The Great Grid Upgrade

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Bramford to Twinstead Reinforcement

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Contents

7. Biodiversity

7.1 Introduction

7.1.1 This Environmental Statement (ES) chapter details the likely significant effects of the project on Biodiversity during construction and operation. The receptors considered within this chapter comprise statutory designated sites, non-statutory designated sites, ancient woodland, habitats of principal importance (HPI), and terrestrial and aquatic biodiversity (including protected species such as bats, hazel dormouse (*Muscardinus avellanarius*), and birds).

7.1.2 The project could affect biodiversity during construction through direct effects, such as the loss or fragmentation of habitats within the construction footprint, or indirectly through changes to groundwater or pollution of watercourses. The project could also generate effects on species both in terms of direct injury or mortality and indirectly through disturbance.

7.1.3 This chapter considers habitat loss associated within the working footprint as a construction effect, although this could include permanent effects where the habitat cannot be reinstated in situ. Operation effects are those associated with inspections and periodic maintenance activities and are therefore limited in terms of biodiversity.

7.1.4 This chapter has links with other chapters, including: ES Chapter 9: Water Environment (**application document 6.2.9**), which provides baseline information used to assess the impacts on aquatic habitats and species; ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**), which provide baseline information used to assess groundwater dependent terrestrial ecosystems (GWDTE); ES Chapter 12: Traffic and Transport (**application document 6.2.12**); ES Chapter 13: Air Quality (**application document 6.2.13**); and ES Chapter 14: Noise and Vibration (**application document 6.2.14**), which provide baseline information used to assess the impacts of construction traffic and machinery on habitats and species.

7.1.5 Cumulative effects between the project and other proposed developments as well as receptors affected by more than one source of direct environmental impact resulting from the same development are considered in ES Chapter 15: Cumulative Effects Assessment (**application document 6.2.15**).

7.1.6 This chapter is supported by the following appendices:

- Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**);
- Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**);
- Appendix 7.3: Aquatic Ecology Baseline Report (**application document 6.3.7.3**);
- Appendix 7.4: Ancient Woodland and Potential Ancient Woodland Report (**application document 6.3.7.4**);
- Appendix 7.5: Important Hedgerows Assessment (**application document 6.3.7.5**);
- Appendix 7.6: Protected and Controlled Species Legislation Compliance Report (**application document 6.3.7.6**);
- Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**);

- Appendix 7.8: Dormouse Survey Report (**application document 6.3.7.8**); and
- Appendix 7.9: Badger Survey Report (**application document 6.3.7.9**).

7.1.7 This chapter is also supported by a number of figures including ES Figures 7.1.1 to 7.1.8 and 7.2.1 to 7.2.8, which can be found in ES Volume 6.4: Figures (**application document 6.4**).

7.1.8 This chapter also makes reference to the Habitats Regulations Assessment (HRA) Report (**application document 5.3**).

7.2 Regulatory and Planning Policy Context

National Policy Statement

7.2.1 ES Chapter 2: Regulatory and Planning Policy Context (**application document 6.2.2**) sets out the overarching policy relevant to the project including the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a). This is supported by NPS for Electricity Networks (EN-5) (DECC, 2011b).

7.2.2 EN-1 states that energy projects could have adverse effects on biodiversity, which has been considered within this chapter. Paragraph 5.3.3. of NPS EN-1 states, '*Where the development is subject to [Environmental Impact Assessment] EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the IPC consider thoroughly the potential effects of a proposed project*.'

7.2.3 Paragraph 5.3.14 in EN-1 also states, '*Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated*.'

7.2.4 EN-5 includes paragraphs in 2.7.1 and 2.7.2, which relate to biodiversity:

'*...large birds such as swans and geese may collide with overhead lines associated with power infrastructure, particularly in poor visibility. Large birds in particular may also be electrocuted when landing or taking off by completing an electric circuit between live and ground wires. Even perching birds can be killed as soon as their wings touch energised parts.*

'The applicant will need to consider whether the proposed line will cause such problems at any point along its length and take this into consideration in the preparation of the EIA and ES (see Section 4.2 of EN-1). Particular consideration should be given to feeding and hunting grounds, migration corridors and breeding grounds.' (paragraphs 2.7.1–2.7.2).

7.2.5 Full consideration of the NPS can be found in the Planning Statement (**application document 7.1**).

Other Relevant Policy

7.2.6 ES Appendix 2.1: Legislation, Policy and Guidance (**application document 6.3.2.1**) includes legislation and national policy relevant to biodiversity. It also outlines key guidance documents that have been referenced when writing this chapter.

7.2.7 ES Appendix 2.2: Local Planning Policy (**application document 6.3.2.2**) lists the local policy relevant to biodiversity. The saved policies in the Mid Suffolk District Local Plan (1998) include CL8 Protecting Wildlife Areas which seeks to resist development which will result in the loss or significant alteration of important habitats. It also seeks to protect 'vulnerable species'.

7.2.8 Policy LPP63 Natural Environment and Green Infrastructure in the adopted Braintree District Council Local Plan (2022) states that developments should protect and enhance the natural environment, habitats, biodiversity and geodiversity; taking climate change and water scarcity into account. It also states that proposals which adversely affect designated nature conservation will not normally be accepted. Similarly, Policy CL8 Recognised Wildlife Areas in the Mid Suffolk District Local Plan (1998) states that development proposals which would harm the nature conservation interest of Sites of Special Scientific Interest (SSSI) and other nationally designated wildlife areas, will not be permitted, apart from exceptional circumstances.

7.2.9 Policy LPP66 Protection, Enhancement, Management and Monitoring of Biodiversity in the adopted Braintree District Council Local Plan (2022) states that development proposals shall provide for the protection of biodiversity and the mitigation or compensation of any adverse impacts or shall be refused.

7.2.10 Policy SP09 Enhancement and Management of the Environment in the emerging Babergh and Mid Suffolk Joint Local Plan (2020) seeks development to support and enhance the management of the natural environment and green infrastructure. Development is required to comply with the HRA and maintain, protect and enhance biodiversity net gain (BNG). Similarly, Policy LP18 Biodiversity and Geodiversity seeks to conserve and enhance biodiversity, supports the creation of biodiversity networks and the need for projects to demonstrate a BNG of at least 10%.

7.2.11 Policy LPP64 Protected Sites in the adopted Braintree District Council Local Plan (2022) concerns the protection of local, national and international designations. Proposals for the loss of irreplaceable habitats such as ancient woodland will not normally be supported. Similarly, Policy CL5 Protecting Existing Woodland in the Mid Suffolk District Local Plan (1998) states that development which would result in the loss of or damage to woodland, particularly ancient woodland will be refused.

7.3 Scope of the Assessment

7.3.1 ES Appendix 5.1: Scope of the Assessment (**application document 6.3.5.1**) outlines the scope of the assessment for Biodiversity. This has been informed by the Scoping Opinion provided by the Planning Inspectorate (**application document 6.6**) on behalf of the Secretary of State, following the submission of the Scoping Report (**application document 6.5.1**).

7.3.2 The scope has also been informed through engagement with relevant consultees as summarised in ES Appendix 5.2: Response to Consultation Feedback (**application document 6.3.5.2**).

7.3.3 National Grid has made a commitment to '*deliver net gain by at least 10% or greater in environmental value (including biodiversity) on all construction projects*' (National Grid, 2021d) and has been working with appointed technical specialists, environmental organisations and landowners to identify potential opportunities for delivering areas of BNG, and where practicable link to wider environmental gains. The enhancement proposals are outlined within the Environmental Gain Report (**application document 7.4**). In the interests of clarity, the enhancements are not assessed as part of the ES, and are considered outside of the EIA process.

7.3.4 The project has the potential to affect legally protected species: badger (*Meles meles*), bats, breeding birds, great crested newt (GCN) (*Triturus cristatus*) and hazel dormouse. National Grid has included draft species licences within the application for development consent and will continue to work with Natural England to review the scope of these should development consent be granted. National Grid has also agreed with Natural England to apply the District Level Licence (DLL) approach to GCN.

7.3.5 The following has been scoped out of the Biodiversity assessment as confirmed by the Planning Inspectorate in the Scoping Opinion (**application document 6.6**) with the reference from the Scoping Opinion included below:

- Construction and operation:
  - Badger (ID 4.2.17) are scoped out of the assessment although surveys have been undertaken to inform a sett closure licence; and
  - Vascular and lower plants (excluding arable plant assemblages) (ID 4.2.15).
- Operation:
  - Air quality (dust) impact upon ecological receptors (ID 4.2.11);
  - Discharge to surface and groundwater (ID 4.2.12); and
  - Protected and other notable species.

7.3.6 Where additional information was requested by the Planning Inspectorate to justify scoping out particular features or matters in the Biodiversity assessment, this is detailed in Table 7.1. A UK Habitat Classification (UKHab) Survey has been undertaken for the project in 2021/22 (as an updated and alternative technique to Phase 1 Habitat survey). This has provided up to date information on the habitats present within the Order Limits to support the decision to scope out aspects in Table 7.1. The results of the survey are presented in ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**).

7.3.7 In addition, the assessment presented in ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**) has concluded that there is a low to very low risk of ground disturbance impacting on groundwater quality or flow. Based on this information, GWDTE, as shown on ES Figure 7.1.3: HPI and GWDTE (**application document 6.4**), have been scoped out of the biodiversity assessment.

Table 7.1 – Additional Information to Justify Scoping Out Matters Following Inspectorate's Comments in the Scoping Opinion (**application document 6.6**)

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Construction and Operation			
Reptiles	(ID 4.2.18) Whilst the Inspectorate agrees that effects on reptiles are unlikely to be significant with the proposed control measures in place, this cannot be confirmed until an up-to-date baseline position is confirmed through the updated Phase 1 habitat survey. This matter should therefore be scoped into the ES where significant effects are considered likely to occur following confirmation of the baseline position.	ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**) describes the results of desk study and habitat suitability assessment regarding reptiles. Updated UKHab surveys were undertaken within the Order Limits between June 2021 and June 2022. Subsequent reptile habitat suitability mapping is displayed on ES Figure 7.2.6: Reptiles - Habitat Suitability Assessment (**application document 6.4**) and shows that the majority of the Order Limits supports habitat of low potential suitability for reptiles. Habitats assessed as having high suitability for reptiles were identified, typically comprising a mosaic of habitats including areas of wet woodland, rough grassland, scrub and large areas of marginal habitat alongside fields or roadsides, e.g. Section G: Stour Valley to the north of Alphamstone. Records of slow worm (*Anguis fragilis*), grass snake (*Natrix natrix helvetica*) and common lizard (*Zootoca vivipara*) were noted in some of the areas assessed as providing high suitability habitat, or the area was present within, or adjacent to, a County Wildlife Site (CWS) with reptiles specifically mentioned in the citation, e.g. Layham Woodland and Meadow CWS.	ES Figure 7.2.6 (**application document 6.4**) displays habitat suitability assessment data for reptiles. Habitats identified as having suitability for reptiles would be subject to good practice measure B05 in the Code of Construction Practice (CoCP) (**application document 7.5.1**) which would avoid injury or mortality of reptiles. B05 states that all habitats due to be impacted by construction that are suitable for common reptiles will be subject to two-stage habitat manipulation under supervision of an ecologist during the reptile active season. Reptile hibernacula would be retained and protected during construction where practicable. If unavoidable, the removal of vegetation and groundworks at hibernacula would be timed to avoid the hibernation season. Replacement hibernacula and refugia would be provided. Standard techniques relating to habitat manipulation where reptiles are assumed present, in order to avoid injury or mortality, are uncontroversial and commonplace. Although individual reptiles may be sensitive to potential habitat loss or mortality and injury impacts, the local reptile population is not considered sensitive to any impact where a significant effect could occur. Legal compliance relating to reptiles is reported in ES Appendix 7.6: Protected and Controlled Species Legislation Compliance Report (**application document 6.3.7.6**).

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
		Habitats assessed as having moderate suitability to support reptiles typically comprised less complex mosaic habitats in smaller or narrower areas of the Order Limits, such as in Section H: Grid Supply Point (GSP) Substation. No records of reptiles were found within the areas assessed as having moderate suitability for reptiles	As the location and extent of potential impacts on reptiles are well understood for this project (i.e. low populations within suitable habitat), reptiles are **scoped out** of the ES.
Terrestrial invertebrates	(ID 4.2.19) Whilst the Inspectorate agrees that an adverse effect to conservation status from mortality is unlikely, it is not possible to conclude that there would be no likely significant effects until the baseline position is confirmed through the updated Phase 1 habitat survey. This aspect should therefore be scoped into the ES.	Habitats with potentially suitable features to support a range of terrestrial invertebrates were identified using the general assemblage features (Natural England, 2007 and Kirby, 2001). These are shown on ES Figure 7.2.7: Terrestrial Invertebrates - Habitat Suitability Assessment (**application document 6.4**). This was then cross referenced with the desk study on invertebrate species and results of the UKHab surveys which were undertaken between June 2021 and June 2022, to identify important habitats for terrestrial invertebrate assemblages and/or notable terrestrial invertebrate species, see ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**).	While a range of invertebrate assemblages will be present across the Order Limits, with particular association with HPI and designated sites, none are of sufficient value to generate a likely significant effect from the project. HPI, including woodlands, are scoped into further assessment thereby providing a proxy assessment for dependent terrestrial invertebrate species. Good practice measure B08 in the CoCP (**application document 7.5.1**) is designed to avoid impacts on saprophytic invertebrates by retaining and protected decaying and deadwood within the Order Limits. As such, terrestrial invertebrates are **scoped out** of the ES.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Other notable species	(ID 4.2.20) The Inspectorate notes that the Scoping Report identifies an impact pathway to notable species during construction for mortality and injury, and species disturbance, suggesting a potential for likely significant effects to occur beyond habitat loss during construction. Until the baseline position is confirmed through the updated Phase 1 habitat survey. This aspect should therefore be scoped into the ES.	The 2021/22 UKHab survey results alongside notable species desk study identified a number of 'other notable species' present within the Order Limits (see ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2)**. These comprised brown hare (*Lepus europaeus*), hedgehog (*Erinaceus europaeus*), polecat (*Mustela putorius*), toad (*bufo bufo*) and harvest mouse (*Micromys minutus*). These species will be present at various densities depending on their specific habitat requirements and the quality of the habitat present, as detailed and mapped in ES Figure 7.2.8 (**application document 6.4**).	Potential impacts would relate to temporary and permanent habitat loss, killing and injury, and disturbance. However, the temporary and short duration of the construction activity in any one location means an adverse effect to the conservation status of notable species is unlikely. Good practice measures in the CoCP (**application document 7.5.1**) designed to avoid impacts on protected species would also be beneficial for other notable species, reducing the potential for killing and injury and disturbance. As a result of the limited impacts on the receptor, notable species have been **scoped out.**
GCN	(ID 4.2.16) GCN: The Inspectorate considers that the Scoping Report does not provide evidence of any agreement with Natural England regarding the use of a DLL.	Not applicable.	National Grid has agreed with Natural England to apply the DLL approach to GCN on the project and evidence of this is provided in Annex A of ES Appendix 7.6: Protected and Controlled Species Legislation Compliance Report (**application document 6.3.7.6**).

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Invasive and Non-native species (INNS)	(ID 4.2.3) The Inspectorate considers that the Applicant should ensure that sufficient baseline information is available to establish the location and extent of INNS. This should include consideration of Australian Swamp Stonecrop. The Inspectorate considers that the validation surveys should also account for INNS.	In addition to desk study records, the 2021/22 UKHab survey undertaken in 2021 and 2022 identified a number of INNS within the Order Limits including Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*), variegated yellow archangel (*Lamiastrum galeobdolon subsp. Argentatum*), montbretia (*Crocosmia* x *crocosmiiflora*) and Australian swamp-stonecrop (*Crassula helmsii*) as described in Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**) and shown on ES Figure 7.1.7: Invasive Non-Native Species (**application document 6.4**). ES Appendix 7.3: Aquatic Ecology Baseline Report **(application document 6.3.7.3**) also identified a number of aquatic fauna INNS including: Jenkins' spire snail (*Potamopyrgus antipodarum*), freshwater shrimp species (*Crangonyx pseudogracilis/floridanus*), zander (*Sander lucioperca*), rainbow trout (*Oncorhynchus mykiss*), feral goldfish (*Carassius auratus*), Turkish crayfish (*Astacus leptodactylus*); signal crayfish (*Pacifastacus leniusculus*), American mink (*Neovison vison*), red-eared terrapin (*Trachemys scripta*).	During construction, topsoil or subsoil which potentially contains INNS plant material could cause the spread of seed or 'propagules' during such activities as excavation and vehicle movements. Invasive fauna, particularly waterborne macroinvertebrates and vascular plants can be transferred between watercourses by construction machinery and personnel. These risks would be controlled through good practice measures described in ES Appendix 7.6: Protected and Controlled Species Legislation Compliance Report (**application document 6.3.7.6**) and set out in the CoCP e.g. B04 (**application document 7.5.1**) to avoid adverse significant effects. Implementation of these measures would result in a **negligible** risk of spreading INNS during construction. As a result of limited operational impacts, INNS are also scoped out during operation. As such, INNS are **scoped out** of the ES for both construction and operation.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Construction			
Collision of nocturnal species with construction machinery	(ID 4.2.1) The Inspectorate considers that there is insufficient information about the location and nature of night-time working to conclude that significant effects will not occur. Therefore, potential effects of collision of nocturnal species with construction machinery should be scoped into the ES.	ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**) and Appendix 7.7: Bat Survey Report (**application document 6.3.7.7)** details the desk study records and field survey results of all species of bat and nocturnal birds that are at risk of colliding with construction machinery. Nocturnal birds specifically mentioned in the desk study results and field survey were barn owl (*Tyto alba*) and tawny owl (*Strix aluco*).	ES Chapter 4: Project Description (**application document 6.2.4**) states that outside of the trenchless crossings, construction work at night would typically only occur on rare occasions and would be likely to last for only a short duration at any one location. The Development Consent Order (DCO) contains reference to a 12-hour construction day. In winter, this could include working after nightfall in the latter part of the working day. Experience from other construction projects indicates that working after dark under construction lighting is likely to be limited to contained sites, such as the construction compounds and specific sites along the route. Therefore, it is considered that the risk of collision of nocturnal species with construction machinery is negligible, particularly as the speed of plant would be restricted and work areas would be lit if used after dark for safety reasons. This matter remains **scoped out**.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Construction generated dust effects on designated sites, habitats and species	(ID 4.2.9) The Planning Inspectorate agrees that this matter can be scoped out of the ES based on the commitments within the Outline CoCP and that any further mitigation would be identified in the Dust Risk Assessment appended to the Outline CEMP. In the event that any matters relating to impacts of construction dust to ecological receptors arise once construction logistics are more fully defined, these should be assessed within the ES (scoped in).	ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**) describes the results of desk study and UKHab survey results, including of designated sites and habitats within the Order Limits. There are a number of designated sites and HPI within the study area and these are shown in ES Figures 7.1.1, 7.1.2 and 7.1.3 (**application document 6.4**).	ES Appendix 13.1: The Dust Risk Assessment (**application document 6.3.13.1**) concludes that with the application of good practice measures within the CoCP (**application document 7.5.1**), namely GG05, GG10, GG12, GG13, GG17, GG18, GG19, GG26 and AS01, there are no likely significant effects in relation to construction dust to ecological receptors. This matter remains **scoped out**.
Construction emissions to surface and groundwater on designated sites, habitats and species	(ID 4.2.12) Given the stage of the project and as the exact location and design for watercourse crossings is yet to be determined, the Inspectorate does not agree that these matters can be scoped out of the ES (scoped in).	ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**) describes the results of desk study and UKHab survey results of all designated sites and habitats. These are shown in ES Figures 7.1.1 to 7.1.3 (**application document 6.4**).	ES Chapter 9: Water Environment (**application document 6.2.9**) and ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**) detail the likely effects to surface water and groundwater respectively. These conclude that with the application of good practice measures within the CoCP (**application document 7.5.1**), there are no likely significant effects to surface water or ground water quality or flows, including from temporary dewatering during construction and break out of drilling muds.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
		ES Appendix 7.3: Aquatic Ecology Baseline Report (**application document 6.3.7.3**) describes the results of a desk study undertaken to establish the aquatic ecology baseline. A number of species of conservation value were reported across the study area including European eel (*Anguilla anguilla*) and brown/sea trout (*Salmo trutta*). Desk study data was obtained for aquatic invertebrates for four crossings across the Order Limits and all demonstrated relatively diverse community indicating good water quality.	In addition, good practice measures and protocols described in the Construction Environmental Management Plan (CEMP) (**application document 7.5**) would manage runoff and reduce the potential for pollution via this pathway. As a result, any significant adverse effects to surface water will be avoided and this matter remains **scoped out**.
Air quality changes arising from construction traffic on designated sites, habitats and species	(ID 4.2.10) It is noted that air quality changes to ecological receptors arising from construction traffic is currently scoped into the ES but could potentially be scoped out following confirmation of traffic numbers and routes.	ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**) identifies and describes the results of designated site and HPI desk study and the UKHab survey results. Where these occur within 200m of emissions to air, assessment guidelines states that air quality impacts can occur (Institute of Air Quality Management, 2019).	Construction traffic levels set out in the Transport Assessment (**application document 5.7**) are below the threshold anticipated to generate significant effects to ecological sites. As a result, this matter remains **scoped out**.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Operation			
Light sensitive species – Operational lighting	(ID 4.2.7) The Inspectorate notes that operational lighting may also be required at the cable sealing end (CSE) compounds. Given the limited scale of these works, the Inspectorate agrees that it is unlikely that significant effects would occur; however, there is insufficient information regarding the type, location and hours of lighting at this stage to confirm this conclusion and this should be assessed in the ES (scoped in).	ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**), Appendix 7.7: Bat Survey Report (**application document 6.3.7.7)** and ES Appendix 7.9: Badger Survey Report details the desk study records and field survey locations of light sensitive species located within the Order Limits.	ES Chapter 4: Project Description (**application document 6.2.4**) details the permanent operational lighting requirements. The operational CSE compounds would not be lit, and portable task lighting would be used for maintenance work or emergencies that need to occur at night. The operational GSP substation would require security lighting, which would be used outside of daylight hours. Lighting would require a trigger (i.e. would not be continuous) and on a timer. Lighting would be low lux level light-emitting diode type luminaires with directable light output to reduce light spill. As such, no significant effects are expected, and operational disturbance is **scoped out** of the ES.

Receptor	Inspectorate's Comments in the Scoping Opinion	Baseline	Scope Review
Operational noise and vibration to species	(ID 4.2.8) Given the stage of the project and as no evidence is provided in the Scoping Report to explain whether the operation of the new GSP substation or the CSE compounds could give rise to significant noise or vibration effects, the Inspectorate does not agree that this matter can be scoped out of the ES (scoped in).	Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**), Appendix 7.7: Bat Survey Report (**application document 6.3.7.7),** Appendix 7.8: Dormouse Survey Report (**application document 6.3.7.8),** and Appendix 7.9: Badger Survey Report (**application document 6.3.7.9),** details the desk study records and field survey locations of species sensitive to noise and vibration disturbance located within the Order Limits.	Section 14.3 of Chapter 14: Noise and Vibration (**application document 6.2.14**) scopes out all operational noise and vibration impacts. The CSE compounds would not generate noise or vibration during operation. No significant noise or vibration effects to ecological receptors are anticipated at the GSP substation. Noise levels modelled for the edge of Butler's Wood and Waldegrave Wood would be a constant level of 35dBA during normal operation, with rare increases to 37dBA for cooling operations on hot days or if one unit is taking full load, and 53dBA when testing with the backup generator once per month during a daytime to test for a short period, or very rarely during power outage. As this is below the threshold identified as disturbing (to bats in particular), this matter remains **scoped out**.

7.3.8 The following specific aspects have been scoped into the biodiversity assessment:

- Construction:
  - Statutory designated sites – habitat loss, habitat modification/degradation, fragmentation, change in surface water quality and effects on qualifying feature/notified species;
  - Non-statutory designated sites – Habitat loss, habitat modification/degradation, habitat gain, fragmentation and change in surface water quality;
  - HPI - habitat loss, habitat modification/degradation, fragmentation and hydrological changes as a result of dewatering during temporary works (mainly in areas of deeper foundations and trenchless crossings);
  - Ancient woodland and potential ancient woodland sites (PoAWS) – habitat loss, habitat modification and fragmentation and change in surface water quality;
  - Aquatic habitats – habitat loss, habitat modification, fragmentation and change to surface water quality or flows;
  - Bats – habitat loss, habitat modification, fragmentation, mortality/injury and disturbance;
  - Hazel dormouse – habitat loss, habitat modification, fragmentation, mortality/injury and disturbance;
  - Riparian mammals – habitat loss, fragmentation, mortality/injury and disturbance;
  - Breeding birds (excluding as a feature Hintlesham Woods SSSI) and overwintering birds (excluding as a feature of European sites which are assessed separately) – habitat loss and disturbance;
  - Fish and other aquatics – habitat loss, fragmentation, mortality/injury and disturbance; and
  - Arable plant assemblage – habitat loss.
- Operation:
  - Statutory designated sites – habitat modification and collision with pylons and overhead lines during operation;
  - Non-statutory designated sites – habitat modification;
  - PoAWS – habitat modification;
  - HPI – habitat modification;
  - Bats – habitat modification;
  - Hazel dormouse – habitat modification; and
  - Breeding and wintering birds (excluding as features of Hintlesham Woods SSSI and Stour and Orwell Estuaries SPA/Ramsar) and bats – collisions with pylons and overhead lines during operation

Project Engagement

7.3.9 National Grid has held a number of meetings with relevant organisations, including Natural England, the Royal Society for the Protection of Birds (RSPB), Essex and Suffolk Wildlife Trusts and the relevant planning authorities. Discussions have focused on the methodology for habitat and species surveys and the use of Biodiversity Metric 3.1 (Natural England, 2022d) for recording habitat loss and BNG. There have also been discussions regarding the scope of surveys at Hintlesham Woods and about construction timings and methods for works around the woods.

7.3.10 In response to feedback from Natural England and the relevant planning authorities, National Grid committed to undertaking a full UKHab survey for the project, which would also provide the condition data required for the Biodiversity Metric 3.1 (Natural England, 2022d). National Grid also undertook further surveys in and around Hintlesham Woods to inform the selection of option, design and methods at this location.

7.3.11 National Grid also committed to producing draft European Protected Species (EPS) licences as part of the application for development consent, in order to secure Letters of No Impediment. An initial version of draft EPS licences were submitted to Natural England in December 2022. Natural England has provided responses on these including provision of the Letter of No Impediment (with caveats) for bats (which is included in the Bat Draft Licence (**application document 6.3.7.7.1**)) and badger (which is included in the Badger Draft Licence (**application document 6.3.7.9.1**)).

7.3.12 Further details on how consultation responses have informed the assessment can be found in ES Appendix 5.2: Response to Consultation Feedback (**application document 6.3.5.2**).

7.4 Approach and Methods

7.4.1 This section describes the methodology used to establish the baseline environment and the adopted approach to assessing the significance of potential effects of the project on biodiversity. A desk study has been undertaken to inform the assessment of significant effects. This has been supported by a suite of ecological field surveys, which are described in Table 7.2.

Data Sources

7.4.2 The baseline has been informed by a desk study. Data was initially requested in 2021, with a further update requested in summer 2022 which included the following information sources:

- International and national statutory designated sites, HPI and granted EPS licences (up to September 2022) were identified on the Multi-Agency Geographic Information for the Countryside (MAGIC) website (Defra, 2022b);
- Supplementary information on statutory designated site citations has been collated from Natural England (Natural England, 2022a);
- Non-statutory designated sites information has been provided by Suffolk Biodiversity Information Service (SBIS, 2022b) and Essex Wildlife Trust Biological Records Centre (Essex Wildlife Trust, 2021b);

- Natural England Open Data Geoportal was consulted for designated sites, ancient woodland, HPI and freshwater ecology datasets (Natural England, 2022a);
- Catchment Data Explorer (Environment Agency, 2022a);
- Ecology and Fish Data Explorer (Environment Agency, 2022f);
- Species records were originally requested in 2021 from Suffolk Biodiversity Information Service, Essex Wildlife Trust Biological Records Centre, North Essex Badger Group, Essex Field Club (who also hold records from Suffolk Bird Recorder and Essex Bird Watching Society), British Trust for Ornithology, Froglife (Toad Patrol areas) and RSPB. The data request was updated in June 2022 based on a 1km study area around the Order Limits; and
- Aerial photography (RGB Aerial Photography, 2021) and Ordnance Survey (OS) maps.

7.4.3 All of the information received has been incorporated into the baseline environment description presented in Section 7.5.

Study Area

7.4.4 The study area for biodiversity relates to the main areas of construction activity, including compounds and temporary access routes, which are located within the Order Limits. The study area is then based on the relative areas by which potential pathways to effect on biodiversity receptors could occur. These were as follows:

- Internationally important statutory designated sites: Special Protection Area (SPA), Special Areas of Conservation (SAC) and Wetlands of International Importance (Ramsar sites) within 2km of the Order Limits, extending to 30km for SAC where bats are the qualifying interest or where European sites are hydrologically connected to the project. The underpinning component SSSI Impact Risk Zones (IRZ) for European sites were also reviewed for electricity infrastructure projects and if there were any direct pathways to effects as shown on Figure 7.1.1: Biodiversity Statutory Designated Sites (**application document 6.4**);
- Nationally important statutory designated sites: SSSI, National Nature Reserves and Local Nature Reserve (LNR) where SSSI IRZ overlap the Order Limits or where direct pathways to effects were possible, as shown on Figure 7.1.1: Biodiversity Statutory Designated Sites (**application document 6.4**);
- Non-statutory sites of local nature conservation importance: CWS, local wildlife sites (LoWS) and Roadside Nature Reserves (RNR), ancient woodland, and HPI where pathways to effects are possible as shown on Figures 7.1.1 to 7.1.3 and Figure 7.4.1 (**application document 6.4**);
- Desk study records of protected or otherwise notable habitats and species, veteran or ancient trees within 1km of the Order Limits as described in the appendices supporting this chapter.

7.4.5 The field survey areas are described in Table 7.2 and further details can be found in the relevant appendix listed within the table. These are considered appropriate field survey areas based on technical knowledge of similar projects and have been set following consideration of the distance over which likely significant effects can reasonably be expected to occur. The appropriateness of the surveys and survey extents have also been discussed with Natural England, as documented in the Statement of Common Ground (**application document 7.3.2**).

Field Survey

7.4.6 The approach to field survey of biodiversity features is detailed in Table 7.2. The site surveys undertaken in 2021 and 2022 built on the results of the data collected in an original programme of site surveys undertaken in 2011-2013. Due to the time lapse since the original surveys were completed, the results of the former survey work is generally presented in the desk study sections of the relevant appendix to avoid confusion with updated survey results where available. Further details on the previous survey data and how this has been used can be found in the relevant appendix listed in Table 7.2.

Table 7.2 – Biodiversity Field Survey Reporting

Report Title	Field Survey
Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**)	**UKHab survey (including hedgerows) – within and immediately adjacent the Order Limits** UKHab surveys were undertaken within the Order Limits between June 2021 and June 2022 to categorise the different habitats present, including HPI. The DAFOR (D – dominant, A – abundant, F – frequent, O – occasional, R – rare) scale system was used to provide estimates of plant species abundance. INNS were also recorded incidentally during these surveys. Hedgerows were surveyed and data recorded using methodologies outlined in UKHab and Hedgerow Survey Handbook (Defra, 2007). **Important Arable Plant Assemblages – within and immediately adjacent the Order Limits** Important Arable Plant Areas were surveyed using the Outstanding Assemblages survey form (Plantlife, 2022) focused on a minimum of one boundary within each field that was identified as potentially supporting important arable plant assemblages. **GWDTE – within and adjacent the Order Limits** GWDTE were identified following a review of the desk study, field survey data and application of the UK Technical Advisory Group guidance (2004).
Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**)	**Breeding Birds – Hintlesham Woods SSSI – specifically Ramsey Wood, Hintlesham Little Wood and Hintlesham Great Wood** Seven breeding bird surveys were undertaken comprising dusk and dawn timeframes between March and July 2022. Three transects were surveyed each time. **Riparian Mammals – within Order Limits plus 200m upstream and downstream** Habitat suitability and subsequent field survey for otter and water vole between June and October 2021 and between April and July 2022. The entire length of waterbodies within the Order Limits were surveyed with an additional 200m upstream and 200m downstream where land access permitted. Camera trapping was used at selected locations. **Habitat suitability assessment – within Order Limits**

Report Title	Field Survey
	Desk based habitat suitability assessment for notable bird species, reptiles, other notable species, and terrestrial invertebrates using the UKHab survey results. Incidental notes were taken during the programme of field survey where the presence/evidence of these species/taxa were recorded.
Appendix 7.3: Aquatic Ecology Baseline Report **(application document 6.3.7.3)**	**Modular River Physical (MoRPh) survey – Order Limits plus up to 100m** MoRPh surveys were completed for all watercourses that meet the UKHab definition for rivers (Butcher *et al.*, 2020). Five continuous MoRPh surveys were carried out to characterise a sub-reach. These were then used to determine the final condition class for each watercourse. This methodology was not applied for waterbodies that met the Biodiversity Metric 3.1 technical supplement (Natural England, 2022d) definition for ditches. **Watercourse Habitat Sensitivity** Each watercourse was classified as high, moderate or low sensitivity for aquatic ecological features. This classification took cognisance of the physical habitat observed at watercourse, the presence of optimal/suboptimal habitats for species of conservation interest, general aquatic flora and fauna and the potential influence of wider catchment pressures.
Appendix 7.4: Ancient Woodland and Potential Ancient Woodland Report **(application document 6.3.7.4)**	This report sets out baseline information on ancient woodland, PoAWS and veteran and ancient trees within and adjacent to the Order Limits based on data gathered from the desk study and field surveys. Field surveys were based on the Order Limits and their immediate surroundings. A UKHab Survey of Hintlesham Woods SSSI (specifically Ramsey Wood and Hintlesham Little Wood) was undertaken on 28 September 2021 and 5 May 2022 and a detailed National Vegetation Classification (NVC) survey undertaken on 5 May 2022.
Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**)	This report collates the results of a desk study; Habitat Suitability Modelling (HSM) for bats of up to 7km from the Order Limits; field survey of trees and buildings for bat roosts within a 50m study area based on the Order Limits (undertaken between 2021 and 2022) and subsequent endoscope inspections or emergence/re-entry surveys. The report also comprises additional targeted bat survey at Hintlesham Woods, (specifically Ramsey Woodland Hintlesham Little Wood) undertaken May – August 2022 comprising monthly static detector deployment and crossing point surveys and a session of bat trapping in August 2022.
Appendix 7.8: Dormouse Survey Report (**application document 6.3.7.8**)	This report collates the results of a desk study, the results of field surveys in 2012 and the results of targeted surveys in 2022. The latter comprised installing dormouse nest tubes at ten survey areas across the Order Limits and connected habitats surrounding the Order Limits in February/ March 2022. These were checked every other month between May and October 2022.
Appendix 7.9: Badger Survey Report (**application document 6.3.7.9**)	The report comprises the results of a desk study and field survey of the Order Limits plus 30m. The locations and orientations of all sett entrances (both active and inactive) were recorded with level of activity noted. Other field evidence was also noted which included latrines, pathways, foraging signs, badger hair, bedding material and badger footprints. Supplementary camera trapping was used at selected locations.

Assessment Methodology

7.4.7 This section sets out the methodology used for assessing the effects on biodiversity for those aspects scoped into the assessment, as set out within Section 7.3 of this chapter.

7.4.8 The assessment process has been undertaken with reference to the Guidelines for Ecological Impact Assessment (Chartered Institute of Ecology and Environmental Management (CIEEM), 2022) (hereafter referred to as 'the CIEEM guidelines'), with some minor amendments to enable consistency of terms across the different topics in the EIA. These recommend that the technical scope of the assessment should comprise those biodiversity receptors that, as a minimum, meet the following criteria:

- Be of sufficient value that effects on them may be significant; and
- Be potentially vulnerable to significant effects arising from the project.

7.4.9 As such, the source-pathway-receptor approach has been followed in this chapter to understand the mechanisms by which the project could result in potential significant effects on biodiversity receptors. Potential sources of significant effects were identified, the Zone of Influence was defined, and the pathway recorded. For a significant effect to occur, all three elements (source-pathway-receptor) must be in place. The absence or removal of one of the elements means there is no likelihood for any effect to occur.

Definitions Used Within the Assessment

7.4.10 The assessment presented within this chapter sometimes references the Proposed Alignment, which is the indicative design that is shown on Figure 4.1: The Project (**application document 6.4**). This is referenced when conveying a sense of scale of the potential effects. However, it should be noted that the permanent aspects of the project, including pylon locations are not fixed and could be located anywhere within the Limits of Deviation (LoD) unless a commitment has been made otherwise. This sensitivity is assessed further within Section 11 of this chapter. The location and orientation of the CSE compounds and GSP substation may also change within the LoD.

7.4.11 The definition of impacts on habitats used in this assessment are follows:

- Permanent habitat loss – habitat cleared during the construction phase which would not be reinstated e.g. the footprint of the CSE compounds and woodland at the base of new pylons;
- Temporary habitat loss – habitat cleared during the construction phase which would be reinstated post-construction e.g. temporary land used for temporary construction compounds, underground cable sections and temporary access routes;
- Permanent habitat modification/degradation – habitat cleared, pruned or working within root protection areas (RPA) during the construction phase with ongoing permanent upkeep during the operational phase to maintain that new state e.g. reduction of woodland height to maintain operational safety clearance zone between the overhead lines and the trees below; and
- Fragmentation – refers to effects on linear features i.e. watercourses, tree lines and hedgerows, from temporary severance for installation of culverts, temporary access routes and underground cables. Fragmentation impacts are typically described in

terms of their impacts on species (rather than the habitats themselves) within the relevant protected species sections of this chapter.

Characterisation of Effect

7.4.12 In accordance with the CIEEM Guidelines (CIEEM, 2019a), the characterisation of effect would be determined referring to the following characteristics:

- Positive (beneficial) or negative (adverse);
- Direct, indirect, cumulative;
- Magnitude: size or amount of an impact, determined on a quantitative basis;
- Extent: area measurements and percentage of total (e.g. percentage area of habitat or territory lost);
- Duration: permanent or temporary in ecological terms (where differing timescales are determined in relation to the life cycle of the receptor, these would be defined);
- Reversibility: whether the effect can be reversed, and whether or not this is planned; and
- Timing and frequency: important seasonal and/or life-cycle constraints and any relationship with frequency considered.

Value/Sensitivity

7.4.13 Biodiversity receptors have been identified within the study area using the baseline data collected during the desk based and field surveys. This information has been used to assign to receptors one of the value (sensitivity) categories defined in ES Appendix 5.4: Assessment Criteria (**application document 6.3.5.4**). These values are based on the importance of the receptors as described in the CIEEM Guidelines (CIEEM, 2019a) and Design Manual for Roads and Bridges (DMRB) (Highways England *et al.*, 2020d).

Impact Magnitude

7.4.14 The criteria for assigning impact magnitude are defined in ES Appendix 5.4: Assessment Criteria (**application document 6.3.5.4**). These consider the scale/extent of the predicted change and the nature and duration of the impact, with examples of each category of impact magnitude provided in the guidance.

Significance

7.4.15 In accordance with CIEEM Guidelines, a significant effect is one that either supports or undermines biodiversity and/or conservation objectives for valuable biodiversity receptors. The assessed degree of significance of effect is a function of a biodiversity receptor's value and the potential magnitude of impacts as caused by a given effect.

7.4.16 Likely significant effects have been assessed using professional judgement considering the sensitivity (or value) of the biodiversity receptors within the study area, and the predicted magnitude of change (impact) likely to be caused by project activities. These factors are combined to give an overall significance of effect.

7.4.17 Significance has been derived using the matrix set out in Illustration 5.1 in ES Chapter 5: EIA Approach and Method (**application document 6.2.5**). This has been supplemented by professional judgement, which where applicable, has been explained to give the rationale behind the values assigned. Likely significant effects, in the context of the Infrastructure Planning (EIA) Regulations 2017, are effects of moderate or greater significance.

7.4.18 Overall significance is also concluded for each receptor, taking into consideration the potential for the project to affect more than one attribute of a particular receptor.

Limitations of Assessment

7.4.19 A desk study was undertaken to provide contextual information on the baseline conditions of the project. Information obtained is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitat or species does not occur in the study area. Likewise, the presence of records for a particular habitat or species does not mean that it necessarily still occurs within the study area. Therefore, the desk study is primarily used to provide contextual information on the potential distribution of habitats and species within the study area and to guide the scope of further survey, where considered to be appropriate. It has been assumed that data provided by third parties is accurate.

7.4.20 A survey can only collect data from a site at the time of the survey. Many species are mobile and may inhabit the site at different times of the year and across years, and habitats are subject to change. The survey-specific constraints are not considered to compromise the ecological impact assessment, especially when considering the project's embedded and good practice measures.

7.4.21 The baseline presented within this ES is considered to provide adequate information for the assessment, and any limitations relating to specific field surveys (including any access restrictions or areas where survey data was not obtained) are documented in the appendices supporting this chapter.

Key Parameters for Assessment and Assumptions

7.4.22 This section describes the key parameters and assumptions that have been used when undertaking the assessment presented within this ES Chapter. The assumptions are based on information presented within ES Chapter 4: Project Description (**application document 6.2.4**) and include:

- Vegetation Loss: The assessment is based on uses reasonable worst-case vegetation clearance assumptions detailed in Chapter 4: Project Description (**application document 6.2.4**) and shown on Trees and Hedgerows to be Removed or Managed Plans (**application document 2.9**) unless a separate commitment has been made;
- Reinstatement: The assessment assumes that vegetation removed during construction would be reinstated, except where there are planting restrictions associated with operational requirements for instance below overhead lines or above underground cables or where other forms of reinstatement have been identified in the Landscape and Ecological Management Plan (LEMP) (**application document 7.8**);

- Night working: As described in ES Chapter 4: Project Description (**application document 6.2.4**) outside of the trenchless crossings, construction work at night would typically only occur on rare occasions and would be likely to last for only a short duration at any one location;
- Lighting: The DCO contains reference to a 12-hour construction day. In winter, this would include working after nightfall in the latter part of the working day. Therefore, for the purposes of the ES, it is assumed that winter working requiring lighting may be required at contained work sites but not at a wide scale across the project. It is assumed that operational lighting would be limited to security lighting at the GSP substation, which would be motion-sensor activated;
- Piling assumptions: Percussive piling may be required at some pylon locations and for the foundations of the CSE compounds, GSP substation and the temporary bridge abutments, depending on ground conditions. The assessment set out in this chapter assumes that piling is required at all pylon locations, the CSE compounds, the bridge abutments and GSP substation (as a reasonable worst case scenario);
- Trenchless crossing construction methodology: The project has committed to undertaking trenchless crossings at the River Box, River Stour, Sudbury Branch Railway Line and to the south of Ansell's Grove. For the purposes of the assessment, it has been assumed that:
  - The proposed technique would be horizontal directional drilling (HDD), which requires launch and receiving pits on either side of a drilled section; and
  - The water used to facilitate the drilling technique would be brought to site in tankers to facilitate drilling.
- Discharges: Discharges from dewatering of opencut trenches to remove rainwater and minor groundwater seepages would be made to ground. At deeper excavations, such as the pits for the trenchless crossings, it is assumed that discharges would be subject to treatment to settle sediments, prior to discharge to ground. Discharge to watercourses is not anticipated.

Embedded and Good Practice Measures

7.4.23 This section outlines the relevant embedded and good practice measures that have been embedded into the design of the project and therefore the assessment has been undertaken on the assumption that these measures would be carried out. All assessment work has applied a precautionary principle, in that where limited information is available (in terms of the project design), a realistic worst-case scenario is assessed.

Relevant Embedded Measures

7.4.24 Embedded measures relevant to biodiversity have included avoiding sensitive features such as ancient woodland and designated sites where practicable, through the options appraisal process, as described in ES Chapter 3: Alternatives Considered (**application document 6.2.3**).

7.4.25 Embedded measures that are particularly relevant to the biodiversity assessment are included in Table 7.3. The full list of embedded measures can be found in the Register of Environmental Actions and Commitments (REAC) **(application document 7.5.2)**.

Table 7.3 – Embedded Measures

Ref	Embedded Measure	Benefits
EM-AB02	The proposed 400kV overhead line will reuse the existing pylons (RB12 and RB13) at Hintlesham Woods Site of Special Scientific Interest (SSSI).	This would reduce loss of ancient woodland and interested features associated with the footprint of the project.
EM-AB05	The tree belt to the north of Hintlesham Woods (PoAWS5) will be retained other than at a 5m gap where the proposed temporary access route will cross the tree belt. Soil from the PoAWS5 will be stored separate to general soil storage so that it can be replaced at PoAWS5, where soil is suitable for reuse (for example, not contaminated).	This would reduce the need for clearance through the habitat to the north of the woodland would maintain an important habitat connection and corridor for protected species. Soil storage and reinstatement would aid re-establishment of existing ground flora.
EM-AB07	Construction of the proposed 400kV overhead line (including pylon foundations) and any ground excavation work (excluding removal of the existing 132kV pylons) would lie a minimum of 15m away from the designated ancient woodland (Toms Wood) boundary.	This would reduce loss of ancient woodland and interested features associated with the footprint of the project.
EM-AB09	For the construction works in and around Hintlesham Woods (between pylons 4YL011 and 4YL017A) construction works would be undertaken outside of bird breeding season except for the following activities which need to take place within agreed outages: Install conductors / transposition works; Construction of pylon 4YL12A and removal of the existing 4YL12; and Assembly and removal of temporary pylon RB12T.	This would avoid potential disturbance to breeding birds at Hintlesham Woods.
EM-E02	The 132kV overhead line will be removed at The Dollops (Babergh 185). Construction activities will be confined to the existing operational maintenance swathe at this location. The conductors will be lowered down and pulled out. Light vehicles will use existing tracks within the woodland.	This would reduce the impacts of construction on the woodland and reduce disturbance to protected species.
EM-E04	The Order Limits have been narrowed to avoid removal of trees at Alder Carr. An arboriculturalist and ecologist will be consulted on the detailed design and construction methods to advise on sensitive working within the RPA in accordance with British Standard 5837: 2012 Trees in Relation to Design, Demolition and Construction.	This would reduce the impacts of construction on the woodland and reduce disturbance to protected species. The Order Limits have been widened to the east of Alder Carr to accommodate the additional temporary soil storage.

Ref	Embedded Measure	Benefits
EM-E05	A trenchless crossing is proposed at the River Box.	The trenchless crossing would avoid disturbance to the river habitats, geomorphological features and aquatic flora and fauna.
EM-G04	A trenchless crossing is proposed at the River Stour and beneath the Sudbury Branch Railway Line.	A trenchless crossing would avoid disturbance to the river habitats, geomorphological features and aquatic flora and fauna.
EM-G08	A trenchless crossing is proposed to avoid habitats to the south of Ansell's Grove including Alphamstone Meadows Local Wildlife Site, Existing routes through the woods will be used where practicable by light good vehicles or tracked vehicles. Otherwise, pedestrian access will be maintained over the top of the trenchless crossing. There would be no temporary access route along the trenchless crossing.	A trenchless crossing would avoid disturbance to woodland habitats and would reduce loss of vegetation and reduce disturbance to protected species.
EM-H03	The proposed GSP substation has been located away from the southern edge of Butler's Wood. Construction works will not encroach into or beyond the ditch that runs east west along the northern and southern edges of the GSP substation.	This would reduce the impacts of construction on the ancient woodland and reduce disturbance to protected species within the woodland.

Good Practice Measures

7.4.26 The CoCP (**application document 7.5.1**) sets out the standard good practice measures that would be undertaken during construction of the project if it is granted consent. The relevant good practice measures relating to biodiversity including programming the removal of vegetation outside of bird breeding season where practicable (B02) and cleaning machinery when used in areas of known INNS (B04). Where relevant measures are discussed as part of the assessment, these are directly referenced along with the reference number.

7.4.27 The LEMP (**application document 7.8**) is also of relevance to the biodiversity assessment as it provides further details on how vegetation would be protected during construction and how it would be reinstated following construction.

7.5 Baseline Environment

Existing Baseline

7.5.1 The baseline presented this chapter is only for those features where potential pathways to significant effects have been identified. Biodiversity features that were identified within the study area but had no pathways to significant effects are included in the full biodiversity baseline which is presented in the supporting appendices described in Table 7.2.

Statutory Designated Sites

7.5.2 The statutory designated sites that have been identified as having potential pathways to significant effects are shown on ES Figure 7.1.1: Biodiversity Statutory Designated Sites (**application document 6.4**). Details on the location and distance of statutory designated sites from the Order Limits and their reason for designation is provided in Table 7.4. Further details about each site can be found in Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**). Further details are also presented below in relation to Hintlesham Woods SSSI and Hadleigh Railway Walk LNR which both lie within the Order Limits.

7.5.3 There are two statutory designated sites within the study area with no pathway to potential significant effects:

- Cornard Mere, Little Cornard SSSI is located approximately 2km north of the Order Limits and upstream of the River Stour. This is designated for its fen and wetland areas, over wintering snipe (*Gallinago gallinago*) and invertebrate interest. Although the IRZ of the SSSI overlaps the project, at this distance it does not raise specific concerns around electricity infrastructure projects and no pathways to effect have been identified. Therefore, this is not considered further within this chapter; and
- Arger Fen LNR is located approximately 410m south of the Order Limits and comprises ancient and non-ancient woodland and wet meadows. No pathways to effect have been identified. Therefore, this is not considered further within this chapter.

Table 7.4 – Statutory Designated Sites

Site Name, Interest and Designated Features	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Stour and Orwell Estuaries SPA/Ramsar This is a wetland of international importance, comprising extensive mudflats, low cliffs, saltmarsh and small areas of vegetated shingle on the lower reaches (Natural England, 2014a). The European site designations are coincident with Cattawade Marshes SSSI, Orwell Estuary SSSI and Stour Estuary SSSI. The SPA provides habitats for an important assemblage of wetland birds in the non-breeding season and supports internationally important numbers of wintering and passage wildfowl and waders. The site also holds several nationally scarce plants and British Red Data Book (JNCC, 2021) invertebrates.	5.72km east	Very high importance and rarity, international scale and very limited potential for substitution.	Habitat loss: • Loss of functionally linked land outside of the SPA/ Ramsar. Habitat or species fragmentation: • Fragmentation of habitat outside of the designated site used by SPA/Ramsar birds during construction in underground cable sections. • Operational dispersal barriers to SPA/Ramsar birds in flight. Reduction in species density: • Mortality or injury risk to SPA/Ramsar birds during vegetation clearance within functionally linked habitats outside of the SPA/Ramsar. • SPA/Ramsar bird collision with overhead lines. • Mortality of Ramsar designated aquatic invertebrate (via changes in water quality). • Degradation or reduction in distribution/extent of Ramsar designated plants (via changes in water quality). Disturbance/ displacement: • SPA/Ramsar bird displacement from noise, visual disturbance and lighting. • SPA/Ramsar bird avoidance of previously used habitats. Changes in Key Indictors of Conservation Value: • Air quality change (nitrogen deposition and dust). • Surface water quality change (from sedimentation and/or pollution incidents). • Groundwater quality change.

Site Name, Interest and Designated Features	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Cattawade Marshes SSSI, Stour Estuary SSSI and Orwell Estuary SSSI Underpinning SSSI of the Stour and Orwell Estuaries SPA/Ramsar. Designated for its for its grazing marshes, mudflats and saltmarsh that support important wintering bird assemblages	5.72km east to 9.1km south-east	High importance and rarity, national scale, and limited potential for substitution.	SSSI IRZ overlaps the project. Habitat or species fragmentation: • Fragmentation of habitat outside of the designated site used by SSSI birds during construction in underground cable sections. • Operational dispersal barriers to SSSI birds in flight. Disturbance/ displacement: • SSSI bird displacement from noise, visual disturbance and lighting during construction. • SSSI bird avoidance of previously used habitats.
Little Blakenham Pit SSSI Chalk grasslands. Large bat hibernation roost – Principally Daubenton's bat (*Myotis daubentoni*), Natterer's bat (*Myotis nattereri*) and brown long-eared bat (*Plecotus auritus*). Woodland and rank herbage provide foraging and sheltering opportunities for bats and shelter to help maintain a suitable microclimate within the tunnel for bats.	2.9km north-east	High importance and rarity, national scale, and limited potential for substitution	SSSI IRZ overlaps the project. Potential impacts relate to bats only. Habitat or species fragmentation: • Fragmentation of habitat outside of the designated site used by SSSI bats during construction. • Operational dispersal barriers to SSSI bats in flight. Reduction in species density: • Mortality or injury risk to SSSI bats during vegetation clearance within functionally linked habitats outside of the SSSI. Disturbance/ displacement: • SSSI bat displacement from noise, visual disturbance and lighting. • SSSI bat avoidance of previously used habitats.

Site Name, Interest and Designated Features	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Hintlesham Woods SSSI Designated for its ancient woodland habitat and breeding woodland bird assemblage. Managed by the RSPB as one of their reserves. Although not designated for its invertebrate assemblages, the site is noted as being valuable for insects particularly saproxylic invertebrate fauna.	Within the Order Limits (AB: Bramford Substation/ Hintlesham)	High importance and rarity, national scale, and limited potential for substitution.	• Temporary habitat loss. • Permanent habitat modification/degradation. Disturbance/ displacement: • SSSI bird displacement from noise, visual disturbance and lighting.
Railway Walk, Hadleigh LNR A disused railway line with semi-natural habitats. Of particular note is the area of open chalky boulder clay grassland on the steep banks of a cutting. Species present are typical of unimproved grassland with a chalky influence, including: pyramidal orchid (*Anacamptis pyramidalis*) and quaking grass (*Briza media*). Hazel dormouse has been noted to be present within this site.	Within the Order Limits (AB: Bramford Substation/ Hintlesham)	Medium importance and rarity, regional scale, and limited potential for substitution.	• Temporary habitat loss. • Permanent habitat modification/degradation.
Arger Fen SSSI A composition of habitats: lowland and wet woodlands, fen and acid and calcareous grassland habitats.	10m south (F: Leavenheath/ Assington)	High importance and rarity, national scale, and limited potential for substitution.	SSSI IRZ overlaps the project. Change in surface water quality resulting in habitat degradation.

Site Name, Interest and Designated Features	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Tiger Hill LNR (also component of Arger Fen SSSI) Habitats here include heathland, fen and woodland. Animals include dormice, badgers and bats. Volunteers have produced a 'dormouse corridor' at Tiger Hill to the neighbouring Arger Fen.	10m south (F: Leavenheath/ Assington)	Medium importance and rarity, regional scale, and limited potential for substitution	Change in surface water quality resulting in habitat degradation.

Hintlesham Woods SSSI

SSSI Interest Feature – Ancient Woodland

7.5.4 The UKHab survey of Hintlesham Woods showed the habitat to comprise w1f7 'other lowland mixed deciduous woodland' HPI (H_A_1041, H_A_772, H_A_776, H_A_819, H3_974), and the woodland is also categorised as ancient woodland. The woodland within the Order Limits that lies directly beneath the existing 400kV overhead line, was assessed to be moderate in condition. This was a 20m wide strip dominated by silver birch (*Betula pendula*) and willow regrowth to 4m high with some areas of tall herbaceous vegetation. This formed approximately 50% of the vegetation within the Order Limits and is the likely result of regular maintenance cutting to prevent interference with the power lines overhead. Dead wood was abundant due to past felling. A noticeably different ground flora, with fewer ancient woodland indicators and more ruderal species was present in this location compared to the wider woodland, which was in good condition.

7.5.5 NVC survey resulted in a clear affiliation to W8a *Fraxinus excelsior – Acer campestre – Mercurialis perennis; Primula vulgaris – Glechoma hederacea* sub-community. PoAWS4 is a large linear area within Ramsey Wood and Hintlesham Little/Great Woods. The historic mapping (Suffolk Historic Environment Record) strongly suggests that the PoAWS4 has ancient woodland origin with the habitat recorded on site exemplifying an area of pre 19th century vegetation clearance but while the mature trees of that time have gone, the ground flora diversity has remained.

SSSI Interest Feature – Breeding Bird Assemblage

7.5.6 Breeding bird surveys were undertaken in 2022 of the Ramsey Wood, Hintlesham Little Wood and the adjacent boundary edge of Hintlesham Great Wood, which are components of the Hintlesham Woods SSSI. The survey area comprised three pre-defined transects, the location of these is shown on ES Figure 7.2.2: Hintlesham Woods Breeding Bird Survey - Priority Species (**application document 6.4**).

7.5.7 Fifty-nine different bird species, comprising 32 priority species of which four were confirmed breeders, were recorded as described in ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**). Six Schedule 1 species were recorded and shown in Figure 7.2.2: Hintlesham Woods Breeding Bird Survey - Priority Species (**application document 6.4**). These were all non-breeding species and are considered to be either wintering passerines (brambling (*Fringilla montifringilla*), firecrest (*Regulus ignicapilla*), redwing (*Turdus iliacus*)) or commuting/ foraging raptors (hobby (*Falco subbuteo*), peregrine (*Falco peregrinus*) and red kite (*Milvus milvus)*).

7.5.8 The most bird activity was found along woodland edges and rides where the open tree canopy promoted the growth of a scrubby understory that are of high value to breeding birds. Conversely, it was evident that dense areas of woodland with limited natural light significantly reduced the presence of bird activity.

Railway Walk, Hadleigh LNR

7.5.9 A UKHab survey was undertaken in 2022 and the habitat where the Order Limits cross Railway Walk, Hadleigh LNR was identified as predominantly w1g woodland; other broadleaved in poor condition. Additional h3h mixed scrub in moderate condition was present to the north. The canopy was dominated by pedunculate oak (*Quercus robur*) with evidence of historic pollarding and an understory of blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*) and elm (*Ulmus sp*.) all being occasional. There was a high proportion (>25%) of bare earth with common ruderal species indicative of nutrient enrichment dominating the ground flora, such as common nettle (*Urtica dioica*) being dominant, bramble (*Rubus fruticosus agg.*) locally abundant and cleavers (*Galium aparine*) being occasional. One ancient woodland indicator species was identified; false-brome (*Brachypodium sylvaticum*), being rare to locally abundant to the south.

Non-Statutory Designated Sites

7.5.10 Where potential pathways to significant effects have been identified on non-statutory designated sites, these are listed in Table 7.5 and are shown in ES Figure 7.1.2: Biodiversity Non-Statutory Designated Sites (**application document 6.4**). A summary of habitat survey for each of those sites within the Order Limits, where access permitted, is also provided in ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**).

7.5.11 Where ancient woodland or lowland fen is present, the value of these sites is high due to the irreplaceable nature of these habitats. For all other non-statutory designated sites, the value of these sites is medium because the sites are of county importance.

7.5.12 RNR 195 and RNR 202 are designated for their botanical interest and located on the verges of Wormingford Road and Rands Road, respectively. RNR 195 is located within the Order Limits but is included for enhancement planting only as part of BNG proposals. As a result, no impacts are anticipated. RNR 202 is located immediately adjacent to the Order Limits which cover an access road. No construction works are proposed that would impact this site.

7.5.13 Although the Order Limits are adjacent to Bushy Park Wood CWS, and Pebmarsh House LoWS, no pathway to effect has been identified as the Order Limits in these areas are associated with BNG proposals only, as described in the Environmental Gain Report (**application document 7.4**). Similarly, although the Order Limits are adjacent to Daws Hall LoWS, no pathway to effect has been identified as the Order Limits in this area are for access along an existing road (Henny Road).

7.5.14 Sites such as Habitat Network Restorable habitat (Defra, 2021e) and Buglife's B-Lines present within the study area are valued as negligible, but their presence and objectives have been considered when identifying the net gain opportunities presented within the Environmental Gain Report (**application document 7.4**).

Table 7.5 – Non-Statutory Designated Sites Where Potential Pathways to Significant Effects Have Been Identified

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Section AB: Bramford Substation/Hintlesham				
Sproughton Park CWS A range of habitats including wet grassland, alder carr, veteran trees, hedgerows, ponds, and springs. Fauna associated includes birds, bats, badger, otter (*Lutra lutra*), water vole (*Arvicola amphibius*), water shrew (*Neomys fodiens*) and amphibians.	N/A – survey not considered necessary as site does not fall within the Order Limits.	100m south-east	Medium	Change in surface water quality resulting in habitat degradation
Tom's/Broadoak Wood CWS Ancient woodland	N/A – survey not considered necessary as site does not fall within the Order Limits.	Immediately adjacent – south	High	Habitat degradation
Valley Farm Meadow CWS An area of low lying land and partly waterlogged year round. Of botanical note include the species common bistort (*Bistorta officinalis*) which is rare in Suffolk. Cattle grazing maintains the meadow and promotes a wider variety of species in its dryer areas.	The majority of the site comprised g3c other neutral grassland in poor condition with creeping soft grass (*Holcus mollis*) and Yorkshire fog (*Holcus lanatus*) present in abundance. The west of the site was an area of pasture with a highwater table dominated by soft rush (*Juncus effusus*) and brooklime (*Veronica beccabunga*) with scattered grey willow (*Salix cinerea)* scrub comprising f2b purple moor grass and rush pastures (HPI). A small area to the south-east transitioned into w1d wet woodland HPI with young grey willow and some semi-mature alder. A small area of f2 fen marsh and swamp HPI (0.03ha) was also located within the Order Limits.	Within the Order Limits	High	Temporary habitat loss

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Hadleigh Railway Walk CWS A former railway line inclusive of a range of semi-natural habitats and the ancient Raydon Great Wood. Open chalk grassland on the steep banks as a result of cutting contain notable plant communities. Description notes presence of dormice.	Where the Order Limits crossed the CWS other woodland habitats were identified comprising w1g broadleaved woodland in poor condition and h3h mixed scrub in moderate condition, with a high proportion of bare earth and common ruderal species present.	Within the Order Limits	Medium	Permanent habitat modification
Section C: Brett Valley				
River Brett (Sections) CWS Watercourse with good water quality of importance for aquatic wildlife. Diverse wetland flora supported, including river water-dropwort (*Oenanthe fluviatilis*) which is a rare plant in special need of protection in the Anglian region.	N/A – see ES Appendix 7.3: Aquatic Ecology (application document 6.3.7.3) for description of River Brett within the Order Limits (not CWS)	0.4km	Medium	Change in surface water quality resulting in habitat degradation
Section D: Polstead				
Valley Farm Wood CWS A secondary woodland with an area on its northern side considered to be ancient. It contains historic footways bordered by hedgerows containing ancient woodland species. Further notable flora is found in the dryer parts of the woodland, with wetter areas partially replanted by non-native	The western area of the CWS crossed by the Order Limits comprised a former Scots pine (*Pinus sylvestris*) woodland: w1h other woodland mixed in moderate condition with areas for rearing game birds. A watercourse was present to the west but there was no significant change in botanical species composition. The east of the wooded area comprised w1f7 Other Lowland mixed deciduous	Within the Order Limits	High	Permanent and temporary habitat loss Permanent habitat modification

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
species and to it southern extent a large artificially made sport fishing lake. Hazel dormice present.	woodland HPI with planted willow (*Salix* species) and a wet ditch (r2) running north to south however it was almost dry with no flow at the time of the survey. No mature trees present. The eastern area was a field of g4 modified grassland in good condition used for grazing livestock.			
Layham Pit Woodland and Meadow CWS An active quarry, with areas of undisturbed habitats fed by a cut off tributary with habitats of semi-natural woodland, wet woodland unimproved wet grassland and fen meadow.	Where the Order Limits overlaps with the CWS the area comprises woodland and urban developed habitat. A large proportion of the area comprised w1g7 other broadleaved woodland types in poor condition. The habitat was a secondary woodland with a silver birch dominant canopy layer. There was no understorey and ground flora were those indicative of disturbed land. An area of secondary w1f lowland mixed deciduous woodland HPI and w1d wet woodland was located to the eastern side, in moderate and poor condition, respectively. To the north a very small area of HPI u1a open mosaic habitat on previously developed land in moderate condition, was identified within the CWS.	Within the Order Limits	Medium	Permanent and temporary habitat loss Permanent habitat modification
Millfield Wood CWS Ancient woodland	N/A – survey not considered necessary as site does not fall within the Order Limits.	Immediately adjacent – north and south	High	Habitat degradation
Section E: Dedham Vale Area of Outstanding Natural Beauty (AONB)				

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
The Dollops CWS A woodland situated along the course of a stream. Varying in structure due to a steep topography down to the watercourse. It contains wet woodland HPI dominated by willow in its centre and bordered by oak (*Quercus* sp.) and ash (*Fraxinus excelsior*) woodland or hedgerows.	W1f Lowland mixed deciduous woodland and w1d wet woodland both of moderate condition, were located where the Order Limits cross the CWS. There were numerous fallen and standing deadwood. The area and close vicinity held a wide variety of ancient woodland indicator species, with a further wide variety of flora typical of and transitioning between the dry to wet woodland.	Within the Order Limits	High	Habitat gain
Broom Hill Wood CWS An ancient woodland which has been partially replanted with non-native species. However, still holds a wide age range of native tree species.	No site survey undertaken due to land access constraints. Aerial photography and site photographs suggest woodland edge habitat with no mature trees.	Immediately adjacent – north	High	Habitat degradation
Section F: Leavenheath/Assington				
Leadenhall Wood CWS Ancient woodland consisting of mainly ash and lime coppice.	N/A – survey not considered necessary as site does not fall within the Order Limits.	3m east	High	Habitat degradation
Arger Fen and Spouse's Vale SWT Reserve Mosaic of ancient coppice woodland and new naturally regenerating woodland alongside wet meadows. Hazel dormouse, barbastelle bat (*Barbastella barbastellus*),	N/A – survey not considered necessary as site does not fall within the Order Limits.	4m south	Medium (excl. SSSI habitats)	Change in surface water quality resulting in habitat degradation

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
badger, common lizard, grass snake and various butterflies present.				
Tiger Hill Long Meadow CWS Grassland in a river valley comprising neutral grassland, rush pasture and fen meadow, scrub and mature native hedgerows.	N/A – survey not considered necessary as site does not fall within the Order Limits.	235m south	Medium	Change in surface water quality resulting in habitat degradation
Section G: Stour Valley				
Moat Farm/Burnt House Marsh LoWS Comprises a wooded stream with a mix of wet and dry grassland habitats	N/A – survey not considered necessary as site does not fall within the Order Limits.	10m south	Medium	Change in surface water quality resulting in habitat degradation
Alphamstone Meadows LoWS The site contains diverse habitats including wet meadows, dry grassland and marsh. This supports a wide variety of wetland plant species.	Where the Order Limits cross the LoWS, the habitats comprised g1a6 other lowland dry acid grassland, g3c5 *arrhenatherum* neutral grassland and w1d wet woodland. A wide diversity of plant species were identified between these habitats. INNS variegated yellow archangel and Himalayan balsam were both present occasionally. The lack of management at the site is resulting in the majority of habitats being in poor condition, apart from the acidic grassland which was good in condition. R1 watercourses (W-G-12, W-G-13, W-G-14 and W-G-15) run through the LoWS and are crossed by the Order Limits	Within the Order Limits	Medium	Temporary habitat loss Change in surface water quality resulting in habitat degradation

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Alphamstone Complex LoWS The site contains a variety of habitats varying from dry grassland, alder carr, woodland and swamps. A notable quantity of alternate-leaved golden saxifrage (*Chrysosplenium alternifolium*) is present.	Where the Order Limits overlap the LoWS, the habitat is considered to be h3 dense scrub, once a hedgerow that has grown into dense scrub with a ditch running through it. The west of the LoWS within the Order Limits comprised a small area of w1f lowland mixed deciduous woodland HPI (HL_197 in Figure 7.1.4 application document 6.4), dominated by ash, in moderate condition.	Within the Order Limits	Medium	Temporary habitat loss
Loshes Meadow Complex LoWS (part EWT Reserve) Contains a mosaic of grassland, woodland, plantations, hedgerows and marsh. The Loshes Brook to the north of the site provides further habitats for wildlife.	The Order Limits cross the LoWS at two locations. The northern section comprised a mosaic of w1g7 other broadleaved woodland, h3b hazel scrub, g3c other neutral grassland and u1a open mosaic habitats on previously developed land HPI. The g3c other neutral grassland to the east was heavily disturbed and has wet areas as it slopes to the river. The second, southern area comprised a plantation of w1f7 other lowland mixed deciduous woodland HPI (H_A_797 and H_A_814 in Figure 7.1.4 application document 6.4) in poor condition.	Within the Order Limits	Medium	Temporary habitat loss Change in surface water quality resulting in habitat degradation
Ansell's Grove/Ash Ground LoWS Woodland within a valley varying in structure from the damp valley centre to the dryer slopes. Wet woodland indicator species are present as well as ancient woodland indicative species.	The Order Limits cross the higher part of the woodland of the wider LoWS on the valley slope and comprised w1f lowland mixed deciduous ash and oak woodland and w1d wet woodland. Ancient woodland indicator species were present. G3c other neutral grassland was present.	Within the Order Limits	High	Habitat gain

Site Name, Interest and Designated Features	Field Survey 2022 (see ES Appendix 7.1 (Application Document 6.3.7.1))	Distance from Order Limits	Value	Pathway to Effect in the Absence of Embedded and Good Practice Measures
Twinstead Marsh LoWS This site holds a wide variety of habitats including alder and willow (*Salix* sp.) carr, marsh and open water.	Where the project overlaps the site, the habitats identified include alder and willow dominated w1d wet woodland in moderate condition, with ground flora dominated by nutrient enrichment species. A cut area of g3c Other neutral grassland of poor condition was also identified, likely created when the existing pylon was first installed. The lake was identified as HPI r1a6 other eutrophic standing waters and in poor condition due to the lack of aquatic vegetation and its use as a fishing lake. H3h mixed scrub was present to the south-east of the site with an access track to the waterbody within it.	Within the Order Limits	Medium	Temporary habitat loss Change in surface water quality resulting in habitat degradation
Section H: GSP Substation				
Waldegrave Wood LoWS Ancient woodland	The woodland was categorised as w1f7 Other lowland woodland mixed deciduous woodland with oak and hazel dominant in the canopy. Numerous ancient woodland indicator species present in the ground flora.	Within the Order Limits	High	Habitat degradation
Butler's Wood LoWS Ancient woodland	The woodland was categorised as w1f7 Other lowland woodland mixed deciduous woodland with an abundant oak canopy cover with frequent hazel, silver birch and ash. Numerous ancient woodland indicator species present in the ground flora.	Immediately adjacent	High	Habitat degradation

Habitats

Ancient Woodland

7.5.15 There are numerous blocks of ancient woodland within 1km of the Order Limits, including one Ancient Woodland Inventory (AWI) site within the Order Limits at Hintlesham Little Wood (Section AB: Bramford Substation/Hintlesham). Based on their designation and the irreplaceable nature of this habitat, these habitats are valued as high. The AWI sites are shown on ES Figure 7.4.1: Ancient Woodland and Veteran Trees (**application document 6.4**).

7.5.16 Areas of potential ancient woodland sites (PoAWS) have been identified through desk study as having features suggesting ancient woodland origin that are not been included in the AWI. This process is further detailed in Appendix 7.4: Ancient Woodland and Potential Ancient Woodland Report (**application document 6.3.7.4**). Field surveys of all 11 PoAWS concluded that three were likely to be ancient woodland. These are PoAWS 4, PoAWS 5 and PoAWS 10 which are valued as high. The remaining PoAWS are not considered to be of ancient origin and are assessed as their relevant woodland habitat.

7.5.17 No ancient trees have been identified within the Order Limits or within a 15m RPA. Ten pedunculate oak trees have been identified as veteran trees and are located within the Order Limits or within a 15m RPA. Further details can be found in the Arboricultural Impact Assessment (**application document 5.10**).

Habitats of Principal Importance

7.5.18 Desk study confirmed by UKHab surveys of the Order Limits identified the presence of the following HPI:

- Coastal and floodplain grazing marsh;
- Lowland mixed deciduous woodland;
- Lowland dry acidic grassland;
- Arable field margins;
- Wet woodland;
- Open mosaic on previously developed land;
- Purple moor grass and rush pastures;
- Lowland fen;
- Hedgerows;
- Rivers;
- Mesotrophic lakes; and
- Eutrophic standing waters and ponds.

7.5.19 Desk study identified additional areas of HPI located within the wider study area (see ES Figure 7.1.3 Habitats of Principal Importance and GWDTE (**application document 6.4**)).

7.5.20 HPI are valued as medium because these habitats are of county importance. A precautionary high value is given to lowland fen due to its irreplaceable definition as per the National Planning Policy Framework (MHCLG, 2021).

Terrestrial Habitats

7.5.21 UKHab surveys of the Order Limits identified valuable habitats including lowland deciduous woodlands, wet woodlands, species-rich hedgerows, river valleys and ponds. Full details of the terrestrial habitat survey results can be found in ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1**).

7.5.22 The landscape was found to be highly agricultural, dominated by arable and pasture bordered with a range of boundary hedgerow types. Occasional blocks of semi-natural broadleaved woodland and plantations interspersed the study area, some of ancient origin, some recently planted. What limited grassland diversity existed was located to the west of the study area, in the main associated with the Stour Valley (Section G).

7.5.23 A desk based approach has been used to cover areas where land access was not granted using high resolution aerial photography mapping (taken between 2017 and 2019) (RGB Aerial Photography, 2021) and comparisons with Phase 1 habitat survey data from 2012. ES Figure 7.1.4 and 7.1.5 show habitat categories identified across the Order Limits (**application document 6.4**).

7.5.24 Areas of alder woodland on floodplains (H91EO) habitat listed as per Annex I of the Conservation of Habitats and Species Regulations 2017 (as amended) were also identified within the Order Limits and have been given a medium value as although they have international importance, they have a widespread presence across the UK albeit likely remnant fragments and recent in origin.

7.5.25 A desk study was undertaken to identify hedgerows and lines of trees within the Order Limits, followed by site surveys of the hedgerows between June 2021 and June 2022. These were undertaken alongside the UKHab surveys, collecting information to inform habitat condition assessment and enable identification of important hedgerows as specified by the Hedgerows Regulations 1997. The desk study and field survey identified 288 hedgerows within the Order Limits, 230 (or approximately 80%) of which were considered to be 'important' under the Hedgerows Regulations 1997. The full results can be found in ES Appendix 7.5: Important Hedgerows Assessment (**application document 6.3.7.5**) and on ES Figure 7.5.1: Important Hedgerows (**application document 6.4**).

Arable Plant Assemblage

7.5.26 The desk study identified a range of notable arable plant species within 1km of the Order Limits within the past 15 years. These include prickly poppy (*Papaver argemone*) (also GB VU and Eng EN), smooth cat's ear (*Hypochaeris glabra*) (GB VU and EN VU) and common cudweed (*Filago vulgaris*) within the Order Limits and the Important Arable Plant Areas Threatened Species (Plantlife, 2022); mousetail (*Myosurus minimus*), dwarf spurge (*Euphorbia exigua*), field woundwort (*Stachys arvensis*), weasel's-snout (*Misopates orontium*), spreading hedge-parsley (*Torilis arvensis*), corn spurrey (*Spergula arvensis*) and shepherd's-needle (*Scandix pecten-veneris*) within the wider study area.

7.5.27 Where arable fields showed potential to support notable arable plants or assemblages during the UKHab survey, these were surveyed further. Two areas (IAPA_8 and IAPA_9) were identified as meeting the Important Arable Plant Assemblages threshold at county level due to the presence of cornflower (*Centaurea cyanus*) and corn marigold (*Glebionis segetum*) and are shown on ES Figure 7.1.6: Notable Plants and Important Arable Plant Assemblages (**application document 6.4**). As a result of their county importance, this receptor at these locations is given a medium value.

Watercourses and Aquatic Habitats

7.5.28 The Order Limits cross the following main rivers: the Belstead Brook (at three locations including the tributary known as the Spring Brook), the River Brett, the River Box, the River Stour (including an unnamed tributary to the River Stour). A retained overhead line section also crosses the Henny Meadow Fleet There are also numerous tributaries of these rivers, classified as ordinary watercourses. The watercourses generally flow in a north-west to south-east direction towards the Stour and Orwell Estuaries.

7.5.29 Environment Agency records (2022f) provided fish data for the main river crossings and is reported in ES Appendix 7.3: Aquatic Baseline Report (**application document 6.3.7.3**). This data demonstrated that Annex II Habitats Directive species (brook lamprey (*Lampetra planeri*), spined loach (*Cobitis taenia*) (which is also a Species of Principal Importance (SPI)) and bullhead (*Cottus gobio*), in addition to SPI European eel (*Anguilla anguilla*) and brown/sea trout (*Salmo trutta*)) were present in the following watercourses and as a result these watercourses were classified as HPI:

- Belstead Brook (bullhead, brown/sea trout and European eel);
- River Brett (bullhead, brown/sea trout and European eel);
- River Box (bullhead, brown/sea trout and European eel);
- River Stour (bullhead, European eel, brook lamprey and spined loach); and
- Henny Meadow Fleet (bullhead, brook lamprey and spined loach).

7.5.30 MoRPh survey, photographs and subsequent River Condition Assessment (RCA) were undertaken in 2021 and 2022 with results reported within ES Appendix 7.3: Aquatic Ecology Baseline Report (**application document 6.3.7.3**). River types H, K and F were identified which are straight and sinuous watercourses typical of lowland England. The RCA concluded with condition classes between fairly poor to fairly good. Where fairly poor RCA was identified this appeared to be due to the watercourses being ‘overdeep’.

7.5.31 The Water Framework Directive Assessment (**application document 5.6**) provides further details on the ecological status of the waterbodies crossed by the project.

7.5.32 Due to being classified as HPI, the Belstead Brook, River Brett, River Box, River Stour and Henny Meadow Fleet have been given a medium value. All other rivers, ordinary watercourses and ditches are given a low value.

Aquatic Ecology

7.5.33 Aquatic receptors comprising macroinvertebrates, fish, and aquatic flora are known to be present within the watercourses, ponds and ditches within the Order Limits. A subsequent desk study of watercourse crossings was undertaken to determine the sensitivity for aquatic ecological features in each, which is reported in ES Appendix 7.3: Aquatic Baseline Report (**application document 6.3.7.3**).

7.5.34 Each watercourse was classified as having high, moderate or low sensitivity i.e. suitability to support aquatic ecological features. Sensitivity was determined with cognisance of the physical habitat observed at each site (aerial photography and/or site photographs), the presence of optimal/suboptimal habitats for species of conservation interest, presence of general aquatic flora and fauna and the potential influence of wider catchment pressures.

7.5.35 Twelve watercourses had low ecological sensitivity and tended to be shallow, narrow streams in a woodland setting. These sites were heavily shaded from the woodland canopy resulting in poor riparian cover or in-channel macrophyte growth. Watercourses typically were either low energy or held very low water levels, reducing habitat diversity for aquatic features.

7.5.36 Five watercourses had moderate sensitivity and were larger watercourses including the Rivers Brett, Box and Stour. These had a mix of habitat types for aquatic flora and fauna and sufficient water depth to allow year-round utilisation. No high sensitivity habitats for aquatic ecology features were identified.

7.5.37 The main rivers crossed by the Order Limits support a diverse range of cyprinid fish species, typical of large rivers and streams in lowland settings. Annex II Habitats Directive species (brook lamprey, spined loach and bullhead) and SPI (European eel, brown/sea trout and spined loach) were reported in the Belstead Brook, River Brett, River Box, River Stour and Henny Meadow Fleet. ES Appendix 7.3: Aquatic Baseline Report (**application document 6.3.7.3**) provides detailed desk study on fish species. The main rivers are therefore considered to be of medium value as they support fish species of county importance. Fish communities comprising non-migratory species, e.g. coarse fish, are typically ubiquitous to watercourses that pass through the Order Limits. These communities have a lower sensitivity to change and are therefore assessed as being of low value, as they are of local importance.

7.5.38 Environment Agency records (Environment Agency, 2020f) provided invertebrate data for the main river crossings and is reported in ES Appendix 7.3: Aquatic Baseline Report (**application document 6.3.7.3**). This data demonstrates good freshwater habitat quality, typified by invertebrate rich communities. Two aquatic invertebrate species of conservation interest were identified in the SBIS records. The scarce chaser (*Libellula fulva*) was reported from the Rivers Stour, Box and Brett and their tributaries. A single record of the water beetle (*Neobrioporous depressus*) was provided for the River Box. A number of pond and stream features were surveyed in 2010 for aquatic invertebrates. No species of conservation interest were recorded from any of the pond or riverine sites. A low value is given to aquatic invertebrates as they are of local importance.

7.5.39 No notable, protected, or non-native macrophyte species were identified in the desk study or field survey. All species are considered to be common and ubiquitous to the habitats they were recorded in. However, a precautionary approach to valuing is used and a low value has been given, as they are of local importance.

Bats

7.5.40 ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) details the outcomes of the desk study, habitat suitability modelling and results of field survey for bats. No SAC that have bats as qualifying features are located within 30km of the Order Limits. Little Blakenham Pit SSSI, Tiger Hill LNR and Arger Fen and Spouse's Vale LNR, Sproughton Park CWS, Raydon Great Wood CWS and Bushy Park Wood CWS all have bats mentioned within their citations. Little Blakenham Pit SSSI is designated for supporting one of the largest underground roosts for hibernating bats known in Great Britain. This is discussed separately as part of the statutory designated sites assessment.

7.5.41 The following bat species have been identified in the desk study and during field surveys undertaken in 2012/3 and 2021/2:

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Daubenton's bat;
- Natterer's bat;
- Brown long-eared bat;
- Noctule (*Nyctalus noctula*);
- Serotine (*Eptesicus serotinus);*
- Leisler's bat (*Nyctalus leisleri*);
- *Myotis* bat species; and
- Barbastelle bat.

Bat Roosts – Trees

7.5.42 Over 700 trees were ground assessed in 2021 and 2022, initially based on the Scoping Boundary at that time (see the Scoping Report (**application document 6.5.1**) for further details) and had some level of bat roosting potential identified. As the Proposed Alignment and design was refined, the survey effort was focused on the trees that were likely to be affected during construction. The nature of the proposed works (e.g. whether it was overhead line or underground cable) was also used to subsequently refine the survey area. As the project commitments for tree retention were further confirmed, the number of trees potentially affected were further reduced.

7.5.43 Details on the approach to survey are given in ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**). National Grid will continue to review the trees potentially affected by the project and would undertake further bat surveys if additional trees are considered to be at risk from the application of the LoD and these would be covered within the future EPS bat licence.

7.5.44 Four bat roosts in trees have been found within the Order Limits or within the 50m survey area. These are detailed in Table 7.6 and are shown in ES Figure 7.7.4: Bat Survey - Trees (**application document 6.4**). Two additional bat roosts were identified and are detailed in Appendix 7.7 (**application document 6.3.7.7**) but are located beyond the 50m survey area defined by the final Order Limits and so not included in this assessment.

7.5.45 Where it was not possible to undertake either ground based surveys or aerial inspections of potential tree roost features with endoscope, a desk study supported with alternative evidence (the Bat Tree Habitat Key (Andrews, 2018), static detector and crossing point survey results, local record centre data and previous field survey) was undertaken to identify bat roost types that may be present. Seven trees with high or moderate bat roosting potential that could be impacted by the project were deemed unsafe to climb / could not be inspected from ground level. A precautionary approach to assessment of these trees has been undertaken and it has been assumed that they could support a range of bat species including hibernation or maternity types.

Bat Roosts – Buildings

7.5.46 Sixteen buildings were identified for bat survey within the 50m survey area. Two of these were within the Order Limits (BB1 and BB2), the remaining were located within the 50m survey area. Hill View is an additional residential property and associated outbuildings located within the Order Limits to the east of High Road, Assington (X: 594113, Y:237242). This property has not been surveyed to date but would be surveyed pre-construction. All buildings are shown on Figure 7.7.3: Bat Survey - Buildings (**application document 6.4**).

7.5.47 No buildings were confirmed as supporting bat roosts within the Order Limits (N.B. Hill View would be surveyed prior to commencement of works). Buildings BB5a and BB10 had confirmed bat roost within 50m of the Order Limits. These comprised low numbers of common species, see Table 7.6. Two additional bat roosts were identified just beyond the 50m survey area. These are detailed in ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) but are not included in the assessment.

Table 7.6 – Summary of Bat Roosts Within Trees and Buildings Within the Survey Area

Roost ID	Species and Maximum Counts	Roost Type	Distance from Order Limits (m)
Trees			
136a_T059	Brown long-eared bat – one bat	Day roost	10
T35a_T004	Pipistrelle species – probably soprano – one bat	Day roost	10
TC27	Natterer's bat – three bats (DNA confirmation)	Day roost	2
T16	Soprano pipistrelle – one bat	Transitional roost	2
Buildings			
BB10	Common pipistrelle – two bats	Day or transitional roost	30
BB5a	Common pipistrelle – three Brown long-eared bat - one	Day roost	50

7.5.48 Small bat roosts of common species are considered of local value (Wray *et al*., 2010). Pipistrelle and brown long-eared bat species are common in Suffolk (SBIS, 2017) and as a result, the day/transitional roosts identified in the surveys are assigned low value as they are of local level importance. Natterer's bats are less common and as a result are considered of medium value due to their county level importance.

Barbastelle Bats

7.5.49 SBIS (2017) suggests that barbastelle bats are widespread cross Suffolk in suitable habitat but in very small numbers. Barbastelle records in Essex are comparatively fewer. The desk study identified presence of barbastelle bat in Tiger Hill LNR, Arger Fen (including Arger Fen LNR) and Layham.

7.5.50 A survey undertaken in 2012 at Hintlesham Woods confirmed the presence of barbastelle bats (Suffolk Bat Group, 2012). Barbastelle bat activity was also recorded during the 2012/13 bat surveys in Section E: Dedham Vale AONB and Section F: Leavenheath/Assington and also recorded incidentally during emergence bat surveys in July 2021, in Section H: GSP Substation.

7.5.51 A focused survey programme was undertaken for barbastelle bats at Hintlesham Woods between May and August 2022. This comprised static bat detector deployment, crossing point surveys and a session of bat trapping in August 2022.

7.5.52 Static detector deployment confirmed presence of barbastelle bat with first recorded activity times within the anticipated 45 mins emergence time from roosts. This suggests barbastelle roosting activity within the wood. Static detectors also recorded relatively high levels of activity along hedgerows leading out of the woodland to the north and along the bridleway to the south, as shown on Figure 7.7.14: Crossing point and static detector survey locations - Hintlesham Woods (**application document 6.4**).

7.5.53 This was confirmed with crossing point surveys where surveyors also observed passes by barbastelle bats. Crossing point surveys also confirmed barbastelle bats crossed the existing 400kV overhead line operational maintained swathe and were most active in the hours after dusk toward the south, below the existing overhead wire and dispersing along the bridleway. The bat trapping surveys caught three barbastelle bats; two post-lactating females and one juvenile male. Capture of barbastelle bats at these life stages suggest a maternity roost is likely present within Hintlesham Woods.

7.5.54 Barbastelle bats, particularly with reference to the likely maternity roost at Hintlesham Woods, are given a high value as they are of national level importance.

Foraging and Commuting Habitat / HSM

7.5.55 Habitat Suitability Modelling (HSM) was used as a statistical technique to predict the suitability of the habitats within the Order Limits to support bat species and subsequently their likely distribution. Data on 28 environmental variables such as road cover, woodland edge density and ditch cover were obtained and correlated with records of bat presence. The output is a 'heatmap' of modelled habitat connectivity at the landscape scale, suitable for the scale of the project. Full details are provided in ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) and heatmaps provided for each species/species group in ES Figures 7.7.5 to 7.7.13 (**application document 6.4**).

7.5.56 Between Bramford and Hadleigh, the HSM showed a moderate to high habitat suitability for most species. The landscape in this area is made up of mainly arable land with woodlands, notably Hintlesham Woods, Wolves Wood to the north of the Order Limits and Raydon Great Wood to the south of the Order Limits. These provided moderate to high suitability habitat. Treelines and watercourses such as the River Brett, Spring Brook and River Box also provided moderate to high suitability for most species. Holbrook Park/Shrub Wood/Great Birch Wood, south of Ipswich, had moderate to high suitability for most species and has good connectivity to neighbouring woodland patches associated with the Order Limits. The HSM showed the area to the east of Bramford had generally low habitat suitability for most bat species.

7.5.57 In the more central areas of the project, i.e. Sections D: Polstead to Section F: Leavenheath/Assington, the HSM showed there was generally low habitat suitability for most species with small patches of moderate to high habitat suitability across the area. The landscape is dominated by arable fields with few hedgerows. Areas of suitable habitat for foraging and commuting bats are present in the form of small to moderate woodland pockets and treelines but these are not generally well connected. Areas such as Polstead Heath/Millfield Wood, Hazel Grove, Long Wood, Assington Thicks, and Arger Fen provide moderate to high suitability for most bat species across the wider landscape. In addition, areas of woodland to the south of the project at Stour Valley such as Rectory Wood, Fiddler's, Hillhouse Wood and Grove Wood provided moderate to high suitability for most bat species and connections to key locations/habitat.

7.5.58 For Section G: Stour Valley and Section H: GSP Substation, the HSM showed there was generally low habitat suitability for most species with isolated, small patches of moderate to high suitability north of Twinstead and Sudbury, such as Home Wood and New Farm, respectively. Sudbury is located north of the Order Limits and can be described as an urbanised area which the HSM showed to be of low suitability for most bat species apart from common and soprano pipistrelle. This may be because both species had a positive relationship with minor road density and be an indication that these species use roads more for navigation as opposed to hedgerows and streetlights for foraging.

7.5.59 The HSM mapping output for barbastelle bat showed high suitability closely focussed around woodland, particularly those of more than 500m 'patch size' which was the most significant variable that influenced the model. The majority of woodland across the study area is shown as high suitability for barbastelle as well as the areas immediately around those woodlands, particularly those that are connected. Suitability decreases as distance from woodland increases, with arable and urban environments being the least suitable.

7.5.60 The Order Limits cross the following areas which are shown as high suitability for all bat species:

- Hintlesham Woods;
- Areas around Hintlesham Golf Club;
- The disused railway south of Hadleigh;
- Dollop's Wood;
- Broom Hill Wood, Bushy Park Wood and connected habitat;

- Immediately east of the proposed Stour Valley East CSE compound where woodlands are located immediately north and south of the Order Limits and connected by linear woodland; and
- Assington Thicks to Arger Fen.

7.5.61 The majority of the Order Limits and the surrounding areas are considered to be of low value for bats being dominated by arable fields bordered by managed hedgerows. However, suitability for a range of bat species increases where presence of woodland with connecting watercourses, tree belts and hedgerows, increases. Therefore, as a whole, the foraging and commuting habitat within the Order Limits is considered to be of county importance and is therefore of medium value for all bat species.

Breeding Birds

7.5.62 A desk based assessment was undertaken to determine habitat suitability within the Order Limits for notable bird species, i.e. those with an increased level of protection in the UK and are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), are SPI, are listed as red or amber on the Birds of Conservation Concern 5 (Stanbury *et al*., 2021) or are considered priority species in Essex or Suffolk.

7.5.63 A habitat suitability assessment was compiled for breeding birds and is reported in ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**). This used data from the 2021/2022 UKHab survey, the 2009-2012 bird surveys, species records and a review of citations for statutory sites and non-statutory designated sites within 1km of the Order Limits. The combined results in Annex C of ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**) and incidental recording of bird species in 2021-2022 identified 90 notable bird species, 30 of which had evidence of breeding behaviour recorded.

7.5.64 The areas within the study area that contain habitats that are potentially suitable for supporting notable bird species are detailed in ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**). This shows that notable bird species could be present in almost any of the semi-natural habitats within the Order Limits, including cropland, wetland, grassland, heathland, hedgerows, rivers and lakes, woodland and in urban areas. Due to this, the Order Limits are likely to support a range of notable bird species.

7.5.65 Cropland (including arable farmland and margins) was the most common habitat present throughout the Order Limits, which provides habitat and feeding opportunities for farmland birds, in particular Section AB: Bramford Substation/Hintlesham, near Hintlesham Village and Section F: Leavenheath/Assington, near Assington. These species are likely to include but are not limited to grey partridge *(Perdix perdix*) and yellowhammer (*Emberiza citrinella*).

7.5.66 Hedgerows border the majority of the arable farmland and are likely to support a range of notable bird species for nesting and as a food resource. Many of these are passerine species and include bullfinch (*Pyrrhula pyrrhula*), song thrush (*Turdus philomelos*) and Schedule 1 species redwing.

7.5.67 Areas of scrub support passerine species and is important for cover for birds such as nightingale. Areas of woodland were also present along the length of the Order Limits, for example Hintlesham Woods, Chestnut Grove and Alder Carr. These support a number of notable woodland species including woodcock (*Scolopax rusticola*), hobby and tawny owl.

7.5.68 ES Figure 7.2.5: Schedule 1 Bird Species Baseline (**application document 6.4**) shows the location of Schedule 1 bird species recorded within the study area. Examples include several records of fieldfare (*Turdus pilaris*) within Section AB: Bramford Substation/Hintlesham to the north of Hintlesham village and barn owl records within Section D: Polstead. Kingfisher were recorded in association with the River Brett. A number of barn owl boxes were also noted within the Order Limits and are shown on ES Figure 7.2.5 (**application document 6.4**).

7.5.69 Breeding birds and raptors have been shown to be consistent with the range of habitats available within the local landscape. To value the overall breeding bird assemblage, Fuller (1980) describes a method to value the ornithological importance of sites using the number of breeding species present. A survey area with 25–49 breeding bird species is considered to have local level of importance. Therefore, the 30 species identified as breeding or probably breeding, mean that breeding birds and raptors outside of statutory designated sites are valued as low, as they are of local importance.

Hazel Dormouse

7.5.70 The desk study identified hazel dormouse presence across the Order Limits by local record centre data and citations for ten designated sites. Field surveys undertaken by the Suffolk Wildlife Trust, on behalf of National Grid in 2012 confirmed the presence of dormouse across the study area, with a suggestion that all suitable habitats may support dormouse, even if they were not confirmed as present during the field survey. The population recorded was spread over a wide geographical area and was not focused on a specific location. Further details can be found in ES Appendix 7.8: Dormouse Survey Report (**application document 6.3.7.8**).

7.5.71 The wider landscape surrounding the project, particularly to the west, supports a large amount of optimal dormouse habitat, including hedgerows and broadleaved woodland, much of which is ancient in origin. The suitable dormouse habitat within the Order Limits is typically well connected to these wider landscape habitats by hedgerows, woodland belts and lines of trees.

7.5.72 The UKHab survey confirmed the presence of habitats suitable to support dormice within the study area, as shown on ES Figure 7.8.1: Dormouse Desk Study (**application document 6.4**). In addition, a targeted dormouse field survey was completed between May and October 2022. Evidence of dormice was recorded across the Order Limits in the following areas as shown in ES Figure 7.8.2: Dormouse Survey Areas and Results (**application document 6.4**):

- One empty dormouse nest found in Area 1 (woodland north of Mill Farm) in Section AB: Bramford Substation/Hintlesham in October 2022;
- Minimum of two dormice and three dormice nests found in Area 4a (Layham Quarry and woodland) in Section D: Polstead across June and October 2022;
- One dormouse nest found in Area 4b (Layham Quarry and woodland) in Section D: Polstead in October 2022;
- Four dormouse nests found in Area 4c (Layham Quarry and woodland) in Section D: Polstead across August and October 2022;
- One dormouse nest found in Area 6c (hedgerow on Holt Road) in Section E: Dedham Vale AONB in October 2022;

- Five dormouse nests and two dormice found in Area 6d (hedgerow north of Sprott's Farm) in Section D: Polstead across August and October 2022;
- One dormouse nest and feeding remains found in Area 9 (wood east of Dunstead Farm) and in Section G: Stour Valley in September 2022;
- Dormouse feeding remains found in Area 10c (woodland south of Culverdown) in Section G: Stour Valley in September 2022; and
- Five dormouse nests and one dormouse found in Area 10d (woodland north-west of Alphamstone) in Section G: Stour Valley in September 2022.

7.5.73 The results did not suggest that any one particular survey sub-site was of high conservation value for dormouse. As such, the presence of dormouse in the study area is representative of the known dormouse population status in the region and is valued as medium, as they are of county level importance.

Riparian Mammals

7.5.74 A national water vole survey carried out in the 1990s suggested water vole were on the brink of extinction in Essex and Suffolk. However, the Water for Wildlife Project run by the Suffolk Wildlife Trust has undertaken habitat management and mink (*Neovison vison*) control resulting in the presence of water vole in most suitable Suffolk habitat (Suffolk Wildlife Trust, 2021b) where mink are controlled. Desk study includes recent (within the last 15 years) recorded presence of otter and water vole on the Rivers Box, Brett and Stour (Suffolk Wildlife Trust, 2021a).

7.5.75 Field survey in 2013 confirmed presence of water vole on the River Box and evidence of otter on watercourses sporadically across the study area. Further surveys for riparian mammals have been undertaken during 2021 and 2022. These comprised initial habitat suitability and additional field signs survey where appropriate. Full results can be found within ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**) and are shown on ES Figure 7.2.1: Otter and Water Vole Survey Results (**application document 6.4**) which also displays the watercourse ID noted in subsequent paragraphs.

7.5.76 Field survey identified the presence of water vole (burrows and feeding piles) on W-AB-46, W-AB-30 (Belstead Brook), W-C-1 (River Brett), W-F-6, W-F-7, W-G-5 (River Stour) and W-G-12. Evidence recorded within the Order Limits comprised a live sighting on the Belstead Brook, water vole droppings and a feeding station on the River Brett, cropped vegetation on the River Stour and a burrow on W-G-12.

7.5.77 Otter are considered widespread in Suffolk (Suffolk Wildlife Trust, 2021a). Otter field signs were identified on four waterbodies: W-AB-4, W-AB-30 (Belstead Brook), W-C-1 (River Brett) and W-G-5 (River Stour). Evidence recorded within the Order Limits was limited to one potential holt (camera monitoring did not confirm use) on W-AB-4 in Section AB: Bramford Substation/Hintlesham.

7.5.78 Water vole are considered present across the Order Limits where they cross the main watercourses and are valued as medium as they are of county level importance.

7.5.79 As otter could use any watercourse occasionally, they are precautionarily valued as medium as they are of county level importance.

Wintering Birds

7.5.80 Desk study has identified limited wintering bird species diversity within the study area. A wintering bird survey was undertaken for the project in 2009/2010 and 2010/2011. These identified low numbers of lapwing (*Vanellus vanellus*), and a single golden plover (*Pluvialis apricaria*) while waders and wildfowl species were limited to occasional mallard (*Anas platyrhynchos*) and mute swan (*Cygnus olor*). Farmland bird records of note in winter were restricted to linnet (*Linaria cannabina*), yellowhammer and corn bunting (*Emberiza calandra*).

7.5.81 Breeding bird surveys of Hintlesham Woods SSSI in 2022 recorded brambling, firecrest and redwing which are also considered to be wintering passerines. Further details can be found in ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**).

7.5.82 There are small areas of wetland present within the Order Limits and although are important, generally, for overwintering waders, waterfowl and wetland birds, the presence of these habitats is restricted to that in association with the major watercourses e.g. River Stour. Examples include a waterbody to the south of Assington in Section F, and waterbodies at Layham Quarry in Section D. The multiple data sources and the review of habitats present within the Order Limits combine to suggest that the habitats within the Order Limits and their surroundings are of limited importance to the waders, waterfowl and wetland birds. This includes the qualifying bird species of the Stour and Orwell Estuaries SPA and Ramsar, which is further discussed in the Habitat Regulations Assessment Report (**application document 5.3**).

7.5.83 The number and diversity of bird species recorded in winter was low. As such, wintering bird assemblages outside of designated sites are valued as low as they are of local importance.

Summary

7.5.84 A summary of the ecological features assessed in this chapter, and their valuation, is presented in Table 7.7.

Table 7.7 – Summary of Ecological Features Assessed

Ecological Feature	Value
The Stour and Orwell Estuaries SPA (and supporting SSSI – Cattawade Marshes SSSI, Stour Estuary SSSI and Orwell Estuary SSSI)	Very high
The Stour and Orwell Estuaries Ramsar (and supporting SSSI – Cattawade Marshes SSSI, Stour Estuary SSSI and Orwell Estuary SSSI)	Very high
Little Blakenham Pit SSSI (bats)	High
Hintlesham Woods SSSI (ancient woodland and breeding bird assemblage)	High
Arger Fen SSSI (habitats)	High
Railway Walk, Hadleigh LNR and Hadleigh Railway Walk CWS	Medium
Tiger Hill LNR and Tiger Hill Long Meadow CWS	Medium
CWS, LoWS, Wildlife Trust Reserves	Medium - High

Ecological Feature	Value
Ancient woodland	High
HPI – Coastal and floodplain grazing marsh, Lowland mixed deciduous woodland, Lowland dry acidic grassland, Purple moor grass and rush pastures, Arable field margins, Wet woodland, Open mosaic on previously developed land	Medium
Alder woodland on floodplains (Annex 1)	Medium
HPI – Lowland fen	High
Hedgerows (including HPI and important hedgerows)	Medium
Arable plant assemblage	Medium
Watercourses and Aquatic habitats (including aquatic HPI)	Medium
Aquatic ecology	Low - Medium
Bats (excluding barbastelle bat)	Low - Medium
Barbastelle bats	High
Bats – Foraging and commuting habitat	Medium
Breeding birds (outside of designated sites)	Low
Hazel dormice	Medium
Otter	Medium
Water vole	Medium
Wintering birds	Low

Future Baseline

7.5.85 Large parts of land within the Order Limits are agricultural. The ecological conditions are unlikely to change significantly in the short term as current agricultural practices are likely to be maintained, i.e. arable land would likely be used for growing crops or used as ley-grassland; improved or semi-improved grasslands would likely continue to be used for grazing livestock. This assumption is given additional certainty when comparing habitats recorded during field survey in 2012 with those reviewed using aerial photography (photographs taken between 2017 and 2019) and the habitats identified during the UKHab surveys in 2021 and 2022. Initial findings appear consistent through the years with changes tending to be increased tree and hedgerow planting while maintaining agriculture as primary land use.

7.5.86 In general, hedgerows, woodlands and trees are likely to be retained by landowners. National Grid also undertakes routine management of vegetation beneath the existing 400kV overhead line for operational safety clearances and health and safety purposes (using its rights as a statutory undertaker), for example at Hintlesham Woods; this will continue in the future while the overhead line is operational.

7.5.87 Changes in land use can affect the habitats present, e.g. a lowering of intensity in the farming regime, could encourage more diverse habitats to establish. This is increasingly likely where landowners engage with agri-environmental schemes, which, since the pause in the project, has seen hedgerow planting schemes, new areas of woodland being planted, woodland management and reversion of arable land to grassland (Dedham Vale AONB and Stour Valley Project, 2016b). Even so, unpredictable changes in the biodiversity value or spatial extent of semi-natural habitat are unlikely to occur.

7.5.88 The Dedham Vale AONB has selected the hazel dormouse as its flagship species for nature recovery following a consultation process in 2020 (Dedham Vale AONB and Stour Valley Project, 2021) and with the Creating the Greenest County (Green Suffolk, 2021) initiative in Suffolk further hedgerow, woodland and habitat connection planting can be expected in the area.

7.5.89 Long-term impacts from climate change could affect the species composition and types of habitats in and around the study area, and therefore types and diversity of fauna. Species could be affected by the change in temperatures making it hard for them to adapt and could lead to the dominance of certain species. However, it is not anticipated that the combined impact of the project and climate change would be any different to the impacts of climate change in isolation (i.e. without the project).

7.6 Likely Significant Effects During Construction (Without Mitigation)

Introduction

7.6.1 This section sets out the potential for likely significant effects on biodiversity during construction. The assessment assumes that the relevant embedded measures in the REAC (**application document 7.5.2**) and the good practice measures in the CoCP (**application document 7.5.1**) are in place, and the results of the assessment then inform the need for any additional mitigation requirements during construction (see Section 7.8).

7.6.2 As described in ES Chapter 4: Project Description (**application document 6.2.4**), the assessment presented within this chapter is split into the 'main project' and the 'GSP substation. The main project includes the 132kV overhead line removal, proposed overhead line and underground cables (including the CSE compounds). The GSP substation includes works at the substation where this connects into the network and the minor works to the existing overhead lines. A summary of the environmental effects as a whole is provided at the end of this section.

7.6.3 It is assumed that this reinforcement would operate at a voltage of at least 400kV in a similar way to the majority of the rest of the transmission network. For the purposes of this report, the new overhead line is referenced as 'proposed 400kV overhead line' to differentiate it from the existing 400kV overhead line and the UK Power Networks (UKPN) owned 132kV overhead line.

Main Project

Statutory Designated Sites

Stour and Orwell Estuaries SPA and Ramsar

7.6.4 The Stour and Orwell Estuaries SPA and Ramsar sites (very high value) are located approximately 5.72km to the south-east of the Order Limits. Potential likely significant effects on the Stour and Orwell Estuaries SPA are assessed in detail in the HRA Report (**application document 5.3**). This concludes that there would be no likely significant effect on the Stour and Orwell Estuaries SPA and Ramsar site following the implementation of good practice measures at Stage 2: Appropriate Assessment.

Stour Estuary SSSI, Orwell Estuary SSSI and Cattawade Marshes SSSI

7.6.5 The IRZ of the Stour Estuary SSSI, Orwell Estuary SSSI and Cattawade Marshes SSSI, (which also underpin the Stour and Orwell Estuaries SPA and Ramsar), overlaps with the Order Limits. These SSSI are not designated for anything in addition to that specified in the SPA/Ramsar designation. Therefore, the conclusion for significant effects described above for the SPA/Ramsar also stand for the component SSSI. Therefore, there would be a **neutral** effect on the underpinning Stour Estuary SSSI, Orwell Estuary SSSI and Cattawade Marshes SSSI which would be **not significant**.

Little Blakenham Pit SSSI

7.6.6 Little Blakenham Pit SSSI lies approximately 2.9km to the north-east of the Order Limits and would not be directly affected by the project. The IRZ for this SSSI overlaps with the Order Limits but extend only so far as Hintlesham Park in Section AB: Bramford Substation/Hintlesham. As noted in Table 7.4, the only potential pathway to a significant effect that has been identified for the project is in relation to bats, as mobile species, principally Daubenton's bat, Natterer's bat and brown long-eared bat.

7.6.7 It is possible that the habitats within the Order Limits east of Hintlesham Park could support the same or contributing SSSI feature bat population in the active season by providing active season roosting sites, feeding grounds and commuting routes. Any impact or loss on those active season roosts or habitats within the Order Limits could have an impact on subsequent hibernation populations.

7.6.8 There are eleven trees with some level of roosting potential (high – low) within the Order Limits where the SSSI IRZ overlaps the project. Nine of these are located within a single woodland belt on the outer boundary of the IRZ. It is possible that the Daubenton's, Natterer's and brown long-eared bat of the SSSI could use these trees to roost in the active season. However, field survey in 2022 did not find evidence of roosting bats in any of these trees. It is unlikely that the hibernating bats of the SSSI use the habitats of the Order Limits as an important active season resource.

7.6.9 Construction activities would cause fragmentation of seven hedgerows, coppicing of one woodland belt and temporary loss of sub-optimal foraging habitat (i.e. arable) within the Order Limits where they overlap the SSSI IRZ. This habitat loss and fragmentation would be temporary with reinstatement planting undertaken at the end of construction. Therefore, there is likely to be a negligible magnitude impact on Little Blakenham Pit SSSI, a receptor of high value, resulting in a **neutral** effect which is **not significant**.

Hintlesham Woods SSSI

7.6.10 The assessment of likely significant effects on Hintlesham Woods SSSI is based on the component Ramsey Wood and Hintlesham Little Wood only. Although the Order Limits are also adjacent the Wolves Wood and Keeble's Grove components of the SSSI, the proposals at these locations are associated with habitat mitigation proposals only and there would be no adverse effect on these components. In addition, no intrusive construction activities would take place within 15m of Ramsey Wood (Unit 003 at Hintlesham Woods SSSI) excluding planting proposals. This includes tracking of heavy vehicles or material storage. Demarcation fencing would be used to protect the exclusion zone (EM-AB10).

7.6.11 Annex B: Hintlesham Woods SSSI Assessment of ES Appendix 7.1: Habitats Baseline Report (**application document 6.3.7.1.2**) gives a detailed assessment of the project impact on the relevant components of the SSSI which is also summarised in the following sections.

SSSI Interest Feature – Ancient Woodland Habitat

7.6.12 The existing 400kV overhead line crosses Hintlesham Woods SSSI in an area of w1f7 other lowland mixed deciduous woodland (a HPI). The project would involve a transposition of the existing overhead line onto new pylons around the north and west of the woods. The existing pylons would then be used for the proposed overhead transmission line. The construction activities within the woods would take place within the existing operational maintained swathe (approximately 190m in length). The vegetation would be coppiced to ground level for a width of 20m and then cut to a graduated height for an additional 12.5m on either side. This is further described in ES Chapter 4: Project Description (**application document 6.2.4**) and shown on Illustration 4.2 in the same chapter. Once the proposed overhead line is in place, the coppiced vegetation would be allowed to regrow subject to the required safety clearances (as per the existing line).

7.6.13 No heavy good vehicle access would be permitted within the woods (EM-AB12, see the REAC (**application document 7.5.2**)) during construction. The temporary access route through Hintlesham Woods SSSI would use protective matting (such as trackway), where appropriate. This would be microsited using data gathered during the arboricultural and habitat surveys within the 20m coppiced area (EM-AB13, see the REAC (**application document 7.5.2**)) to protect ground flora and soils.

7.6.14 The existing 400kV overhead line would be routed on new pylons along the north and western boundary of Hintlesham Woods SSSI for a distance of approximately 1km. This is assumed to comprise three new pylons located adjacent to the woods. National Grid has committed to no intrusive construction activities within 15m of the north and western edge of Hintlesham Woods SSSI excluding planting proposals and works to the existing overhead line). This includes tracking of heavy vehicles or material storage. Demarcation fencing would be used to identify protect the exclusion zone (EM-AB10, see the REAC (**application document 7.5.2**)). Therefore, there would be no impact to the woodland due to these activities. In addition, the temporary access route providing access between pylons to the north and west of Hintlesham Woods SSSI would be located to the north and west of the proposed overhead line (EM-AB11, see the REAC (**application document 7.5.2**)) increasing the distance between the works and the SSSI. As such, there is expected to be no change upon the SSSI and ancient woodland habitat in this area.

7.6.15 Overall, the commitments to reduce impact upon the high valued ancient woodland habitat would result in a temporary small magnitude impact in the short term, resulting in a **minor adverse** effect, reducing to a **neutral** effect once the coppiced vegetation has re-established, which would be **not significant**.

SSSI Interest Feature – Breeding Bird Assemblage

Habitat loss

7.6.16 Habitat, suitable to support breeding birds, within the existing management swathe across the woodland would be coppiced for a length of approximately 190m. A 20m width area would be coppiced to ground level with an additional 12.5m cut to a graduated height on both sides to install the conductors onto the arms of the pylons. This activity would impact approximately 0.9ha of the 76.6ha habitat present (Ramsey and Hintlesham Great and Little Woods) (<1.2%).

7.6.17 ES Appendix 7.2: Species Baseline Report (**application document 6.3.7.2**) presents the breeding bird survey of Hintlesham Woods. This shows that relatively fewer birds were recorded within the existing management swathe (where vegetation works are proposed) compared to the rest of the woodland habitat. All the areas within Hintlesham Woods identified as having peak density of bird presence would be retained.

7.6.18 Wren, nightingale and mistle thrush were recorded where the Order Limits cross the SSSI. These bird species are not dependent upon the habitats specifically within the Order Limits and have plentiful alternative habitat available within the wider SSSI. This includes nightingale, which although this species has a preference for thick scrub and woodland habitats, which is present in the impacted area, the season long surveys found that nightingale were recorded more often along the north-east facing boundary of Ramsey Wood, outside of where the Order Limits cross the SSSI.

7.6.19 The coppicing impact would have a temporary effect on the breeding bird assemblage of the SSSI by temporarily reducing available habitat. However, the habitat would re-establish to baseline condition and extent after the transposition of overhead lines taking up to five years to return to the functional bird breeding habitat present during the baseline surveys. As a result, there would be an impact of small magnitude which would result in a **minor adverse** effect, which would be **not significant**.

Disturbance

7.6.20 To avoid and reduce effects on breeding birds at Hintlesham Woods, National Grid has committed to limiting the activities that can take place within bird breeding season to those that would require an electrical outage. Embedded measure (EM-AB09 in the REAC (**application document 7.5.2**)) states that for the construction works in and around Hintlesham Woods (between pylons 4YL011 and 4YL017A) construction works would be undertaken outside of bird breeding season except for the following activities which need to take place within agreed electrical outages:

- Install conductors / transposition works;
- Construction of pylon 4YL12A and removal of the existing 4YL12; and
- Assembly and removal of temporary pylon RB12T.

7.6.21 Of these activities which could cause disturbance to the breeding bird assemblage present at Hintlesham Woods SSSI, the conductor stringing would involve a small team in a light goods vehicle to access the newly built pylons and climb the pylons to tie in the conductors. As such, disturbance to breeding birds due to this activity would be limited.

7.6.22 The construction of pylon 4YL12A would be located approximately 365m north of the SSSI boundary and removal of the temporary pylon RB12T would be approximately 200m north of the SSSI boundary. The breeding bird survey of Hintlesham Woods identified the highest densities of bird presence along the eastern woodland edge of Ramsey Wood and rides within the woodland where the open tree canopy promoted the growth of a scrubby understory. The species recorded along the eastern boundary of Ramsey Wood comprised a range of typical woodland bird species but also a primary area for nightingale. Relatively few bird records were made along the north-western boundary of Hintlesham Little Wood. No Schedule 1 bird species were identified as breeding on any of the eastern boundary of Ramsey Wood or north-western boundary of Hintlesham Little Woods (i.e. those facing the potentially disturbing activities).

7.6.23 All the areas identified as having peak density of bird presence would be retained. The distance between the highest density of bird records and the removal of the temporary pylon would be over 400m. The distance between the highest density of bird records and the construction of pylon 4YL12A would be nearly 500m.

7.6.24 Although there is limited published guidance on disturbance thresholds for woodland birds there is advice on 100m to 250m buffer considerations for a range of British raptor species such as red kite, buzzard and hobby (Goodship *et al.,* 2002) in Scottish forests. There is also a study on the effects of construction noise for waterbirds that has identified 70dB and above as generating an impact to bird activity which includes movement away from their resting location (Cutts *et. al.,* 2009).

7.6.25 The noise assessment for the project has identified an average sound power level for pylon construction (including piling activities, where required) of 86dBA at 10m from the source, 78dBA at 25m, 72dBA at 50m, 66dBA at 100m and 60dBA at 200m as set out in Table 2.2 in ES Appendix 14.1: Construction Noise and Vibration Data (**application document 6.3.14.1**). At 300m distance from origin, the sound pressure level is reduced to 56dBA which is comparable to existing ambient and background noise levels of around 50dB in the Order Limits.

7.6.26 The modelled sound pressure levels suggest that the closest proposed pylon works necessary within the bird breeding season at approximately 200m from Hintlesham Woods is unlikely to generate a response from any breeding birds within which would result in leaving the nest based on Goodship *et al*., (2022) and Cutts *et al*., (2009). It would also be expected that breeding birds within the woodland itself would be additionally buffered from many of the potentially disturbing activities outside of the woodland by other trees. Especially as visual disturbance is an important additional feature necessary to generate a disturbance response by birds.

7.6.27 The furthest Lowest Observed Adverse Effect Level for vibration has been modelled at 170m for foundation piling for pylon construction as shown in Table 2.5 in ES Appendix 14.1: Construction Noise and Vibration Data (**application document 6.3.14.1**). No groundworks within the bird breeding season are proposed within this distance from the SSSI.

7.6.28 Therefore, although works would unavoidably need to be scheduled during bird breeding season, the potentially disturbing construction activities would be at distance where disturbance to breeding birds would be limited. As a result, there would be an impact of small magnitude which would result in a **minor adverse** effect, which would be **not significant**.

Railway Walk, Hadleigh LNR and Hadleigh Railway Walk CWS

7.6.29 The boundaries of the LNR and CWS at Hadleigh Railway Walk are concurrent and so are assessed as one feature in this section. The Order Limits cross the sites where they comprise w1g broadleaved woodland.

7.6.30 Where the existing 132kV overhead line is to be removed, the contractor would retain vegetation, where practicable, in accordance with LV01. There would be limited vegetation removal required as works would lie within the existing operational maintenance swathe but some coppicing maybe required to reduce the canopy height to maintain safety clearance between the vegetation and the 132kV overhead line removal works. On completion, the woodland would be left to naturally reinstate.

7.6.31 New overhead transmission line would be installed south of where the existing 132kV overhead line is located. Scaffolding and netting would be used during construction of the overhead line (conducting installation works) over Hadleigh Railway Walk (EM-C01). Additional efforts would be made to reduce the impact on trees however, some vegetation may have to be cut in order to put netting over the scaffold crossing. No temporary access route would need to go through Railway Walk LNR, Hadleigh, (EM-C02) so all root material would be retained.

7.6.32 Although installation of scaffolding would reduce the requirement for vegetation works, a reasonable worst case impact on woodland, including the essential soil strip for the installation of a new 400kV pylon, within the designated sites would be: approximately 0.05ha of woodland permanently removed; 0.09ha coppiced and 0.08ha pruned. On completion of construction of the new overhead line, the coppiced and pruned vegetation would be left to naturally regenerate with ongoing management to maintain the operational safety clearance between the new overhead line and the vegetation below. Scrub would be planted under the new pylon as woodland and trees would not be possible. This permanent loss of woodland habitat is approximately 0.4% of the total designated site. The replacement scrub habitat would maintain the continued connectivity and therefore the function of this linear habitat.

7.6.33 The combined effects of construction is likely to result in a short term small magnitude impact on the medium value designated sites resulting in a **minor adverse** effect, reducing to a **negligible** effect once the coppiced vegetation has re-established to the height currently managed for operation and replacement scrub habitat has established. This effect would be **not significant**.

Arger Fen SSSI and Tiger Hill LNR

7.6.34 Arger Fen SSSI is notified for its composition of habitats: lowland and wet woodlands, fen, acid grassland and calcareous grassland. Tiger Hill LNR is a component of Arger Fen SSSI. ~~Potential pathways to significant effect have been identified for changes in surface water quality resulting in habitat degradation.~~

7.6.35 Arger Fen SSSI and Tiger Hill LNR are located approximately 10m to the south of ~~a S~~section F: Leavenheath/Assington of the Order Limits (see ES Figure 7.1.1: Biodiversity Statutory Designated Sites (**application document 6.4**)) ~~,~~ which is proposed as an environmental area. The nearest construction works would occur at approximately 670m north of the designated sites. Topography and ground water body data suggest that there is no connection between the construction works in the Order Limits where ground excavations are required, and the GWDTE of Arger Fen SSSI and Tiger Hill LNR. As such, ~~and therefore there would be no adverse effect on the SSSI or LNR.~~ there is no impact pathway related to hydrogeology or any GWDTE.

7.6.36 Potential pathways to significant effect have been identified for changes in surface water quality resulting in habitat degradation. Construction works at a watercourse (W-F-7) upstream of the designated sites, within the Order Limits, where a temporary culvert crossing is proposed could result in sedimentation and pollution effects that could wash downstream to the watercourse that forms the western boundary of Arger Fen SSSI. However, the temporary culvert would be installed in accordance with CoCP measures GG04, GG06, GG14, GG15, W02, W03 and W15, which would avoid impacts upon surface water quality. As a result, there would be an impact of negligible magnitude on a receptor of high value, resulting in a **neutral** effect which is **not significant**.

Non-Statutory Designated Sites

7.6.37 A number of pathways to significant effects from the project on non-statutory designated sites have been identified.

7.6.38 Table 7.8 lists the individual sites and their potential impact pathways. The sites are shown in ES Figure 7.1.2 (**application document 6.4**).

Table 7.8 – Non-Statutory Designated Sites with Pathways to Significant Effect

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Sproughton Park CWS	The Belstead Brook discharges into Sproughton CWS and is crossed by the project at watercourse crossing W-AB-4 and W-AB-30. There is no temporary access route crossing proposed at these watercourse locations.	None–- Change in surface water quality resulting in habitat degradation is avoided with no in river or near river works to Belstead Brook (W-AB-4 and W-AB-30)	Medium	N/A	None	Neutral – Not significant
Tom's/ Broadoak Wood CWS and AWI site	The 132kV overhead line would be removed and the new overhead transmission line would be installed to the north of the woodland. Groundworks within 15m of ancient woodland could cause tree root damage. The Order Limits run along the northern boundary of the site for a distance of approximately 275m.	Habitat degradation	High	Construction of the proposed 400kV overhead line (including pylon foundations) and any ground excavation work (excluding removal of the existing 132kV pylons) would lie a minimum of 15m away from the designated ancient woodland (Toms Wood) boundary (EM-AB07).	Negligible	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Valley Farm Meadow CWS	Approximately 3.6ha of this mainly grassland site is located within the Order Limits. No pylons would be installed in this site. The existing 132kV overhead line would be removed from over the CWS and the proposed 400kV overhead line would be installed. There would be a temporary access route through this site during construction through an area of f2b purple moor grass and rush pastures (polygon ID H_A_807) to avoid the wet woodland and marsh. Soil stripping would be required which would mean a temporary loss to approximately 0.01ha of this HPI. Approximately 0.19ha g3c grassland and 0.06ha g4 modified grassland would also be required. The removal of the 132kV overhead would be restricted to the existing operational maintenance swathe in the CWS. Once removed, the woodland habitat would be left to fully re-establish and no further management would be needed at this location. The alignment of the 400kV overhead line would require approximately 0.08ha w1f wet woodland HPI to be coppiced.	Temporary habitat loss for installation of access track Habitat gain Permanent habitat modification	High	No new pylon would be located within Valley Farm Meadows CWS (Babergh 61). Soil stripping within the CWS would be confined to the construction of the temporary access route. All vehicle access, including the temporary access route, through Valley Farm Meadow CWS would avoid the Priority Habitat w1d – Wet woodland (polygon ID H_A_944) and f2 – Fen marsh and swamp (Polygon ID H_A_809) located near the southern edge of the Order Limits (EM-AB03). The purple moor grass and rush pastures habitat would be reinstated post works.	Small – Short term	Minor adverse, reducing to neutral in the long term – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
River Brett (Sections) CWS	A temporary bridge would be installed over the River Brett (W-C-1) as part of the temporary access route to facilitate overhead line works (good practice measure W17). The bridge would be set back from the river edge to avoid the need for bank side excavation.	Change in surface water quality resulting in habitat degradation	Medium	The bridge would be installed in accordance with CoCP measures GG04, GG05, GG14, GG15, W02, W03, W04, W15 and GH06.	Negligible	Neutral – Not significant
Valley Farm Wood CWS	Approximately 3.6ha of this 28ha site is located within the Order Limits. Approximately 0.12ha of w1h other woodland - mixed would be permanently lost associated with new pylon installation.	Permanent habitat loss	Medium	Vegetation would naturally reinstate below the newly installed pylon to a scrub state.	Small – long term	Minor adverse – Not significant
	Approximately 0.5ha of woodland habitats would be coppiced and 0.6ha pruned to provide safety distances between the vegetation for installation of the proposed 400kV overhead line.	Permanent habitat modification	Medium	Vegetation would naturally reinstate on completion of installation works but be managed at a reduced canopy height to maintain the operational safety buffer.	Small – long term	Minor adverse – Not significant
	Temporary loss of 0.1ha g4 modified grassland would be required for installation of a temporary access route and the new 400kV pylon.	Temporary habitat loss	Medium	The habitats would be reinstated on completion of the works.	Small – short term	Minor adverse, reducing to negligible in the long term – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
	The existing 132kV overhead line would be removed at this location. It is assumed that there would be limited vegetation lost during the removal of the 132kV overhead line, as works would lie within the existing maintenance swathe. Once removed, no further management of the habitat would be required in the maintained operational swathe and the land would be left to recolonise.	Habitat gain	Medium	Where the 132kV pylon is removed, vegetation would recolonise naturally.	Small – long term	Neutral – Not significant
Layham Pit Woodland and Meadow CWS	Approximately 0.9ha of this 6.8ha site is located within the Order Limits. Approximately 0.11ha of w1g7 other broadleaved woodland types would be permanently lost in association with 400kV pylon installation. However, a similar area of habitat would be left to re-establish due to removal of the 132kV pylon removal. Additional woodland habitat totalling 0.1ha would be coppiced and 0.2ha pruned to safely install 400kV overhead lines. Upon completion, these habitats would be left to re-establish but would be maintained at a reduced height to maintain operational safety clearances.	Permanent habitat loss Habitat gain Permanent habitat modification	Medium	Where the 132kV pylon is removed, vegetation would recolonise naturally. Scrub vegetation would be planted below the newly installed pylon, post construction, to replace woodland habitat lost.	Small – long term	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Millfield Wood CWS	The Order Limits lie immediately adjacent to this designated site which comprises two areas of ancient woodland. The northern Order Limit run adjacent approximately 225m of the northern area of woodland, while the southern Order Limits are immediately adjacent the boundary of the southern woodland for approximately 200m. Groundworks within 15m of ancient woodland can cause tree root damage.	Habitat degradation	High	Construction of the new 400kV underground cables and any ground excavation work (e.g. associated with the temporary access route or new service connection) would lie a minimum of 15m away from the designated ancient woodland (Millfield Wood north) boundary (EM-D02). The works adjacent to Millfield Wood South are for landscape planting only.) (EM-D03).	Negligible	Neutral – Not significant
The Dollops CWS	Approximately 130m of 132kV overhead line would be removed at this location. It is assumed that there would be limited vegetation lost during the removal of the overhead line, as works would lie within the existing maintenance swathe. The conductors would be lowered down and pulled out. Once removed, no further management would be required of the previously maintained swathe and as a result vegetation would be left to recolonise.	Habitat gain	Medium	The 132kV overhead line will be removed at The Dollops (Babergh 185). Construction activities would be confined to the existing operational maintenance swathe at this location. The conductors will be lowered down and pulled out. Light vehicles will use existing tracks within the woodland (EM-E02).	Small (beneficial) in the long term	Minor beneficial – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Broom Hill Wood CWS	Broom Hill Wood is immediately adjacent the Order Limits for approximately 425m. Groundworks within 15m of ancient woodland could cause tree root damage.	Habitat degradation	High	Construction of the new 400kV underground cables and any ground excavation work (e.g. associated with the underground cable temporary access route) would lie a minimum of 15m away from the designated ancient woodland (Broom Hill) boundary. Construction access for the existing 132kV overhead line would use the existing track. Temporary matting/trackway would be used where the temporary access route is located within 15m of the ancient woodland unless advised otherwise by an arboriculturalist (EM-E06).	Negligible	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Leadenhall Wood CWS	Leadenhall Wood is approximately 3m east of Order Limits for approximately 30m where a services connection cable is proposed. Groundworks within 15m of ancient woodland can cause tree root damage.	Habitat degradation	High	Site specific measures will be employed for the excavation of the trench for the service connection where they are delivered pursuant to the DCO to reduce the effects on the RPA of the Leadenhall ancient woodland. A method statement would be prepared with input from an arboriculturalist. Measures may include but not be limited to hand digging and vacuum excavation under arboricultural supervision. (EM-F02).	Negligible	Neutral – Not significant
Arger Fen and Spouse's Vale SWT Reserve	Watercourse W-F-7 is crossed by the Order Limits. A temporary culvert is required to install a temporary access route at this watercourse. This installation could generate sedimentation and pollution effects on the watercourse that forms the western boundary of the Arger Fen and Spouse's Vale SWT Reserve downstream.	Change in surface water quality resulting in habitat degradation	Medium	The temporary culvert would be installed in accordance with CoCP measures GG04, GG05, GG15, GG22, W02, W03 and W15 to avoid impact upon surface water quality.	Negligible	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Tiger Hill Long Meadow CWS	Watercourses W-F-10 and W-F-8 are crossed by the Order Limits. There is no requirement for a watercourse crossing at W-F-10, and W-F-8 is already crossed by an existing road which would be used for access. Works in the vicinity of W-F-10 could generate sedimentation and pollution effects on the watercourse that forms the river downstream that runs through the centre of the Tiger Hill Long Meadow.	Change in surface water quality resulting in habitat degradation	Medium	Any such incident would be controlled with the pollution measures stipulated in the CoCP, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02 and W15.	Negligible	Neutral – Not significant
Moat Farm/Burnt House Marsh LoWS	Watercourse W-G-12 is crossed by the Order Limits. Trenchless installation of underground cabling at this location could result in accidental pollution of the watercourse if drilling muds were to break through to ground level. Downstream, the watercourse passes through the centre of the LoWS.	Change in surface water quality resulting in habitat degradation	Medium	Any such incident would be controlled with the pollution measures stipulated in the CoCP, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02 and W15.	Negligible	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Alphamstone Meadows LoWS	The LoWS would be crossed by an underground cable using trenchless installation techniques at this location. This area does not require a vehicular temporary access route. Pedestrian or light goods vehicle access would be permitted only. All habitat within the Order Limits would be retained.	Temporary habitat loss	Medium	A trenchless crossing is proposed to avoid habitats to the south of Ansell's Grove including Alphamstone Meadows LoWS, Existing routes through the woods will be used where practicable by light good vehicles or tracked vehicles. Otherwise, pedestrian access will be maintained over the top of the trenchless crossing. There would be no temporary access route along the trenchless crossing. (EM-G08).	No change	Neutral – Not significant
	The watercourses W-G-12, W-G-13, W-G-14 and W-G-15 are crossed by the Order Limits. A trenchless crossing is proposed at this location which could result in accidental pollution of the watercourses if drilling muds were to break through to ground level. The watercourses run through the LoWS. No engineered crossings for access across the watercourses are required.	Change in surface water quality resulting in habitat degradation	Medium	Any such incident would be controlled with the pollution measures stipulated in the CoCP, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02 and W15	Negligible	Neutral – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Alphamstone Complex LoWS	Approximately 0.02ha of this 7.6ha site is located within the Order Limits comprising h3h mixed scrub habitat. Installation of underground cables are proposed at this location which will enter into the CSE compound south of the LoWS, requiring soil strip.	Temporary habitat loss	Medium	Scrub would be permitted to naturally establish after the work has been completed and the ground reinstated.	Small	Minor adverse – Not significant
Loshes Meadow Complex LoWS (part EWT Reserve)	Approximately 0.6ha of this site is located within the Order Limits at two locations: where sections of 132kV overhead lines and pylons are to be removed; and where a 400kV pylon would require modification work with partial removal of overhead line to the south. Where the existing 132kV overhead lines are to be removed, temporary matting is proposed for the access route (i.e. no soil stripping) and no access to the LoWS required as the overhead line does not cross the designated site. Where pylon modification works and removal of the existing 400kV overhead line to the south is required, approximately 0.05ha of w1g7 broadleaved woodland would be coppiced but would be left to re-establish after removal.	Temporary habitat loss	Medium	Impacted habitats would be left to naturally reinstate after the work has been completed.	Small	Minor adverse in the short term, reducing to negligible in the long term – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
	Approximately 140m of watercourse W-G-16 runs adjacent to the southern boundary of the LoWS where a retained 400kV pylon would require modification and overhead line removed to the south. No engineered crossing of the watercourse is anticipated. However, works within the LoWS could result in an accidental pollution.	Change in surface water quality resulting in habitat degradation	Medium	Any such incident would be controlled with the pollution measures stipulated in the CoCP, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02 and W15	Negligible	Neutral – Not significant
Ansell's Grove/Ash Ground LoWS and potential ancient woodland (PoAWS 10)	Approximately 0.52ha of this 8.4ha site is located within the Order Limits. Removal of the existing 400kV overhead line and pylons is proposed here. A temporary access route is required through the existing operational maintained swathe to remove the existing overhead line. An existing track would be used but some coppicing may be required (roots retained). The entire operational maintained swathe would be left to recolonise naturally once the overhead line has been removed and no further management would be necessary.	Habitat gain	High	The 132kV overhead line would be removed at Ansell's Grove/Ash Ground LWS (from approximate X,Y: 587022.00, 236075.00 and 587016.00, 236202.00) located in Section G: Stour Valley. At this location, construction activities would be confined to the existing operational maintenance swathe. The conductors would be lowered down and pulled out. Light vehicles would use existing tracks within the woodland (EM-G07).	Small (beneficial)	Minor beneficial **in** the long term – Not significant

Site Name	Description of Works	Pathway to Effect	Value of Receptor	Embedded/ CoCP Measure	Magnitude of Impact	Significance
Twinstead Marsh LoWS	The Order Limits include approximately 0.26ha of this 3.8ha site. Pruning of approximately 0.02ha w1f7 - Other Lowland mixed deciduous woodland could be required to ensure safety clearance around an existing pylon to undertake modification works.	Temporary habitat loss	Medium	Vegetation would be retained where practicable at Twinstead Marsh LoWS (Bra222) in Section G: Stour Valley from approximate X,Y: 586168.00, 237057.00. Vegetation clearance would be limited to the existing access track within the site and only light good vehicles would be used during construction in this area. (EM-G10). Pruned habitats would be left to naturally regenerate post works.	Negligible	Neutral – Not significant
	Eutrophic standing water and pond HPI is located within the Order Limits at this location. Works within the LoWS could result in accidental pollution of the aquatic habitats.	Change in surface water quality resulting in habitat degradation	Medium	Any such incident would be controlled with the pollution measures stipulated in the CoCP, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02, W03 and W15	Negligible	Neutral – Not significant

Habitats

Ancient Woodland and Veteran Trees

7.6.39 No pathways to potential effects for additional designated ancient woodland (AWI sites) other than those in the designated sites assessment above have been identified.

7.6.40 In terms of potential ancient woodland identified by the project, PoAWS4 has been assessed as part of the Hintlesham Woods SSSI and PoAWS10 as part of Ansell's Grove/Ash Ground LoWS.

7.6.41 The tree belt to the north of Hintlesham Woods (PoAWS5) would require a temporary access route through it for construction of the overhead line around the north and west of Hintlesham Woods requiring full removal of vegetation. PoAWS5 would be retained other than at a 5m gap where the proposed temporary access route will cross the tree belt. Soil from the PoAWS5 would be stored separate to general soil storage so that it can be replaced at PoAWS5, where soil is suitable for reuse (for example, not contaminated) (EM-AB05). On completion of construction activities, replacement woodland planting would be provided to supplement the reinstated original soils.

7.6.42 The resulting change in PoAWS5 habitat is likely to result in a short term small magnitude on a high value receptor, resulting in a **minor adverse** effect, reducing to a **neutral** in the long term once the vegetation re-establishes. This would be **not significant**.

Habitats of Principal Importance

7.6.43 Where HPI are part of a designated site and would be impacted by the project, the assessment has been included in the corresponding designated site's assessment. HPI impacted by the project outside of designated sites are assessed below.

Lowland Mixed Deciduous Woodland HPI

7.6.44 Both w1f and w1f7 woodland habitats within the Order Limits have been considered as lowland mixed deciduous woodland HPI. There is approximately 12.0ha of this HPI (2.21ha within designated sites) located across the Order Limits. Approximately 8.16ha (68%) of this would be retained with no direct impact.

7.6.45 The installation of new permanent infrastructure would result in approximately 0.35ha of lowland mixed deciduous woodland HPI, outside of designated sites, being permanently removed over four locations. Two of these are associated with new pylons and one with a permanent access route to the Stour Valley East CSE compound combining to approximately 0.16ha. The fourth and largest single area of lowland mixed deciduous woodland HPI of approximately 0.19ha would be affected by the underground cabling.

7.6.46 Where installation of underground cabling is required across the lowland mixed deciduous woodland (Habitat ID H_A_1029) in Section G: Stour Valley, a reduced working width of 60m would be implemented (EM-G09). Trees would be cut down to ground level with the stumps and roots removed to allow excavation of the cable trenches. However, scrub vegetation would be planted back over the cable once installed and although trees could not be planted over the top of the cables, low growing, shallow rooted, scrub species planting would be possible to reconnect retained woodland either side.

7.6.47 Installation of the proposed 400kV overhead line would require a 20m swathe coppicing of woodland to ground level (no removal of roots) to facilitate construction activities. The trees would be cut at a graduated height for an additional 12.5m on either side of the 20m swathe to accommodate construction activities and install the conductors onto the arms of pylons as shown on Illustration 4.2 in ES Chapter 4: Project Description (**application document 6.2.4**).

7.6.48 In addition, the permanent removal of the 132kV and 400kV lines could require coppicing and pruning of lowland mixed deciduous woodland HPI during the removal works, although this would be confined to areas which are already subject to maintenance to maintain the operational safety clearances. Once completed, the swathes would be left to naturally recolonise.

7.6.49 Although up to 3.53ha of lowland mixed deciduous woodland HPI would undergo coppicing/pruning with permanent reduction of canopy height (outside of designated sites), up to approximately 1ha would have its previous management regime removed which would lead to a habitat canopy height gain, improving its condition and the connection between the existing retained habitats beneath the existing overhead line.

7.6.50 The combined potential impact of the above effects anticipated across a number of locations across the project, on the medium value lowland mixed deciduous woodland HPI, as a whole, can be precautionarily assumed to be of medium magnitude resulting in a **moderate adverse** effect, which would be **significant**.

Wet woodland HPI and Alder Woodland on Floodplains

7.6.51 Approximately 5.9ha of wet woodland HPI has been identified within the Order Limits, all of which would be retained. Embedded measure EM-P09 (see the REAC (**application document 7.5.2**)) specifies protection and retention of wet woodland in Section AB and Section H, and EM-G12 (see the REAC (**application document 7.5.2**)) would retain where practicable, w1d -wet woodland HL_108, located in Section G: Stour Valley from approximate 587186, 236634 and 586972, 236616).

7.6.52 Coppicing of approximately 0.27ha wet woodland (w1d) HPI and pruning of 0.18ha (outside of designated sites) over three locations would be required for the removal of the existing 400kV and 132kV overhead lines and for installation of the proposed 400kV overhead line. No permanent loss of wet woodland HPI would be required.

7.6.53 Wet woodland crossed by the proposed 400kV overhead line would have a 20m swathe coppiced to ground level (no removal of roots) to facilitate construction activities. The trees would be graduated cut for an additional 12.5m on either side of the 20m swathe to accommodate construction activities.

7.6.54 Areas of wet woodland crossed by the 132kV overhead line removal would be temporarily impacted although works would generally be confined to the existing maintained swathe. Once completed, the swathe would be planted up with trees or left to naturally recolonise and would be able to mature to its full height in future, which would better connect the retained existing habitats previously severed by the overhead line.

7.6.55 Approximately 1.36ha of alder woodland on floodplains (Annex 1) habitat has been identified in the Order Limits at two locations in association with watercourse crossings W-F-12 and W-F-10 which are shown on ES Figure 7.1.4: UK Habitat Classification (UKHab) Survey - Areas (**application document 6.4**). The larger area of habitat that is crossed by the Order Limits would require approximately 0.28ha of coppicing and 0.27ha of pruning to remove the existing 132kV overhead line and to install the proposed 400kV overhead line.

7.6.56 As a result, these medium valued wet woodland and alder woodland on floodplain habitats would likely be impacted by a short term small magnitude scale impact, resulting in a **minor adverse** effect that would be **not significant**.

Hedgerows HPI

7.6.57 There are approximately 262 HPI hedgerows within the main project Order Limits, equating to approximately 32,800m in length. Of these, approximately 232 are considered hedgerow HPI, equating to approximately 29,600m. The impact upon Hedgerows HPI, and hedgerows more generally, are summarised in Table 7.9. It should be noted that values provided in relation to 'Important hedgerows' are not in addition to the hedgerow habitats given, they are a different classification of the same habitats.

7.6.58 A maximum 60m gap would be created in hedgerows that would be crossed by the proposed underground cables. The hedgerow would be removed (including roots) to construct the cable trenches. The hedgerow would be reinstated following construction with low rooted varieties. If trees are lost from the hedgerow, these cannot be planted over the top of the cables but would be replaced as close to the original location.

7.6.59 For the installation of the proposed 400kV overhead lines, and the removal of the existing 400kV overhead line in Section G: Stour Valley, hedgerows would be coppiced at each temporary access route crossing. Hedgerows would be replanted once works are complete.

7.6.60 Table 7.9 summarises the lengths of hedgerow that would be lost, coppiced or pruned based on the Trees and Hedgerows to be Removed or Managed Plans (**application document 2.9**). Approximately 42m would be lost permanently at five locations (comprising 14m which is classed as 'important' under the Hedgerows Regulations 1997).

7.6.61 Once planting has matured, the impact of the combination of works on the medium valued hedgerow HPI habitats would be of small magnitude in the short term, resulting in a **minor adverse** effect, reducing to a **neutral** once the hedgerow vegetation had established which would be **not significant**.

Table 7.9 – Summary of Hedgerow Impacts within the Main Project Order Limits

Habitat	Permanent Loss	Temporary Loss (Reinstatement)	Coppiced	Pruned
Hedgerow – HPI	42m	2470	4540m	3055m
Hedgerow – other	None	145m	356m	147m
Line of trees	None	90m	235m	270m
Total	**42m**	**2705m**	**5131m**	**3472m**
Important hedgerow	14m	2270m	4070m	2240m

Coastal and Floodplain Grazing Marsh HPI

7.6.62 Approximately 0.86ha of Coastal and Floodplain Grazing Marsh HPI was identified within the Order Limits immediately west of River Brett (W-C-1) as shown on ES Figure 7.1.3 (**application document 6.4**).

7.6.63 The 132kV overhead line would be removed in this habitat, and temporary trackway matting would be used to protect the soil and avoid the need for soil stripping for this task. An existing pylon is located within the coastal and floodplain grazing marsh HPI that would be removed and the subsoil and topsoil reinstated following the removal work.

7.6.64 The proposed 400kV overhead line would be located within the HPI. There would be no permanent habitat loss but temporary habitat loss would occur due to soil stripping of an 8m wide area to allow for installation of a temporary access route and up to 40m square working area for the new pylon. The habitat would be reinstated following construction. As such, there would be no permanent HPI loss. This medium valued habitat would be temporarily lost which is a small magnitude impact resulting in a short term **minor adverse** effect and **not significant**.

Lowland Dry Acidic Grassland HPI

7.6.65 Approximately 0.23ha of lowland dry acid grassland HPI is located within the Order Limits over five discrete areas as shown on ES Figure 7.1.3 (**application document 6.4**). Four of the five areas would be retained and protected as they are either located within a section of 132kV overhead line removal where no soil stripping is required or are covered by embedded measure (EM-P09) in the REAC (**application document 7.5.2**).

7.6.66 The fifth area is approximately 0.07ha and is located in Section D: Polstead, immediately west of Rands Road. It is unlikely but temporary, partial habitat removal could be necessary in this location for a temporary access route. This is a medium valued habitat with a (worst-case) small magnitude impact anticipated resulting in a **minor adverse** effect which is **not significant**.

Arable Field Margins HPI

7.6.67 Approximately 5.49ha, across multiple areas, of arable field margins HPI were located within the Order Limits and are shown on ES Figure 7.1.3 (**application document 6.4**).

7.6.68 Arable field margin HPI habitat removal for the project would comprise approximately 0.62ha of temporary loss, as the result of the temporary access routes. No permanent loss is anticipated as a result of the project.

7.6.69 Good practice measures in the CoCP (**application document 7.5.1**) regarding stripping of topsoil and reinstatement post works would permit natural re-establishment of the temporarily lost arable field margin plant assemblage. As this habitat type is widespread in the landscape, and is formed by disturbance activities, the temporary loss of this habitat is assessed to be of negligible magnitude resulting in a **neutral** effect on the arable plant assemblage, which would be **not significant**.

Open Mosaic on Previously Developed Land HPI

7.6.70 Approximately 2.53ha of open mosaic on previously developed land HPI (outside of designated sites) was identified within the Order Limits. Approximately 0.04ha would be retained as stated in embedded measure EM-P09 in the REAC (**application document 7.5.2**). Of the remaining 2.49ha approximately 0.35ha would be impacted by installation of temporary access routes and new 400kV pylons.

7.6.71 This type of habitat is characterised by that disturbance and early pioneer establishing vegetation. The proposed construction work would be no more disruptive than the activities that have gone before to create these habitats. The areas would be left to re-establish following construction.

7.6.72 There would be no permanent loss of open mosaic on previously developed land HPI. The combined areas of these medium valued habitats to be temporarily lost are of small magnitude, resulting in a **minor adverse** effect which would be **not significant**.

Purple Moor Grass and Rush Pastures

7.6.73 One area of purple moor grass and rush pastures was identified within the Order Limits in association with Valley Farm Meadow CWS. The assessment for this habitat is provided in Table 7.8.

Rivers HPI

7.6.74 The Belstead Brook, River Brett, River Box, River Stour and Henny Meadow Fleet are HPI located within the Order Limits. These watercourses are shown on ES Figure 7.1.3 (**application document 6.4).**

7.6.75 Existing good practice measures include temporary clear span bridge crossings at the River Stour, River Box and the River Brett which would be set back a minimum of 8m from the river's edge to avoid disturbance to habitats as noted in good practice measure W17 in the CoCP (**application document 7.5.1**). Trenchless crossings are also proposed for the underground cable installation at the River Stour (EM-G04, see the REAC (**application document 7.5.2**)) and River Box (EM-E05, see the REAC (**application document 7.5.2**)). No direct impacts are anticipated to the Belstead Brook or Henny Meadow Fleet (i.e. no underground cables proposed and no temporary access route crossing). Therefore, there are not anticipated to be any fragmentation impacts to these rivers.

7.6.76 The CEMP and CoCP (**application document 7.5** and **7.5.1**) contain good practice measures to reduce risk of a pollution incident, including measures to reduce drilling muds entering the River Stour and River Box following an accidental outbreak, specifically GG04, GG05, GG14, GG15, GG16, GG22, W02, W03 and W11.

7.6.77 There are no hydrological changes anticipated as a result of dewatering during temporary works (mainly in areas of deeper foundations and trenchless crossings). Further details can be found in ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**).

7.6.78 The combination of works on this medium valued habitat, is no change in magnitude resulting in a **neutral** effect which would be **not significant**.

Eutrophic Standing Waters and Ponds HPI

7.6.79 Approximately 0.96ha across multiple areas of Eutrophic Standing Waters and Ponds HPI were recorded within the Order Limits as shown on ES Figure 7.1.3 (**application document 6.4**). No standing water would be directly impacted by the project.

7.6.80 With the implementation of the good practice measures set out in the CoCP (**application document 7.5.1**) for example GG04, GG05, GG14, GG15, GG16, GG22 and W03, no indirect impact upon these HPI is anticipated. This is a medium valued habitat with no change resulting in a **neutral** effect which would be **not significant**.

Mesotrophic Lake HPI

7.6.81 One mesotrophic lake HPI of approximately 0.20ha is located within the Order Limits (ES Figure 7.1.3 (**application document 6.4**)). This lake is located within Layham Quarry (not within the Layham Pit and Meadows CWS) adjacent to the proposed 400kV overhead line and a temporary access route. No impacts are anticipated to this lake.

7.6.82 With the implementation of the good practice measures set out in the CoCP CoCP (**application document 7.5.1**) for example GG04, GG05, GG14, GG15, GG16, GG22 and W03, no indirect impact upon this HPI is anticipated. This is a medium valued habitat with no change resulting in a **neutral** effect which would be **not significant**.

Table 7.10 – Summary of Non-Woodland HPI Impacts (outside of designated sites)

HPI	Permanent Loss	Temporary Loss (reinstatement)
Coastal and Floodplain Grazing marsh	None	0.04ha
Lowland Dry Acid Grassland	None	0.07ha
Arable Field Margins	None	0.62ha
Open Mosaic on Previously Developed Land	None	0.35ha
Purple Moor Grass and Rush Pastures	None	(only located within designated site)
Rivers HPI	None	None
Eutrophic Standing Waters	None	None
Mesotrophic Lake	None	None

Arable Plant Assemblage

7.6.83 Two areas (IAPA_8 and IAPA_9) within the Order Limits have been identified as meeting the Important Arable Plant Assemblages threshold at county level due to the presence of cornflower and corn marigold. Within the Order Limits, IAPA_8 is approximately 0.17ha and IAPA_9 is approximately 0.07ha as shown on ES Figure 7.1.6 (**application document 6.4**). These are both located in the footprint of a temporary access route for the proposed pylon modification works north of Twinstead in Section G: Stour Valley. No impacts are associated with the habitats as temporary trackway matting would be used to protect the soil and avoid the need for soil stripping. As a result, there would be a **neutral** effect on the arable plant assemblage, which would be **not significant.**

Watercourses and Aquatic Habitats

7.6.84 Watercourse crossings would be required for installation of the proposed 400kV overhead lines and for the underground cable, as well as for the temporary access routes. ES Chapter 9: Water Environment (**application document 6.2.9**) provides detail on the assessment of impact on watercourses in terms of water quality, hydromorphology and drainage. This section discusses impacts on non-HPI watercourses and aquatic habitats. The River Stour, River Box, River Brett, Henny Meadow Fleet and Belstead Brook assessment is detailed in the HPI section above.

7.6.85 New 400kV pylons would not be located within 3m of an ordinary watercourse as per good practice measure W14 in the CoCP (**application document 7.5.1**).

7.6.86 Three minor watercourses (W-D-8, W-E-7 and W-G-6) would be crossed by an opencut method during installation of the underground cables. The length of each channel affected would be up to 80m in length. All watercourses crossed by an opencut methodology would be designed to allow continued downstream flow during construction (W15, see the CoCP (**application document 7.5.1**)) and a pollution boom would be installed downstream of opencut works (W02, see the CoCP (**application document 7.5.1**)).

7.6.87 Watercourses would be reinstated post installation of the underground cable. A full record of condition would be carried out (photographic and descriptive) of the working areas that may be affected by the construction activities. This record will be available for comparison following reinstatement after the works have been completed to ensure that the standard of reinstatement at least meets that recorded in the pre-condition survey (GG06, see the CoCP (**application document 7.5.1**)).

7.6.88 Approximately 22 minor watercourses would require temporary access route crossings in the form of culverts, which would affect up to 10m of channel. A typical culvert design is shown on the Design and Layout Plans: Temporary Culvert for Access (**application document 2.11.14**). These minor watercourses are typically; dry or semi-permanent stagnant agricultural drains, permanently wetted minor ditches and feeder tributaries with low flows.

7.6.89 During installation of the culvert, hydrological connectivity would be maintained via an appropriately sized pipe to maintain natural riverine connectivity throughout the year, at both high and low flows and natural substrate would be provided in accordance with good practice measures W03 and B09 in the CoCP (**application document 7.5.1**).

7.6.90 Once construction is complete, the culverts would be removed and the riparian vegetation and natural bed of the watercourse, using the material removed when appropriate, would be reinstated. If additional material is required, appropriately sized material of similar composition (W02, see the CoCP (**application document 7.5.1**)).

7.6.91 The CEMP and CoCP (**application document 7.5** and **7.5.1**) contain further good practice measures to reduce risk of a pollution incident, specifically GG04, GG05, GG15, GG22, W02, W03 and W11. These same good practice measures would also reduce the general risk of accidental sedimentation and pollution incidents at all watercourses.

7.6.92 Consequently, the change to watercourses and aquatic habitats is assessed as of short term small magnitude on receptors of medium value, resulting in a **minor adverse** effect. Any impact upon watercourses and aquatic habitats would be temporary and localised such that any adverse effect would be **not significant**.

Aquatic Ecology

7.6.93 The potential impact on watercourse habitat structure is assessed above. This section relates to assessment of the function of the watercourses and the effect on the species within those watercourses.

7.6.94 Existing good practice measures for main rivers include temporary clear span bridges at the River Brett, the River Box and the River Stour (W17, see the CoCP (**application document 7.5.1**)). These would be set back from the river edge to avoid disturbance to habitats. The River Box and River Stour would be crossed by underground cables using trenchless methods (EM-E05 and EM-G04, see the REAC (**application document 7.5.2**)). No direct impacts to the Belstead Brook or Henny Meadow Fleet are anticipated (as these are overhead line sections and do not require a temporary access route crossing). Therefore, there would be **no change** to aquatic species in these watercourses.

7.6.95 For the remaining minor watercourses where in-channel works were required in terms of dewatering, fluming, culvert installation or opencut installation of underground cables there is the potential for injury/mortality of fish and aquatic invertebrate species and disturbance to migratory fish.

Aquatic invertebrates

7.6.96 The effect of a temporary loss of aquatic habitat on aquatic invertebrates is likely to result in localised mortality and injury of individuals in along 80m of channel in three watercourses and less than 10m long at culvert crossings. This is highly unlikely to be of a magnitude to affect the population as a whole.

7.6.97 Aquatic invertebrate populations are considered ubiquitous to the watercourse type and no protected species were reported. However, they are known to demonstrate fidelity to specific flow regimes and changes may result in modification of the macroinvertebrate community. Good practice measure W02 in the CoCP (**application document 7.5.1)** means that the watercourse would be reinstated after construction to allow invertebrates to recolonise and avoid fragmentation of populations. The temporary nature of the impact and reinstatement of the channel following construction would see that the potential impact on macroinvertebrates is of negligible magnitude resulting in a **neutral** effect which would be **not significant**.

Fish

7.6.98 Overpumping would be undertaken as part of the installation of the opencut sections of underground cable and during the installation of the temporary access route culvert crossings. Opencut sections would be restricted to low value agricultural drains, which were typically ephemeral or under water level control. As such, these agricultural drains are expected to hold limited fish populations of low value which concurs with the watercourse habitat sensitivity assessment in ES Appendix 7.3: Aquatic Ecology Baseline (**application document 6.3.7.3**).

7.6.99 As these sections would be impacted for approximately eight weeks, with the implementation of the good practice measures set out in the CoCP (**application document 7.5.1**) the potential mortality and injury and disturbance effects on fish, freshwater invertebrates and macrophytes are assessed as short-term small magnitude on receptors of medium or low value, resulting in a **minor adverse** effect. Any impact upon aquatic ecology would be temporary and localised such that any adverse effect would be **not significant**.

Bats

7.6.100 Vegetation clearance for construction of the overhead line and underground cable sections could result in the following impacts on bats:

- Loss of bat roosts if located in trees which require removal;
- Loss and modification of foraging and commuting habitat, resulting in fragmentation where linear features are affected;
- Injury or mortality of bats should bats be present within trees requiring clearance; and
- Disturbance (from changes in noise, light and vibration).

Roost Loss

Loss of Known or Likely Roosts

7.6.101 Four known bat roosts of medium value are located within 50m of the Order Limits. None of these roosts are to be lost.

7.6.102 Evidence gathered during the site surveys have shown that it is likely that a barbastelle bat maternity colony is roosting within Hintlesham Woods (based on capture of post lactating and juvenile bats within anticipated emergence timeframe). No tree roosts have been found within the Order Limits and therefore there is no pathway to this effect for this species.

7.6.103 Seven trees along the alignment (170_T003, 122_T002, 132_T008, 140_T001, 140_T002, 109_T029 and 3_T001) with high or moderate bat roosting potential were not able to have the full complement of required surveys as they could not be surveyed safely through aerial means. As a result, it is possible that these trees could support a range of bat species and roost types. These trees could be lost or modified to facilitate construction. A precautionary approach to assessment is employed here and a detailed study in presented in ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) to inform the likely bat species and roost types potentially present. The draft bat licence (Annex A of Appendix 7.7 (**application document 6.3.7.7.1**)) details the approach to mitigating the loss of these trees which includes, soft felling, and deployment of a range of bat boxes that include maternity and hibernation types.

7.6.104 In addition, there is potential for bats to use previously unused roost features in trees in the period between the surveys which were completed to inform this assessment, and the start of construction. In particular, those trees within the Order Limits identified as being of moderate or high suitability which are located where impacts could occur (54 trees) are most likely to support future roosts. No buildings within the Order Limits had moderate or high potential to support roosting bats.

7.6.105 Subject to DCO consent, pre-construction bat surveys including climbing surveys and/or emergence and re-entry surveys would be completed, as appropriate, on trees to be affected by construction. The feasibility of survey of the seven trees listed above (where surveys were not possible to inform this assessment) would also be undertaken. If new roosts are identified during pre-construction surveys, the Natural England EPS mitigation licence that has been drafted in ES Appendix 7.7 Annex A (**application document 6.3.7.7.1**) would be updated to cover the outcomes of the pre-construction bat surveys. If new roosts are identified during pre-construction surveys, the following general principles could be applied to any future iterations of the bat licence:

- Exclusion of bats from roosting features ahead of works, for example using one-way excluders and internal lighting;
- Avoidance of mortality, injury or disturbance to bats, through scheduling works for when bats are least vulnerable to harm (i.e. when bats are not hibernating in winter or in maternity roosts in summer) where practicable;
- Pre-demolition inspection by a licensed bat ecologist including supervised removal of roosting features by hand (i.e. soft felling of trees) as practicable; and
- The provision of alternative roosting habitat prior to works taking place. The size and style of the box would be suitable for the species in the existing roost. Three maternity suitable boxes would be installed per tree maternity roost lost and one hibernation box per tree hibernation roost lost. Boxes would be positioned within retained habitat (either attached to retained trees or a free-standing post) in proximity to the roosts to be lost. These would be positioned to avoid any impacts from construction or operation of the project, e.g. away from sources of noise or lighting disturbance.

Loss of Roosting Resource

7.6.106 Construction could result in the loss of general bat roosting opportunities at approximately 54 trees (i.e. trees with high and moderate potential in the Order Limits but where surveys have not confirmed bat presence). The provision of alternative roosting habitat would be provided to replace those potential roosting features in trees lost. Two artificial bat boxes would be deployed on retained trees to every one tree with high or moderate bat roosting potential felled. Where high potential roosting features are present, the project would seek to soft fell these and attach limbs to retained trees where practicable, as per good practice measure B06 in the CoCP (**application document 7.5.1**). Further details are set out in the draft Bat Licence in ES Appendix 7.7 Annex A (**application document 6.3.7.7.1**).

7.6.107 There is some flexibility within the Order Limits for micro-siting temporary access routes to avoid bat roosts in trees. In the absence of further mitigation and recognising that roosts affected would be covered by the future EPS licence, there is assessed to be an impact of small magnitude on a receptor of high (barbastelle bat) and medium to low value (all other bat species), resulting in a **minor adverse** effect for both species which is **not significant**.

Foraging habitats – loss and modification

7.6.108 Bats are insectivores and loss of habitats that support invertebrate populations due to vegetation clearance within the construction working width across the project would potentially remove bat foraging habitat. Foraging habitat for bats within the Order Limits comprise woodland habitats, neutral grasslands, marshy areas, arable field margins and hedgerows and tree belts.

7.6.109 The vegetation loss assumptions are shown on Trees and Hedgerows to be Removed or Managed Plans (**application document 2.9**). These habitats are common and widespread in the local landscape and will support sufficient invertebrate food sources for any bats directly impacted within the Order Limits.

7.6.110 The majority of vegetation loss would be temporary with all areas either being reinstated in situ or as close as practicable given restrictions regarding safety clearances and planting over the underground cables. Further details can be found in the LEMP (**application document 7.8**).

7.6.111 As a result, there would be a impact of small magnitude on a receptor of medium value, resulting in a short term **minor adverse** effect, reducing to **neutral** in the medium to long term once reinstated habitats (non-woodland) had fully established. The permanent loss of approximately 0.8ha of woodland habitats (over 11 locations) for bats would be a long term impact of small magnitude. Any adverse effect would be **minor adverse** and **not significant**.

Commuting habitats – Fragmentation

7.6.112 Bats use linear habitat features (hedgerows, watercourses and lines of trees) in the landscape along which they commute to access roosting sites and foraging habitat. There is potential for construction activities to cross these linear features, creating gaps and fragmenting commuting habitats.

7.6.113 The vegetation loss assumptions are shown on Trees and Hedgerows to be Removed or Managed Plans (**application document 2.9**). As per good practice measures B07 in the CoCP (**application document 7.5.1**), where the works require the crossing or removal of hedgerows, the gap would be reduced to a width required for safe working.

Maternity Roosts

7.6.114 Two maternity bat roosts were identified in the wider survey area: a soprano maternity roost within the Nussteads Farm complex adjacent Broom Hill Wood (Section E: Dedham Vale AONB) and a (likely) barbastelle bat maternity colony roosting within Hintlesham Woods (Section AB: Bramford Substattion/Hintlesham Woods) (see ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) for details). Fragmentation of commuting routes to/from these important nursery sites could have significant effects upon bat populations.

7.6.115 The soprano pipistrelle maternity roost was observed specifically at emergence to identify dispersal routes. The emerging bats were seen emerging south from the building but then flying immediately east and north towards the adjoining woodland (Broom Hill Wood). Although many were seen feeding along the wooded edge directly east of Nussteads, none were observed flying south or southeast to cross the Order Limits.

7.6.116 At and around Hintlesham Woods, the proposed 400kV overhead line would use the existing operational maintained swathe for operational safety clearances through the woods, and the existing 400kV overhead line would be re-routed around to the north and west of the woods on newly constructed pylons. The temporary access routes for the new overhead line would require a 5m gap to be created in the three hedgerows to the north, west and south-west of the woods during construction. Bat activity surveys reported in ES Appendix 7.7: Bat Survey Report (**application document 6.3.7.7**) have indicated that hedgerows and trees along the bridleway to the north and south from the woodland are the most used by barbastelle bats and form an important commuting route out of the woodland for the colony. Other hedgerows appear to be used by lower numbers of barbastelle bats.

7.6.117 As such, an embedded measure (EM-AB04, see the REAC (**application document 7.5.2**)) to not use the proposed temporary access route to the south of Hintlesham Woods (AB-AP9) during dusk, dawn and night time hours during the months of May to August has been made. This would reduce the impacts to bat roosts, including the Barbastelle maternity roost and bat foraging corridor. In addition, the tree belt to the north of Hintlesham Woods (PoAWS5) would be retained other than at a 5m gap where the proposed temporary access route will cross the tree belt. Soil from the PoAWS5 would be stored separate to general soil storage so that it can be replaced at PoAWS5, where soil is suitable for reuse (for example, not contaminated) (EM-AB05, see the REAC (**application document 7.5.2**)).

Across the wider project

7.6.118 Habitat Suitability Modelling presented in ES Appendix 7.7: Bat Survey report (**application document 6.7.7.7**) identified features where each bat species/species group was likely to have a preference, and potential reliance. In these locations, in accordance with good practice measure B07 (see the CoCP (**application document 7.5.1**), 'dead hedging' would be used where practicable, in the interim periods to retain connectivity during construction. Dead hedging can comprise vegetation arisings or artificial provision, such as willow screening panels or Heras fencing covered in camouflage netting. Slack (2022) details the successful use of such temporary artificial habitat connections by commuting bats.

7.6.119 Across the project, it is highly unlikely the small gaps (up to 8m wide including the roots) created in hedgerows and lines of trees for the temporary access route, even where replicated over multiple locations, would result in a barrier to commuting bats. Gaps of 10m or wider, as shown in scientific literature, are routinely crossed by a significant number of species (Andrews, 2018) including by the bat species recorded within 1km of the Order Limits. Larger gaps made in hedgerows for underground cable installation (up to 60m wide including the roots), may delay the dispersal of the bats, as individual bats may wait until it is darker before crossing the severed gaps as there would not be the same protection/sheltered commuting habitat offered as the rest of the commuting routes. However, provision of dead-hedging at these locations would reduce any such potential change in bat behaviour (B07, see the CoCP (**application document 7.5.1**)).

7.6.120 Where the proposed 400kV overhead line would cross hedgerows and lines of trees, 20m of coppicing would be required during construction to safely install the oversailing conductors onto the new pylon arms. However, the hedgerow and lines of trees would remain as a feature available for commuting bats, albeit lowered, during this time and it would be permitted to regrow after installation.

7.6.121 In total, 197 hedgerows and lines of trees of the 313 in the main project Order Limits could be impacted. Watercourses are also used as commuting features by bats. Watercourses would be crossed by the project where the underground cables are to be installed and also at the temporary access route crossings. These are all temporary impacts which would not create a temporary nor permanent barrier for bats in flight. The watercourse features would remain as features in the landscape available for use by bats.

7.6.122 In summary, the temporary fragmentation of commuting habitat impacts on bats would be of short term small magnitude on receptors of high value (barbastelle bat) and medium to low value (all other bat species) and the effect would be **minor adverse**, reducing to **neutral** in the long term once habitats had established and **not significant**.

Injury/Mortality

7.6.123 Injury or mortality of bats within trees to be removed or modified would be avoided with the implementation of method statements agreed with Natural England through the EPS licensing process and the effect would be **not significant**.

Disturbance

7.6.124 Retained tree roosts within or immediately adjacent to the Order Limits that are not directly affected by installation activity may be affected by disturbance caused by noise, light or vibration. Bats commuting or foraging in retained habitats within or adjacent to the Order Limits may also be affected by noise, vibration or light disturbance.

7.6.125 Noise and vibration have the potential to impact on bats while roosting during the day by causing premature departure from the roost during daylight hours, potentially leading to increased mortality of bats as they would be more vulnerable to predation during the day. Bats may also be impacted through loss of roosts which may become temporarily unsuitable for use during the period over which disturbance occurs.

7.6.126 Construction of the project could result in construction noise disturbance impacts to known roosts within the 50m study area around the Order Limits (no confirmed bat roosts have been found within the Order Limits). A literature review identified 68dB as the lowest threshold at which commuting and foraging bats are likely to be disturbed (Barber *et al.,* 2010; Bennett and Zurcher, 2013; Finch *et al*., 2020; Luo *et al.,* 2015; Schaub *et al.,* 2008; and Siemers and Schaub, 2010). Construction noise data presented in ES Appendix 14.1 Construction Noise and Vibration Data (**application document 6.2.14**) have been used to identify bat roosts which would experience a change in noise level from below 68dB to above this level, or any receptor currently over 68dB where there is an increase in noise of 1dB or more. Noise data covers the worst-case expected construction noise level at that location and takes account of all construction activities between the source and receptor by assessing the distance between the two.

7.6.127 Table 7.11 compares baseline and modelled construction noise for the three confirmed bat roosts identified in the main project 50m study area. Roost 136a_T059 is located within Hintlesham Woods and although it is located approximately 10m from the Order Limits, the only works in this area are for planting and as a result, no disturbance impacts are likely. Roost 35a_T004 is located in close proximity to underground cabling and temporary access route. Roost BB10 is located approximately 30m from the Order Limits in the 400kV underground cable section within Section G: Stour Valley.

7.6.128 Given the distance and the baseline noise levels at all roost, the anticipated noise levels would be <68db, therefore no impacts are anticipated to any of these roosts as a result of construction activities.

Table 7.11 – Summary of Potential Noise Change at Bat Roosts

Roost ID	Baseline Noise (db)	Baseline Noise + Construction Noise (db)	Noise Increase due to Construction Noise (db)
136a_T059	40	58	18
35a_T004	40	66	26
BB10	40	62	22

7.6.129 This assessment assumes that construction work at night, outside of trenchless crossings, would typically only occur on rare occasions. The DCO contains reference to a 12-hour construction day. In winter, this would include working after nightfall in the latter part of the working day. It is assumed that winter working requiring lighting may be required at contained focused work sites. Low levels of light spillage from such construction activities could temporarily negatively affect bat activity during the construction by fragmenting commuting routes, affecting access to foraging areas or affecting access to roosting sites. However, in all instances, the construction lighting would be of the lowest luminosity necessary to safely perform each task. It would also be designed, positioned and directed to reduce the intrusion into adjacent properties, protected species and sensitive habitats as per good practice measure GG20 in the CoCP (**application document 7.5.1**).

7.6.130 Increased light levels could also result in increased abundance of prey. Some species such as noctule, serotine, Leisler's and pipistrelle bats would benefit from increased lighting as they are able to forage prey which are attracted to it. Therefore, these species may be temporarily positively impacted by lighting (BCT and Institution of Lighting Professionals, Guidance Note 08/18, 2018). However, slower-flying broad-winged species such as barbastelle bats, long-eared bats and Myotis species are less tolerant of light and are therefore less able to forage successfully and efficiently. Increased light levels would therefore have the potential to result in a temporary negative impact to these species (BCT and Institution of Lighting Professionals, 2018).

7.6.131 The core working hours are 07:00 – 19:00 and there is no intention for night working as standard. As a result, impacts to bat roosts would be reduced. There may still be some disturbance impacts as a result of noise resulting from daytime works, but these are not expected to be of significance. The temporary disturbance of bats would be assessed as of small magnitude in the short term on receptors of high (barbastelle bat) and medium to low value (all other bat species), resulting in a **minor adverse** effect. Any adverse effect would be **not significant**.

Breeding Birds (outside of Hintlesham Woods)

7.6.132 Clearance of vegetation within the Order Limits could lead to disturbance or mortality of breeding birds, particularly dependent young and eggs. In addition, ground-nesting birds would be vulnerable to mortality through collisions with plant or through an activity such as earthworks which could damage or destroy a nest while in use.

Habitat loss

7.6.133 Construction activities would result in the approximate temporary loss of the following habitats based on the Proposed Alignment: 56.5ha of arable, 32.6ha of grassland, 4.3ha woodland (removed and coppiced to ground level), 1.12ha scrub, and approximately 7840m hedgerow (removed and coppiced to ground level).

7.6.134 While there would be approximately 0.8ha of permanent loss of woodland habitat this would be, mostly, replaced with either scrub planting or natural regeneration on completion of works. Approximately 3.9ha of arable habitat would be permanently lost in association with the proposed CSE compounds and permanent access routes. Arable habitat is widely available within the wider landscape

7.6.135 The magnitude of the impact of temporary and permanent habitat loss to breeding birds (outside of Hintlesham Woods SSSI) is short term and smallm as most habitats would be reinstated following construction. This would result in a short term **minor adverse** effect on a low valued receptor, reducing to **negligible** in the long term as reinstated habitats became established, which would be **not significant**.

Disturbance and Mortality

7.6.136 Construction activities have the potential to impact nesting birds though temporary increases in noise, vibration and visual disturbance. This would constitute disturbance and could negatively impact the survival, range and abundance of certain species, although susceptibility to disturbance does vary between species, from total avoidance through to rapid habituation.

7.6.137 Species such as hobby, that are sensitive to noise, vibration, and human presence, and therefore prone to disturbance, could be displaced and prevented from breeding for the duration of works. Two species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) have been recorded during surveys (barn owl and hobby) and are probable/possible breeders. It would be illegal to disturb these species whilst breeding. As such, where sensitive features are to be retained within or immediately adjacent to the Order Limits, an appropriate protective area will be established using suitable demarcation and signage and would be inspected, repaired and replaced as necessary (GG08). This would include breeding bird nests in retained vegetation, where necessary, within the Order Limits.

7.6.138 The effects of visual disturbance from mobile construction teams would vary spatially and temporally, depending on the activity being undertaken. As this is a linear project, the works would typically be transient in most locations. This would limit the potential for disturbance to breeding birds in any given area.

7.6.139 The magnitude of the impact of disturbance to breeding birds (including Schedule 1 birds) during construction is considered **neutral** and **not significant** due to the limited species diversity present, the availability of alternative similar habitats in the immediate area, and the good practice measures in the CoCP (**application document 7.5.1**) including B02 which states that vegetation with the potential to support breeding birds will be programmed to be removed outside of breeding bird season (March to August inclusive) where practicable. If any vegetation clearance is required during the breeding bird season, vegetation will be checked by an ecologist for nesting birds prior to removal. Appropriate protection measures will be put in place should active nests be found.

7.6.140 Also, embedded measure EM-P08 (see the REAC (**application document 7.5.2**)), which states that a pre-construction survey would be completed on owl boxes in the Order Limits. If occupied and nesting, no trenchless crossing launching or piling works would be undertaken within 40m of the owl box, until the nest box is unoccupied, which would be confirmed on-site by the Environmental Clerk of Works. The 40m buffer will be marked / fenced off if deemed necessary by an ecologist.

Hazel Dormice

7.6.141 Vegetation clearance in the construction stage could result in the following impacts on hazel dormouse:

- Permanent and temporary loss/modification of feeding and nesting habitat;
- Fragmentation of habitats;
- Injury or mortality of dormouse should they be present within vegetation requiring clearance; and
- Disturbance (from changes in noise and vibration).

Habitat – Loss and Modification

7.6.142 Suitable habitats for dormouse would be temporarily impacted by the construction stage of the project. It is assumed that all suitable habitat to support dormouse in the Order Limits could support the species. Vegetation loss as shown on Trees and Hedgerows to be Removed or Managed Plans (**application document 2.9**) would result in a temporary loss of feeding and nesting habitat for dormice. However, the majority of these habitats would be reinstated post construction works with permanent habitat loss of 0.8ha woodland replaced with scrub that is functionally suitable for dormouse.

7.6.143 Dormouse nest boxes would be installed in six locations across the Order Limits in retained woodland to provide additional nesting resource as part of the dormouse licence requirements. A Natural England EPS mitigation licence been drafted in ES Appendix 7.8 Annex A (**application document 6.3.7.8.1**).

7.6.144 The permanent and temporary woodland and hedgerow clearance necessary, in the absence of further mitigation, is assessed as of small magnitude on a receptor of medium value, resulting in a **minor adverse** effect. As the majority of the habitat loss would be temporary, any adverse effect in the long term, post habitat reinstatement, would be **not significant**.

Habitat – Fragmentation

7.6.145 Where the proposed overhead lines cross woodland, up to a 45m swathe would be coppiced (20m to ground level and 12.5m either side having a graduated cut). Post construction, this would be left to regenerate naturally but managed on a permanent basis to maintain a reduced canopy height for operational safety clearances beneath and adjacent to the overhead line. This would maintain habitat connectivity within those woodlands.

7.6.146 For the installation of the underground cables, EM-G09 (see the REAC (**application document 7.5.2**)) commits to woodland clearance that would be reduced to a 60m swathe where the cables cross one area of woodland in Section G: Stour Valley. The trees would be felled and the roots of the trees excavated to allow the construction of the temporary access route and cable trenches. This area would be replanted with scrub habitat as tree planting is not possible over cables as the roots can interfere with the cable rating. Hedgerow gaps in underground cable sections would be limited to 60m with reinstatement planting, post works, of shallow rooting hedgerow species.

7.6.147 Where the temporary access route crosses hedgerows a gap (up to 8m) would be required either coppiced (132kV removal) or with roots removed (400kV overhead line). At all locations where the works require the crossing or removal of hedgerows, the gap would be reduced to a width required for safe working. Where hedgerow removals are necessary and the hedgerow is identified as having value for dormouse (i.e. gaps of 60m and above), then 'dead hedging' would be used where practicable, in the interim periods to retain connectivity during construction (B07, see the CoCP (**application document 7.5.1**)).

7.6.148 The habitat severance described above would temporarily reduce connectivity until habitat reinstatement takes place but with the installation of dead hedging in the interim period, habitat connectivity would be maintained. This temporary short-term impact is assessed as of small magnitude on a receptor of medium value, resulting in a **minor adverse** effect, which would be **not significant**.

Injury/Mortality

7.6.149 Injury or mortality of dormouse within woodland and hedgerows to be cleared would be avoided with the implementation of method statements agreed with Natural England through the EPS licensing process as set out in the draft version of the Dormouse Licence in Annex A of ES Appendix 7.8 (**application document 6.3.7.8.1**) and the effect would be **not significant**.

Disturbance

7.6.150 Dormice are sensitive to direct disturbance associated with habitat clearance, although their sensitivity to construction disturbance in adjacent retained habitats is less understood. Disturbance could occur in response to noise and vibration from ground works and provision of temporary artificial lighting. This could result in increased energy expenditure that is difficult to replace, avoidance behaviours or inducement of stress that could have impacts on the condition of individuals and subsequent survival and reproductive success. However, dormice are frequently recorded in habitats subject to background noise and visual disturbance, such as alongside motorways and major roads.

7.6.151 Due to the temporary nature of this impact and the presence of abundant suitable connected habitat in the wider area into which dormice could naturally disperse, the effects on hazel dormouse, of medium value, are assessed as of small magnitude and therefore have a **minor adverse** effect which is **not significant**.

Riparian Mammals

7.6.152 For watercourses within the Order Limits where in-channel works are required (culvert installation or opencut installation of underground cables), or where night-time work for the trenchless crossings are required at the River Stour and River Box, there is the potential for:

- Temporary loss of riparian habitat, including resting places;
- Temporary fragmentation of foraging, commuting and resting habitats;
- Injury/mortality of individuals; and
- Disturbance from changes in noise, vibration, visual and light sources.

7.6.153 Watercourses due to be impacted by the project with known or possible suitability for riparian mammals are the River Box (W-E-10), the River Stour (W-G-5), the River Brett (W-C-1) and four minor watercourses (W-AB-47, W-F-7, W-G-6 and W-H-20).

Temporary Loss of Habitat and Fragmentation

7.6.154 Good practice measure W17 includes for clear span bridges for the temporary access route at the River Stour, River Brett and the River Box. These would be set back from the river edge to avoid disturbance to habitats. The River Box and River Stour would be crossed using trenchless methods (EM-E05 and EM-G04, see the REAC (**application document 7.5.2**)). No direct impacts to the Belstead Brook or Henny Meadow Fleet are anticipated (including no underground cable crossing or temporary access routes).

7.6.155 Temporary culverts would need to be installed at W-AB-47, W-F-7, W-G-6 and W-H-20. W-AB-47 and W-F-7 which were highlighted as suitable for riparian mammals. W-G-6 and W-H-20 were not surveyed due to access constraints. W-G-6 is directly linked to the River Stour which is known to support both water vole and otter from field survey and desk study.

7.6.156 Installation of temporary culverts would affect up to 10m of channel. A typical culvert design is shown on the Design and Layout Plans: Temporary Culvert for Access (**application document 2.11.14**). Once construction is complete, the culverts would be removed and the riparian vegetation and natural bed of the watercourse, using the material removed when appropriate, would be reinstated. If additional material is required, appropriately sized material of similar composition would be used (W02, see the CoCP (**application document 7.5.1**)).

7.6.157 In the underground cable section, W-G-6 would be crossed by an opencut method. The length of channel affected would be up to 80m in length. During installation and works hydrological connectivity would be maintained via a pipe with natural substrate provided as stated in good practice measure W03 in the CoCP (**application document 7.5.1**).

7.6.158 The temporary works in-channel and in riparian corridor habitat would result in a short term impact of small magnitude on a receptor of medium value, resulting in a short term **minor adverse** effect. The habitat loss and fragmentation would be temporary and would be **neutral** in the long term following habitat reinstatement, which would be **not significant**.

Injury/Mortality

7.6.159 A pre-construction survey would be undertaken to identify any additional measures required to avoid disturbance. Injury or mortality of riparian mammals within watercourses and riparian habitats to be affected by the works would through the protected species licensing process, if required following the results of pre-construction surveys (which would include watercourses W-G-6 and W-H-20 which have not been surveyed to date due to access constraints). Therefore, effects would be **not significant**.

Disturbance

7.6.160 Existing good practice measures for main rivers include temporary clear span bridges at the River Stour, River Brett and the River Box (W17 in the CoCP (**application document 7.5.1**). These would be set back from the river edge to avoid disturbance to habitats. The River Box and River Stour would be crossed using trenchless methods (embedded measures EM-E05 and EM-G04). Works would be set back from the river edge and would avoid direct disturbance on the watercourses and their riparian habitats, thereby avoiding potential impacts on riparian mammals, but the potential for disturbance impacts remains. However, these would be temporary and limited in timescale.

7.6.161 It is assumed that the trenchless crossings could be undertaken at night. Low levels of light spillage from construction activities could temporarily negatively disturb riparian mammals on the River Stour (W-G-5) and connected waterbodies to the west (including W-G-6) which lie in close proximity of the temporary access route to the railway crossing. Good practice measure GG20 in the CoCP (**application document 7.5.1**) states that cconstruction lighting would be of the lowest luminosity necessary to safely perform each task. It would be designed, positioned and directed to reduce the intrusion into adjacent properties, protected species and sensitive habitats.

7.6.162 Due to the temporary nature of disturbance impacts and the presence of abundant suitable connected habitat in the wider area which riparian mammals could move into, the short term impacts are assessed of small magnitude, resulting in a **minor adverse** effect which is **not significant**.

Wintering Birds

Habitat loss

7.6.163 Wintering birds are highly dependent on arable land sown with cover crops. Habitats for farmland birds, such as arable edges and stubble fields. There would be temporary loss of habitats which are important for wintering birds during the construction period comprising approximately: 56.5ha of arable and 32.6ha of grassland. The majority of this would be reinstated with the exception of 3.9ha of arable and 0.5ha of grassland. However, these habitats are common and widespread, meaning that any loss or alteration of these habitats would not be significant within a wider context.

7.6.164 The desk study and field survey has identified limited species diversity within the study area and presence of very few of the qualifying bird species for the Stour and Orwell Estuaries SPA and Ramsar. It has therefore been concluded that the habitats within and surrounding the Order Limits are not functionally linked with the European site. This is further discussed in HRA Report (**application document 5.3**).

7.6.165 The loss of habitat suitable for wintering birds habitat would result in a short term impact of negligible magnitude on a receptor of low value, resulting in a **neutral** effect. This would be **not significant**.

Disturbance

7.6.166 Construction activities have the potential to temporarily impact wintering birds through disturbance due to temporary increases in noise, vibration, and lighting. However, it is assessed that as highly mobile species, birds would move to other local habitats in the wider landscape and effects are assessed as not significant.

7.6.167 Therefore, there would be negligible impact on the low value wintering bird assemblage and effects would be **neutral** and **not significant**.

GSP Substation

Statutory Designated Sites

7.6.168 There are no pathways to effect on statutory designated sites from the construction of the GSP substation.

Non-statutory Designated Sites

7.6.169 The northern boundary of Waldegrave Wood LoWS, which is also an AWI site, is located within the Order Limits as shown is ES Figure 7.1.1 (**application document 6.4**). As a result of operational safety clearances, there may need to be pruning of individual trees on the boundary of Waldegrave Wood LoWS to maintain the operational safety clearance associated with the existing 400kV overhead line.

7.6.170 No tree felling is required within Butler's Wood or Waldegrave Wood for the proposed GSP substation and associated works. Groundworks within 15m of ancient woodland can cause tree root damage. However, both woodlands are bordered by a ditch in excess of 1m depth. The arboricultural survey has concluded that the ditches create hydrological separation and enforce habitat separation between the woodlands and the adjacent arable land where the GSP substation is proposed. Together, these provide evidence that the tree roots would be confined to the woodland areas outside of the working areas. Therefore, the impact would be of negligible magnitude on high value receptors, resulting in a **neutral** effect, which would be **not significant**.

Habitats of Principal Importance

7.6.171 A hedgerow, a HPI runs parallel to the west of the A131 running north to south between Butler's Wood and Waldegrave Wood. This hedgerow is not considered important for biodiversity reasons according to the Hedgerows Regulations 1997. Approximately 30m of this hedgerow would be permanently lost to create the permanent access route and required bellmouth to the GSP substation off the A131 and a further 45m of hedgerow would be removed but reinstated where gaps are necessary to install the 132kv underground cable. The impact on this medium value receptor would be of negligible magnitude, resulting in a **neutral** effect, which would be **not significant**.

7.6.172 No other direct impacts on habitats of conservation value are anticipated from the construction of the GSP substation, as the works are limited to arable and improved grassland habitats.

Arable Plant Assemblage

7.6.173 The permanent loss of arable habitat from construction of the GSP substation would be approximately 2.4ha. Additional arable habitat would also be lost to post construction landscape planting. No species of arable plant interest have been recorded at this location in the desk study nor in the UKHab survey undertaken in 2021. Therefore, there is no pathway to effect.

Watercourses and Aquatic Habitats

7.6.174 Two minor watercourses (W0H8 and W-H-11) would have an opencut crossing that requires up to 30m of damming and over pumping of water to create a dry working area for installation of the 132kV underground cable. Both watercourses would be designed to allow continued downstream flow during construction (W15, see the CoCP (**application document 7.5.1**)) and a pollution boom would be installed downstream of open cut works (W02, see the CoCP (**application document 7.5.1**)). Watercourses would be reinstated following construction to a standard that at least meets that recorded in the pre-condition survey (GG06, see the CoCP (**application document 7.5.1**)).

7.6.175 Consequently, the change to watercourses and aquatic habitats is assessed as of small magnitude on receptors of medium value, resulting in a short term **minor adverse** effect changing to a **neutral** effect in the long term as the channel establishes, which would be **not significant**.

Aquatic Ecology (Fish, Invertebrates, Macrophytes)

7.6.176 The direct impact on watercourses is described above. Consequential impacts on aquatic ecology is discussed here. As these sections would be impacted for approximately eight weeks, with the implementation of the good practice measures set out in the CoCP (**application document 7.5.1**) the potential mortality and injury and disturbance effects on fish, freshwater invertebrates and macrophytes are assessed as small magnitude on receptors of medium or low value, resulting in a short-term **minor adverse** effect changing to a **neutral** effect in the long term on aquatic ecology, which would be **not significant**.

Bats

7.6.177 Construction of the GSP substation could result in the following impacts:

- Loss of roost sites due to required trimming of trees;
- Permanent and temporary loss of foraging habitat (grassland, arable and hedgerow); and
- Disturbance (from changes in noise, vibration, visual and light stimuli).

Roost Loss

7.6.178 No felling of trees is required for construction and therefore there is no pathway to effect. There may need to be pruning of overhanging branches of trees on either side of the GSP substation site in order to maintain a safe working area but this is not considered to affect any trees identified as having a confirmed roost or features suitable for bat roosting.

Foraging and Commuting Habitats – Loss and Modification

7.6.179 No vegetation loss is anticipated within the adjacent woodland blocks. A short section (c. 30m) of hedgerow would need to be permanently removed along the A131 for the permanent access route and bellmouth. Approximately 2.64ha of arable would be lost temporarily and approximately 2.4ha lost permanently.

7.6.180 The embedded planting added to the west of the GSP substation to help screen the site would also provide additional foraging habitat. Further details about proposed reinstatement planting can be found in the LEMP (**application document 7.8**).

7.6.181 The impact on this medium value receptor would be of negligible magnitude, resulting in a **neutral** effect, which would be **not significant**.

Disturbance

7.6.182 Piling activities generating in excess of 68dB may generate short term disturbance to bats in roosts during construction (threshold justification given in Bats section above). There are confirmed bat roosts in two trees outside the Order Limits but within 50m:

- TC27, a Natterer's bat transitional roost located approximately 2m from the Order Limits and 165m from the GSP substation on the Proposed Alignment; and
- T16, a soprano pipistrelle day roost located approximately 45m from the Order Limits and 325m from the GSP substation.

7.6.183 Both roosts are located in close proximity to the temporary access route. Table 7.12 gives a summary of the modelled noise change at the known bat roost locations.

Table 7.12 – Summary of Potential Noise Change at Bat Roosts with No Noise Mitigation

Roost ID	Baseline Noise (db)	Baseline Noise + Construction Noise (db)	Noise Increase due to Construction Noise (db)
TC27	50	79	29
T16	50	65	15

7.6.184 Although baseline plus construction noise impacts are greater than 68db for TC27, impacts to the roost as a result of construction are not anticipated as the bat roost is set 10m back from the edge of the woodland and is behind the front edge trees of the woodland here. It is likely that the front line of trees would attenuate some of the noise generated. It is also anticipated the tree structure of the roost itself would also provide some degree of sound attenuation. Considering this and the short term nature of the works in this location, it has been assessed that a licence for disturbance from Natural England would not be required. The piling works, although potentially disturbing within the timeframe of activity, would be short term (e.g. the construction of the foundation for the gantry within the single circuit sealing end compound is expected to take less than a month).

7.6.185 The confirmed bat roost in T16 is not anticipated to be disturbed by construction noise given the distance from the works and the outputs from noise showing modelling baseline plus construction noise impacts are <68db.

7.6.186 The assessment assumes that any night working at the GSP substation would be exceptional. It is assumed that lighting may be required during winter working in the latter part of the working day at the GSP substation. Low levels of light spillage from such construction activities could temporarily negatively affect bat activity during the construction by fragmenting commuting routes, affecting access to foraging areas or affecting access to roosting sites. In all instances, the construction lighting would be of the lowest luminosity necessary to safely perform each task. It would also be designed, positioned and directed to reduce the intrusion into adjacent properties, protected species and sensitive habitats in accordance with good practice measure GG20 in the CoCP (**application document 7.5.1**).

7.6.187 Increased light levels could also result in increased abundance of prey. Some species such as noctule, serotine, Leisler's and pipistrelle bats would benefit from increased lighting as they are able to forage prey which are attracted to it. Therefore, these species may be temporarily positively impacted by lighting (BCT and Institution of Lighting Professionals, Guidance Note 08/18, 2018).

7.6.188 However, slower-flying broad-winged species such as barbastelle bats, long-eared bats and Myotis species are less tolerant of light and are therefore less able to forage successfully and efficiently. Increased light levels would therefore have the potential to result in a temporary negative impact to these species (BCT and Institution of Lighting Professionals, 2018).

7.6.189 The core working hours are 07:00 – 19:00 and there is no intention for night working as standard. As a result, impacts to bats would be reduced. There may still be some disturbance impacts as a result of noise resulting from daytime works, but these are not expected to be significant.

7.6.190 The disturbance of bats is assessed as of small magnitude on a receptor of medium value, resulting in a short term **minor adverse** effect that is **not significant**.

Breeding Birds

7.6.191 There would be losses of habitats which are important for breeding birds during this construction period. This would be approximately 2.64ha of arable lost temporarily and approximately 2.64ha lost permanently, approximately 1.15ha of grassland lost permanently, and 30m hedgerow lost permanently.

7.6.192 Clearance of existing vegetation within the Order Limits could lead to disturbance or mortality of breeding birds, particularly dependent young and eggs. In addition, ground-nesting birds would be vulnerable to mortality through collisions with plant or through an activity such as earthworks which could damage or destroy a nest while in use.

7.6.193 Construction activities have the potential to impact nesting birds though temporary increases in noise and vibration. This would constitute disturbance and could negatively impact the survival, range and abundance of certain species. Species such as hobby, that are sensitive and therefore prone to disturbance, could be displaced and prevented from breeding for the duration of works.

7.6.194 The magnitude of the impact of temporary loss of habitat and disturbance to breeding birds (including Schedule 1 birds) during construction is considered neutral due to the limited species diversity present, the availability of alternative similar habitats in the immediate area, and the good practice measures in the CoCP (**application document 7.5.1**), including B02, which states that vegetation clearance would be programmed outside of bird breeding season where practicable.

7.6.195 There would be reinstatement of habitats after construction. This would result in a **neutral** effect on a low valued receptor which would **be not significant**.

Hazel Dormouse

7.6.196 Permanent vegetation loss is minimal (c. 30m section of hedgerow) and would not affect the availability or connectivity of habitat suitable for dormouse in the area. The potential loss or construction disturbance to hazel dormouse is assessed as of small magnitude on a receptor of medium value, resulting in a **minor adverse** effect that would be **not significant**.

Riparian Mammals

7.6.197 There is no pathway to effect on riparian mammals from the construction of the GSP substation.

Wintering Birds

7.6.198 There is limited suitable wintering bird habitat present at the proposed GSP substation comprising approximately 2.64ha of arable lost temporarily and approximately 2.4ha lost permanently, approximately 1.15ha of grassland lost permanently, and 30m hedgerow lost permanently. Any habitat loss or disturbance effect during construction would be negligible as a result of the density of similar habitat within the surrounding landscape. Therefore, there would be **neutral** effects on wintering birds, which would be **not significant**.

Summary of Construction Effects

7.6.199 The construction phase of the project has potential to impact upon ecological receptors through habitat loss, fragmentation and modification, disturbance, injury and mortality. However, embedded and good practice measures avoid or reduce the magnitude of these impacts so that the majority are not significant. The assessment has shown that there is only likely to be one significant effect from the project on biodiversity during construction. This is habitat loss and modification / degradation of lowland mixed deciduous woodland HPI.

7.6.200 When considering the impact to woodland habitats as a whole, approximately 2.57ha of woodland HPI (lowland mixed deciduous woodland, wet woodland and alder on floodplain) would be lost or coppiced. When adding the impact on non-HPI woodland types, the cumulative impact on woodlands is 4.26ha (removal and coppicing). Combined, this is a medium magnitude impact resulting in a **moderate adverse** effect, which would be **significant**.

7.7 Likely Significant Effects During Operation (Without Mitigation)

Introduction

7.7.1 This section sets out the potential for likely significant effects on biodiversity during operation. This assessment assumes that the relevant embedded measures and the good practice measures in the CoCP (**application document 7.5.1**) were implemented during the construction phase, and the results of the assessment then inform the need for any additional mitigation during operation (see Section 7.9). Where pathways to effects are not present those receptors are not discussed below.

7.7.2 As described in ES Chapter 4: Project Description (**application document 6.2.4**), the assessment presented within this chapter is split into the 'main project' and the 'GSP substation. The main project includes the 132kV overhead line removal, proposed overhead line and underground cables (including the CSE compounds). The GSP substation includes works at the substation where this connects into the network and the minor works to the existing overhead lines.

The following sections refer to maintenance of operational safety clearances between the overhead line and vegetation. This would maintain a clearance of 5.2m plus three years (two years plus one years growth) between the maximum swing of the conductor and vegetation. The height tolerance of vegetation would be dependent upon the tree/scrub species and the sag of the conductors at any specific location. Operational management would be required on a continuous reoccurring cycle of approximately three years.

Main Project

Statutory Designated Sites

Stour and Orwell Estuaries SPA/Ramsar (and Component SSSI)

7.7.3 The potential bird collision risk with pylon and overhead wire infrastructure has been assessed as specified in NPS EN-5 planning policy. The recorded presence of qualifying bird species of the Stour and Orwell Estuaries SPA and Ramsar is extremely low. In the unlikely event that qualifying bird species were present in significant numbers, they would likely be in transition through the area, as supported by the few records of these species identified in the desk study and in previous wintering bird surveys. As such, they would be at height in a wider landscape with existing overhead lines. The HRA (**application document 5.3**) provides justification as to why the Order Limits do not provide functionally linked land to the SPA, nor important migratory routes.

7.7.4 Designated species would not occur in the Order Limits or their surrounds in significant numbers and so the effects of disturbance or collisions are considered negligible, even if collisions did occur. Where designated species have been recorded, they have been relatively close to the existing overhead line (TEP, 2011), suggesting the overhead lines do not pose a displacement risk. The impact of the new overhead line and removal of existing overhead line is likely to generate more than a small beneficial magnitude impact on SPA bird populations in the long term resulting in a **minor adverse** effect which is **not significant**.

Hintlesham Woods SSSI

SSSI Interest Feature – Ancient Woodland Habitat – Habitat Modification

7.7.5 Ongoing woodland management comprising management of the existing operational maintained swathe to maintain the operational safety clearance distance between the overhead line and the woodland would be required. This is as currently undertaken to maintain the existing overhead line operational safety distance. As such, there is no change in magnitude of impact, resulting in a **neutral** effect which would be **not significant**.

SSSI Interest Feature – Breeding Bird Assemblage – Collision Risk

7.7.6 The presence of approximately 2.6km of new pylons and an overhead line in the landscape where there is currently none (i.e. to the north and west of Hintlesham Woods) could increase the risk of collision by birds resulting in injury or mortality. However, bird surveys of Hintlesham Woods which included the north-western boundary of Ramsey Wood, identifying a range of agile passerine species. It is considered unlikely that birds using the woodland would be at risk of collision with the new overhead line in this location. Woodland birds are agile species that could easily avoid these features in flight.

7.7.7 The existing overhead line through the woodland would be replaced with new conductors which would be at the same height as existing (as the pylons would be the same height either side). Therefore, the change in risk of collision would be neutral. The removal of the existing 132KV overhead line to the south of the Hintlesham Woods SSSI would remove approximately 5km of overhead line from the landscape, removing this as a potential collision feature for the breeding bird assemblage of the Hintlesham Woods SSSI.

7.7.8 The operational impact of reoccurring management, lowering the canopy height, of the vegetation under the overhead lines would be as per the existing baseline. There would be no new effect at this location.

7.7.9 Together, these changes are unlikely to generate more than a small magnitude impact on nesting birds resulting in a **minor adverse** effect which is **not significant**.

Non-Statutory Designated Sites – Habitat Modification

7.7.10 As a result of the required operational safety clearance underneath the overhead lines, there could be operational impacts at Valley Farm Wood CWS.

7.7.11 Approximately 0.5ha of woodland habitats would be permanently modified at Valley Farm Wood CWS to maintain the operational safety clearance distance between the overhead line and the woodland would be required. Similar management elsewhere resulting in the reduced canopy height for the existing overhead lines suggests that while this management changes the structure of vegetation, it does not change its function or habitat categorisation. The operational long term change is assessed as being of negligible magnitude on a medium value receptor, resulting in a **minor adverse** effect that would be **not significant**.

Habitats

Potential Ancient Woodland– habitat modification

7.7.12 Permanent modification of habitat could be required for approximately 25m through regular pruning of PoAWS5 to maintain the operational safety clearance between the overhead line and the vegetation below. While the structure of the habitat could be lowered in height, the function and integrity of the habitat would continue. As a repeated activity there is unlikely to be any pathway to effect, particularly over such a relatively short distance. The resulting long term change in PoAWS5 habitat is assessed as being of small magnitude on a high value receptor, resulting in a **minor adverse** effect that would be **not significant**.

Lowland Mixed Deciduous Woodland HPI and Hedgerows HPI – habitat modification

7.7.13 Once the project has been constructed the coppiced areas of woodland and hedgerows that are crossed by the proposed 400kV overhead line would be allowed to regenerate although operational safety clearances would be maintained between the overhead line and vegetation below and adjacent to avoid interference with the conductors. This would result in continued and permanent modification/degradation of approximately 1.56ha of lowland mixed deciduous woodland HPI habitat. The combined potential long term impact of small magnitude on a medium value receptor result in a **minor adverse** effect, which would be **not significant**.

Bats

Habitat Modification

7.7.14 Woodland coppiced for the installation of overhead lines would be regularly managed to maintain a safety distance beneath the overhead lines and the vegetation below.

7.7.15 Bat activity surveys undertaken within Hintlesham Woods in 2022 confirmed that bats, including barbastelle bats, crossed and foraged along the habitat edges of the existing 400kV overhead line operational maintained swathe. Therefore, it is unlikely that bats would be prevented from crossing and foraging under the new overhead lines using modified habitats, once in operation. The impact would be negligible and the effect would be **neutral** and **not significant**.

Hazel Dormouse

Habitat Modification

7.7.16 Where woodland is coppiced for the installation of overhead lines or removed for the installation of underground cables it would be regularly managed to maintain operational safety clearances where the overhead lines oversail. However, this modified habitat would continue to provide suitable habitat for dormice providing foraging and nesting habitat and connections between other suitable habitats. The impact would be negligible and the effect would be **neutral** and **not significant**.

Bats and Birds (outside of Hintlesham Woods SSSI and Stour and Orwell Estuaries SPA/Ramsar)

Collision Risk

7.7.17 The potential bird collision risk with pylon and overhead wire infrastructure has been assessed as specified in NPS EN-5. While the proposed 400kV overhead line would be higher than the existing 132kV overhead line being removed (with pylons c.54m compared to the existing 30m), the proposed 400kV overhead line would be at the approximate same height as the existing retained parallel 400kV overhead line. As such, there is unlikely to be any additional risk of collision by bats or birds, as the vertical extent of features in the landscape (i.e. two overhead lines at different height) are actually reduced.

7.7.18 Overall, the project will remove more overhead line than it would introduce, including one less overhead line in Section E: Dedham Vale AONB and parts of Section G: Stour Valley. There would be installation of approximately 18km of new overhead line and removal of approximately 27km of existing overhead line and associated pylons (comprising 25km of the 132kV overhead line and 2km of the existing 400kV overhead line. This would remove the risk of bat or bird collision in those locations.

7.7.19 Overall, the impact of the new overhead line and removal of existing overhead line is likely to generate more than a small beneficial magnitude impact on local bird and bat populations in the long term resulting in a **minor beneficial** effect which is **not significant**.

GSP Substation

7.7.20 There are no likely significant effects on biodiversity during operation of the GSP substation or associated works.

Summary of Operational Effects

7.7.21 There are limited pathways from operational effects on biodiversity.

7.7.22 Maintenance of the operational safety clearance between the new overhead lines and the vegetation below would be required. The introduction of new overhead lines is not anticipated to increase the risk of collisions given the existing (broadly) parallel 400kV overhead line within the landscape. Beneficial effects include the removal of overhead lines in some sections, removing these potential collision features from the landscape. The effects of these on designated sites, habitats and bats and dormice would be **not significant.**

7.8 Proposed Mitigation During Construction

Introduction

7.8.1 This section sets out the proposed additional mitigation for the potential likely significant effects during construction outlined in Section 7.6. These are in addition to the embedded measures identified in the REAC (**application document 7.5.2**) and the good practice measures in the CoCP (**application document 7.5.1**). The additional mitigation measures are listed in the REAC, which forms Appendix B to the CEMP (**application document 7.5.2**). The CEMP is secured though Requirement 4 of the draft DCO (**application document 3.1**).

Main Project

7.8.2 Loss and modification/degradation of lowland mixed deciduous woodland HPI was assessed as having a potential likely significant effect during construction. When all woodland types were considered, to include non-HPI types, a medium magnitude impact was identified resulting in a moderate adverse effect, which would be significant.

7.8.3 The approach to identifying mitigation areas for woodland creation has aimed to create singular, larger areas connected to retained good condition woodland habitat where the success of similar habitat creation would be maximised. As such, the area around Hintlesham Woods SSSI was targeted and additional benefits reviewed i.e. the connection of currently separate woodland blocks.

7.8.4 The Order Limits include additional areas for mitigation woodland creation, to compensate for this woodland lost or that which has been retained but modified/degraded. Mitigation areas are displayed on ES Figure 16.1 (**application document 6.4**) with woodland creation proposed at the following locations specifically for biodiversity purposes: MM09 and MM10.

7.8.5 The approach at these locations would be to encourage natural regeneration of woodland, using Hintlesham Woods SSSI as the source. Trees would develop naturally in these areas from seeds that have fallen from the immediately adjacent ancient woodland. Seed would also be collected from the trees within Hintlesham Woods, propagated and planted to assist establishment, particularly at MM09 where planting (rather than natural regeneration) may be required to create the habitat connection between Ramsey Wood and Wolves Wood/Keeble's Grove to the north-west. The combined woodland mitigation habitats site would be approximately 13ha.

GSP Substation

7.8.6 The assessment has concluded that there are no likely significant effects in relation to biodiversity receptors during construction of the GSP substation. Therefore, no mitigation measures have been identified.

7.9 Proposed Mitigation During Operation

7.9.1 The assessment has concluded that there are no likely significant effects in relation to biodiversity receptors during operation. Therefore, no mitigation measures have been identified.

7.10 Residual Significant Effects (With Mitigation)

7.10.1 The assessment has concluded that there are no likely significant residual effects in relation to biodiversity receptors during construction or operation (Table 7.13). The provision of new woodland would mitigate that lost or modified with the added benefit of connecting previously discrete areas of SSSI woodland.

Table 7.13 – Summary of Likely Significant Effects

Aspect/Proposed Matter	Likely Significant Effect (Without Mitigation)	Proposed Additional Mitigation	Residual Significant Effect (With Mitigation)
Construction			
Habitat loss and modification/degradation of lowland mixed deciduous woodland HPI (**medium value**) – 1.91ha. Habitat loss and modification/degradation of all woodland habitat types cumulatively – an additional 4.3ha	Long term, moderate adverse	(EIA_B01) Mitigation woodland creation (natural regeneration and planting), proposed at two locations connected to Hintlesham Woods: MM09 and MM10.	Neutral – Not significant

7.11 Sensitivity Testing

Introduction

7.11.1 This section outlines alternative approaches to the baseline assessment presented in Sections 7.6 to 7.10. It considers the alternative construction schedule, which is described in ES Appendix 4.2: Construction Schedule (**application document 6.3.4.2**) and also flexibility between the baseline design and method set out within ES Chapter 4: Project Description (**application document 6.2.4**) and the Proposed Alignment shown on ES Figure 4.1: The Project (**application document 6.4**). Further details on the flexibility assumptions are outlined in Section 4.2 of ES Chapter 4: Project Description (**application document 6.2.4**).

Assessment of Alternative Construction Schedule

7.11.2 This chapter assumes the baseline construction schedule described in ES Appendix 4.2: Construction Schedule (**application document 6.3.4.2**) for the purposes of the assessment. Sensitivity testing considering the alternative schedule, which has a later start date due to the GSP substation being delivered pursuant to the DCO, has shown that with the inclusion of the seasonal constraints around vegetation clearance and works to avoid effects on biodiversity receptors included as embedded and good practice measures, there would be no new or different likely significant effects to those identified in the assessment in Sections 7.6 to 7.10 of this chapter.

Flexibility in Design

Flexibility in Trenchless Crossings

7.11.3 The assessment has assumed trenchless crossings at the River Box, River Stour, Sudbury Branch Railway Line and south of Ansell's Grove. Changes that could result from an alternative construction method or from a change to drill direction, would not result in any new or different significant effects to those identified in Sections 7.6 to 7.10 of this chapter, given that the good practice measures in the CoCP (**application document 7.5.1**) would be in place.

Flexibility in Construction Method

7.11.4 The ES assumes a worst case that piling is required at all pylon locations. If the piling was not required at all locations, then this would not affect the assessment presented in Sections 7.6 to 7.10 for biodiversity receptors. However, it may lessen the impact to noise-sensitive species depending on the location of the change.

7.11.5 The assessment presented within Sections 7.6 to 7.10 has assumed the locations for the temporary access route and watercourse crossings in cable sections shown on Figure 4.1: The Project (**application document 6.4**). Sensitivity testing has been carried out to determine the potential for likely significant effects should alternative locations be chosen. Changes to the location of temporary access routes and crossings could result in different vegetation being affected. Disturbance on different sensitive ecological receptors as a result of construction noise, vibration and lighting is also possible. However, it is likely that vegetation removal would be of a similar magnitude to that of the existing locations and effects would be temporary and vegetation reinstated wherever the temporary access routes or working areas are located.

7.11.6 Given the embedded measures in the REAC (**application document 7.5.2**) and the good practice measures set out in the CoCP(**application document 7.5.1**), the sensitivity testing has shown that there would be no new or different likely significant effects as a result of changes to the location of temporary access routes and watercourse crossings.

Flexibility within the Order Limits

7.11.7 The assessment presented within Sections 7.6 to 7.10 has assumed the Proposed Alignment shown on ES Figure 4.1: Proposed Project (**application document 6.4**). It should be noted that as described in ES Chapter 4: Project Description (**application document 6.2.4**), the Proposed Alignment is not fixed and could be subject to change within the defined LoD within the parameters shown on the Works Plans (**application document 2.5**). Sensitivity testing has been carried out to determine the potential for likely significant effects should alternative designs within the parameters defined by the LoD be taken forward.

7.11.8 Changes to pylon position could result in direct habitat loss/degradation or a change in the extent of the operational safety distance required, where overhead lines cross woodland. While some minor change in the locations could occur if pylon locations changed, there would be no change in the anticipated magnitude of the effect as the Order Limits mainly comprise arable fields of limited biodiversity value and other habitat present can be readily reinstated if required. LoD have been designed to avoid sensitive ecological features where they do exist and a range of good practice measures in the CoCP (**application document 7.5.1**) provide additional protection. As such, sensitivity testing considering flexibility within the Order Limits, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Sections 7.6 to 7.10.

Compensatory Habitats

7.11.9 There are habitats that would be temporarily lost during construction based on the Proposed Alignment. Although these would not result in a likely significant effect in EIA terms, these habitats would need to be reinstated and additional habitats provided to compensate for the habitat loss and to bring the Biodiversity Metric 3.1 to zero i.e. no net loss (before considering net gain). This is described in more detail in the Environmental Gain Report (**application document 7.4**).

7.11.10 For completeness, these compensation habitats based on the estimated losses from the Proposed Alignment, are shown on ES Figure 16.1 (**application document 6.4**) to demonstrate where compensatory habitat is proposed to offset the loss. These areas have been identified to provide connection to tie in with areas identified for landscape softening and/or to provide habitat connection to existing habitats. Further details can also be found in the LEMP (**application document 7.8**).

7.12 Conclusion

7.12.1 The assessment presented in Sections 7.6 to 7.10 has concluded that there are no likely significant residual effects in relation to biodiversity during construction or operation. In addition, the sensitivity testing presented in Section 7.11 has shown that there would be no new or different significant effects through the application of either the alternative construction schedule or through flexibility within the LoD. As such, the requirements of the NPS EN-1 are considered to be met.

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com