length of onshore cable route within which duct installation would occur |

# 1 INTRODUCTION

## 1.1 Background

1. The Development Consent Order (DCO) for the Norfolk Vanguard Offshore Wind Farm (herein 'the project') requires a number of plans to be prepared by the Applicant and approved by relevant authorities, prior to construction. The following requirements relate specifically to landscape and ecology:

   - Requirement 18– Provision of landscaping.
   - Requirement 19 – Implementation and maintenance of landscaping
   - Requirement 24 – Ecological management plan.

2. This Outline Landscape and Ecological Management Strategy (OLEMS) is drafted to form the basis of the more detailed schemes and plans which will be provided under those requirements. It is a certified plan under Requirement 18 of the DCO and has been drafted based on the landscape and ecological mitigation and enhancement measures deemed necessary on the basis of the assessment of impacts of the construction, operation and decommissioning of the onshore project area, as contained within Chapter 22 Onshore Ecology, Chapter 23 Onshore Ornithology and Chapter 29 Landscape and Visual Impact Assessment of the Environmental Statement (ES).

3. In advance of construction, the plans outlined above will be developed in accordance with the information provided within this OLEMS and in consultation with and subject to agreement from Natural England and the relevant local authorities.

4. Norfolk Vanguard Limited will work with the relevant local authorities to ensure appropriate resourcing is in place to monitor compliance with the provisions of the OLEMS, and the plans and schemes of which it forms the basis.

## 2 STRUCTURE OF OLEMS

5. This OLEMS presents a framework for the landscaping provisions and ecological mitigation which is to be delivered before, during and after the construction and operation of the onshore project area and provides details of the outline landscaping provisions and of the ecological mitigation measures which have been committed to at this stage.

6. The assessments detailed within the ES were based on inclusion of certain measures as 'embedded mitigation', which is defined in Chapter 5 Project Description as 'mitigation measures that were identified and adopted as part of the evolution of the project design'.

7. Where, after taking into account embedded mitigation, significant impacts would be unavoidable then 'additional mitigation' was proposed in the ES and is captured in further detail in this OLEMS.

8. This OLEMS is structured by receptor, and details mitigation and enhancement measures for each ecological receptor individually. Under the heading of each receptor, an overview of baseline and embedded mitigation is provided, followed by further discussion of additional mitigation as necessary. The discussion of additional mitigation is structured chronologically to outline the mitigation / enhancement measures which would apply at each stage of construction / operation:

   - Pre-construction;
   - During construction; and
   - Post-construction.

9. This OLEMS is structured as follows:

   - **Section 3** provides a summary of the **purpose** of this OLEMS, and provides details for how **compliance** with the plans which it will inform will be ensured;
   - **Section 4** provides a summary of the **embedded mitigation** which has been used on the project;
   - **Sections 5** sets out the details of **pre-construction surveys** which are required to complete the project's ecological baseline pre-construction;
   - **Section 6** provides details of the proposed **landscaping mitigation**;
   - **Sections 7**, **8**, **9** and **10** provides receptor-by-receptor details of the **ecological mitigation measures** which will be adhered to under each receptor;
   - **Section 11** provides a summary of the **timings** of any mitigation measures set out above;

- **Section 12** provides details of how the success of the mitigation measures described in Sections 4, 5 and 6 will be **monitored**;
- **Section 13** provides details of the licensing requirements for the project.

## 3 AIMS AND OBJECTIVES

10. The aim of this OLEMS is to outline the requirement for landscape and ecological mitigation and enhancement measures that are reflective of the surveys and impact assessment carried out for the onshore project area. The final detail of the mitigation and enhancement measures will be provided through the Landscaping Management Scheme(s) and Ecological Management Plan(s), to be agreed with the relevant authorities, pursuant to Requirements 18 and 24 of the draft DCO. The Landscaping Management Scheme(s) and Ecological Management Plan(s) will be drafted in accordance with this document.

11. The OLEMS, as the basis for these more detailed future plans and schemes, has the following objectives:

- To clearly outline the framework for ecological management.
- To outline the provision of the details that would form both species protection and landscape mitigation planting schemes.
- To provide a framework for the project Ecological Management Plan (EMP), which will act as a single document for all ecological mitigation considerations on site e.g. a single reference for the Ecological Clerk of Works (ECoW).
- To ensure all reasonable precautions are taken by Norfolk Vanguard Limited and their contractors to safeguard protected species. This OLEMS also acts as the basis for individual Species Protection Plans. A final detailed scheme of protection and mitigation measures for any European Protected Species potentially affected during the construction and operation phases of the project, prior to construction, will be agreed with the relevant authorities and proposed as part of draft mitigation licence applications under Requirement 28 of the draft DCO.
- To provide the basis for the agreement of a detailed Landscape Management Scheme under Requirement 18 of the DCO for the onshore project substation and National Grid substation extension, with an aftercare period of 5 years following implementation of the planting. One for one replacement planting of failed plants would be required for the first 5 years. Replacement planting after this date may be requested at the discretion of Norfolk County Council. This scheme will detail how ecological landscape and Sustainable Drainage System (SuDS) requirements will be integrated at the onshore project substation site and National Grid substation extension site.
- To provide the basis for the agreement of a detailed Landscape Management Scheme for the protection and restoration of impacted and

replanted trees and hedges in the onshore cable route, with an aftercare period of 5 years.

- It is expected that the schemes of planting and aftercare for the onshore cable route would be delivered by contractors who can demonstrate appropriate experience and capacity to deliver effective and robust aftercare and provide a consistent quality of work across the whole project. Norfolk Vanguard Limited would seek to work collaboratively with Breckland Council, North Norfolk District Council, Broadland District Council and Norfolk County Council to develop planting specifications for tendering for this work.
- To form the basis of a process of ongoing dialogue / forum with Local Authorities leading up to and during construction to ensure that Local Authorities are kept informed and satisfied of the implementation of the OLEMS (and the plans / schemes of which it forms the basis) and in order that they can also keep communities informed.

# 4 EMBEDDED MITIGATION

12. Norfolk Vanguard Limited has made a decision on a number of techniques and engineering designs/modifications inherent as part of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process.

13. A range of different information sources has been considered as part of embedding mitigation into the design of the project (for further details see Chapter 5 Project Description, Chapter 4 Site Selection and Assessment of Alternatives and the Consultation Report (document reference 5.1) including engineering requirements, feedback from community and landowners, ongoing discussions with stakeholders and regulators, commercial considerations and environmental best practice.

14. The project has undergone an extensive site selection and design refinement process which has involved incorporating landscape and ecological considerations into the identification of the proposed onshore project area locations and into the project design. Table 1 summarises the embedded mitigation which is relevant to onshore ecological, ornithological and landscape and visual receptors. Where embedded mitigation is relevant to particular receptors, this is described under the relevant subsection in Sections 6-10.

15. Where, after taking into account embedded mitigation, significant impacts would be unavoidable – or in instances where specific mitigation measures have been requested by stakeholders in relation to specific receptors - then additional mitigation is proposed. Additional mitigation measures are provided under the relevant subsection in Sections 6-10.

**Table 1 Embedded mitigation measures for the project**

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| Strategic approach to delivering Norfolk Vanguard and Norfolk Boreas | Subject to both Norfolk Vanguard and Norfolk Boreas receiving development consent and progressing to construction, onshore ducts will be installed for both projects at the same time, as part of the Norfolk Vanguard construction works. This would allow the main civil works for the cable route to be completed in one construction period and in advance of cable delivery, preventing the requirement to reopen the land in order to minimise disruption. Onshore cables would then be | The strategic approach to delivering Norfolk Vanguard and Norfolk Boreas has been a consideration from the outset. |

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | pulled through the pre-installed ducts in a phased approach at later stages.<br>In accordance with the Horlock Rules, the co-location of Norfolk Vanguard and Norfolk Boreas onshore project substations will keep these developments contained within a localised area and, in so doing, will contain the extent of potential impacts. | |
| Commitment to HVDC technology | Commitment to HVDC technology minimises environmental impacts through the following design considerations;<br>• HVDC requires fewer cables than the HVAC solution. During the duct installation phase this reduces the cable route working width (for Norfolk Vanguard and Norfolk Boreas combined) to 45m from the previously identified worst case of 100m. As a result, the overall footprint of the onshore cable route required for the duct installation phase is reduced from approx. 600ha to 270ha;<br>• The width of permanent cable easement is also reduced from 54m to 20m;<br>• Removes the requirement for a CRS;<br>• Reduces the maximum duration of the cable pull phase from three years down to two years;<br>• Reduces the total number of jointing bays for Norfolk Vanguard from 450 to 150; and<br>• Reduces the number of drills needed at trenchless crossings (including landfall). | Norfolk Vanguard Limited has reviewed consultation received and in light of the feedback, has made a number of decisions in relation to the project design. One of these decisions is to deploy HVDC technology as the export system. |
| Site Selection | The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules for onshore project substations and National Grid infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts.<br>Key design principles from the outset were followed (wherever practical) and further refined during the EIA process, including; | Constraints mapping and sensitive site selection to avoid a number of impacts, or to reduce impacts as far as possible, is a type of primary mitigation and is an inherent aspect of the EIA process. Norfolk Vanguard Limited has reviewed consultation received to inform the site selection process (including local communities, landowners and regulators) and in response to feedback, has made a number of decisions |

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | • Avoiding proximity to residential dwellings;<br>• Avoiding proximity to historic buildings;<br>• Avoiding designated sites;<br>• Minimising impacts to local residents in relation to access to services and road usage, including footpath closures;<br>• Utilising open agricultural land, therefore reducing road carriageway works;<br>• Minimising requirement for complex crossing arrangements, e.g. road, river and rail crossings;<br>• Avoiding areas of important habitat, trees, ponds and agricultural ditches;<br>• Installing cables in flat terrain maintaining a straight route where possible for ease of pulling cables through ducts;<br>• Avoiding other services (e.g. gas pipelines) but aiming to cross at close to right angles where crossings are required;<br>• Minimising the number of hedgerow crossings, utilising existing gaps in field boundaries;<br>• Avoiding rendering parcels of agricultural land inaccessible; and<br>• Utilising and upgrading existing accesses where possible to avoid impacting undisturbed ground. | in relation to the siting of project infrastructure. The site selection process is set out in Chapter 4 Site Selection and Assessment of Alternatives. |
| Duct Installation Strategy | The onshore cable duct installation strategy is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) and once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise the duration of works on any given section of the route. | This has been a project commitment from the outset in response to lessons learnt on other similar NSIPs. Chapter 5 Project Description provides a detailed description of the process. |
| Long HDD at landfall | Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain open access to the beach during construction. Norfolk Vanguard Limited have also agreed to not use the beach car park at Happisburgh South. | Norfolk Vanguard Limited has reviewed consultation received and in response to feedback, has made a number of decisions in relation to the project design. One of those |

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | | decisions is to use long HDD at landfall. |
| Trenchless Crossings | Commitment to trenchless crossing techniques to minimise impacts to the following specific features;<br>• Wendling Carr County Wildlife Site;<br>• Little Wood County Wildlife Site;<br>• Land South of Dillington Carr County Wildlife Site;<br>• Kerdiston proposed County Wildlife Site;<br>• Marriott's Way County Wildlife Site / Public Right of Way (PRoW);<br>• Paston Way and Knapton Cutting County Wildlife Site;<br>• Norfolk Coast Path;<br>• Witton Hall Plantation along Old Hall Road;<br>• King's Beck;<br>• River Wensum;<br>• River Bure;<br>• Wendling Beck;<br>• Wendling Carr;<br>• North Walsham and Dilham Canal;<br>• Network Rail line at North Walsham that runs from Norwich to Cromer;<br>• Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham; and<br>• Trunk Roads including A47, A140, A149. | A commitment to a number of trenchless crossings at certain sensitive locations was identified at the outset. However, Norfolk Vanguard Limited has committed to certain additional trenchless crossings as a direct response to stakeholder requests. |
| **Embedded mitigation for onshore ecology, ornithology and landscape and visual impact** | | |
| Designated sites | Constraints mapping was undertaken prior to the publication of the Norfolk Vanguard EIA Scoping Report (Royal HaskoningDHV, 2016). This constraints mapping exercise was used to determine the route options for the onshore project area for the project. The following ecological receptors were considered as part of the constraints mapping process:<br>• International designated sites for nature conservation (SAC, SPA, Ramsar sites);<br>• National designated site for nature conservation (The Broads National Park, SSSI, NNR, LNR); and<br>• Ancient woodland. | More information can be found in Chapter 4 Site Selection and Assessment of Alternatives. |

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | These ecological receptors have been avoided during the onshore project area route selection process. | |
| Route Refinement | Route refinements have included consideration of more detailed ecological constraints, and the following principles have been applied when refining the onshore project area:<br>• Ancient woodland – following the Forestry Commission's Standing Advice on Ancient Woodland and Veteran Trees, a buffer of 15m around all ancient woodlands has been used (Forestry Commission, 2014);<br>• Woodland – areas of woodland have been avoided where possible during the route selection process;<br>• Habitat – standing water bodies, trees, and agricultural ditches have been avoided where possible; and<br>• Hedgerows – the number of hedgerow crossings has been minimised as far as possible, taking other fixed constraints into account. | Further information on the route refinement process can be found in Chapter 4 Site Selection and Assessment of Alternatives. |
| Hedgerow and watercourse crossings | The working width at hedgerow and watercourse crossings is 20m[1] (reduced from 54m at Preliminary Environmental Information Report (PEIR)) due to the selection of a HVDC electrical solution.<br><br>Where hedgerow gaps are required beyond the two-year duct installation phase (i.e. for the duration of the subsequent two-year cable pull phase), the number of gaps required will be minimised as far as possible and will be no wider than 6m. | Further information can be found in Chapter 5 Project Description. |
| Country Wildlife Sites | In response to comments from stakeholders raised in response to the PEIR as part of the Evidence Plan Process (EPP), Norfolk Vanguard Limited is now proposing to use trenchless | Further information on trenchless crossing techniques can be found in |

[1] This width assumes that the onshore cable route bisects each hedgerow in a perpendicular fashion. In reality, some hedgerows will be crossed at an angle, therefore increasing the maximum width of the gap required up to a possible 25m.

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | crossing techniques (e.g. HDD) at all CWS and proposed CWS crossed by the onshore project area in order to minimise the impacts upon the habitats contained within these sites.<br><br>This includes proposed trenchless crossing techniques (e.g. HDD) at the following locations:<br><br>• Wendling Carr CWS (CWS no. 1013);<br>• Little Wood CWS (CWS no. 2024),<br>• Land South of Dillington Carr CWS (CWS no. 1025),<br>• Kerdiston proposed CWS (no CWS number);<br>• Marriott's Way CWS (CWS no. 2176) (in two locations); and<br>• Paston Way and Knapton Cutting CWS (CWS no. 1175).<br><br>At five of these six locations, no works will be undertaken within the CWS boundary. | Chapter 5 Project Description.<br><br>At one location, Wendling Carr CWS, only a running track will be required to pass through the CWS. This will be a 6m by up to 180m road located within the CWS. This is shown on Figure 22.3. |
| Construction Programme | The construction programme for the onshore cables has been designed to minimise the duration and extent of impacts to ecological receptors at any given location along the onshore cable route.<br>Specifically:<br>• During the two-year duct installation phase, each duct installation team will work along a section of the cable route, tackling a short section (approximately 150m) at a time. Where possible, each 150m workfront (approximately 0.7ha in area) will be reinstated following duct installation, before works commence on the next section. The works at each section, including reinstatement, will take approximately one week (up to two in a worst case scenario). Within each section, a 6m wide strip will be retained for the running track, for up to the remainder of the two-year duct installation phase (i.e. as a worst case a 60km by 6m strip along the onshore cable route will be lost for the duration of the cable duct installation);<br>• During the cable pulling phase, a reduced 12km by 6m strip along the onshore cable route is anticipated to be lost for up to approximately 16 weeks during the cable | For further details on the construction approach and programme, please see Chapter 5 Project Description. |

| Parameter | Mitigation measures embedded into the project design | Notes |
|---|---|---|
| | pull for the running track, thus minimising the number of hedgerow gaps required for the duration of construction down to approximately 20%; and<br>The majority of disturbance to watercourses will only occur during the two-year duct installation phase. Once the ducts are in the ground, subsequent cable pulling operations will not result in further disturbance to watercourses. There may be disturbance to a small number watercourses which need to be crossed when the running track is reinstated to facilitate the cable pulling operations. | |
| Strategic landscape mitigation | Mitigation measures associated with the onshore project substation, National Grid substation extension and access from the A47 form part of a strategic approach to enhancing landscape character and biodiversity in the local area. Figure 29.12 in Chapter 29 Landscape and Visual Impact Assessment shows how mitigation planting will contribute to the wider landscape structure of the area and help consolidate green corridors for wildlife. | For further details on project landscaping, please see Chapter 29 Landscape and Visual Impact Assessment. |

# 5 PRE-CONSTRUCTION SURVEYS

16. The field surveys which have informed the project Ecological Impact Assessment (EcIA) were undertaken during the 2017 ecological survey season. However, landowner access was not possible for the entire onshore project area and therefore, access was only possible to approximately 50% of the field survey habitats and species study area (i.e. 50% the onshore project area plus a 50m buffer).

17. Norfolk Living Map data provided by Norfolk Biodiversity Information Service (NBIS) has been used to characterise the habitats for the remaining 50% of the habitats and species study area, and other desk study data (e.g. the NBSG's bat data) has been used to provide additional species information where possible. However, as no field survey data has been gathered for these areas, this presents a data gap in the project's ecological baseline. Despite the survey limitations described, the data collected is considered to be sufficient to identify the nature and scale of impacts likely to arise as a result of the project in order to conduct a robust EcIA. Where there are gaps in the data collected due to landowner access restrictions, impenetrable habitat or other restrictions, by using detailed desk study data where available (e.g. using the Norfolk Living Map) and by assuming that species are present within these unsurveyed areas the EcIA presented in Chapter 22 Onshore Ecology and Chapter 23 Onshore Ornithology ensures that a worst case scenario assessment of impacts upon ecological receptors has been adequately undertaken.

18. In areas where surveys have not been possible during the 2017 ecological surveys, full surveys of these 'unsurveyed' areas will be carried out post-consent. These 'pre-construction surveys' will inform the ecological mitigation presented within the final EMP. These pre-construction surveys will be carried at the optimum time of the year for each species.

19. The extent of the unsurveyed areas for specific receptors, and therefore the scope of the pre-construction surveys required for each receptor, is set out within Sections 6-10. The extent of the pre-construction surveys required to complete the characterisation of the ecological baseline for each receptor is set out in Table 2 below.

**Table 2 Extent of pre-construction surveys required for each receptor**

| Receptor | Extent of unsurveyed area requiring pre-construction survey |
|---|---|
| Habitats | There will be post-consent surveys of all unsurveyed areas. This is approximately 50% of the onshore project area. |
| Badgers | There will be post-consent surveys of all unsurveyed areas. This is approximately 50% of the onshore project area. |

| Receptor | Extent of unsurveyed area requiring pre-construction survey |
|---|---|
| Bats | Nine trees and structures were not surveyed during the 2017 Bat Activity Survey. These trees and structures will require surveys post-consent.<br>A further eight areas within the habitat and species study area were identified within the unsurveyed areas as potentially suitable to support roosting bats. These areas will require assessment to determine suitability of trees to support roosting bats post-consent. |
| Water voles | Eight watercourses have been identified within the unsurveyed areas using the Norfolk Living Map and aerial photography which may be suitable habitat for water voles. There were a further two watercourses scoped into the 2017 Water Vole Survey which were unable to be surveyed in 2017. These watercourses will require surveys post-consent. |
| Great crested newt | Six unsurveyed waterbodies are located within the onshore project area. A further 124 waterbodies are located within 250m of the onshore project area temporary works and 500m of the permanent works. These waterbodies will require surveys post-consent. |
| Reptiles | Six areas have been identified by the Norfolk Living Map and aerial photography as potentially providing suitable habitat for reptiles within the unsurveyed areas. Two areas of habitat mosaics were unsurveyed during the 2017 Extended Phase 1 Habitat Survey. These areas will require surveys post-consent. |
| Other invertebrates | Northern bank of the River Wensum within the onshore project area (for Desmoulin's Whorl Snail survey). This area will require surveys post-consent. |
| Invasive non-native species | There will be post-consent surveys of all unsurveyed areas. This is approximately 50% of the onshore project area. This area will require surveys post-consent. |

# 6 LANDSCAPE MITIGATION

## 6.1 Introduction

20. Landscape planting forms part of the embedded mitigation in respect of the onshore project substation, National Grid substation extension and the new A47 site access junction. The landscape planting proposed for these areas is contained within the red line boundary of the project, which has been designed specifically to ensure sufficient space is available to accommodate the proposed planting. The inclusion of the landscape planting within the red line boundary will ensure that Norfolk Vanguard Limited has control over the implementation and maintenance of the planting, as well as provide the opportunity to implement advanced planting in select locations, prior to and during project construction.

21. Mitigation measures are illustrated on the following plans in Chapter 29 Landscape and Visual Impact Assessment:

- Figure 29.9a Indicative Onshore Project Substation Mitigation Planting – Norfolk Vanguard;
- Figure 29.9b Indicative Onshore Project Substation Mitigation Planting – Norfolk Vanguard and Norfolk Boreas;
- Figure 29.10a Planting Removals – National Grid Substation Extension;
- Figure 29.10b Indicative National Grid Substation Extension Mitigation Planting – Norfolk Vanguard;
- Figure 29.10c Indicative National Grid Substation Extension Mitigation Planting – Norfolk Vanguard and Norfolk Boreas;
- Figure 29.11a Planting Removals – A47; and
- Figure 29.11b Indicative A47 Mitigation Planting.

## 6.2 Baseline

22. The baseline condition in the context of the onshore project substation, National Grid substation extension and the new A47 site access junction, comprises arable farmland with some existing woodland, field boundary hedgerows, and young mitigation planting associated with the recently constructed Dudgeon substation and associated National Grid substation extension.

### 6.2.1 Baseline - Onshore Project Substation

23. The site of the onshore project substation is located in an area of agricultural land, typified by open fields of arable farmland, with some enclosure from hedgerows. On the site there are existing hedgerows of variable condition. The

hedgerow along the western site boundary is the most mature and complete. Other hedgerows occur to the south of where the onshore project substation would be located and on the site of the proposed footprint to the east and north of centre. Necton Wood lies to the immediate north of the onshore project substation, while the larger woodland of Great Wood lies further to the east. The construction and operation of the onshore project substation will not extend into the woodland areas and therefore there will be no direct effects on their structure or content.

### 6.2.2 Baseline – National Grid Substation Extension

24. At the National Grid substation extension, the presence of the National Grid substation and Dudgeon substation means the character of this area has already been altered and loss of native hedgerows has occurred within the site boundaries during the construction of these developments. On-site mitigation planting has been implemented for these developments, which comprises a mix of new hedgerows, woodland strips and specimen trees. SuDS ponds have also been created along the eastern edge of the existing substations. In the farmland surrounding this site, hedgerows and occasional woodland blocks occur, creating some sense of enclosure.

### 6.2.3 Baseline – A47 Site Access Junction

25. Along the section of the A47 where the new site access junction for the project would be located, there is an existing mix of new planting and more mature planting. The new planting comprises a 10m band of deciduous and coniferous woodland whips, planted as part of the mitigation measures associated with Dudgeon substation. This woodland planting is off-site from the Dudgeon substation and extends along a considerable length of the A47. It has been implemented with the intention of bolstering the existing road-side planting in order to screen views of Dudgeon substation from the A47. The existing planting comprises mixed deciduous tree cover of variable height and density located adjacent to the road, mostly continuous but with some notable gaps and thin enough such that filtered views of the substation occur whilst the trees are bare of leaf in the winter months. Similar planting, albeit denser and often more mature, occurs on the northern side of the road, creating a more effective screen. The Dudgeon mitigation planting is located to the south of the road, set behind the existing road-side planting. It currently comprises a mix of young woodland whips encased in protective tubes.

## 6.3 Removals

26. As part of the embedded mitigation, the project has been designed to avoid loss of trees wherever practical and minimise the extent of hedgerow to be removed. This has been considered in the site selection process, as well as the proposed layout of the onshore project substation, National Grid substation extension, and A47 site access junction.

### 6.3.1 Removals - Onshore Project Substation

27. The footprint of the onshore project substation would cover an area of 250m x 300m. The onshore project substation has been positioned to the east of the existing more mature western boundary hedgerow to ensure that this important landscape feature and ecological resource would be retained, so far as possible. Inevitably, owing to the scale of the footprint there would be some loss of hedgerows, although the hedgerows to be removed are comparatively smaller and form less prominent features in the landscape. These occur along the field boundary to the east of centre and the field boundary to the north. The field boundary to the south of the onshore project substation would be partly retained and, where removals would be required to accommodate the construction of the 400 kV interface cables connecting to the National Grid substation extension, hedgerow losses would be reinstated post construction. It is anticipated that losses would comprise only hedgerows, with either no tree removals or a very small number of losses.

### 6.3.2 Removals – National Grid Substation Extension

28. In terms of the losses that would occur in relation to the National Grid substation extension, these would affect sections of the Dudgeon mitigation planting. Where the onshore 400kV cable route would cross the southern site boundary, a short section of the existing hedgerow, new hedgerow and small number of specimen trees would be removed. Where the footprint of the National Grid substation extension would be located, a section of the woodland belt would also be removed, along with a short section of the hedgerow to the north, where the modifications to the overhead line would occur. Along the southern boundary and northern boundary, the hedgerows removed would be replaced post construction, although the specimen trees could not be replanted over the cables owing to associated restrictions. On site, the loss of the woodland belt would be longer term as this is where the National Grid substation extension would be located. Figure 29.10a in Chapter 29 Landscape and Visual Impact Assessment shows the planting removals at the National Grid substation extension.

### 6.3.3 Removals – A47 Site Access Junction

29. In order to construct the A47 site access junction and ensure the required sightlines for road-users are accommodated, removal of road-side tree cover and Dudgeon mitigation planting would be required along select sections to the south of the A47. Over an approximate 300m section, the older road-side vegetation would need to be removed. The Dudgeon mitigation planting is located to the south of this and the majority would remain unaffected as it is further recessed from the A47 than the older road-side vegetation. To the north-east of the junction, a thin section of the Dudgeon mitigation planting would need to be removed to ensure sightlines were fully accommodated without the interference of planting. Replacement woodland planting would be implemented on the southern side so that an overall depth of 10m would be maintained along the length of this woodland belt. Figure 29.11a shows the planting removals at the A47 site access junction.

## 6.4 Aims of landscape planting

30. Mitigation planting associated with the onshore project substation, National Grid substation extension and A47 site access junction has been designed with the principal aim of reducing the effects of the project on surrounding landscape and visual receptors. The design has been informed by the assessment of landscape and visual effects presented in Chapter 29 Landscape and Visual Impact Assessment. This has identified those receptors from which the project would be visible. Mitigation measures have been designed to screen the project from the most sensitive receptors.

31. With this principal aim in mind, the planting includes areas of fast growing woodland planting as this would provide, most importantly the height required, as well as the density, to ensure effective screening. Other considerations for the design and layout of the planting, include the use of predominantly native species and those species indigenous to this area, to ensure that the planting integrates well with the local landscape character.

32. The mitigation planting is multi-functional and beyond the principal aim to screen the project it also serves other aims as follows;

- Local landscape character. The baseline character of the local landscape is predominantly rural with arable fields set within a landscape framework of hedgerows and woodlands. Mitigation planting would enhance the local landscape character, by strengthening the landscape framework around the onshore project substation and National Grid substation extension and access from the A47.

- Historic landscape character. The historic landscape would have been characterised by a greater extent of hedgerow and woodland enclosure and greater occurrence of common pasture. Enclosure in the local landscape has become eroded owing to more intensive agricultural practices over the past century. Mitigation planting would help restore enclosure following the character and form inherent in the historic landscape.
- Strategic landscaping. Mitigation planting aims to create a landscape framework that connects with existing woodland and hedgerows to improve the wider strategic green network. This is important for the movement of animals through the area, as well as increasing bio-diversity across the local landscape. Figure 29.12 shows the strategic plan of the indicative mitigation planting.
- Biodiversity. The mitigation planting increases the area of land given over to wildlife. A mix of species would be included in the woodland planting and hedgerows and the integration of grass strips and wider species rich grassland areas have been included to provide a diversity of habitats and food sources for wildlife.
- Hydrology. SuDS are included as part of the mitigation measures and will attenuate run-off from the onshore project substation and National Grid substation extension. In combination with the wider areas of mitigation planting around these, water levels will be regulated to ensure there is no increased risk of flooding.

### 6.4.1 Landscape planting - Onshore Project Substation

33. The onshore project substation site benefits from some substantial existing hedgerows and woodland blocks within the local area. These would provide mitigation of landscape and visual effects from the outset and can be strengthened during the construction phase of the proposed project to ensure robust screening. Mitigation planting would mostly comprise indigenous woodland species and would be located around the onshore project substation site. Owing to the dimensions of the onshore project substation site and the onshore project substation temporary construction compound, construction activities would be required to level existing contours. A subtle earthwork bund of up to 2m along the western side of the onshore project substation is proposed. This would help to give an incremental increase to the overall height of screening along this sensitive boundary which is not constrained by planting restrictions associated with underground cables.

34. A band of woodland planting would be introduced to the south of the onshore project substation, offset to accommodate the onshore 400kV cable route that

would egress the onshore project substation along this boundary. This woodland would provide a screen in views from the south, most importantly the views of residents in the hamlet of Ivy Todd. Woodland planting would also be implemented to the north east, to complete the enclosure with Necton Wood to the north-west albeit with planting limited to hedgerows over the onshore cable route and an easement of 6 to 10m either side. Figure 29.9a shows the indicative mitigation planting for the onshore project substation.

### 6.4.2 Landscape planting – National Grid Substation Extension

35. Mitigation planting associated with the National Grid substation extension would be concentrated along the southern boundary – this being the most sensitive boundary, other than the A47, owing to the presence of the village of Necton in this direction. This would comprise a band of woodland planting to bolster the existing hedgerow and tree planting implemented as part of the Dudgeon mitigation measures and would ensure a more effective screen over the long term. Mitigation relating to views of road-users on the A47 has already been addressed through the Dudgeon mitigation planting of a band of woodland adjacent to the road.

### 6.4.3 Landscape planting – A47 Site Access Junction

36. The principal purpose of the planting around the A47 site access junction is to screen views of road-users on the A47. The removal of the road-side vegetation during the construction of the junction would create a notable opening and open up views across the agricultural landscape to the onshore project substation and National Grid substation extension. Planting along the road-side and along the new access road would grow to screen these views and re-enclose this section of the A47.

## 6.5 Landscape Planting Species and Growth

37. The mitigation planting would be designed to comprise a mix of faster growing 'nurse' species and slower growing 'core' species. The core species would comprise a mix of preferred native, canopy species that would outlive the nurse species and characterise the woodland structure over the longer term. It is anticipated that the growth rate of these species would be on average 250mm per annum. The nurse species would be faster growing and shorter-lived, providing shelter to bring on the canopy species. The mix would contain nurse species such as alder, birch, and pine, with average growth rates of 350mm per annum and core species such as oak, beech and horse chestnut, with average growth rates of 250mm per annum. It is anticipated that 5m to 7m growth would take over 20 years and after 30 years the heights would be approximately

9.25m to 12.55m (assuming planting height of 1m). The nurse species would be sufficiently fast growing to provide partial screening of the onshore project substation after 20 years.

38. It is anticipated that the construction of the project would commence in 2020 at the earliest. In locations where it is possible to achieve advanced planting this would be implemented at the start of the construction phase in 2020. This would mean these areas would already have had approximately three years of growth prior to completion of construction and commencement of operation. This equates to an additional growth of approximately 1.05m in height on top of a base height of approximately 0.75m (for the faster growing nurse species). The heights after 20 years would therefore be approximately 6.75m and 9.05m respectively and after 25 years 8m and 10.80m.

## 6.6 Landscape Management Scheme(s)

39. In fulfilment of Requirement 18 of the DCO, prior to construction, a Landscape Management Scheme for each stage of the works would be produced to include details of all proposed hard and soft landscaping works, including:

- Location, number, species, size and density of any proposed planting, including any trees.
- Cultivation, importing of materials, protection, and weed control to ensure plant establishment.
- Proposed finished heights, form and gradient of earthworks.
- Hard surfacing materials.
- Details of existing trees and hedges to be retained with measures for their protection during the construction period.
- Retained historic landscape features such as ditches and banks and proposals for restoration, where relevant.
- Implementation timetables for all landscaping works.
- Soil retention, handling and protection.
- The provision of a scheme of sustainable drainage will be integrated into the details of hard and soft landscaping works at the substation.
- Integration of relevant sections of substation design principles.

40. All landscaping works would be carried out in accordance with the Landscape Management Scheme, unless otherwise agreed in writing by the relevant planning authorities, and to a reasonable standard in accordance with the relevant recommendations of appropriate British Standards or other recognised codes of good practice. The specific standards are to be agreed with Breckland District Council and Norfolk County Council prior to commencement.

41. A specific Landscape Management Scheme would be developed for the onshore project substation, National Grid substation extension and A47 junction. Indicative mitigation plans have been taken into account in the assessment in the ES as part of embedded mitigation. Final details of the planting and earthworks for the project would be developed prior to construction, as part of the Landscape Management Scheme under Requirement 18 of the DCO. These details would be agreed with the relevant planning authorities. The Landscape Management Scheme for the substation would include:

- Drawings indicating cross-section with long cross-sections to include typical elevations of the substation. These drawings would also indicate proposed floor levels and proposed contours.
- A detailed scheme of tree and shrub planting and aftercare. This would include details of soil restoration and ground preparation, species choice, stock size, spacing, protection and a program of weed control and aftercare to cover a period of 5 years.
- A scheme of protection to demonstrate how new tree and hedge planting would be protected against deer, rabbits / hares etc. The detail would also indicate a variety of access gates within the detail for badgers or other creatures that may have, for instance, established routes through the restored areas.
- A process to deal with incidents of ash die back, including removal of diseased specimens and replanting of replacement native species (non-ash species).
- Details of local provenance suppliers of plant material for inclusion within the specification.
- Recommendations to landowners, for management of trees and hedgerows in the longer term.

## 6.7 Relationship with National Grid Substation Infrastructure

42. Cognisance of the mitigation planting associated with the National Grid substation and Dudgeon Substation has been taken into account in the proposals for mitigation planting associated with the National Grid substation extension. This is in order to ensure there is a degree of continuity between the separate proposals and that collectively a comprehensive approach to screening this area of development is achieved.

### 6.7.1 Pre-construction

43. The roots of retained trees along the edge of the cable corridor would be protected from soil compaction by the enforcement of Root Protection Areas

that would be fenced off from the construction (the extent of which would be calculated using guidance from BS5837: 2012).

44. Where possible, the location of pre- and post-construction land drains would also be adjusted to avoid or minimise damage to tree roots.

### 6.7.2 During Construction

45. The typical mitigation measures that would be employed during construction to minimise the impacts upon trees and woodland are as follows:

- Facilitation pruning may be recommended where tree crowns are at risk from impact by machinery or high sided vehicles.
- Where possible removal of vegetation would be timed to avoid the bird breeding season (March to August inclusive). Where tree or scrub removal during the breeding season is unavoidable, a check by the ECoW would be undertaken immediately prior to habitat removal to confirm that there are no occupied nests. Should any occupied nests be identified, an appropriate buffer zone (determined on the basis of the species concerned and the location of the nest in the context of the surrounding vegetation, but no less than 5m) would be implemented until the chicks have fledged.

46. For trees in which bat roosts have been identified or which are identified as having bat roost potential, then the measures set out in section 9.7 would be followed.

### 6.7.3 Post Construction

47. Post-construction the following measures will be taken:

- Where compliant with landscape objectives, replanting would be on a one for one basis with native species, preferably of local origin.
- If required, drawings shall be produced to show where replacements for trees lost within the onshore cable route shall be provided to reflect and maintain local landscape character. This would also include details of species. Where possible trees would be replanted in the appropriate season.
- The mitigation strategy, if required, for the loss of any veteran trees or trees with veteran characteristics, would be implemented.
- Where possible, the location of pre- and post-construction land drains would also be adjusted to avoid or minimise damage to tree roots.
- To ensure development of the planting to a satisfactory standard, there will be an agreed procedure for joint annual inspection of all planting areas by representatives of the relevant Local Authorities and Norfolk Vanguard

Limited at the end of each growing season and for each year of the aftercare period, (five years at the substation and along the onshore cable route) following implementation. Areas found not to be thriving should be treated to such additional works as are required to rectify the situation within the next growing season.

- Any tree or shrub planted as part of an approved Landscape Management Scheme that, within the first five years of the aftercare period, is removed, dies or becomes, in the opinion of the relevant Local Authorities, seriously damaged or diseased, must be replaced in the first available planting season with a specimen of the same species and size as that originally planted, unless otherwise agreed in writing by the relevant Local Authorities.
- Suspension of the aftercare period for any part of the scheme at the substation and the onshore cable route may occur in the event that in the opinion of the relevant Local Planning Authorities there was a significant failure of the planting scheme that could not be satisfactorily remedied in the following planting season, and or part of the planting scheme was failing to progress to the extent that it would not achieve the objectives of the scheme within the specified aftercare period.

# 7 STATUTORY DESIGNATED SITES

## 7.1 Norfolk Valley Fens SAC and Booton Common SSSI

### 7.1.1 Baseline

48. The Norfolk Valley Fens has been designated as a Special Area of Conservation (SAC). The primary reason for the selection of this site are alkaline fens (Annex I habitat). The Annex II species which are also the primary reason for selection of this site include narrow-mouthed whorl snail *Vertigo angustior* and Desmoulin's whorl snail *Vertigo moulinsiana*. There are several other Annex I habitats present as qualifying features which are not primary reasons for the selection of the site.

### 7.1.2 Embedded Mitigation

49. Constraints mapping was undertaken prior to the publication of the Norfolk Vanguard EIA Scoping Report (Royal HaskoningDHV, 2016). This constraints mapping exercise was used to determine site selection for the onshore project area. The following ecological receptors were considered as part of the constraints mapping process:

- International designated sites for nature conservation (SAC, SPA, Ramsar sites);
- National designated sites for nature conservation (The Broads National Park, SSSI, NNR, LNR); and
- Ancient woodland.

50. These ecological receptors have been avoided during the onshore project area site selection process.

### 7.1.3 Additional Mitigation

51. A scheme and programme for each watercourse crossing, diversion and reinstatement, which will include site specific details regarding sediment management and pollution prevention measures will be developed in advance of construction. This scheme will be submitted to and, approved by the relevant planning authority in consultation with Natural England, Norfolk County Council, the Environment Agency and relevant drainage authorities. This commitment is secured through Requirement 25 (Watercourse Crossings) of the DCO.~~There are no additional mitigation measures proposed for this site~~.

## 7.2 River Wensum SAC and SSSI

### 7.2.1 Baseline

52. The River Wensum has been designated as a SAC. The Annex I habitats which are a primary reason for the selection of this site are watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. The Annex II species that are a primary reason for the selection of this site are white-clawed (or Atlantic stream) crayfish. There are other Annex II species present as qualifying features which are not the primary reason for selection of the site.

53. The River Wensum is also designated as a Site of Special Scientific Interest (SSSI). It has been selected as one of a national series of rivers of special interest as an example of an enriched, calcareous lowland river.

54. Due to the sensitivity of the SAC, there is the potential for water quality impacts related to surface water drainage and soil management during construction.

### 7.2.2 Embedded Mitigation

55. As part of the embedded mitigation, the River Wensum will be crossed using trenchless crossing techniques (e.g. HDD), in order to minimise direct impacts upon this site and the habitats/species for which it is designated.

### 7.2.3 Additional Mitigation

#### 7.2.3.1 Pre-Construction

56. A pre-construction drainage plan will be developed and implemented to minimise water within the cable trench and ensure ongoing drainage of surrounding land. Where water enters the trenches during installation, this will be pumped via settling tanks or ponds to remove sediment, before being discharged into local ditches or drains via temporary interceptor drains in order to prevent increases in fine sediment supply to the watercourses. Further information is provided in Chapter 20 Water Resources and Flood Risk.

#### 7.2.3.2 During Construction

57. Best practice topsoil management practices will be followed. For the duct installation works, topsoil will be stripped, stored and capped to minimise water erosion within the easement whilst works are conducted. The practices to be followed will be detailed in a Construction Code of Practice (CoCP), an outline draft of which has been submitted as part of the application (document reference 8.1).

58. Existing tracks and roadways will be utilised for access where possible. Where temporary accesses are needed, topsoil and surface water management measures will be employed as defined in the Surface Water Drainage Plan provided with the CoCP, an outline draft of which has been submitted as part of the application.

59. Geotextile, or other suitable material, will be used to allow the safe storage and movement of vehicles within the area, maintain required drainage, and prevent soil erosion and increased surface runoff.

60. The working methodology will follow construction industry good practice guidance, as detailed in the Environment Agency's Pollution Prevention Guidance (PPG) notes (including PPG01, PPG05, PPG08 and PPG21), and CIRIA's 'Control of water pollution from construction sites – A guide to good practice' (2001), such as having spill kits on site at all times, checking equipment regularly to ensure leakages do not occur, and limiting refuelling of construction plant to designated impermeable areas.

61. The project is aiming for a construction scenario whereby construction works within the River Wensum floodplain (i.e. land north of Penny Spot Beck) are not required, and a trenchless crossing technique (e.g. HDD) at the River Wensum would run beneath this area. However, in advance of a more detailed assessment of ground conditions, this cannot be confirmed at this stage. If land north of Penny Spot Beck within the River Wensum floodplain is used during construction, then works will take place outside of the winter period (October – February inclusive) to avoid the wettest period of the year to minimise the risk of effects on local ground conditions due to vehicle tracking.

~~61.~~62. Full details of mitigation measures in relation to sediment management (both within the functional floodplain and within the wider River Wensum catchment), pollution prevention and bentonite breakout in relation to the River Wensum are detailed in the outline CoCP (document reference 8.1) which is secured through Requirement 20 of the DCO.

## 7.3 Paston Great Barn SAC and SSSI

### 7.3.1 Baseline

~~62.~~63. The Paston Great Barn has been designated as a SAC for Annex II species Barbastelle *Barbastella barbastellus*. It is designated as a SSSI for the same reason, because it supports the only barbastelle bat maternity roost in Norfolk and is one of only three known in the UK. Paston Great Barn is located approximately 3km north of the onshore cable route.

~~63.~~64. Due to the sensitivity of the SAC, there is the potential for impacts to commuting / foraging habitats of the barbastelle maternity colony it supports during construction.

### 7.3.2 Embedded Mitigation

~~64.~~65. There will be trenchless crossing techniques (e.g. HDD) at Witton Hall Plantation along Old Hall Road (deciduous woodland habitat) in order to minimise impacts upon the woodland habitat and the sensitive ecological features it supports.

### 7.3.3 Additional Mitigation

#### 7.3.3.1 Pre-Construction

~~65.~~66. Pre-construction bat activity surveys will be undertaken at the hedgerow along North Walsham Road from Edingthorpe Green to Edingthorpe Heath and at two hedgerows between Witton and North Walsham Road to provide full baseline data for these features. These pre-construction surveys will be carried at the optimum time of the year.

67. Hedgerow removal will be programmed for winter (November to February) where possible, to allow bats time to adjust to the change prior to their maternity period. Hedgerows will be removed as close to the onset of works as possible, and works will not commence after nights of poor weather (in case of bad weather roosts being used).

68. A Hedgerow Mitigation Plan will be developed in consultation with Natural England prior to the removal of hedgerows. This mitigation plan will be included within the Ecological Management Plan, secured through Requirement 24 of the DCO~~)~~. This mitigation plan will detail the reinstatement approach for hedgerows removed during construction and the monitoring and maintenance requirements following hedgerow planting. The mitigation plan for hedgerows associated with Paston Great Barn SAC will allow for hedges 25m either side of the section to be removed left to become overgrown prior to construction (subject to landowner agreement) in order to improve the quality of the surrounding hedgerow as a resource for commuting and foraging bats; in addition monitoring of replacement hedgerows should be in place for 7 years or until the original hedgerow has recovered fully.

~~66.~~69. During detailed project design undertaken post-consent, Norfolk Vanguard will seek to avoid mature trees within hedgerows through the micro-siting of individual cables, in order to retain as many mature trees as possible given the benefits they provide within linear commuting / foraging features (following Boughley et al., 2011).

#### 7.3.3.2 Post-Construction

~~67.~~70. Subject to landowner permissions prior to construction, the six hedgerows that are important for foraging and commuting bats would be left to become overgrown either side of the section to be removed prior to construction. Hedgerows would be allowed to become overgrown within the onshore cable route width, therefore at each hedgerow a total of up to 25m will be left to become overgrown in this manner. This would be undertaken to improve the quality of the surrounding hedgerow as a resource for commuting and foraging bats (Bates, 2010).

~~68.~~71. Replanting will where possible follow in the first winter after construction (with the exception of the 6m gap required for the running track, which will be replanted following the cable pull phase where required) (BCT, 2012). Replanting will follow guidance within the Norfolk hedgerow BAP and will include appropriate species for north-east Norfolk (NBP, 2009), including ground flora planting designed to encourage insect biomass (BCT, 2012). Future hedgerow management to include allowing standard trees to develop to improve quality of the hedgerow as a foraging resource. Hedges will be double-planted with 2m grassland strips on both sides so there is always a leeward side to forage.

## 7.4 Dillington Carr, Gressenhall SSSI

### 7.4.1 Baseline

~~69.~~72. The Dillington Carr is designated as a SSSI and is an extensive area of carr woodland and open water occupying the valley floor and sides of a small tributary of the River Wensum. It is located approximately 550m downstream of the cable route on the Wendling Beck watercourse. The site includes sump alder and extensive stands of the nationally rare lowland bird cherry alder woodland.

~~70.~~73. Due to the sensitivity of the SSSI, there is the potential for water quality impacts related to surface water drainage and soil management during construction.

### 7.4.2 Embedded Mitigation

~~71.~~74. This site has been avoided during the onshore project area route selection process.

~~72.~~75. As part of the embedded mitigation, the Wendling Beck will be crossed using trenchless crossing techniques (e.g. HDD), in order to minimise direct impacts upon this site and the habitats/species for which it is designated.

### 7.4.3 Additional Mitigation

~~73.~~76. The mitigation measures outlined with respect to the River Wensum would be applied for all works at the trenchless crossing zone at Wendling Beck and are considered suitable for minimising the risk of sediment / pollutant release into the Wendling Beck (see section 7.2.3).

## 7.5 Pigney's Wood LNR

### 7.5.1 Baseline

~~74.~~77. Pigney's Wood LNR is a woodland site with reedbeds, a scrape, and wildflowers, butterflies, trees and birds.

~~75.~~78. Due to the sensitivity of the LNR, there is the potential for indirect impacts arising from disturbance effects generated during construction.

### 7.5.2 Embedded Mitigation

~~76.~~79. General embedded mitigation measures will apply as shown in Table 1.

### 7.5.3 Additional Mitigation

~~77.~~80. No additional mitigation is proposed.

## 7.6 Other statutory designated sites

~~78.~~81. The following statutory designated sites for nature conservation are located within 2km of the onshore project area:

- Beetley & Hoe Meadows SSSI
- Dereham Rush Meadow SSSI
- Foxley Wood SSSI, NNR
- East Ruston Common SSSI
- Holly Farm Meadow, Wendling SSSI
- Honeypot Wood, Wendling SSSI.
- Whitwell Common SSSI
- Bryant's Heath Felmingham SSSI
- Cawston and Marsham Heaths SSSI
- Felmingham Cutting LNR
- Knapton Cutting LNR

~~79.~~82. These sites have all been avoided during the onshore project area site selection process.

~~80.~~83. General embedded mitigation measures will apply as shown in Table 1.

## 7.7 Ancient Woodlands

### 7.7.1 Baseline

~~81.~~84. There are eight ancient woodlands located within 500m of the onshore cable route:

- Old Lane Carr (330m south of the onshore cable route);
- Bacton Wood (180m south of the onshore cable route);
- The Leaselands (30m west of the onshore cable route);
- Sparham Grove (450m east of the onshore cable route);
- Old Carr (Dillington) (adjacent to the onshore cable route);
- North Grove (130m west of the onshore cable route);
- Great Wood (250m south of the onshore cable route); and
- Necton Wood (adjacent to the onshore cable route).

~~82.~~85. Due to the sensitivity of these sites, there is the potential for indirect impacts of severance of connecting habitats between ancient woodland sites during construction.

### 7.7.2 Embedded Mitigation

~~83.~~86. The onshore cable route will not encroach to within 15m of the above woodlands.

~~84.~~87. All ancient woodlands have been avoided during the onshore project area route selection process, either through route selection or through the use of trenchless techniques.

~~85.~~88. General embedded mitigation measures will apply as shown in Table 1.

### 7.7.3 Additional Mitigation

#### 7.7.3.1 Pre- and Post–Construction

~~86.~~89. The mitigation measures listed under Paston Great Barn SAC and SSSI will also be applied to the two species-rich hedgerows between Necton Wood and Great Wood, to mitigate for impacts to connectivity between these ancient woodlands.

#### 7.7.3.2 Post-Construction

~~87.~~90. The landscaping proposals described in Chapter 29 Landscape and Visual Impact Assessment have been designed to ensure that any ecological connections severed by construction of the substation are recreated to ensure that ecological corridors connect Necton Wood to other woodlands to the east and south.

# 8 NON-STATUTORY DESIGNATED SITES

## 8.1 County Wildlife Sites and Roadside Nature Reserves

### 8.1.1 Baseline

~~88.~~91. There is a total of 95 non-statutory designated sites (CWS) and Roadside Nature Reserves (RNR) within and up to 2km of the designated sites study area. Five of these sites are located directly within the onshore project area. These sites are Wendling Carr CWS (CWS no. 1013), Little Wood CWS (CWS no. 2024), Land South of Dillington Carr CWS (CWS no. 1025), Marriott's Way CWS (CWS no. 2176) (crossed twice) and Paston Way and Knapton Cutting CWS (CWS no. 1175). In addition, there is a proposed CWS which, if it is designated, will be located within the onshore project area at Kerdiston between Kerdiston Hall and the Marriott's Way ('Kerdiston Old Hall Meadows').

~~89.~~92. There is potential for direct loss of these sites, and due to the sensitivity of these sites, there is the potential for indirect impacts arising from noise and dust emissions during construction.

### 8.1.2 Embedded Mitigation

~~90.~~93. In response to comments from stakeholders, raised in response to the PEIR as part of the EPP, Norfolk Vanguard is now proposing to use trenchless crossing techniques (e.g. HDD) at all CWS and proposed CWS crossed by the onshore project area in order to minimise the impacts upon the habitats contained within these sites. This includes proposed trenchless crossing techniques (e.g. HDD) at the following locations:

- Wendling Carr CWS (CWS no. 1013);
- Little Wood CWS (CWS no. 2024),
- Land South of Dillington Carr CWS (CWS no. 1025),
- Kerdiston proposed CWS (no CWS number);
- Marriott's Way CWS (CWS no. 2176) (in two locations); and
- Paston Way and Knapton Cutting CWS (CWS no. 1175).

~~91.~~94. At five of these six locations, no works will be undertaken within the CWS boundary. At one location, Wendling Carr CWS, a running track will be required to pass through the CWS in order for the trenchless crossing works to take place. This will be a 6m by up to 180m road located within the CWS.

### 8.1.3 Additional Mitigation

#### 8.1.3.1 Pre-construction

~~92.~~95. Following advice received by Norfolk Wildlife Trust (NWT) during the EPP, the management proposals for Wendling Carr CWS have been taken into account when considering mitigation. The management proposals for the site state that control of the young (pioneer) species of the broadleaved woodland parcel on the site should be prevented from establishing within the grazed meadow where possible. Methods other than grazing should be used to achieve this.

~~93.~~96. A pre-construction botanical survey of Wendling Carr CWS will be undertaken at the optimum time of the year. Following the botanical survey and consultation with NWT, if required manual clearance of any pioneer woodland species establishing themselves within the meadow would be undertaken within the grazed meadow prior to construction of the running track.

#### 8.1.3.2 During construction

~~94.~~97. Best practice construction mitigation measures would be in place to minimise dust and noise emissions during construction. These will be captured within the CoCP, an outline draft of which has been submitted as part of the application (document reference 8.1).

# 9 HABITATS AND SPECIES

## 9.1 Woodland

### 9.1.1 Baseline

~~95.~~98. A detailed baseline relating to woodland is provided in Chapter 22 Onshore Ecology of the ES, section 22.6.3.1. In summary, there is approximately 8.8ha of woodland habitat located within the onshore project area (1.9% of the onshore project area), the majority of which comprises broadleaved and coniferous plantation woodland and broadleaved semi-natural woodland, with several UKHPI woodland habitats. Isolated trees were located throughout the habitats and species study area. Two veteran trees were noted during the 2017 field survey. Neither will be lost during the project construction phase.

~~96.~~99. There is the potential for direct loss of this habitat during construction.

### 9.1.2 Embedded Mitigation

~~97.~~100. Areas of woodland have been avoided where possible during the site selection process.

~~98.~~101. Trenchless crossing techniques (e.g. HDD) are proposed to be used where possible at any areas of mixed lowland deciduous woodland which cannot be avoided during route selection. This includes woodland at the following locations:

- Witton Hall Plantation along Old Hall Road;
- King's Beck; and
- Old Carr (Dillington).

### 9.1.3 Additional Mitigation

#### 9.1.3.1 Pre-construction survey

~~99.~~102. A pre-construction walkover survey would be undertaken by an appropriately experienced arboriculturalist. This survey would define specific mitigation measures to protect trees situated adjacent to the onshore cable route working width, including defining root protection areas. The arboricultural report would be submitted to and approved by the local authority prior to the commencement of any construction works. In addition, the following mitigation measures would also be undertaken:

- The roots of retained trees along the edge of the working width would be protected from soil compaction by the enforcement of Root Protection Areas that would be fenced off from the construction (the extent of which would be calculated using guidance from BS5837: 2012);
- Facilitation pruning may be recommended where tree crowns are at risk from impact by machinery or high sided vehicles;
- Where possible, removal of vegetation would be timed to avoid the bird breeding season (March to October inclusive); and
- If bat roosts are found in the trees then the measures set out for bat mitigation would be followed.

## 9.2 Hedgerows

### 9.2.1 Baseline

~~100.~~103. A detailed baseline relating to hedgerows is provided in Chapter 22 Onshore Ecology of the ES, section 22.6.3.4. Hedgerows are both UKHPI and Norfolk LBAP priority habitats. There were 110 hedgerows located within the surveyed sections of the onshore project area. An additional 55 hedgerows were identified within the unsurveyed areas from the Norfolk 'Living Map', totalling approximately 3.3km in length of hedgerow in total. Out of the 110 surveyed hedgerows, there were 58 species-rich hedgerows and 52 species poor.

### 9.2.2 Embedded Mitigation

~~101.~~104. The number of hedgerow crossings has been minimised as far as possible, taking other fixed constraints into account. When crossing hedgerows, the width of the cable easement will be reduced to the running track and cable trenches only to minimise the amount of hedgerow removal. The working width at hedgerow crossings has been reduced from ~~54m~~ 45m to 20m.

~~102.~~105. Where hedgerow gaps are required beyond the two-year duct installation phase (i.e. for the duration of the subsequent two-year cable pull phase), the number of gaps required will be minimised as far as possible and the retained gap will be no wider than 6m.

### 9.2.3 Additional Mitigation

#### 9.2.3.1 Pre-construction

~~103.~~106. All unsurveyed hedgerows within the onshore project area will be subject to a hedgerow survey prior to construction at the optimum time of the year.

~~104.~~107. During detailed project design, Norfolk Vanguard Limited will seek to avoid mature trees within hedgerows through the micro-siting of individual cables, in order to retain as many mature trees as possible.

108. Hedgerow removal will be undertaken outside of the bird nesting season whenever possible (which is typically from March to August, although can commence earlier or later depending on the weather conditions). Hedgerows will be reinstated during early winter where possible when they have the greatest chance of taking root.

~~105.~~109. A Hedgerow Mitigation Plan will be developed in consultation with Natural England prior to the removal of hedgerows. This mitigation plan will be included within the Ecological Management Plan, secured through Requirement 24 of the DCO~~)~~. This mitigation plan will detail the reinstatement approach for hedgerows removed during construction and the monitoring and maintenance requirements following hedgerow planting.

#### 9.2.3.2 Post construction

~~106.~~110. Hedgerows which are temporarily removed to enable the project will be reinstated where possible. Replanting of all except the 6m gap required for the running track, where required, will where possible follow in the first winter after completion of the duct installation phase works (the 6m gap will be replanted following the cable pull phase). Replanting will follow guidance within the Norfolk hedgerow BAP, i.e. species composition for north-east Norfolk (if on an existing line, and that line is straight: mostly hawthorn, with blackthorn, field maple; if curving or on a roadside or parish boundary: hawthorn, with blackthorn, field maple and occasional crab apple, hazel, spindle, ash and holly) (NBP, 2009). Ground flora planting designed to encourage insect biomass will be included (BCT, 2012). Where possible, future hedgerow management will include allowing standard trees to develop and hedges will be double-planted with 2m grassland strips on both sides so there is always a leeward side to forage.

~~107.~~111. The landscaping proposals described in Section 6 have been designed to ensure that new planting is created to compensate for the permanent loss of species-rich hedgerow at the onshore project substation. New hedgerow is proposed along the western margin of onshore project substation, and existing hedgerow will be enhanced with adjacent woodland and species-rich grassland planting. Please see Section 6 for full details of the proposed landscape mitigation planting.

## 9.3 Grassland

### 9.3.1 Baseline

~~108.~~112. A detailed baseline is provided in Chapter 22 Onshore Ecology, section 22.6.3.5. There were no areas of unimproved, semi-improved or species rich grasslands in the habitats and species study area recorded in the 2017 Extended Phase 1 Habitat Survey. However, there was one area of semi-improved grassland identified within the unsurveyed areas from the Norfolk 'Living Map'. Six locations of marshy grassland were recorded within the onshore project area, covering an area of 8.1ha (1.7% of the onshore project area). There were three areas of marshy grassland classified as coastal and floodplain grazing march, which is a UKHPI and Norfolk LBAP priority habitat. There were 11 separate locations within the onshore project area of improved grassland subject to regular grazing, totalling approximately 1.8% of the onshore project area. There were localised areas of tall ruderal habitat recorded during the 2017 Extended Phase 1 Habitat Survey. Lowland fen (UKHPI and Norfolk Biodiversity Action Plan (BAP) priority habitat) was noted within the habitats and species study area.

~~109.~~113. There is the potential for direct loss of this habitat during construction.

### 9.3.2 Embedded Mitigation

~~110.~~114. There are no specific embedded mitigation measures for grasslands, however the general embedded mitigation measures will apply, as shown in Table 1.

### 9.3.3 Additional Mitigation

#### 9.3.3.1 Pre-construction

~~111.~~115. All unsurveyed areas within the onshore project area will be subject to an Extended Phase 1 Habitat Survey prior to construction at the optimum time of the year.

#### 9.3.3.2 During construction

~~112.~~116. The mitigation measures set out with respect to the River Wensum SAC and SSSI will be adhered to during all works undertaken within the UKHPI coastal and floodplain grazing marsh. These measures are good construction working practices.

#### 9.3.3.3 Post construction

~~113.~~117. All grassland habitats will be reinstated following the completion of works (either following completion of duct installation phase or following completion of cable pull phase where relevant), including UKHPI coastal and floodplain grazing marsh. Reinstatement of these grasslands will be by natural regeneration following demobilisation.

## 9.4 Watercourses and Ponds

### 9.4.1 Baseline

~~114.~~118. A detailed baseline for watercourses and ponds can be found in Chapter 22 Onshore Ecology, sections 22.6.3.10 and 22.6.3.11. There is a total of 206 standing water bodies, i.e. ponds, lakes and selected ditched located within the great crested newt study area, of which six are located within the onshore project area, of which five will be lost during construction. Ponds are a UKHPI and Norfolk LBAP priority habitat. There are five main rivers located within the habitats and species study area, and additional minor watercourses and field drains. Rivers are a UKHPI, but not a Norfolk LBAP priority habitat.

~~115.~~119. There is the potential for direct impacts to this habitat during construction.

### 9.4.2 Embedded Mitigation

~~116.~~120. Main rivers have been avoided where possible during the site selection process.

~~117.~~121. Trenchless crossing techniques (e.g. HDD) are proposed to be used to cross the following locations:

- River Wensum;
- River Bure;
- King's Beck;
- Wendling Beck; and
- North Walsham and Dilham Canal.

~~118.~~122. Standing water bodies have been avoided where possible during the site selection process.

### 9.4.3 Additional Mitigation

#### 9.4.3.1 Pre-construction

~~119.~~123. All unsurveyed areas within the onshore project area will be subject to an Extended Phase 1 Habitat Survey prior to construction at the optimum time of the year.

~~120.~~124. Pre-construction mitigation for great crested newts will be adhered to in all locations where pond removal is required. Please refer to section 9.10 for a description of the mitigation for great crested newts.

~~121.~~125. The locations of all arable field margins identified during the 2017 Extended Phase 1 Habitat Surveys or during post-consent surveys of the unsurveyed areas will be recorded, to inform reinstatement.

#### 9.4.3.2 During construction

~~122.~~126. Best practice sediment management and pollution prevention measures will be employed when working adjacent to watercourses and will be provided in the Site and Excavated Waste Management Plan (SWMP) and Code of Construction Practice (DCO requirement 20). These measures are set out in section 7.2.

#### 9.4.3.3 Post construction

~~123.~~127. All pond habitats will be reinstated as far as possible following the completion of works (either following completion of duct installation phase or following completion of cable pull phase where relevant). All pond restoration will follow the guidelines set out in the Norfolk Ponds BAP (NBP, 2010). Where possible, Norfolk Vanguard Limited will also consider recreating a greater number of ponds than is lost during project construction (five) or restoring new ponds outside the onshore project area (see section 9.10).

## 9.5 Arable Land

### 9.5.1 Baseline

~~124.~~128. A detailed baseline of arable land is found in Chapter 22 Onshore Ecology, section 22.6.3.13.1. Arable land is the largest habitat by area, covering 405.7ha, and equates to approximately 87% of the habitats and species study area. Although comprising small parcels of land within the onshore project area only, it should be noted that arable field margins are a UKHPI and Norfolk LBAP priority habitat.

~~125.~~129. There is the potential for direct loss of arable field margin habitat during construction.

### 9.5.2 Embedded Mitigation

~~126.~~130. There are no specific embedded mitigation measures for arable land, however the general embedded mitigation measures will apply, as shown in Table 1.

### 9.5.3 Additional Mitigation

#### 9.5.3.1 Pre-construction

~~127.~~131. All unsurveyed areas within the onshore project area will be subject to an Extended Phase 1 Habitat Survey prior to construction.

#### 9.5.3.2 Post construction

~~128.~~132. All arable field margin habitat within the onshore project area will be reinstated post-construction (either following completion of duct installation phase or following completion of cable pull phase where relevant).

## 9.6 Badgers

### 9.6.1 Baseline

~~129.~~133. A detailed baseline for badgers is found in Chapter 22 Onshore Ecology, section 22.6.5.1.1. Badgers are protected under the Protection of Badgers Act 1992. [redacted] The 2017 field survey found no active setts within the onshore project area, but [redacted] A further [redacted]. Approximately 50% of the survey area has not been surveyed for badgers as landowner access could not be agreed.

~~130.~~134. There is the potential for disturbance of this species during construction.

### 9.6.2 Embedded Mitigation

~~131.~~135. Key habitats for badger setts (woodland) have been avoided where possible during site selection. The length of hedgerows to be removed during

construction, another key habitat for badger setts, has been reduced to a maximum of 20m at any one location.

~~132.~~136. General embedded mitigation measures will apply, as shown in Table 1.

### 9.6.3 Additional Mitigation

#### 9.6.3.1 Pre-construction

~~133.~~137. Approximately 50% of the habitat and species study area and 50% of the National Grid substation area has not been surveyed for badgers. For all unsurveyed areas of the onshore cable route, a full badger survey will be undertaken to search for field signs of badgers within the habitat and species study area.

~~134.~~138. If ~~main setts~~active setts (of any category) are found within the onshore project area, they would need to be closed and destroyed. This would require the preparation and submission of a licence application to Natural England and would follow their Standing Advice (Natural England, 2015a) on sett closure and destruction. An artificial sett would also be required for all main setts that are to be closed and destroyed.

~~135.~~139. The exact details of sett closure would be agreed in advance with Natural England through the licensing process and would follow Natural England's Standing Advice (Natural England, 2015a) on sett closure and destruction.

~~136.~~140. A pre-construction badger survey of all active badger setts (of any category) found within the habitat and species study area will be undertaken in advance of construction to ensure that the location of setts has not changed. If setts have now moved closer to the onshore project area, a suitably qualified ecologist would review the situation and a disturbance licence may be required (or alternatively works under a badger class licence). The details of this licence would need to be agreed with Natural England in advance of the proposed works.

#### 9.6.3.2 During construction

~~137.~~141. In order to minimise the potential disturbance effects on badger during the construction phase, mitigation measures will be agreed in advance of any works within 30m of an active badger sett (following Natural England's Standing Advice on the impact of development on badgers (Natural England, 2015a; English Nature, 2002), which will include consideration of habitat manipulation, buffer zones for different construction activities within 30m of known badger setts, timing of construction works and construction lighting.

~~138.~~142. Adherence to mitigation measures agreed in advance with Natural England would be considered sufficient that a licence to disturb a badger sett will not be required.

#### 9.6.3.3 Post-construction

~~139.~~143. All hedgerow habitat removed will be reinstated in line with the Norfolk Hedgerow BAP (NBP, 2009).

## 9.7 Bats

### 9.7.1 Baseline

~~140.~~144. A detailed baseline for bats is found in Chapter 22 Onshore Ecology, section 22.6.5.2.1. There are records of nine species of bat within 5km of the onshore project area as held by NBIS and NBSG. NBSG also hold records of 29 bat roosts located within 5km of the onshore project area, including the Paston Great Barn and Old Hills Wood barbastelle maternity colonies. However, none of these bat roosts are located within the habitat and species study area. The 2017 Extended Phase 1 Habitat Survey found that 28 trees and structures located within the habitat and species study area were assessed as providing moderate suitability for roosting bats, however bat emergency / re-entry surveys recorded no roosts present within these trees and structures located within the onshore project area, and three roosts present within trees and structures located within the wider habitat and species study area. Linear features (hedgerows and watercourses) were assessed for their suitability to support foraging bats, it was found that 58 provide moderate or high suitability.

~~141.~~145. Within the unsurveyed areas of the onshore project area, approximately 55 linear features were identified by the Norfolk Living Map and aerial photography for their potential suitability to support commuting or foraging bats. Nine trees and structures were not surveyed during the 2017 Bat Activity Survey. A further eight areas within the unsurveyed areas of the habitat and species study area were identified by the Norfolk Living Map and aerial photography as potentially containing additional trees which may be suitable to support roosting bats.

~~142.~~146. There is the potential for habitat loss for and disturbance of this species during construction.

### 9.7.2 Embedded Mitigation

~~143.~~147. Key habitats for roosting bats (woodland) have been avoided where possible during site selection. Watercourses, key habitats for commuting and foraging bats, have been avoided through site selection where possible, or through the use of trenchless techniques. The length of hedgerows to be removed for construction, a key habitat for commuting and foraging bats, has been reduced to a maximum of 20m at any one location.

~~144.~~148. General embedded mitigation measures will apply, as shown in Table 1.

### 9.7.3 Additional Mitigation

#### 9.7.3.1 Pre-construction

~~145.~~149. Nine trees and structures were not surveyed during the 2017 bat emergence / re-entry survey and therefore they will need to be surveyed during the post-consent survey effort to confirm whether they support roosting bats. These surveys will be conducted at the optimum time of the year.

~~146.~~150. If bats or signs of bats are found in any of the features, appropriate mitigation measures would be developed adhering to Natural England Standing Advice (Natural England, 2015b), which may include blocking up features, soft felling and timing of works. A European Protected Species (EPS) licence may be necessary to work on or remove the trees.

~~147.~~151. The three trees which support bats roosts located within the habitat and species study area will be subject to the following mitigation measures to ensure that the construction works do not affect tree health and risk the existence of these roosts:

- A tree survey of the trees will be undertaken prior to works;
- The trees' root protection areas (RPA) will be calculated and no works will take place within the trees' RPA.

~~148.~~152. Hedgerow removal will be programmed for winter (November to February) where possible, to give bats time to adjust to the change prior to their maternity period. Hedgerows will be removed as close to the onset of works as possible, and unless unavoidable works will not commence after nights of poor weather (in case of bad weather roosts being used).

153. Subject to landowner permissions, the ~~six~~ 16 hedgerows that are important for foraging and commuting bats of the Paston Great Barn / Old Hills Wood maternity colonies would be left to become overgrown either side of the section

to be removed prior to construction. Hedgerows would be allowed to become overgrown within the onshore cable route width, therefore at each hedgerow a total of up to 25m will be left to become overgrown in this manner. This would be undertaken to improve the quality of the surrounding hedgerow as a resource for commuting and foraging bats (Bates, 2010).

~~149.~~154. A Hedgerow Mitigation Plan will be developed in consultation with Natural England prior to the removal of hedgerows. This mitigation plan will be included within the Ecological Management Plan, secured through Requirement 24 of the DCO. This mitigation plan will detail the reinstatement approach for hedgerows removed during construction and the monitoring and maintenance requirements following hedgerow planting.

#### 9.7.3.2 During construction

~~150.~~155. Where possible, Norfolk Vanguard Limited will seek to avoid mature trees within hedgerows through the micro-siting of individual cables, in order to retain as many mature trees as possible given the benefits they provide within linear commuting / foraging features (following Boughley et al., 2011).

~~151.~~156. To avoid indirect effects arising from the construction phase works, the following mitigation measures will be adhered to:

- Construction phase lighting will be used between 7am-7pm in low light conditions, with lower-level security lighting outside of these times; and
- All temporary lighting to be designed in line with the BCT *Bats and Lighting in the UK* guidance (2009). This will include the use of directional lighting during construction.

#### 9.7.3.3 Post construction

~~152.~~157. Hedgerow replanting will where possible follow in the first winter after construction, with the exception of the 6m gap required for the running track (BCT, 2012). Replanting will follow guidance within the Norfolk hedgerow BAP and will include appropriate species for north-east Norfolk (NBP, 2009), including ground flora planting designed to encourage insect biomass (BCT, 2012). Future hedgerow management to include allowing standard trees to develop to improve quality of the hedgerow as a foraging resource. Hedges will be double-planted with 2m grassland strips on both sides so there is always a leeward side to forage.

~~153.~~158. Mitigation planting at the onshore project substation has been designed to replace and improve all ecological connections currently located within the

onshore project substation footprint. This includes creation of new woodland strips connecting the commuting / foraging resources severed by the construction phase works. The location of this mitigation planting is described in more detail in section 6.

## 9.8 Water Voles

### 9.8.1 Baseline

~~154.~~159. Full details of the baseline for water voles are found in Chapter 22 Onshore Ecology of the ES, section 22.6.5.3.1. Water voles are protected under the Wildlife and Countryside Act 1981 (as amended) and are a Norfolk LBAP priority habitat. 21 watercourses fell within the refined habitat and species study area. A presence/ absence study was undertaken for 19 of these watercourses (the other two were inaccessible at the time). This study recorded water voles being present within six of these, five of which were located within the onshore project area. A high population density of water voles was recorded in one watercourse, the River Wensum.

~~155.~~160. A further eight watercourses were identified within the unsurveyed areas using the Norfolk Living Map as suitable for the water vole.

~~156.~~161. There is the potential for habitat loss for and disturbance of this species during construction.

### 9.8.2 Embedded Mitigation

~~157.~~162. Trenchless crossing techniques (e.g. HDD) are proposed to be used to cross three of the five watercourses where water voles have been recorded; the River Wensum, the River Bure and the Wendling Beck at Dillington. General embedded mitigation measures also apply, as shown in Table 1.

### 9.8.3 Additional Mitigation

#### 9.8.3.1 Pre-construction

~~158.~~163. A pre-construction survey of the two inaccessible watercourses plus the potential additional eight watercourses located within the unsurveyed areas will be undertaken post-consent, at the optimum time of the year.

~~159.~~164. For all watercourses where signs of water vole activity are found during the surveys, the mitigation set out below will be adhered to.

~~160.~~165. A pre-construction survey will be undertaken of all watercourses suitable for supporting water voles prior to work to confirm the current distribution of water voles within the habitat and species study area.

~~161.~~166. For works at watercourses WV14 and WV15 (both Penny Spot Beck) (see Figure 22.7, Chapter 22 Onshore Ecology), displacement under licence of the width of the cable route (i.e. 45m) will be conducted prior to works. Displacement will follow the protocol set out in Appendix 1 of the Water Vole Mitigation Handbook (2016).

~~162.~~167. For works to habitats immediately adjacent to WV05 (see Figure 22.7, Chapter 22 Onshore Ecology), if no field signs of water voles are found within 50m of the proposed works during the pre-construction survey, no further mitigation is required.

#### 9.8.3.2 Post construction

~~163.~~168. Habitats will be fully reinstated following duct installation phase works. The guidelines for habitat restoration set out in Water Vole Mitigation Handbook (2016) will be adhered to.

~~164.~~169. Monitoring will be undertaken to determine the status of the water vole population during the breeding season one year after completion of construction.

## 9.9 Otter

### 9.9.1 Baseline

~~165.~~170. Full baseline information for otter is presented in Chapter 22 Onshore Ecology of the ES, section 22.6.5.4. Otter are an EPS and Norfolk LBAP priority species. NBIS holds two records for otter within 2km of the onshore project area. Seven of 21 watercourses accessed within the habitat and species study area were assessed as being suitable for commuting and foraging otter during the 2017 Extended Phase 1 Habitat Survey. During the 2017 water vole survey, field signs of otter (spraints) were found in two locations within the onshore project area, Penny Spot Beck (a tributary of the River Wensum) and the River Bure. Otter have also been confirmed on the Dilham Canal upstream of the onshore project area.

~~166.~~171. There is the potential for habitat loss for and disturbance of this species during construction.

### 9.9.2 Embedded Mitigation

~~167.~~172. The seven watercourses suitable to support commuting otter will be subject to trenchless crossing techniques to avoid potential impacts at these locations.

### 9.9.3 Additional Mitigation

#### 9.9.3.1 During construction

~~168.~~173. In order to minimise the indirect effects upon otters during the construction phase, the following mitigation measures will be implemented:

- Wherever possible, night-time working near watercourses would be avoided or else minimised; and
- Exit ramps from excavations would be provided at night near watercourses with confirmed presence, so that otters can escape if they fall in.

## 9.10 Great Crested Newts

### 9.10.1 Baseline

~~169.~~174. Detailed baseline for great crested newts is found in Chapter 22 Onshore Ecology of the ES, Section 22.6.5.5. Great crested newts are an EPS and a Norfolk LBAP priority species. The 2017 surveys recorded great crested newt presence in five of the 43 water bodies surveyed. One of these is within the onshore project area. Three of them are within 250m of the cable route, and one within 500m of the substation. Approximately 40% of the water bodies located within the great crested newt study area have been surveyed to date, the remainder were inaccessible.

~~170.~~175. There is the potential for habitat loss for and disturbance of this species during construction.

### 9.10.2 Embedded Mitigation

~~171.~~176. The one water body located within the onshore project area in which great crested newts have been found will be avoided using trenchless techniques. As a consequence, this breeding pond will not be affected during the construction phase.

### 9.10.3 Additional Mitigation

#### 9.10.3.1 Pre-construction

*9.10.3.1.1 Surveyed areas*

~~172.~~177. A pre-construction presence / absence survey of all water bodies located within 250m of onshore project area and 250m of each confirmed breeding pond will be undertaken post-consent, approximately one year in advance of construction to ensure that the local great crested newt population distribution has not changed. This survey will be undertaken at the optimum time of the year. As a presence / absence survey, eDNA methods will be suitable for this survey.

*9.10.3.1.2 Unsurveyed areas*

~~173.~~178. Six waterbodies located within the onshore project area, plus 124 waterbodies located within the great crested newt study area (i.e. a total of 130 water bodies) were not surveyed during the 2017 great crested newt surveys and therefore will need to be surveyed during pre-construction surveys to confirm whether they support breeding populations of great crested newts.

~~174.~~179. Should great crested newts be found within these water bodies, then mitigation will be required. Potential mitigation measures which might be required are set out within the Norfolk Vanguard draft great crested newt mitigation licence application, which has been drafted and consulted upon with Natural England. The measures outlined within the draft licence application are in accordance with the Great Crested Newt Mitigation Guidelines (English Nature, 2001) and include:

- A capture and release programme under licence, including the use of exclusion fencing, receptor sites for translocation;
- Terrestrial and aquatic habitat reinstatement;
- Ecological supervision of the works; and
- A programme of post-construction monitoring.

~~175.~~180. Based on the draft great crested newt mitigation licence application, a Letter of No Impediment (dated 29th June 2018) has been provided confirming that Natural England see no impediment to issuing a licence in the future (following submission of a final updated application). The need for a final great crested newt mitigation licence application following post-consent surveys of the 130 unsurveyed water bodies will be agreed with Natural England via consultation post-consent. The agreed approach would be in accordance with the Great Crested Newt Mitigation Guidelines (English Nature, 2001).

#### 9.10.3.2 During construction

##### *9.10.3.2.1 Surveyed areas*

~~176.~~181. As the likelihood of encountering great crested newts during construction is low, but a risk of killing or injuring great crested newts exists, a precautionary method of working (PMoW) will be followed during the construction phase in areas within 250m of all confirmed breeding ponds (TF9614-154, TF9614-155, TG0721-256 and TF9010-50). The PMoW will be agreed with Natural England prior to construction and would include details of the locations of terrestrial habitat affected surrounding identified great crested newt breeding ponds, habitat manipulation and reinstatement required, and ecological supervision of the works.

##### *9.10.3.2.2 Unsurveyed areas*

~~177.~~182. If mitigation is required for the unsurveyed areas following receipt of the survey results these areas, this is likely to include construction mitigation including ecological supervision. The details of any construction mitigation will be agreed with Natural England through consultation post-consent.

#### 9.10.3.3 Post construction

##### *9.10.3.3.1 Surveyed areas*

~~178.~~183. Aquatic and terrestrial habitats affected would be reinstated either following completion of duct installation phase or following completion of cable pull phase where relevant.

##### *9.10.3.3.2 Unsurveyed areas*

~~179.~~184. If mitigation is required for the unsurveyed areas following receipt of the survey results for these areas, this is likely to include post-construction population monitoring. The details of any post-construction mitigation will be agreed with Natural England through consultation post-consent.

~~180.~~185. Terrestrial and aquatic habitats affected will be reinstated either following completion of duct installation phase or following completion of cable pull phase where relevant.

#### 9.10.3.4 Alternative mitigation options (for potential impacts within unsurveyed areas)

~~181.~~186. Following consultation with Natural England held in March 2018, the project has discussed retaining the option to use 'alternative' approaches to delivering great crested newt mitigation under Natural England's new licensing policies (Policies '1' and '2') which have been in place since December 2016 (Natural England, 2016). These policies allow for the opportunity to undertake

habitat creation or restoration both onsite and offsite (i.e. away from the development site boundary), subject to landowner consent, as alternative to trapping, translocating and excluding newts, provided it can be proven that this action is more likely to improve the conservation status of the species, and that other criteria set out in the policies can be met. Following these discussions, the project has included the option of using alternative approaches to delivering great crested newt mitigation under Natural England's new licensing policies alongside the 'traditional' approach outlined earlier in this section. At this stage, only the principles of such an alternative approach have been proposed. In summary, these are:

- **Breeding ponds**: Where direct impacts on confirmed breeding ponds (of any population size) are anticipated, traditional mitigation methods including fencing and trapping (ring-fencing) will be undertaken. However, rather than recreating the ponds within the onshore project area, it is proposed that habitat enhancement / pond restoration measures are undertaken within 500m of those breeding ponds affected. Further surveys will be required to support this approach.
- **Terrestrial habitats:** Where direct impacts upon terrestrial habitats are anticipated, it is recommended that unless a medium or high population has been recorded, or the pond is located within 50m of the onshore project area, exclusion fencing is not required. Where this is identified, instead habitat enhancement / pond restoration measures are undertaken within 500m of those breeding ponds affected. Further surveys will be required in order to support this approach.
- The location of all offsite mitigation will be identified in partnership with the Norfolk Ponds Project (NPP) and Norfolk Farming and Wildlife Advisory Group (Norfolk FWAG). Where habitat creation is considered, the location of 'ghost pond' sites will be considered (Alderton et al., 2017).

## 9.11 Reptiles

### 9.11.1 Baseline

~~182.~~187. There is detailed baseline information provided for reptiles in Chapter 22 Onshore Ecology of the ES, section 22.7.3.14. Reptiles are protected under the Wildlife and Countryside Act 1981 (as amended). 17 areas of suitable habitat mosaic were identified as potentially being suitable to support common species of reptiles within the onshore project area. The 2017 reptile presence / absence survey found one slow worm and two grass snakes within the onshore project area, and nine slow worm and two grass snakes within the habitat and species

study area. The Living Map dataset has identified an additional six areas of suitable habitat within the areas that were not surveyed.

~~183.~~188. There is the potential for habitat loss for and disturbance of this species during construction.

### 9.11.2 Embedded Mitigation

~~184.~~189. There is no specific embedded mitigation for reptiles, but the general embedded mitigation measures will be applied, as in Table 1.

### 9.11.3 Additional Mitigation

#### 9.11.3.1 Pre-construction

*9.11.3.1.1 Surveyed areas*

~~185.~~190. The numbers of reptiles potentially affected is small, but a risk of killing or injuring these reptiles exists. As such, a PMoW will be followed during the construction phase in those locations where reptiles have been recorded. The PMoW will be agreed with Natural England prior to construction, and will include details of pre-construction habitat manipulation, ecological supervision, and post-construction habitat reinstatement.

*9.11.3.1.2 Unsurveyed areas*

~~186.~~191. An additional six areas have been identified using the Norfolk Living Map and aerial photography, as potentially providing suitable habitat for reptiles. Two areas of habitat mosaics were identified during the 2017 Extended Phase 1 Habitat Survey, but these areas were unable to be surveyed.

~~187.~~192. If small populations of reptiles are found within the unsurveyed areas of suitable habitat mosaics, then the PMoW referred to above would also be implemented for these sites. If high populations of reptiles are found, then in addition to the adherence to the PMoW, a capture and release programme would also be implemented. The details of a capture and release programme will be drafted following the Reptile Mitigation Guidelines (Natural England, 2011) and agreed with Natural England in advance of works.

#### 9.11.3.2 During construction

~~188.~~193. The PMoW agreed with Natural England would likely include measures to be adhered to during construction, including ecological supervision. The details of this will be agreed with Natural England in advance of works.

#### 9.11.3.3 Post construction

~~189.~~194. Habitats suitable for supporting common reptiles would be fully reinstated either following completion of duct installation phase or following completion of cable pull phase where relevant.

## 9.12 White-clawed crayfish

### 9.12.1 Baseline

~~190.~~195. A detailed baseline of white-clawed crayfish is provided in Chapter 22 Onshore Ecology of the ES, Section 22.6.5.7. White-clawed crayfish are an EPS and Norfolk LBAP priority species. NBIS holds no records for white-clawed crayfish within 2km of the onshore project area. The Environment Agency indicated that white-clawed crayfish are not known to be present in any reaches located within the habitat and species study area (Environment Agency, 2017). The River Wensum and River Bure are known to support populations of white-clawed crayfish in other reaches (Environment Agency, 2017).

### 9.12.2 Embedded Mitigation

~~191.~~196. Both the River Wensum and the River Bure will be subject to trenchless crossing techniques (e.g. HDD) as part of embedded mitigation to avoid potential impacts at these locations.

### 9.12.3 Additional Mitigation

~~192.~~197. No additional mitigation is proposed.

## 9.13 Other invertebrates

### 9.13.1 Baseline

~~193.~~198. The detailed baseline for other invertebrates is found in Chapter 22 Onshore Ecology of the ES, Section 22.6.5.8. The NBIS holds records for 64 notable invertebrates within 2km of the onshore project area, including notable bee, dragonfly, butterfly, moth, cricket and beetle species. Targeted surveys of the Desmoulin's whorl snail were undertaken in the floodplain of the River Wensum (southern bank) within the habitat and species study area, however this species was not recorded during any survey. The Norfolk hawker dragonfly was recorded at one location along a drainage ditch adjacent to the River Bure during the 2017 reptile surveys. The Norfolk hawker is protected under the Wildlife and Countryside Act 1981 (as amended) and is listed as 'Endangered' in the Odonata Red Data List and is a Norfolk LBAP priority species.

~~194.~~199. There is the potential for habitat loss for and disturbance of Desmoulin's whorl snail during construction.

### 9.13.2 Embedded Mitigation

~~195.~~200. The unsurveyed areas of suitable habitat for Desmoulin's whorl snail adjacent of the River Wensum (i.e. the floodplain habitat on the northern bank) are being avoided through the use of trenchless crossing techniques, therefore direct effects will not occur. A pre-construction survey of the floodplain habitat on the northern bank of the River Wensum will still be undertaken, to understand the distribution of this species adjacent to the onshore project area.

### 9.13.3 Additional Mitigation

~~196.~~201. The mitigation measures proposed for the River Wensum SAC and SSSI will apply, as shown in section 7.2.3.

## 9.14 Fish

### 9.14.1 Baseline

~~197.~~202. A detailed baseline for fish is provided in Chapter 22 Onshore Ecology, Section 22.6.5.9 of the ES. NBIS returned no records of notable fish species within 2km of the onshore project area. The National Fish Population Database has recorded Bullhead and Brown Trout within the habitat and species study area in Wendling Beck and Penny Spot Beck and upstream and downstream of the species study area in the River Wensum and River Bure. Bullhead has also been recorded upstream of the habitats and species study area in Reepham Stream (western branch) and upstream and downstream of the habitats and species study area of King's Beck. Brown Trout is also recorded upstream and downstream of the habitats and species study area in Booton Watercourse. In addition, Brook Lamprey has been recorded upstream and downstream of the habitat and species study area in River Wensum, River Bure and King's Beck.

~~198.~~203. There is the potential for habitat loss for and disturbance of bullhead, brook lamprey and brown trout during construction.

### 9.14.2 Embedded Mitigation

~~199.~~204. There are no specific embedded mitigation measures for fish, but the general embedded mitigation measures will apply, including trenchless crossing techniques (e.g. HDD) at main rivers (see Table 1).

### 9.14.3 Additional Mitigation

#### 9.14.3.1 Pre-construction

~~200.~~205. Prior to construction, a survey of the onshore project area within Reepham Stream (eastern branch), the Reepham Stream (western branch) and Booton watercourse will be undertaken to assess the suitability of the substrate at these locations for supporting spawning bullhead and brown trout.

#### 9.14.3.2 During construction

~~201.~~206. If suitable habitat for these species is identified, appropriate mitigation (such as ecological supervision during works, timing of works to avoid sensitive seasons or micrositing) would be agreed with Natural England post-consent.

~~202.~~207. The mitigation measures proposed for the River Wensum SAC and SSSI (as shown in section 7.2.3) will applied when working adjacent to these watercourses.

## 9.15 Protected Flora

### 9.15.1 Baseline

~~203.~~208. A detailed baseline of protected flora is in Chapter 22 Onshore Ecology of the ES and Section 22.6.5.10. During the 2017 Extended Phase 1 Habitat Survey there was no evidence notable plant species. During a detailed botanical survey of the flood plain habitat adjacent to the River Wensum (within the habitat and species study area), various communities were identified but there was no evidence of species associated with the River Wensum SAC habitat.

### 9.15.2 Embedded Mitigation

~~204.~~209. The River Wensum will be crossed using trenchless crossing techniques (e.g. HDD) as part of embedded mitigation to avoid potential impacts at these locations.

### 9.15.3 Additional Mitigation

~~205.~~210. The mitigation measures proposed for the River Wensum SAC and SSSI will apply, as shown in section 7.2.3.

## 9.16 Invasive Non-Native Species

### 9.16.1 Baseline

~~206.~~211. A detailed baseline of invasive non-native species is found in Chapter 22 Onshore Ecology, Section 22.6.5.11. NBIS recorded several invasive non-native

species within 2km of the onshore project area. These included Japanese Knotweed *Fallopia japonica*, American mink *Neovison vison* and signal crayfish *Pacifastacus leniusculus*. During the Extended Phase 1 Habitat Survey Japanese Knotweed was found established in one area and there was one patch of giant hogweed. There was also a signal crayfish recorded in the River Wensum during the 2017 botanical survey within the habitat and species study area.

~~207.~~212. There is the potential to spread invasive species throughout the onshore project area during construction.

### 9.16.2 Embedded Mitigation

~~208.~~213. The invasive species American mink and signal crayfish have been recorded on the River Wensum. There is no risk of releasing American mink into other locations. The River Wensum will be crossed using trenchless crossing techniques (e.g. HDD) as embedded mitigation, and as such there is no risk of releasing signal crayfish into other areas of the habitats and species study area at these locations.

### 9.16.3 Additional Mitigation

#### 9.16.3.1 Pre-construction

~~209.~~214. The unsurveyed areas within the onshore project area will be surveyed at the optimum time of the year as part of the pre-construction surveys, and the locations of all stands of invasive species will be recorded and their extent mapped. The below mitigation measures will be adhered to, where invasive species are recorded.

~~210.~~215. Prior to construction, an Invasive Species Management Plan will be developed. This plan will be agreed with the Environment Agency and Natural England in advance of construction. Details of the Invasive Species Management Plan are provided within the outline CoCP provided with the DCO application (document reference 8.1).

#### 9.16.3.2 During construction

An Ecological Clerk of Works (ECoW) will be required to ensure compliance with Invasive Species Management Plan. Details of their responsibilities will be set out in the Invasive Species Management Plan provided within the outline CoCP provided with the DCO application (document reference 8.1).

# 10 BIRDS

## 10.1 Baseline

~~211.~~216. Detailed baseline relating to birds is provided in Chapter 23 Onshore Ornithology of the ES, Section 23.6.5. The baseline uses information provided by NBIS and Natural England, findings of the 2017 Extended Phase 1 Habitat Survey and findings of the Wintering Bird Survey (October 2016- March 2017) and of the Breeding Bird Survey (May 2017- August 2017).

~~212.~~217. Within the internationally designated site study area there are a total of four international statutory designated sites for nature conservation with an ornithological interest or qualifying feature:

- Broadland SPA and Ramsar site and The Broads SAC;
- Paston Great Barn SAC;
- River Wensum SAC; and
- Norfolk Valley Fens SAC.

~~213.~~218. There is a total of six national statutory designated sites for nature conservation which are notified or designated in part due to the breeding or wintering bird species they support. These sites are:

- River Wensum SSSI;
- Dereham Rush Meadow SSSI;
- Dillington Carr, Gressenhall SSSI;
- Cawston and Marsham Heaths SSSI;
- Booton Common SSSI; and
- Pigney's Wood LNR.

~~214.~~219. There is a total of five non-statutory designated sites (CWS and RNR) located directly within the onshore project area and of potential ornithological interest. These sites are:

- Wendling Carr CWS (CWS no. 1013);
- Necton Wood CWS (CWS no. 2024);
- Land South of Dillington Carr CWS (CWS no. 1025);
- Marriott's Way CWS (CWS no. 2176) (crossed twice); and
- Paston Way and Knapton Cutting CWS (CWS no. 1175).

~~215.~~220. Habitats suitable for supporting breeding or wintering / on passage bird species are located within the onshore project area, as shown in Table 3.

**Table 3 Habitat footprints within the onshore project area**

| Habitat type | Area (ha) | % of onshore project area | Potential to support common or notable breeding birds | Potential to support common or notable wintering / on passage birds |
|---|---|---|---|---|
| Lowland mixed deciduous woodland | 3.6 | 0.8% | Yes | No |
| Broadleaved semi-natural woodland | 1.3 | 0.3% | Yes | No |
| Broadleaved plantation woodland | 0.4 | 0.1% | Yes | No |
| Coniferous plantation woodland | 3.3 | 0.7% | Yes | No |
| Mixed plantation woodland | 0.2 | 0.0% | Yes | No |
| Dense/continuous scrub | 0.4 | 0.1% | Yes | No |
| Scattered scrub | 0.2 | 0.0% | Yes | No |
| Broadleaved parkland / scattered trees | <0.1 | 0.0% | Yes | No |
| Woodland rides | <0.1 | 0.0% | Yes | No |
| Improved grassland | 8.4 | 1.8% | Yes | Yes |
| Marshy grassland | 8.1 | 1.7% | Yes | Yes |
| Coastal and floodplain grazing marsh | 0.3 | 0.1% | Yes | Yes |
| Semi-improved grassland | 1.2 | 0.3% | Yes | Yes |
| Poor semi-improved grassland | 8.3 | 1.8% | Yes | Yes |
| Tall ruderal | 0.1 | 0.0% | Yes | Yes |
| Standing water | 0.2 | 0.1% | Yes | Yes |
| Running water | 0.8 | 0.2% | Yes | Yes |
| Cultivated / disturbed land - arable | 405.7 | 87.4% | Yes | Yes |
| Cultivated / disturbed land - amenity grassland | 0.7 | 0.2% | No | Yes |
| Gardens | 1.2 | 0.3% | Yes | Yes |
| Intertidal mud / sand | 6.3 | 1.4% | No | Yes |
| Dune grassland | 0.8 | 0.2% | No | Yes |
| Beach | <0.1 | 0.0% | No | Yes |
| Maritime Cliff and Slopes | <0.1 | 0.0% | No | Yes |

~~216.~~221. Habitats suitable for supporting wintering / on passage bird species were surveyed. Surveys of the agricultural fields in North Walsham district, Dereham

Rush Meadow SSSI, Hundred Stream and the North Norfolk coast between Eccles-on-Sea and Paston recorded a small number of water birds, but not of a scale to be of national (or greater) importance (i.e. less than 1% of the Great Britain or international population).

~~217.~~222. Selected areas were identified during the 2017 Extended Phase 1 Habitat Survey as being suitable to support populations of notable breeding birds, and were therefore surveyed:

- At Rush Meadows a total of 35 species were recorded including, bullfinch, dunnock, reed bunting, reed warbler, song thrush and willow warbler;
- At Dillington Carr, 47 species were recorded including the notable species, coot, cuckoo, dunnock, gadwall, great-crested grebe, little grebe, mallard, mistle thrush, moorhen, mute swan, reed bunting, song thrush and stock dove;
- There were 29 species recorded at Booton Common, including notable species dunnock, marsh tit and song thrush;
- At Pigney's Wood, there were records of 38 species including notable species cuckoo, dunnock, mute swan, reed bunting, song thrush and stock dove;
- The land south of Dillington Carr has 41 species recorded including bullfinch, dunnock, reed bunting, reed warbler, song thrush and willow warbler; and
- Wensum Floodplain had a total of 42 recorded species including barn owl, bullfinch, cuckoo, dunnock, great spotted woodpecker, kestrel, linnet, mallard, mute swan, reed bunting, skylark, song thrush and stock dove.

~~218.~~223. However, no birds listed on Schedule 1 of the Wildlife and Countryside Act (as amended) (1981) have been recorded as nesting within the survey area. Following refinement of the onshore project area, Booton Common SSSI, Dillington Carr SSSI and Dereham Rush Meadows SSSI are now located more than 300m from the onshore project area.

~~219.~~224. In addition, there were suitable habitats for common breeding birds found throughout the survey area.

~~220.~~225. There is potential to disturb wintering and breeding birds during construction.

## 10.2 Embedded Mitigation

~~221.~~226. General embedded mitigation will apply to birds as described in Table 1.

## 10.3 Additional Mitigation

### 10.3.1 Pre-construction

227. ~~O~~An additional year of wintering bird surveys will be undertaken in advance of construction. These surveys ~~would~~will aim to replicate as far as possible the surveys undertaken during 2016/2017. The surveys will involve:

- Six monthly (October to March inclusive) road-transect surveys;
- Survey area comprising farmland within the Order limits (and up to 300m buffer) that sits within 5km of Broadland SPA / Ramsar;
- All swan and goose species will be recorded;
- A transect route and the regular 'stop and scan' points will be selected, swans and geese flying over will also be counted and the flight line mapped;
- Key species: whooper swan; Bewick's swan, pink-footed goose (also bean goose and white-fronted goose are part of the assemblage); and
- Activity i.e. feeding or non-feeding (roosting, resting, preening, bathing and vigilance/alert).

### ~~10.3.1~~10.3.2 Construction

~~222.~~228. The following mitigation will be applied in relation to statutory designated sites:

- Adherence to JNCC's scheme to reduce disturbance to waterfowl during severe winter weather (available on the JNCC website (http://jncc.defra.gov.uk/page-2894)) during construction works at the landfall and along the onshore cable route in areas within 5km of the Broadland SPA and Ramsar site, including ceasing operations when temperatures drop below agreed criteria during the period 9th November to 20th February; and
- Best practice construction mitigation measures will be in place to minimise dust, noise and light emissions during construction. These measures are detailed in the outline CoCP (document reference 8.1) which is secured by Requirement 20 of the DCO.~~.~~

~~223.~~229. The following mitigation is proposed in relation to wintering / on passage birds:

- To minimise the potential effects upon lapwing and other species using arable land within the onshore project area, it is proposed that these habitats are only subject to works for one winter period in any one area in consecutive years (for example, if works occur during the winter period

2020-2021 (November to February), no winter works are undertaken in the same location in winter 2021-2022;

- Habitats which are temporarily lost during construction will be reinstated where possible following completion of construction. All hedgerows which are removed to enable the project will be reinstated following guidance within the Norfolk hedgerow BAP and will include appropriate species for north-east Norfolk (NBP, 2009). Future hedgerow management will include allowance for standard trees to develop; and
- The project is aiming for a construction scenario whereby construction works within the River Wensum floodplain (i.e. land north of Penny Spot Beck) are not required, and a trenchless crossing technique (e.g. HDD) at the River Wensum would run beneath this area. However, in advance of a more detailed assessment of ground conditions, this cannot be confirmed at this stage. If land north of Penny Spot Beck within the River Wensum floodplain is used during construction, then works will take place outside of the winter period (October – February inclusive). If this is not possible, an area of the floodplain habitat will be left undisturbed to provide wintering habitat for waders / wildfowl using this site for the duration of the works in this area.
- **Should qualifying features of the Broadland SPA and Ramsar site be recorded during the pre-construction surveys**: only one of the two sections of the onshore project area located within the Broadland SPA / Ramsar study area (see Figure 1 below) would be worked on at any one time, i.e.
  - November to January inclusive – Intrusive work will only take place in one of the two sections where the onshore project area intersects with the SPA / Ramsar study area.
  - February to October inclusive – The above restriction does not apply i.e. works can progress in both sections simultaneously.

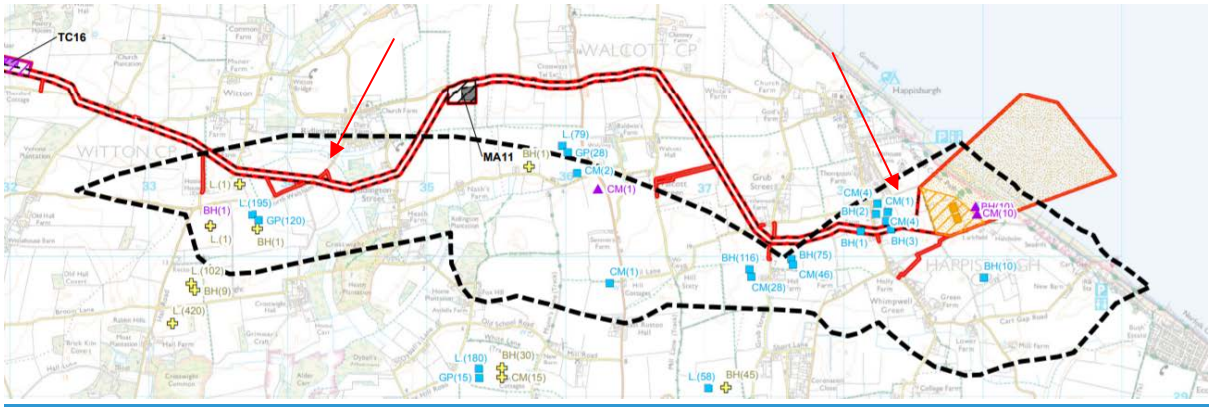


**Figure 1: Broadland SPA / Ramsar study area (black dashed line) and onshore project area (red line). Red arrows indicate two separate sections of the onshore project area located within the Broadland SPA / Ramsar study area.**

~~224.~~230. The following mitigation is proposed in relation to breeding birds:

- Construction methodologies proposed for site vegetation clearance include the removal of all nesting habitat for common breeding birds outside of the bird breeding season (typically March-August inclusive, temperature and weather dependant). As such, risk of damaging, destroying or disturbing the nest of any wild bird (either during construction or whilst in use) during the onshore project area works has been removed. If for any reason vegetation is not removed outside of the bird breeding season, a pre-construction check for nesting birds will be undertaken at most 48 hours in advance of construction, and any nests identified will be protected and left undisturbed until the young have fledged;
- Keep the winter crop stubble within the onshore project area low during the bird breeding season (which is typically from March to August, although can commence earlier or later depending on the weather conditions) in order to minimise the chance of notable ground nesting birds (i.e. skylarks, corn bunting and stone curlew) nesting prior to work on arable land. If for any reason winter crop stubble is not kept low and should works commence within the bird breeding season (March - August inclusive), a pre-construction check for nesting skylarks will be undertaken at most 48 hours in advance of construction, and any nests identified will be protected and left undisturbed until the young have fledged;
- Set aside ground-nesting bird areas outside of 50m of the cable route prior to construction works. The locations for these set-aside mitigation areas would be agreed in consultation with Natural England post-consent, and would follow the RPSB's Skylark: Advice for Farmers in creating skylark habitat;
- In additional to the mitigation in relation to hedgerows outlined above, hedgerow removal will be undertaken outside of the bird nesting season where possible (which is typically between March and August inclusive, but is weather and temperature dependant);
- The landscaping proposals described in Section 6 have been designed to ensure that new planting is created to compensate for the permanent loss of species-rich hedgerow at the onshore project substation. New hedgerow is proposed along the western margin of onshore project substation, and existing hedgerow will be enhanced with adjacent woodland and species-rich grassland planting. Please see Section 6 for full details of the proposed landscape mitigation planting; and

- Bat Conservation Trust's (BCT) Artificial lighting and wildlife guidance (2014) will be adhered to when designing lighting during temporary works at trenchless crossing locations.

### ~~10.3.2~~10.3.3 Post Construction

~~225.~~231. All habitats which are temporarily lost during construction will be reinstated following completion of construction.

### ~~10.3.3~~10.3.4 Operation

~~226.~~232. Due to the disturbance of operational lighting from the onshore project substation and National Grid substation, a lighting scheme will be designed for the final design for the permanent infrastructure, which will include measures to minimise light spill following the Bat Conservation Trust's (BCT) Artificial lighting and wildlife guidance (2014). This will be included within the project Design and Access Statement.

## 11 TIMINGS

~~227.~~233. The timings of the mitigation outlined in this document, and any further mitigation which is proposed following receipt of pre-construction baseline survey data, will be provided within the project EMP (DCO requirement 25), and the details of which will be agreed with Natural England prior to construction. No timing information is provided at this stage.

# 12 MONITORING AND COMPLIANCE

## 12.1 Ecological Clerk of Works

~~228.~~234. An ECoW would be present on site where relevant during construction in order to ensure compliance with the project EMP. The ECoW will be responsible for ensuring implementation of the agreed ecological mitigation measures on site during construction. The ECoW will monitor and record the success of the delivery of these ecological mitigation measures.

~~229.~~235. If protected species are unexpectedly found, or trees and hedges specified to be retained are damaged during construction, the following action would take place:

- Works would cease immediately;
- The ECoW and Construction Manager would be informed;
- The relevant area would be demarcated and access would be restricted if necessary;
- A way forward would be established and agreed and if necessary licences and authorisations would be sought; and
- Works would restart once the ECoW, Natural England, Norfolk County Council and or North Norfolk, Broadland or Breckland Council (as appropriate) are satisfied with the works proposed.

~~230.~~236. Norfolk Vanguard Limited will work with the relevant local authorities to ensure appropriate resourcing is in place to monitor compliance with the provisions of the OLEMS, and the plans and schemes of which it forms the basis.

## 12.2 Post-Construction Monitoring

~~231.~~237. Post-construction monitoring during breeding seasons one year after completion of construction will be undertaken to determine the status of the water vole population.

~~232.~~238. If mitigation for great crested newts is proposed for the unsurveyed areas following receipt of the survey results for these areas, this is likely to include post-construction population monitoring. The details of any post-construction mitigation will be agreed with Natural England via consultation post-consent.

# 13 LICENSING REQUIREMENTS

## 13.1 Introduction

~~233.~~239. In instances where European and certain UK protected species have been recorded within the study area for the project, in order to carry out some elements of the proposed mitigation for that species, a UK or EPS licence will be required. These licences will allow the project to undertake otherwise prohibited activities in order to ensure that favourable conservation status of the species in question is maintained.

~~234.~~240. A summary of the licences anticipated to be required for the project, the information required within each licence, when each licence will need to be obtained and what activities each licence will cover is provided below.

~~235.~~241. The final EMP will provide full details of the licences to be sought, once full post-consent survey data has been obtained.

## 13.2 Great Crested Newt Mitigation Licence

~~236.~~242. Although great crested newts have been recorded within four water bodies within 250m of the temporary works and 500m of the permanent works of the onshore infrastructure, given the barriers between these water bodies and the onshore project area, presence of great crested newts within the onshore project area has been considered unlikely and a great crested newt mitigation licence is not considered necessary.

~~237.~~243. There are a further 130 water bodies located within or within 250m of the temporary works and 500m of the permanent works of the onshore infrastructure which could not be surveyed during the 2017 surveys. Although at this stage it is not known whether or not these water bodies support great crested newts, given the scale of the unsurveyed area and the existing desk-based information regarding the extent of great crested newts within the study area, it is considered likely that great crested newt presence will be encountered during full baseline surveys conducted post-consent, and therefore that a great crested newt mitigation licence will need to be sought from Natural England.

~~238.~~244. To this end, a draft great crested licence was prepared. The draft licence application contained the following information:

- Details of the surveys conducted to date;
- A draft assessment of the potential impacts of the project should great crested newts be found in all unsurveyed areas; and

- A draft proposed approach to mitigation should great crested newts be found in all unsurveyed areas.

~~239.~~245. In addition, a proposal for undertaking mitigation using Natural England's new licensing policies (Policies '1' and '2') which have been in place since December 2016 (Natural England, 2016) was also considered.

~~240.~~246. The draft licence was consulted on with Natural England, who then issued a letter of comfort (dated 29th May 2018) stating that they see no impediment to issuing a licence in the future.

~~241.~~247. Following receipt of full baseline survey data post-consent, this draft mitigation licence application will be updated to a final mitigation licence application, and details of proposals included in the licence application will be included within the EMP.

## 13.3 Bat Mitigation Licence

~~242.~~248. During the surveys conducted to date, no active bat roosts have been found within trees which will need to be removed for construction of the project, and therefore no bat mitigation licence is considered to be required at this stage.

~~243.~~249. Nine tree and structures and a further eight areas of the cable route were not surveyed during the 2017 surveys, therefore the possibility of encountering roosting bats during construction cannot be ruled out at this stage. If roosting bats are found following full baseline survey data collected post-consent, then a bat mitigation licence would need to be sought from Natural England. Details of this licence, if required, would be included within the EMP.

## 13.4 Licence to Interfere with a Badger Sett

~~244.~~250. During the surveys conducted to date, no active badger setts have been found within 30m of the project, and therefore no licence to interfere with a badger sett for the purpose of development is considered to be required at this stage.

~~245.~~251. Approximately 50% of the onshore cable route and National Grid substation extension and OHL works areas have not been surveyed for badgers during the 2017 surveys, therefore the possibility of encountering active badger setts within 30m of the onshore project area cannot be ruled out at this stage. If an active badger sett is found, then a licence to interfere with a badger sett for the purpose of development would need to be sought from Natural England. Details of this licence, if required, would be included within the EMP.

## 13.5 Draft Water Vole Mitigation Licence

~~246.~~252. As outlined in section 9.8, in order to minimise the potential impacts upon water voles at Penny Spot Beck during construction, displacement under licence is proposed.

~~247.~~253. Unlike the licences described above, where a specific project mitigation licence is required, it is proposed that water vole displacement is carried out by a registered person (and their assistants) under a class licence for intentional disturbance of water voles and damage/destruction of water vole burrows by means of 'Displacement'. The methodology for displacement would be devised under the conditions of the class licence by the licence holder, and details of the licence holder and the methodology to be employed would be included within the EMP.

~~248.~~254. A further eight watercourses along the cable route could not be surveyed during the 2017 surveys. When full baseline data is collected for these surveys post-consent, if water vole presence is found then displacement under licence will also be required for these watercourses.

## 14 SUMMARY

~~249.~~255. This OLEMS has been drafted in order to provide a framework for the following plans proposed to be submitted prior to construction of the project under the requirements of the project DCO:

- Requirement 18 – Provision of landscaping.
- Requirement 18 – Implementation and maintenance of landscaping.
- Requirement 24 – ecological management plan.

~~250.~~256. To this end, this OLEMS has summarised the landscape and ecological mitigation and enhancement measures which have been proposed within the project ES. The OLEMS also details the procedures which have been proposed for ensuring monitoring of and compliance with these measures.

~~251.~~257. The key embedded mitigation measures summarised in this OLEMS are:

- Trenchless crossing techniques (e.g. HDD) at woodlands, watercourses and County Wildlife Sites (CWS);
- HVDC solution to reduce the footprint of the onshore project area; and
- Route refinement of the onshore project area.

~~252.~~258. Additional mitigation measures are provided for the following receptors within the onshore project boundary:

- River Wensum SAC and SSSI;
- Paston Great Barn SAC and SSSI;
- Dillington Car SSSI;
- Pigney's Wood LNR;
- County Wildlife Sites;
- Woodland;
- Hedgerows;
- Grassland;
- Watercourses and Ponds;
- Arable Land;
- Badgers;
- Bats;
- Water Voles;
- Otter;
- Great Crested Newts;
- Reptiles;
- Invasive Non-Native Species; and
- Birds.

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