

**The Great Grid Upgrade**

Norwich to Tilbury

# Preliminary Environmental Information Report

Volume I – Main Text

April 2024

**nationalgrid**

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# 1. Introduction

# 1. Introduction

## 1.1 Overview of the Project

- 1.1.1 National Grid Electricity Transmission (NGET) referred to as National Grid within this report, owns and maintains the national high-voltage electricity transmission network throughout England and Wales.
- 1.1.2 The transmission network connects the power from where it is generated to the regional Distribution Network Operators (DNO) who then supply businesses and homes.
- 1.1.3 National Grid holds the Transmission Licence for England and Wales, and their statutory duty is to develop and maintain an efficient, co-ordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.
- 1.1.4 National Grid is working to build a cleaner, fairer, and more affordable energy system that serves everyone, powering the future of our homes, transport, and industry. The Norwich to Tilbury Project would support the UK's net zero target through the connection in East Anglia of new low carbon energy generation, and by reinforcing the local transmission network.
- 1.1.5 It is National Grid that is developing plans for Norwich to Tilbury, previously known as the East Anglia Green Energy Enablement (GREEN) Project (referred to as the 'Project' in this report).
- 1.1.6 The Project is a proposal by National Grid to reinforce the high voltage power network in East Anglia. The reinforcement is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which is generated by offshore wind) that is expected to connect to the network over the next ten years and beyond. Completion of the Project, together with other new reinforcements across the country will meet this future energy transmission demand both in East Anglia and across the UK.
- 1.1.7 The Project proposes to reinforce the transmission network between the existing substations at Norwich Main in Norfolk, Bramford in Suffolk, and Tilbury in Essex as well as connecting new offshore wind generation and an interconnector proposed to come ashore on, or in the vicinity of, the Tendring Peninsula.
- 1.1.8 Current draft proposals for the Project, referred to as the 2024 preferred draft alignment, which are the subject of the 2024 statutory consultation, comprise:
- A new 400 kV electricity transmission connection of approximately 184 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation comprising:
    - Approximately 159 km of new overhead line supported on approximately 510 steel lattice pylons (approximately 50 m in height) some of which are gantries (typically up to 15 m in height) within proposed Cable Sealing End (CSE) compounds or existing or proposed substations

- Approximately 25 km of 400 kV underground cabling (some of which is located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB)))
  - Six new CSE compounds each with a permanent access, to connect the overhead lines to the underground cables
  - A new 400 kV East Anglia Connection Node (EACN) Substation, with a new permanent access, on the Tendring Peninsula. This is proposed to be an Air Insulated Switchgear (AIS) substation
  - Substation extension works at the existing Norwich Main, and Bramford Substations and works within the existing Tilbury Substation to connect and support operation of the new transmission connection
  - Temporary works associated with the construction of the Project
- 1.1.9 An alternative design at the Waveney Valley (referred to as the Waveney Valley Alternative) is also being considered and is the subject of consultation and ongoing assessment. The design alternative, if taken forward, would result in changes to those elements of the Project set out below. This would comprise:
- Installation of approximately 157 km of new 400 kV overhead line
  - Installation of approximately 27 km of 400 kV underground cabling (some of which is located through the Dedham Vale National Landscape (an AONB))
  - Eight new CSE compounds (each with a permanent access) to connect the overhead lines to the underground cables
- 1.1.10 All other works not listed above would remain consistent with either alternative.
- 1.1.11 The Waveney Valley Alternative, if taken forward and based on the 2024 preferred draft alignment would comprise approximately 2 km less new 400 kV overhead line and approximately an additional 2 km of 400 kV underground cabling and two additional new CSE compounds, each with a permanent access, to connect the overhead lines to the underground cables.
- 1.1.12 In addition, third party utilities diversions and / or modifications would also be required to facilitate the construction of the Project. There would also be land required for mitigation, compensation and enhancement of the environment including Biodiversity Net Gain (BNG).
- 1.1.13 As well as the permanent infrastructure, land would also be required temporarily for construction activities including for example working areas for construction equipment and machinery, site offices, welfare, storage and temporary construction access.
- 1.1.14 Further details of the Project are included within Chapter 4: Project Description.
- 1.1.15 If progressed with significant elements of overhead line, then Norwich to Tilbury would be classified as a Nationally Significant Infrastructure Project (NSIP) as defined under Part 3 Section 14 and Section 16 of the Planning Act 2008 as it meets the criteria:
- *‘Section (14)(1) In this Act “nationally significant infrastructure project” means a project which consists of any of the following—...*
    - (b) the installation of an electric line above ground...

- *Section (16)(1) The installation of an electric line above ground is within section 14(1)(b) only if (when installed) the electric line will be— (a) wholly in England...*

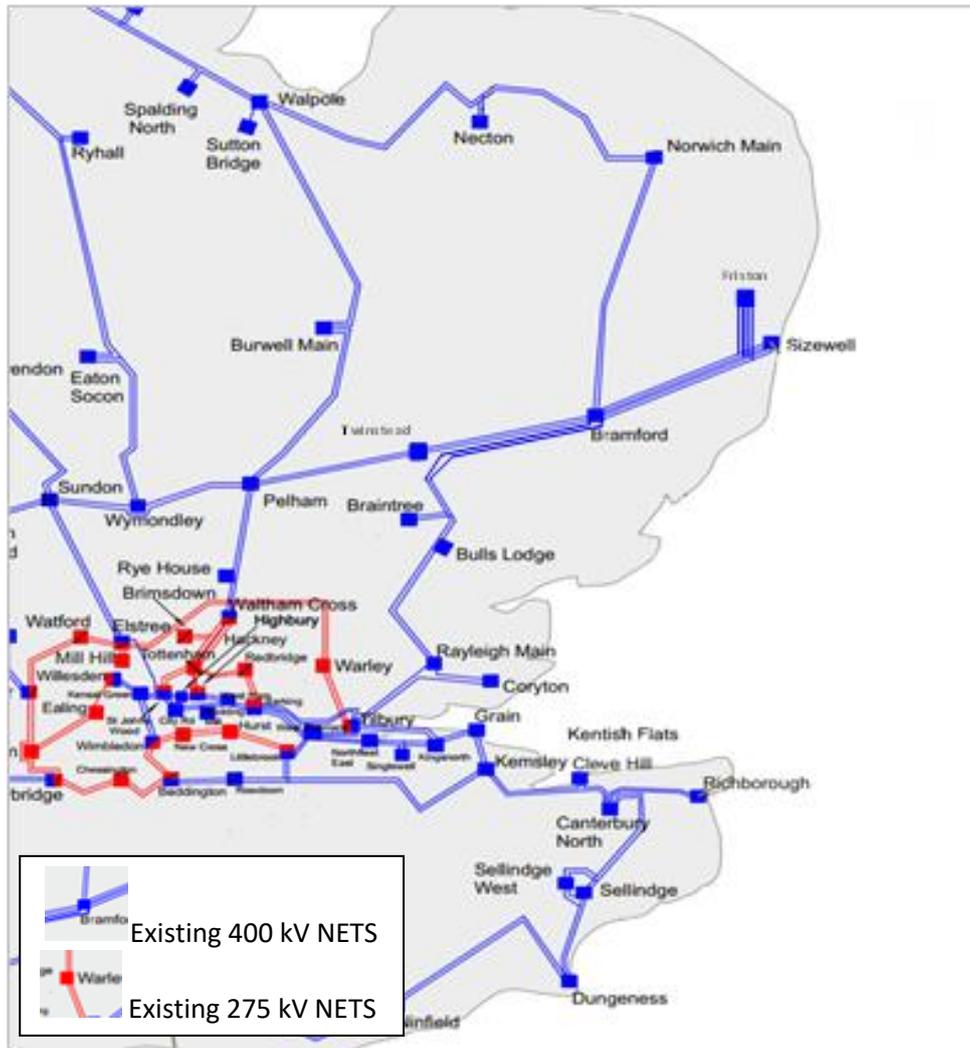
- 1.1.16 The Project, in its current form does not meet any of the exemption criteria above, therefore is an NSIP.
- 1.1.17 National Grid intends to apply for the granting of an order for development consent to the Secretary of State (referred to as the Development Consent Order (DCO) application) for the Project as it comprises installation of 400 kV electricity transmission infrastructure over a distance of approximately 184 km.
- 1.1.18 The Project also constitutes Environmental Impact Assessment (EIA) development as defined in the Infrastructure Planning EIA Regulations 2017 (referred to as the 'EIA Regulations' in this report). The Project falls within Schedule 1 paragraph 20 of the EIA Regulations, '*Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km*'. Therefore, an assessment of the impacts of the Project on the environment is required.

## 1.2 The Need for the Project

- 1.2.1 Great Britain already has 8.5 gigawatts (GW) of offshore wind energy in operation, and another 1.9 GW under construction. The Government's Energy White Paper (EWP) (December 2020) outlines a plan to increase energy from offshore wind to 40 GW by 2030 (with this Government target being increased in April 2022 to 50 GW) and this Project would support achieving that target.
- 1.2.2 New connections for new offshore wind and nuclear power generation projects and for interconnectors into East Anglia are expected to continue in addition to the current contracted position. These new connections are being constructed or are expected to connect into substations at Necton, Norwich Main, Bramford, Friston and Sizewell. Additionally, agreements are in place with two offshore wind farm projects and an interconnector based on their connections into a new EACN Substation. National Grid has a duty to facilitate new connections and maintain a safe National Electricity Transmission System (NETS) and has considered the capability of the existing network to support such connections.
- 1.2.3 The Project could also connect new offshore wind farms off the Essex coast and a European interconnector to the electricity transmission network. Two offshore wind farms, the North Falls Offshore Wind Farm and Five Estuaries Offshore Wind Farm, and the Tarchon Energy interconnector (from Germany) are currently in development. If consented, they are expected to be operational by the end of 2030.
- 1.2.4 East Anglia's 400 kV electricity transmission network was built in the 1960s. It was built to supply regional demand, centred around Norwich and Ipswich. With the growth in new energy generation from offshore wind, nuclear power and interconnection with other countries, there will be more electricity connected in East Anglia than the network can currently accommodate.
- 1.2.5 As a result, and to comply with its duties, National Grid needs to reinforce the electricity network to allow power to be imported to and exported from East Anglia. The reinforcement would provide additional capability to connect to areas of demand, allowing power flows across boundaries, and linking interconnectors to and from Europe.

1.2.6 The National Grid Electricity System Operator (ESO) concluded that the existing high voltage electricity network in East Anglia does not have the capacity needed to reliably and securely transport all the energy that will be connected into the network while meeting the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS). This is documented within Section 3 of the 2023 SOBR (National Grid, 2023). The current network arrangements (as presented on Image 1.1) are not sufficient to meet this standard for the projected levels of power flow.

Image 1.1 - Baseline Network Configuration (not to scale) – as taken from the Corridor and Preliminary Routing and Siting Study (CPRSS) (National Grid, 2022)



1.2.7 An optioneering process has been completed for the Project (between 2009 and 2022) which identified a preferred Strategic Proposal (a new 400 kV double-circuit of ~60 km between Norwich Main and Bramford Substations and a new 400 kV double circuit of ~120 km between Bramford and Tilbury Substations via a new EACN Substation proposed in the Tendring District) which was outlined in a Strategic Options Report (part of the CPRSS). Following the selection of the Strategic Proposal, the routing and siting stage was undertaken, this resulted in a preferred corridor as reported in the CPRSS (National Grid, 2022) being identified.

1.2.8 The preferred corridor in the CPRSS (referred to within the EIA Scoping Report as the ‘Scoping Report Corridor’) was consulted on at the 2022 non-statutory consultation.

- 1.2.9 A further round of non-statutory consultation was then held in 2023 on a preferred route alignment which included proposed pylon locations, CSE compound locations, locations of underground cables and the proposed new EACN Substation location. Prior to non-statutory consultation a backcheck and review was undertaken of the Strategic Options to determine if the preferred Strategic Proposal was still valid.
- 1.2.10 Following both rounds of non-statutory consultation, feedback received was considered and changes made to the Project to reflect feedback where possible – further details are included within Chapter 3: Main Alternatives Considered.

### **Transmission of Energy Legislative Controls**

- 1.2.11 National Grid holds the Transmission Licence for England and Wales and their statutory duty is to develop and maintain an efficient, co-ordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.
- 1.2.12 Section 9(2) of the Electricity Act 1989 places general duties on National Grid as a licence holder ‘*to develop and maintain an efficient, co-ordinated and economical system of electricity transmission...*’. In addition, Section 38 and Schedule 9 of the Electricity Act 1989 require National Grid, when formulating proposals for new lines and other works, to:
- ‘...have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects’.*
- 1.2.13 Under Licence Condition C8 (Requirement to offer terms) of the Transmission Licence Standard Conditions (OFGEM, 2022), National Grid ESO have a duty to meet obligations relating to making offers to provide connections to the Transmission System. In summary, where any person applies for an offer, National Grid shall offer to enter into an agreement(s) to connect, or to modify an existing connection, to the Transmission System and the offer shall make detailed provision regarding:
- The carrying out of works required to connect to the Transmission System
  - The carrying out of works (if any) in connection with the extension or reinforcement of the Transmission System
  - The date by when any works required to permit access to the Transmission System (including any works to reinforce or extend the Transmission System) shall be completed

## **1.3 Geographical Context**

- 1.3.1 Figure 1.1: Site Location Plan and Project Sections in Volume II presents the location of the Project, together with the draft Order Limits. The northern most extent of the Project comprises the connection with the existing Norwich Main Substation in South Norfolk. The Project extends south through the districts of South Norfolk, Mid Suffolk, Babergh, Colchester and through to Tendring where the new EACN Substation would be constructed. From there it continues south through Braintree, Chelmsford, Basildon, Brentwood and into Thurrock connecting into the existing Tilbury Substation.

- 1.3.2 The topography of the wider geographical area is predominantly flat and low-lying comprising of large-scale arable fields with clusters of urban and rural settlements. Part of the proposed route alignment (approximately 3%) is located within the Dedham Vale National Landscape (an AONB) noted for its unspoilt rural character which has remained largely free from the intrusion of modern development. Within the National Landscape it is proposed that underground cabling would be used.
- 1.3.3 The Project crosses several areas of flood risk (Flood Zones 2 and 3), with particularly large areas of flood risk around Tilbury.
- 1.3.4 Ecological features within proximity to the Project include the Flordon Common Site of Special Scientific Interest (SSSI), Wortham Ling SSSI, Middle Wood SSSI, Marks Tey Brickpit SSSI, River Ter SSSI, Langdon Ridge SSSI and many discrete areas of Ancient Woodland. There are four areas of Ancient Woodland within the draft Order Limits – Round Wood and Bullen Wood south of Bramford Substation, an unnamed Ancient Woodland north-east of Rivenhall and Writtle - Writtlepark Wood.
- 1.3.5 Heritage assets crossed or in proximity to the Project include the Bressingham Museum and Gardens, and Langley’s Historic Park/ Garden, as well as many discrete heritage assets such as scheduled monuments and listed buildings.
- 1.3.6 Most of the Project would be located on land that is categorised on provisional Agricultural Land Classification (ALC) mapping as Grade 3 agricultural land or higher quality.
- 1.3.7 The Project has also been broken down into eight geographical sections (referenced throughout this PEIR), based largely on Local Authority boundaries. These are presented on Figure 1.1: Site Location Plan and Project Sections in Volume II and comprise:
- Section A – South Norfolk Council
  - Section B – Mid-Suffolk District Council
  - Section C – Babergh District Council, Colchester City Council and Tendring District Council
  - Section D – Colchester City Council
  - Section E – Braintree District Council
  - Section F – Chelmsford City Council
  - Section G – Basildon Borough Council and Brentwood Borough Council (and part of Chelmsford City Council)
  - Section H – Thurrock Council

## 1.4 Purpose of this Report

- 1.4.1 Regulation 12(2) of the EIA Regulations defines preliminary environmental information as information that has been compiled by the applicant and ‘*is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)*’.
- 1.4.2 The Planning Inspectorate’s Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Planning Inspectorate, 2020), paragraph 8.4 states ‘*There is no prescribed format as to*

*what PEI should comprise and it is not expected to replicate or be a draft of the ES... A good PEI document is one that enables consultees (both specialist and non-specialist) to understand the likely environmental effects of the Proposed Development and helps to inform their consultation responses on the Proposed Development during the pre-application stage’.*

- 1.4.3 This PEIR has been prepared in accordance with The Planning Inspectorate’s Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Planning Inspectorate, 2020), by competent experts (refer to Appendix 1.1: Competent Experts in Volume III) and is intended to give consultees an understanding of the potential likely significant effects (positive or negative) to enable them to prepare well-informed responses to the statutory consultation. All conclusions and assessments are by their nature preliminary and are based on the current early Project design as described within this PEIR. All assessment work has applied (and any ongoing work continues to apply) a precautionary principle, in that where limited information is available (in terms of the proposals for the Project and baseline information), a realistic worst-case is assessed. The final assessment will be presented within the ES submitted with the DCO application. This would consider and take into account the representations made during the statutory consultation and ongoing engineering design informed by the EIA process.
- 1.4.4 The PEIR has been informed by the EIA Scoping Opinion published by the Secretary of State in December 2022<sup>1</sup>.
- 1.4.5 Any significant effects identified within the PEIR are identified on a preliminary basis and may be subject to change as individual assessments progress. Therefore, likely significant effects provisionally identified within this PEIR may later be found not to be significant following completion of the design and identification of further mitigation measures reported in the ES.
- 1.4.6 This PEIR comprises three volumes. Volume I is the written statement (this report); Volume II contains the Figures and Volume III comprises the Technical Appendices. The PEIR is also accompanied by a Non-Technical Summary.
- 1.4.7 Table 1.1 outlines the structure of this PEIR, outlining the chapters and supporting appendices along with a summary of their contents.

**Table 1.1 – Structure of the PEIR**

<b>Chapter / Appendix</b>	<b>Content</b>
Non-Technical Summary	Summarises the Project and preliminary findings reported within the PEIR using non-technical language – the Non-Technical Summary is a stand-alone separate document.
1. Introduction	Introduces the Project and the purpose and structure of the PEIR.
2. Key Legislation and Planning Policy Context	Includes a review of the legislation and policy relevant to the Project.

<sup>1</sup> East Anglia GREEN Scoping Opinion available to view at <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN020027/EN020027-000009-EAGN%20-%20Scoping%20Opinion.pdf>

Chapter / Appendix	Content
3. Main Alternatives Considered	This chapter outlines the evolution of the Project, main alternatives considered and the reasons for selecting the Project.
4. Project Description	This chapter describes the Project including permanent features and associated temporary works. It describes the general characteristics of the Project, outlines areas of flexibility in relation to design parameters, and how these would be addressed in the environmental assessment through the application of Limits of Deviation (LoD) and the Rochdale Envelope (refer to section 2.6).
5. EIA Approach and Method	This chapter includes a description of the overall EIA methodology that is proposed to be presented in the ES including temporal durations and approach to mitigation. This chapter also includes a summary of how the EIA Scoping Opinion has informed the EIA approach and methods.
6-16. Topic chapters Topic chapters (Agriculture and Soils; Air Quality; Ecology and Biodiversity; Contaminated Land, Geology and Hydrogeology; Health and Wellbeing; Historic Environment; Hydrology and Land Drainage; Landscape and Visual (including Arboriculture); Noise and Vibration; Socio-Economics, Recreation and Tourism; and Traffic and Transport).	<p>There is a chapter for each environmental topic scoped into the EIA. The topic chapters are structured as follows:</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Regulatory and Planning Policy Context</li> <li>• Scoping Opinion</li> <li>• Project Engagement and Consultation</li> <li>• PEIR Approach and Methods</li> <li>• Baseline Conditions <ul style="list-style-type: none"> <li>○ Describes the understanding of the existing and future environment based on the baseline information collected to date</li> <li>○ Explains any further information to be obtained through further consultation, desk-based studies, or surveys</li> </ul> </li> <li>• Embedded, Standard and Additional Mitigation Measures</li> <li>• Potential Residual Impacts and Preliminary Likely Significant Effects</li> <li>• Sensitivity Testing</li> </ul>
17. Cumulative Effects	Outlines a description of the way in which cumulative effects will be assessed along with an initial indication of potential cumulative effects associated with the Project.

<b>Chapter / Appendix</b>	<b>Content</b>
18. Summary and Next Steps	Provides a summary table setting out the significant effects for each aspect by topic.
19. Abbreviations	Provides all abbreviations used in the PEIR.
20. References	Provides a list of all references referenced in the PEIR.
Volume II - Figures	Contains supporting figures to the PEIR. This document is split into 27 separate parts.
Volume III - Technical Appendices	Contains additional technical information supporting the chapters above. This document is split into four separate parts.

- 1.4.8 This PEIR has been developed in parallel with other regulatory environmental studies, including the Habitats Regulations Assessment (HRA) screening, Flood Risk Assessment (FRA) and the Water Environment Regulations (WER) screening assessment. These are described in further detail in Chapter 8: Ecology and Biodiversity and Chapter 12: Hydrology and Land Drainage.
- 1.4.9 The PEIR has been prepared by competent experts as required under Regulation 14(4) of the EIA Regulations and has been prepared and coordinated by environmental consultants who are competent members of the Institute of Environmental Management and assessment (IEMA) EIA Quality Mark Scheme. Further information about the authors is presented in Appendix 1.1: List of Competent Experts in Volume III.
- 1.4.10 Consultation feedback will inform the ongoing development of the Project. The design of the Project and therefore the assessment of its effects will continue to evolve in response to consultation, and as further baseline information becomes available. As such, information on the likely significant effects (material to the decision-making process) may change. However, the baseline information presented in the PEIR is considered to be sufficient to inform the preliminary assessment of the Project and is further informed by the professional judgement of specialists undertaking the environmental studies.

## **1.5 Biodiversity Net Gain**

- 1.5.1 Although not a statutory requirement for DCO projects submitted to the Planning Inspectorate prior to November 2025, National Grid has committed to 10% Environmental Net Gain<sup>2</sup> including as a minimum 10% BNG<sup>3</sup> across all its construction projects.
- 1.5.2 This commitment is underpinned by the delivery of quantifiable enhancements for biodiversity measured from a baseline using the Department for Environment, Food and Rural Affairs (Defra) Statutory Metric (Defra, November 2023) with actions formalised

<sup>2</sup> Environmental Net Gain follows the same themes as biodiversity net gain but requires developers to deliver a wider range of environmental benefits over and above the full environmental impact of the proposed development (e.g. air quality, flood risk management).

<sup>3</sup> Biodiversity Net Gain is an approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand.

and secured by long term management arrangements with external organisations and partners.

- 1.5.3 These commitments ensure that National Grid can deliver long term environmental improvements as part of their works. The commitments align and will make a positive contribution to regional and national strategies and facilitate collaboration and partnerships with our communities and stakeholders.

# 2. Key Legislation and Planning Policy Context

## 2. Key Legislation and Planning Policy Context

### 2.1 Introduction

- 2.1.1 This chapter sets out a summary of the key environmental and planning legislation and national policy relevant to the Project. Additional legislation and policy applicable to specific environmental topics is listed in each relevant topic chapter (Chapters 6 – 17 of this PEIR).
- 2.1.2 A Planning Statement will be produced to support the application for a DCO and will include a full planning policy review and set out how the Project meets planning policy.

### 2.2 Key Legislation

#### Planning Act 2008

- 2.2.1 The Planning Act 2008 introduced a consenting procedure for NSIPs. Section 14(1)(b) and Section 16 of the Planning Act 2008 and the Planning Act (Electric Lines) Order 2013 outline that a project that involves the installation of an electric line above ground of more than 2 km, which will operate at 400 kV in England is an NSIP.
- 2.2.2 For an NSIP the grant of development consent is required by the making of a DCO under the Planning Act 2008.
- 2.2.3 Only a proposed new above ground electricity line would be an NSIP by virtue of the definitions in the Planning Act. Other development, such as underground cables, may be granted development consent as associated development within the meaning of Section 115 of the Planning Act.
- 2.2.4 Section 104 of the Planning Act 2008 states at (2)(a) that the Secretary of State must have regard to any national policy statement which has effect in relation to development of the description to which the application relates.
- 2.2.5 The National Policy Statements (NPSs) relevant to this Project are the Overarching National Policy Statement for Energy (EN-1) (Department of Energy Security and Net Zero (DESNZ) 2024) and the National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024) which are discussed in Section 2.3. National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2024) is also relevant insofar as it gives express support for the onshore infrastructure required to deliver new offshore wind developments.
- 2.2.6 The Planning Act 2008 has been amended through the adoption of the Localism Act 2011 (SI 2011 c. 20). Under the Localism Act 2011, the Planning Inspectorate is responsible for the NSIP planning process and will examine the DCO application for the Project and make a recommendation to the Secretary of State to grant or refuse consent.

## The Infrastructure Planning (EIA) Regulations 2017

- 2.2.7 The Infrastructure Planning (EIA) Regulations 2017 govern the EIA process relevant to NSIPs. Schedule 1 of the EIA Regulations lists those projects for which an EIA is required and includes, under paragraph 20, the construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.
- 2.2.8 The Project includes the proposed installation of 400 kV electricity transmission infrastructure over a distance of approximately 184 km, of which the majority is overhead line. It therefore falls under Schedule 1 and requires a statutory EIA.
- 2.2.9 EIA Regulation 5 sets out the EIA process. This includes Regulation 5(2) to identify, describe and assess the direct and indirect significant effects of the Project during construction and operation on the environment (see Table 5.5 for a list of relevant factors) and EIA Regulation 5(4) to include, where relevant the expected significant effects arising from the vulnerability of the Project to major accidents or disasters. Schedule 4 of the EIA Regulations set out the information to be included in an ES. There is a requirement under EIA Regulation 32(1) to consider transboundary effects, that is, those effects that could affect receptors in other countries. A screening exercise was undertaken using Advice Note Twelve: Transboundary Impacts and Process, Annex I (Planning Inspectorate, 2020) as part of the scoping process. No transboundary effects have been predicted in relation to the Project, as there is no pathway for effects to occur outside the UK – this was confirmed at the scoping stage.

## Electricity Act 1989

- 2.2.10 Section 9(2) of the Electricity Act 1989 places general duties on National Grid as a licence holder *‘to develop and maintain an efficient, co-ordinated and economical system of electricity transmission...’* In addition, Section 38 and Schedule 9 of the Electricity Act 1989 require National Grid, when formulating proposals for new lines and other works, to:
- ‘...have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what [it] reasonably can mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects’.*
- 2.2.11 National Grid's Stakeholder, Community and Amenity Policy<sup>4</sup> sets out how the company will meet the Schedule 9 duty placed upon it by the legislation.
- 2.2.12 Under Licence Condition C8 (Requirement to offer terms) of the Transmission Licence Standard Conditions (OFGEM, 2022), National Grid ESO have a duty to meet obligations relating to making offers to provide connections to the Transmission System. In summary, where any person applies for an offer, National Grid shall offer to enter into an agreement(s) to connect, or to modify an existing connection, to the Transmission System and the offer shall make detailed provision regarding:
- The carrying out of works required to connect to the Transmission System

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<sup>4</sup> <https://www.nationalgrid.com/electricity-transmission/document/81026/download>

- The carrying out of works (if any) in connection with the extension or reinforcement of the Transmission System
- The date by when any works required to permit access to the Transmission System (including any works to reinforce or extend the Transmission System) shall be completed

## Countryside and Rights of Way Act 2000 as amended by the Levelling-up and Regeneration Act 2023

- 2.2.13 Areas of Outstanding Natural Beauty (now rebranded as National Landscapes) are designated for their outstanding natural beauty. They are designated under Section 82 of the Countryside and Rights of Way Act 2000 to secure their permanent protection against development that would damage their special qualities. In November 2023, AONBs were renamed National Landscapes (the legal designation for Dedham Vale (and the other 45 AONBs across the UK) will remain AONBs).
- 2.2.14 National Grid, as a statutory undertaker, has a duty under Section 85 of the Act, as amended by Section 245 of the Levelling-up and Regeneration Act 2023 which states *'In exercising or performing any functions in relation to, or so as to affect, land in an area of outstanding natural beauty a relevant authority other than a devolved Welsh authority must seek to further the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty'*. This amendment overrides and strengthens the previous duty to *'have regard'* to the purposes of conserving and enhancing the natural beauty of an AONB.
- 2.2.15 Section 89 of the Countryside and Rights of Way Act 2000 requires a Management Plan to be produced for each National Landscape (AONB). These are statutory documents which form a material consideration in decision making. The Dedham Vale National Landscape (an AONB) and Stour Valley Management Plan 2021-2026 (Dedham Vale and Stour Valley and Landscapes for Life, 2021) is the current adopted plan.
- 2.2.16 The Management Plan covers the Dedham Vale National Landscape (an AONB) and the Stour Valley Project Area and sets out policies for its management. The Stour Valley Project Area is not currently designated, although an application has been submitted to Natural England to extend the Dedham Vale AONB to include parts of the Stour Valley Project Area.

## The Conservation of Habitats and Species Regulations 2017

- 2.2.17 There is a requirement to undertake a screening exercise to determine whether there are likely significant effects on European sites because of the Project, either alone or in combination with other plans and projects. If likely significant effects cannot be ruled out, an Appropriate Assessment (AA) must be carried out by the competent authority, in this case, the Secretary of State. The applicant must provide a report with the application showing the site(s) that may be affected together with sufficient information to allow the AA to take place. The Planning Inspectorate would also expect a series of matrices to be completed and submitted, in line with section 6 of Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Planning Inspectorate, 2022).
- 2.2.18 In light of the conclusions of the AA, other than where there are Imperative Reasons of Overriding Public Interest, the competent authority may only agree to the plan or project

if it has ascertained the project will not adversely affect the integrity of the European Site.

## Environment Act 2021

- 2.2.19 The Environment Act 2021 provides a framework for improving environmental management across a wide spectrum of environmental issues including waste and resources, water quality, biodiversity, and air quality. It aims to deliver long-term targets to improve environmental conditions and reduce pollution, which would need to be considered by the Project. The Environment Act 2021 in Section 99 and Schedule 15 includes a requirement for NSIPs to deliver biodiversity gain as part of the application and for the areas of biodiversity net gain to be maintained for a specified period. DCOs must meet a biodiversity gain objective defined in a biodiversity gain statement. This requirement for NSIPs begins in November 2025. National Grid is currently working with other organisations to identify how this can best be implemented and the securing mechanisms for maintaining habitats for the specified period.

## Water Environment Regulations

- 2.2.20 The Water Environment (Water Framework Directive) Regulations 2017 impose duties on the Secretary of State and the Environment Agency to carry out certain assessments, when deciding whether to grant, vary or revoke certain permits and licences which affect water quality.
- 2.2.21 Part 2 of the Regulations requires the identification of River Basin Districts (RBD), and several other assessments to be carried out by the Environment Agency to characterise and classify the status of water bodies in those districts and assess the economic aspects of water use. River basin management plans must be established for each river basin district.
- 2.2.22 The Regulations require several types of areas which are protected by other EU legislation (for example, protected habitats and birds' sites) to be included on registers of protected areas.

## 2.3 National Policy

- 2.3.1 National Policy Statements (NPS) are produced by Government through a parliamentary approval process, and they present the planning policy framework for all decision making for NSIPs. They also include the Government's objectives for the development of NSIPs and are produced for different types of infrastructure development.
- 2.3.2 The Overarching NPS for Energy (NPS EN-1)<sup>5</sup> was designated in January 2024 and sets out national policy for energy infrastructure in combination with the relevant technology-specific NPS, in this case the NPS for Electricity Networks (NPS EN-5).
- 2.3.3 The NPS for Electricity Networks (NPS EN-5)<sup>6</sup> was also designated in January 2024 and sets out the Government's policy for nationally significant electricity transmission

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<sup>5</sup> <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>

<sup>6</sup> <https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf>

networks and, together with EN-1 sets the information that should be provided alongside any application for development consent to satisfy their requirements.

- 2.3.4 These NPSs have therefore informed the assessments provided within this PEIR and where relevant the NPSs are referenced and appraised within the relevant chapter. Reference is also made to NPS EN-3 which includes support for the onshore infrastructure required to deliver new offshore wind developments.

## Overarching National Policy Statement for Energy (EN-1) (2024)

- 2.3.5 NPS EN-1 sets out the Government's overarching policy about the development of NSIPs in the energy sector. It emphasises the need for new energy projects to contribute to a secure, diverse, and affordable energy supply.
- 2.3.6 EN-1 recognises that to *'produce the energy required for the UK and ensure it can be transported to where it is needed, a significant amount of infrastructure is needed at both local and national scale. High quality infrastructure is crucial for economic growth, boosting productivity and competitiveness'*. (Para 2.1.3). It continues *'There is an urgent need for new electricity network infrastructure to be brought forward at pace to meet our energy objectives'* (Para 3.3.65).
- 2.3.7 Section 3.3 recognise that the volume of onshore reinforcement works needed to meet decarbonisation targets is substantial. National Grid ESO forecasts that over the next decade a doubling of north south power transfer capacity will be required. Specific mention is made of the need for *'substantial reinforcement in East Anglia to handle increased power flows from offshore wind generation'* (Para 3.3.68).
- 2.3.8 Section 4.2 sets out the critical national priority for low carbon infrastructure and states: *'Government has committed to fully decarbonising the power system by 2035, subject to security of supply, to underpin its 2050 net zero ambitions. More than half of final energy demand in 2050 could be met by electricity, as transport and heating in particular shift from fossil fuel to electrical technology'* (para 4.2.1) concluding that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure.
- 2.3.9 For electricity grid infrastructure, all power lines in scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations are CNP.
- 2.3.10 EN-1 also sets out guidance on generic impacts of any of the types of energy infrastructure covered by the energy NPS' in respect of matters such as air quality and emissions, biodiversity, dust and odour, flood risk, historic environment, landscape, land use, noise and vibration, socio-economics, traffic and transport and waste management.

## National Policy Statement for Electricity Networks Infrastructure (EN-5) (2024)

- 2.3.11 NPS EN-5 specifically relates to electricity networks.
- 2.3.12 As identified in EN-1, government has concluded that there is a CNP for the provision of nationally significant low carbon infrastructure.
- 2.3.13 *'As stated in Section 4.2 of EN-1, to support the urgent need for new low carbon infrastructure, all power lines in scope of EN-5 including network reinforcement and*

*upgrade works, and associated infrastructure such as substations, are considered to be CNP infrastructure’ (paragraph 2.1.5).*

- 2.3.14 As set out in EN-1 (Section 4.2) the assessment principles outlined in Section 4 of EN-1 continue to apply to CNP infrastructure.
- 2.3.15 Paragraphs 2.2.1 and 2.2.2 note that *‘The Secretary of State should bear in mind that the initiating and terminating points – or development zone – of new electricity networks infrastructure is not substantially within the control of the applicant’*. *‘Siting is determined by:*
- *the location of new generating stations or other infrastructure requiring connection to the network, and/or*
  - *system capacity and resilience requirements determined by the Electricity System Operator’*.
- 2.3.16 Paragraph 2.2.6 recognises that *‘...the locational constraints identified above do not, of course, exempt applicants from their duty to consider and balance the site-selection considerations set out below, much less the policies on good design and impact mitigation ...’*.
- 2.3.17 Paragraph 2.2.10 of EN-5 reiterates the duties of transmission and distribution licence holders under Section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and in formulating proposals for new electricity networks infrastructure, to *‘have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest...’*
- 2.3.18 Paragraph 2.4.1 notes that *‘The Planning Act 2008 requires the Secretary of State to have regard, in designating an NPS and in determining applications for development consent to the desirability of good design’*.
- 2.3.19 Section 2.7 of the NPS deals with holistic planning and states:
- ‘...the government envisages that, wherever reasonably possible, applications for new generating stations and their related infrastructure should be contained in a single application to the Secretary of State. However a consolidated approach of this kind may not always be possible..’* (paragraph 2.7.2).
- ‘This could be, for example, due to the differing lengths of time needed to prepare the applications for submission to the Secretary of State, or because a network application relates to multiple generation projects (which could be onshore or offshore), or because the works involved are strategic reinforcements required for a number of reasons.’* (paragraph 2.7.3).
- 2.3.20 Section 2.8 deals with Strategic Network Planning and sets out that *‘A more strategic approach to network planning will ensure that network development keeps pace with renewable generation and anticipates future system needs’* (this is also referred to in paragraphs 2.13.1 - 2.13.13).
- 2.3.21 Paragraph 2.9.7 recognises that *‘the government does not believe that the development of overhead lines is incompatible in principle with applicants’ statutory duty under Schedule 9 to the Electricity Act 1989, to have regard to visual and landscape amenity and to reasonably mitigate possible impacts thereon’*.
- 2.3.22 Paragraph 2.9.16 references recognises the importance of the guidelines provided in the Holford Rules *‘intended as a common sense approach to overhead line design,*

*were reviewed and updated by the industry in the 1990s and they should be embodied in the applicants' proposals for new overhead lines'.*

- 2.3.23 Paragraph 2.9.18 refers to the Horlock Rules, guidelines for the design and siting of substations) setting out that *'these principles should be embodied in applicants' proposals for the infrastructure associated with new overhead lines'.*
- 2.3.24 Paragraph 2.9.20 covers undergrounding *'Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty)'.*
- 2.3.25 It goes on *'However, undergrounding will not be required where it is infeasible in engineering terms, or where the harm that it causes (see section 2.11.4) is not outweighed by its corresponding landscape, visual amenity and natural beauty benefits. Regardless of the option, the scheme through its design, delivery, and operation, should seek to further the statutory purposes of the designated landscape. These enhancements may go beyond the mitigation measures needed to minimise the adverse effects of the scheme' (paragraph 2.9.22) and 'Additionally, cases will arise where – though no part of the proposed development crosses a designated landscape high potential for widespread and significant adverse landscape and/or visual impacts along certain sections of its route may result in recommendations to use undergrounding for relevant segments of the line' (paragraph 2.9.23).*
- 2.3.26 Critical National Priority is referred to again in paragraph 2.12.7:  
*'As highlighted in EN-1 government has concluded that there is a CNP for the provision of nationally significant low carbon infrastructure. This includes for electricity grid infrastructure, all power lines in scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations. This is not limited to those associated specifically with a particular generation technology, as all new grid projects will contribute towards greater efficiency in constructing, operating and connecting low carbon infrastructure to the National Electricity Transmission System. This includes infrastructure identified in the Holistic Network Design and subsequent strategic network design exercises'.*

## National Policy Statement for Renewable Energy (EN-3) (2024)

- 2.3.27 NPS EN-3 also includes support for the onshore infrastructure required to deliver new offshore wind developments.
- 2.3.28 Section 2.8 deals with offshore wind. Paragraph 2.8.1 states that *'As set out in the British Energy Security Strategy, the Government expects that offshore wind .... Will play a significant role in meeting demand and decarbonising the energy system. The ambition is to deploy up to 50GW of offshore wind capacity (including up to 5GW floating wind) by 2030, with an expectation that there will be a need for substantially more installed offshore capacity beyond this to achieve net zero carbon emissions by 2050.'*
- 2.3.29 Paragraphs 2.8.34 to 2.8.43 (inclusive) reiterate the position set out in EN-1 and EN-5 that a co-ordinated approach to onshore-offshore transmission is required. Paragraph 2.8.35 states that *'The previous standard approach to offshore-onshore connection involved a radial connection between single wind farm projects and the shore. A coordinated approach will involve the connection of multiple, spatially close, offshore*

*wind farms and other offshore infrastructure, wherever possible, as relevant to onshore networks.'*

- 2.3.30 The NPS also includes references to CNP Infrastructure outlining that the assessment principles outlined in Section 4 of EN-1 continue to apply to this. Applicants must show how any likely significant negative effects would be avoided, reduced, mitigated or compensated for, following the mitigation hierarchy. Early application of the mitigation hierarchy is strongly encouraged, as is engagement with key stakeholders including SNCBs, both before and at the formal pre-application stage.

## National Planning Policy Framework (2023)

- 2.3.31 The revised National Planning Policy Framework (NPPF)<sup>7</sup> was published in December 2023. The NPPF sets out in paragraph 5 that it does not contain specific policies for NSIPs. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant NPS for major infrastructure, as well as any other matters that are relevant (which may include the NPPF). While NPS EN-1 and EN-5 remain the prime decision-making documents, where they do not provide guidance, each topic chapter has considered whether there is important and relevant guidance in the NPPF that may require consideration by the decision-making authority.
- 2.3.32 The NPPF is supported by Planning Practice Guidance (PPG) which was first published in March 2015. This guidance is updated on a regular basis and provides advice on a range of topics related to the implementation of NPPF Policies. The key PPG topics considered relevant to the Project at this stage are as follows:
- Air Quality
  - Climate Change
  - Environmental Impact Assessment
  - Flood Risk
  - Green Belt
  - Historic Environment
  - Natural Environment
  - Noise
  - Open Space, sports and recreation facilities, public rights of way and local green space
  - Travel Plans, Transport Assessments and Statements
  - Water supply, wastewater, and water quality
- 2.3.33 Although the NPPF does not contain policies relating to NSIPs, it does include policies pertinent to generic development management considerations and some of its principles may be considered where relevant to the Project. These principles are concerned with protection and conservation of the natural and built and historic environment, climate change and flooding as well as sustainable growth, development, and a strong, competitive economy.

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<sup>7</sup> <https://www.gov.uk/guidance/national-planning-policy-framework>

## 2.4 Regional and Local Planning Policies

2.4.1 As set out above, the NPSs are the primary basis for decision making, but the Secretary of State must also have regard to any other matters which they think are both important and relevant to the decision and this could include regional and local planning policies. In so doing, the Secretary of State may have regard to the local impact reports produced by the relevant local planning authorities for consideration during the examination of the application.

2.4.2 The relevant adopted and emerging local plans for the Project comprise:

- South Norfolk Council:
  - Joint Core Strategy for Broadland, Norwich, and South Norfolk, adopted 2011, amendments, adopted 2014
  - Site Specific Allocations and Policies Document, adopted 2015
  - Development Management Policies Document, adopted 2015
  - Emerging Greater Norwich Local Plan – currently under examination prior to adoption in early to mid-2024
  - Norfolk Minerals and Waste Development Framework: Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026, adopted in 2011
  - Norfolk Minerals and Waste Development Framework: Minerals Site Specific Allocations Development Plan Document, adopted in 2013, amendments adopted in 2017
  - Norfolk Minerals and Waste Development Framework: Waste Site Specific Allocations Development Plan Document, adopted in 2013
  - Emerging Norfolk Minerals and Waste Local Plan – currently under examination and due for adoption in 2024
  - Norfolk County Council Local Transport Plan 4 Strategy 2021-2036 and Implementation Plan, adopted in 2022
  - Wymondham Area Action Plan (October 2015)
  - The Long Stratton Area Action Plan (May 2016)
- Mid Suffolk District Council:
  - Babergh and Mid Suffolk Joint Local Plan: Part 1, adopted November 2023
  - Babergh and Mid Suffolk Joint Local Plan: Part 2, Issues and Options forecast for Spring 2024
  - Suffolk Minerals and Waste Local Plan, adopted in 2020
  - Suffolk Local Transport Plan 2011- 2031, adopted in 2011
- Babergh District Council:
  - Babergh and Mid Suffolk Joint Local Plan: Part 1, adopted November 2023
  - Babergh and Mid Suffolk Joint Local Plan: Part 2, Issues and Options forecast for Spring 2024

- Saved policies from the Babergh Local Plan Alteration No.2, adopted in 2006
- Saved policies from the Babergh Local Plan 2011-2031 Core Strategy and Policies, adopted in 2014
- Suffolk Minerals and Waste Local Plan, adopted in 2020
- Colchester City Council:
  - Colchester City Local Plan 2013-2033: North Essex Authorities' Shared Strategic Section 1 Plan, adopted in 2021 Colchester City Local Plan 2017-2033 Section 2, adopted in 2022
  - Tendring Colchester Borders Garden Community Development Plan Document (Examination Hearing Sessions to commence May 2024)
  - Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
  - Essex Minerals Local Plan, adopted in 2014
  - Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Tendring District Council:
  - Local Plan 2013-2033 and beyond comprising:
    - North Essex Authorities' Shared Strategic Section 1 Plan, adopted in 2021
    - Tendring District Local Plan 2013-2033 Section 2, adopted in 2022
  - Tendring Colchester Borders Garden Community Development Plan Document (Examination Hearing Sessions to commence May 2024)
  - Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
  - Essex Minerals Local Plan, adopted in 2014
  - Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Braintree District Council:
  - Braintree District Council Local Plan 2033 Section 1, adopted in 2021
  - Braintree District Council Local Plan 2033 Section 2, adopted in 2022
  - Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
  - Essex Minerals Local Plan, adopted in 2014
  - Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Chelmsford City Council:
  - Chelmsford Local Plan: Our Planning Strategy 2013 to 2036, adopted in 2020
  - A Local Plan Review 2022 is being carried out to assess if any changes or additional documents are required. A preferred options consultation is planned to commence in May 2024 with the emerging Local Plan scheduled for adoption in Q2 2025

- Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
- Essex Minerals Local Plan, adopted in 2014
- Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Basildon Borough Council:
  - Basildon District Council Local Plan Saved Policies, adopted in 2007
  - Basildon District Council Compliance Review of the Saved 1998 Local Plan Policies with the Revised NPPF, adopted in 2018
  - A new Local Plan is currently in development with Issues and Options consultation taking place between June and September 2023
  - Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
  - Essex Minerals Local Plan, adopted in 2014
  - Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Brentwood Borough Council:
  - Brentwood Borough Council Local Plan 2016-2033, adopted in 2022
  - Dunton Hills Garden Village Supplementary Planning Document (2023)
  - Essex and Southend-on-Sea Waste Local Plan, adopted in 2017
  - Essex Minerals Local Plan, adopted in 2014
  - Emerging Replacement Essex Minerals Local Plan 2025 to 2040 Regulation 18 Consultation
- Thurrock Council:
  - Thurrock Local Development Framework, Core Strategy and Policies for management of Development, adopted in 2015
  - The Thurrock Council Local Plan is currently under review and a new plan is set to be adopted in Summer 2026. Regulation 18 Consultation took place between December 2023 and February 2024

## 2.5 Statutory Guidance

- 2.5.1 In March 2015 the Department for Communities and Local Government (DCLG, 2015) published a statutory guidance document<sup>8</sup> on the pre-application process for NSIPs. Whilst statutory requirements for consultation are provided in the Planning Act 2008 the purpose of the guidance is to:
- Advise users of the (Planning Act) regime on the processes involved in the pre-application stage

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<sup>8</sup> <https://www.gov.uk/government/publications/guidance-on-the-pre-application-process-for-major-infrastructure-projects>

- Guide applicants as to how the pre-application requirements of the Planning Act should be fulfilled and provide some advice on best practice
- Inform other users of the regime, including consultees, of their roles in the pre-application process and to let them know what is expected of applicants at this stage
- Help ensure that the regime is transparent and accessible to all

## 2.6 Non-Statutory Guidance

### Planning Inspectorate Advice Notes

- 2.6.1 The Planning Inspectorate has published a series of non-statutory advice notes to inform developers, consultees, the public and other interested parties about a range of procedural matters in relation to the Planning Act process. Not all these Advice Notes are applicable to the PEIR, although those that are integral, and have informed the environmental assessment process for the Project, are discussed further below.
- 2.6.2 Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate, 2020) details the procedural requirements that apply to NSIPs which are EIA development and particularly, in the context of this PEIR, provides clarity on its role and purpose. Advice Note Seven recognises that the degree of information that is available within a PEIR is dependent upon the stage in the design process at which consultation takes place. Within this PEIR National Grid has therefore presented information on the likely significant effects associated with the development of the Project, and where further studies and assessments remain, these have been clearly identified.
- 2.6.3 Advice Note Nine: Rochdale Envelope<sup>9</sup> (Planning Inspectorate, 2018) provides guidance on the use of the ‘*Rochdale Envelope*’; a term used to describe those elements of a scheme that have not yet been finalised but can be constrained within certain limits and parameters hence allowing a determination of likely significant effects to be presented in the ES. When using the Rochdale Envelope to apply for flexibility within a DCO application, the developer should use a worst-case approach to identifying likely significant effects and should incorporate mitigation accordingly within the parameters of their scheme. Greater information is included within Section 4.5 on how National Grid intends to make use of the Rochdale Envelope in the consenting process for the proposed Project.
- 2.6.4 Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects<sup>10</sup> (Planning Inspectorate, 2022) provides advice for Applicants in relation to the Habitats Regulations. It identifies the stages of the HRA process and clarifies the information to be provided with a DCO application with respect to HRA at each stage of the Planning Act 2008 process.
- 2.6.5 Advice Note Twelve: Transboundary Impacts and Process<sup>11</sup> (Planning Inspectorate, 2020) explains the roles and responsibilities of the Secretary of State, the Planning

<sup>9</sup> <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/>

<sup>10</sup> <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/>

<sup>11</sup> <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/>

Inspectorate, European Economic Area Member States, and applicant applicable under Regulation 32 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

- 2.6.6 Advice Note Seventeen: Cumulative Effects Assessment<sup>12</sup> (Planning Inspectorate, 2019) sets out the recommended approach to Cumulative Effects Assessment (CEA) for NSIP projects including guidance on the relative weight to be applied to other developments depending upon how progressed they are through the consenting process. Greater information on the CEA is included within Chapter 17.
- 2.6.7 Advice Note Eighteen: The Water Frameworks Directive<sup>13</sup> (Planning Inspectorate, 2017) sets out the approach to coordinating the requirements of the Water Framework Directive with the EIA process. Greater information is included within Chapter 12: Hydrology and Land Drainage.

## 2.7 National Grid Policy and Guidance

- 2.7.1 National Grid has its own policies and processes that are followed when developing projects. The policies that are applicable to this Project are as follows:
- Our Approach to Options Appraisal (National Grid, 2012): This document describes the options appraisal process that is followed when developing new gas and electricity infrastructure projects. It follows a staged approach to the assessment and sets out the considerations when making decisions as to which option should be taken forward
  - Our Stakeholder, Community and Amenity Policy (National Grid, 2016): This document describes the ten commitments that National Grid has made to the way that electricity and gas works are carried out in the UK. This includes setting out how National Grid would meet its amenity responsibilities and how stakeholders and communities are involved on projects
  - Our Approach to Consenting (National Grid, 2022): This document outlines National Grid's approach to developing and delivering new infrastructure and applies to projects across their whole regulated electricity transmission business
- 2.7.2 National Grid also has an extensive range of process and guidance documents that govern how projects are designed and implemented to ensure operational safety.

### Holford Rules

- 2.7.3 Guidelines on overhead line routeing were first formulated in 1959 by Sir William, later Lord, Holford, as advisor to the Central Electricity Generating Board. Holford developed a series of planning guidelines in relation to amenity issues, that have subsequently become known as the 'Holford Rules'<sup>14</sup> and remain a valuable tool in selecting and assessing potential overhead line route options as part of the options appraisal process. A summary of the Holford Rules can be found in Table 2.1. These have been an important consideration during the development of the 2024 preferred draft alignment and whether certain sections should be considered for undergrounding. The Holford

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<sup>12</sup> <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf>

<sup>13</sup> [https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice\\_note\\_18.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf)

<sup>14</sup> [www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf](http://www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf)

Rules are also expressly considered as part of NPS EN-5. The principles of the Holford Rules are being applied to the Project.

**Table 2.1 - Summary of the Holford Rules**

<b>Rule</b>	<b>Description</b>
Rule 1	Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is increased in consequence.
Rule 2	Avoid smaller areas of high amenity value, or scientific interests by deviation; if this can be done without using too many angle towers, i.e., the more massive structures which are used when lines change direction.
Rule 3	Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers.
Rule 4	Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line must cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.
Rule 5	Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.
Rule 6	In country, which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires, and cables, to avoid a concentration or 'wirescape.'
Rule 7	Approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.

## Horlock Rules

2.7.4 National Grid devised the Horlock Rules<sup>15</sup> in 2003, and these were subsequently updated in 2006. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. In summary, like the Holford Rules, they facilitate consideration of environmental and amenity considerations within the design and siting of new substation infrastructure.

2.7.5 The Horlock Rules contain the following guidelines in relation to siting:

- Overall System Options and Site Selection
  - In the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical and capital cost requirements for new developments against the

<sup>15</sup> [www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf](http://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf)

consequential environmental effects to keep adverse effects to a reasonably practicable minimum

- Amenity, Cultural or Scientific Value of Sites
  - The siting of new National Grid Company (NGC) substations, sealing end compounds and line entries should as far as reasonably practicably seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections
  - Areas of local amenity value, important existing habitats and landscape features including Ancient Woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable
- Local Context, Land Use and Site Planning
  - The siting of substations, extensions and associated proposals should take advantage of the screening provided by landform and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum
  - The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum
  - The land use effects of the proposal should be considered when planning the siting of substations or extensions
- Design
  - In the design of new substations or line entries, early consideration should be given to the options available for terminal pylons, equipment, buildings, and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum
  - Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation
  - The design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings
- Line Entries
  - In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines to avoid a confusing appearance
  - The inter-relationship between pylons and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal pylons on prominent ridges should be minimised by siting pylons against a background of trees rather than open skylines

# 3. Main Alternatives Considered

# 3. Main Alternatives Considered

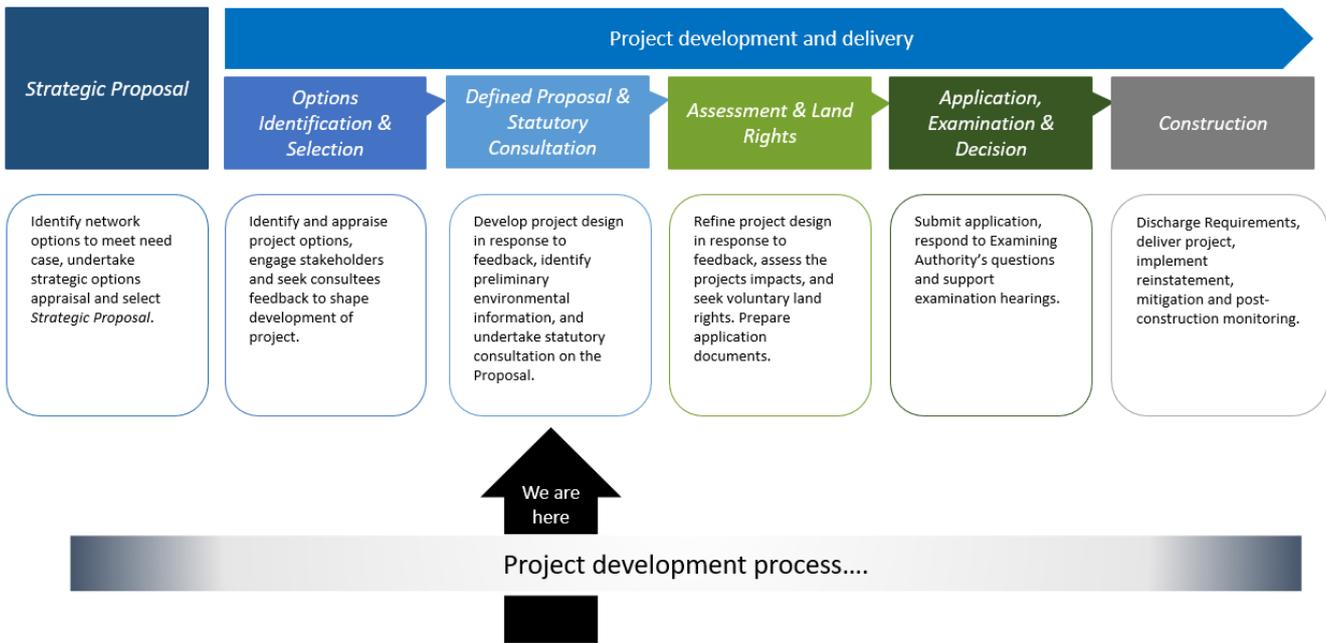
## 3.1 Consideration of Alternatives

- 3.1.1 Regulation 14(d) in conjunction with Schedule 4, paragraph 2 of the EIA Regulations states that an ES should include a description of reasonable alternatives studied by the developer and an indication of the main reasons for selecting the chosen option. While there is no statutory requirement to include an assessment of alternatives in the PEIR, the consideration of alternatives is an integral part of the ongoing development of the Project, and so relevant information to allow the reader to understand how the Project has evolved having regard to environmental considerations is included in this chapter.
- 3.1.2 National Grid undertakes options appraisal for their individual projects. There are often several different ways that a project can be developed, involving different locations, technologies, or designs. Each project requires judgements and decisions about the most appropriate way to achieve the required outcome. The options appraisal process provides information to help inform those judgements.
- 3.1.3 National Grid has been through an iterative options appraisal process to determine the preferred option, which comprises the Project presented on Figure 4.1: Proposed Project Design in Volume II.

## 3.2 National Grid's Approach to Options Appraisal

- 3.2.1 Options appraisal is a robust and transparent process that is used to compare options and to assess the positive and negative effects they may have, across a wide range of criteria including environmental, socio-economics, technical, and cost factors. The aim is to find a balanced outcome, bearing in mind the range of National Grid's statutory duties. Further details on the options appraisal process can be found in Our Approach to Options Appraisal (National Grid, 2012) and in Our Approach to Consenting (National Grid, 2022).
- 3.2.2 At each stage in the options appraisal process for a project, transparent methods are used to inform the iterative decision-making and design development processes, including inputs from engineers and environmental consultants. Interim decision making takes into (and continues to take) account of feedback from both prescribed bodies, as defined in the Planning Act 2008, other stakeholders, and the local community through an extensive programme of engagement and consultation. In addition, projects are subject to challenge and review to ensure the robustness of the decisions made in the light of changing environments (including technical, environmental, socio-economics, and cost). Options appraisal has been undertaken for the Project. Image 3.1 presents where the options appraisal sits in the overall National Grid consenting process and where statutory consultation fits in with the process.

Image 3.1 - National Grids Consenting Process



### 3.3 Strategic Proposal

- 3.3.1 National Grid ESO leads an annual review cycle which identifies how much electricity can be carried on the transmission network and where future capacity is required. This is reported within their Network Options Assessment (NOA) reports. The need for the Project was identified as critical to take forward in both the 2021 and 2022 editions of the NOA 2021/22 Report (National Grid ESO, 2022). The Project is described in the NOA 2021/22 Report as AENC – A new 400 kV double circuit in north East Anglia and ATNC – A new 400 kV double circuit in south East Anglia.
- 3.3.2 Following the need for the Project being identified, National Grid commenced their optioneering process to determine how best to achieve reinforcements identified in AENC and ATNC. The first stage in the options appraisal process was to determine a preferred Strategic Option or Strategic Proposal.
- 3.3.3 Conceptually there were numerous options through which reinforcements could theoretically be achieved including a range of different technologies and multiple connection points on the existing NETS.
- 3.3.4 Initially alternative connection technologies were considered and then these were applied to a representative number of alternative reinforcement options. Alternative technologies included:
- Offshore connections
  - Onshore connections
  - Increasing operating voltage
  - Alternating Current (AC) overhead lines
  - AC underground cable
  - Alternative overhead AC pylon types

- High Voltage Direct Current (HVDC) offshore cables
  - HVDC onshore overhead line
  - HVDC onshore cables
  - Gas insulated line.
- 3.3.5 Through the filtering and optioneering process AC overhead lines (with undergrounding through National Landscapes (AONB) / National Parks), HVDC offshore cables, HVDC onshore cable, and increasing the operating voltage were taken forwards and considered with several alternative reinforcement options.
- 3.3.6 The geographical scope of the options was then considered. In general terms, the geographical scope was restricted to the area of East Anglia and the south-east that encompassed the nearest parts of the NETS that would facilitate a connection between the northern parts of East Anglia, South Coast Interconnectors and the electricity demand area formed by south-east.
- 3.3.7 Reinforcement options were considered next by applying a filter to technology and geographical scope that could meet the needs case. A total of 23 options were identified that aimed to provide a solution with longer term goals of supporting the system's capacity into the 2030s. These options were then appraised following National Grid's options appraisal process which looked at environmental, socio-economics, technical, and cost factors.
- 3.3.8 Options were discounted, for example, owing to poor performing cost benefit analysis, the presence of complex Special Protection Area (SPA) / Special Area of Conservation (SAC) / SSSIs and options having higher capital costs for limited benefit and the presence of the Suffolk Coast and Heaths National Landscape (an AONB).
- 3.3.9 The preferred Strategic Proposal included three distinct elements: an offshore reinforcement between the south coast and East Anglia (whilst subject to separate study this is initially identified as between Sizewell and Richborough and referred to as the Sea Link project); an onshore reinforcement between Tilbury and Grain; and an onshore reinforcement between Norwich and Tilbury.
- 3.3.10 In response to feedback, including that from non-statutory consultation and the Offshore Electricity Grid Task Force (Offset<sup>16</sup>) regarding a fully offshore HVDC option to deliver the Project, National Grid provided further clarification on the potential for a feasible offshore strategic option to deliver the additional transmission capacity required, having regard to their duties. The clarification provided explained why, at that early pre-statutory stage of consultation, the offshore strategic option was not being progressed, although none of the conclusions should be seen as final. This information can be found on the Project website<sup>17</sup>.
- 3.3.11 The Project covers the onshore reinforcement between Norwich and Tilbury and comprises 'A new 400 kV double-circuit of ~60 km between Norwich Main and Bramford Substations and a new 400 kV double circuit of ~120 km between Bramford and Tilbury Substations via a new EACN Substation to be located in Tendring District' (Corridor and Preliminary Routeing and Siting Study, National Grid, 2022).

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<sup>16</sup> A task force set up to represent communities in Suffolk and Essex.

<sup>17</sup> <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/norwich-to-tilbury>

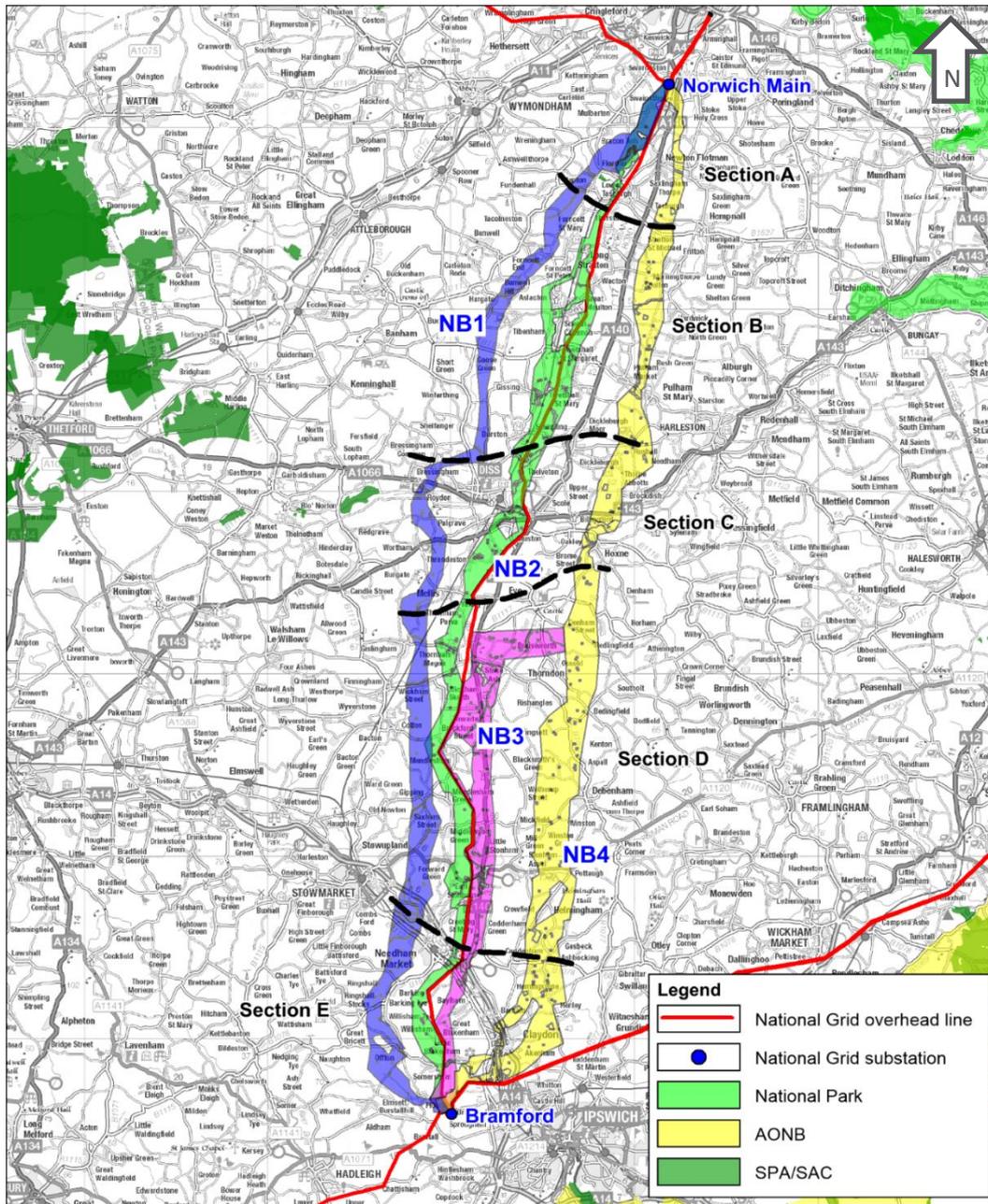
- 3.3.12 The preferred Strategic Proposal (covering the onshore reinforcement between Norwich and Tilbury) was initially identified as comprising steel lattice pylons supporting overhead lines, with the use of appropriate mitigation including undergrounding in certain locations such as through the Dedham Vale National Landscape (an AONB).

## **3.4 Options Identification and Selection**

### **Norwich Main Substation to Bramford Substation**

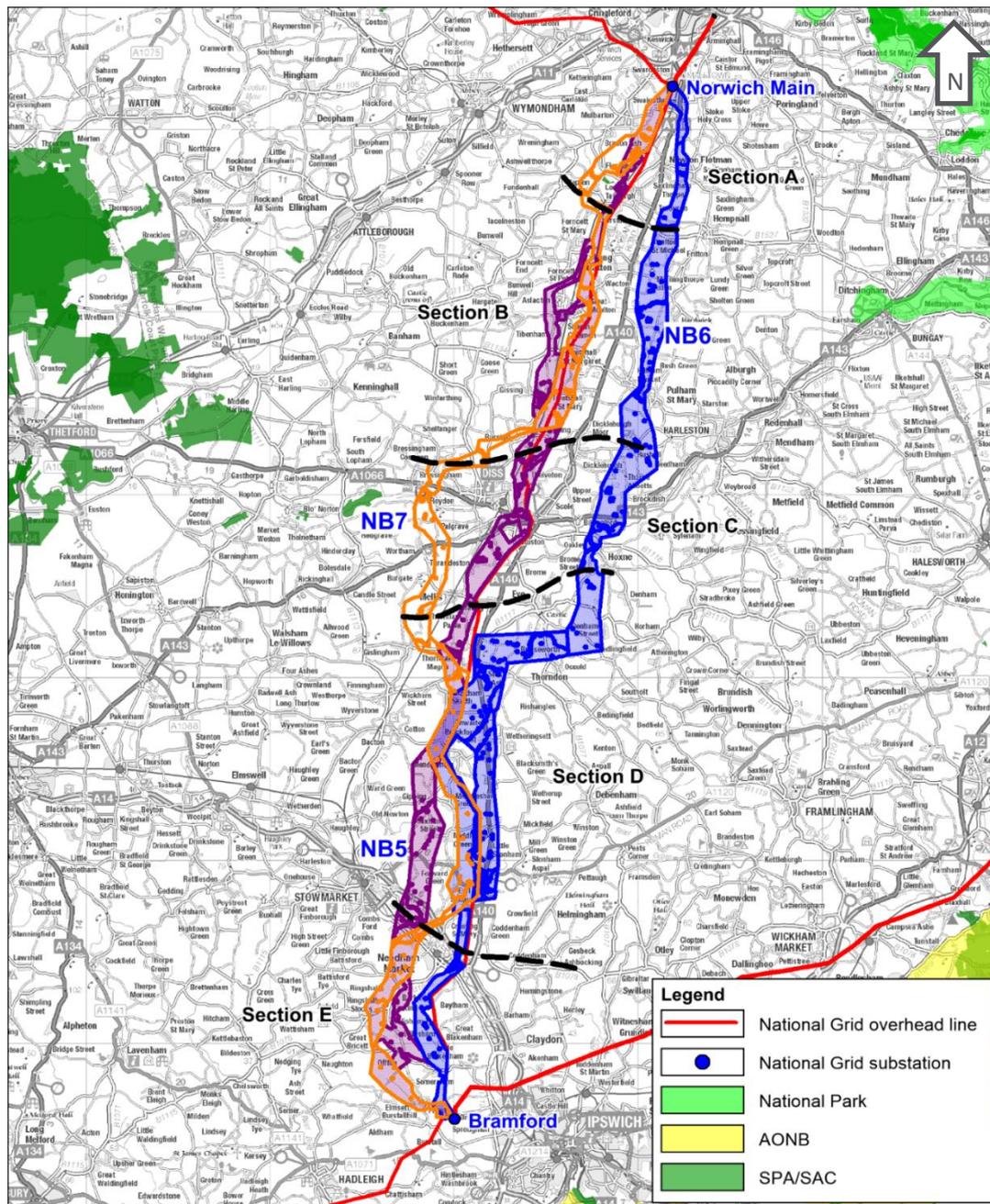
- 3.4.1 Following the selection of the preferred Strategic Proposal, the routeing and siting process commenced which as previously noted followed the appraisal process outlined within Our Approach to Options Appraisal (National Grid, 2012) and Our Approach to Consenting (National Grid, 2022). The appraisal covering technical, environmental, socio-economics, and cost is documented in the Corridor and Preliminary Routeing and Siting Study (National Grid, 2022).
- 3.4.2 A study area was first defined to deliver the Strategic Proposal between Norwich and Bramford. Baseline information was then obtained, this included information on environmental features within the defined study area. Four potential route corridors were identified and taken forward to the options appraisal. These are presented on Image 3.2 and referenced as NB1 to NB4.

Image 3.2 – Norwich Main Substation to Bramford Substation Initial Options (not to scale) – as taken from the CPRSS (National Grid, 2022)



3.4.3 Following the appraisal, a challenge and review exercise took place to analyse and discuss the outputs of the options appraisal, filter out / remove non-feasible options, and ultimately shortlist options to be taken forward for further consideration. As part of this exercise three hybrid corridors were identified (Options NB5, NB6 and NB7) which were also subject to the options appraisal process. These are presented on Image 3.3.

Image 3.3 - Norwich Main Substation to Bramford Substation Hybrid Options (not to scale) – as taken from the CPRSS (National Grid, 2022)



3.4.4 Once decisions had been reached following the options appraisal process, Option NB1 (Image 3.2) was preferred from an environmental (ecology, landscape, historic environment, socio-economics), technical and cost perspective.

3.4.5 Option NB1 had the potential for effects on an SAC, while Options NB2, NB4, NB5 and NB6 did not. However, it was considered that effects could be minimised through the implementation of standard mitigation measures so that significant effects did not arise. Option NB1 avoided the potential for residential properties to be surrounded in proximity to overhead lines to a greater extent than the other options and thus reduced the potential of unacceptable levels of effect upon general residential amenity. As such, effects were deemed to be difficult to mitigate with standard measures, this weighed considerably in favour of Option NB1. Option NB1 also avoided a locally protected landscape that other options did not, though this was not a major differentiating factor. Option NB1 was also preferred from an historic environment perspective, particularly

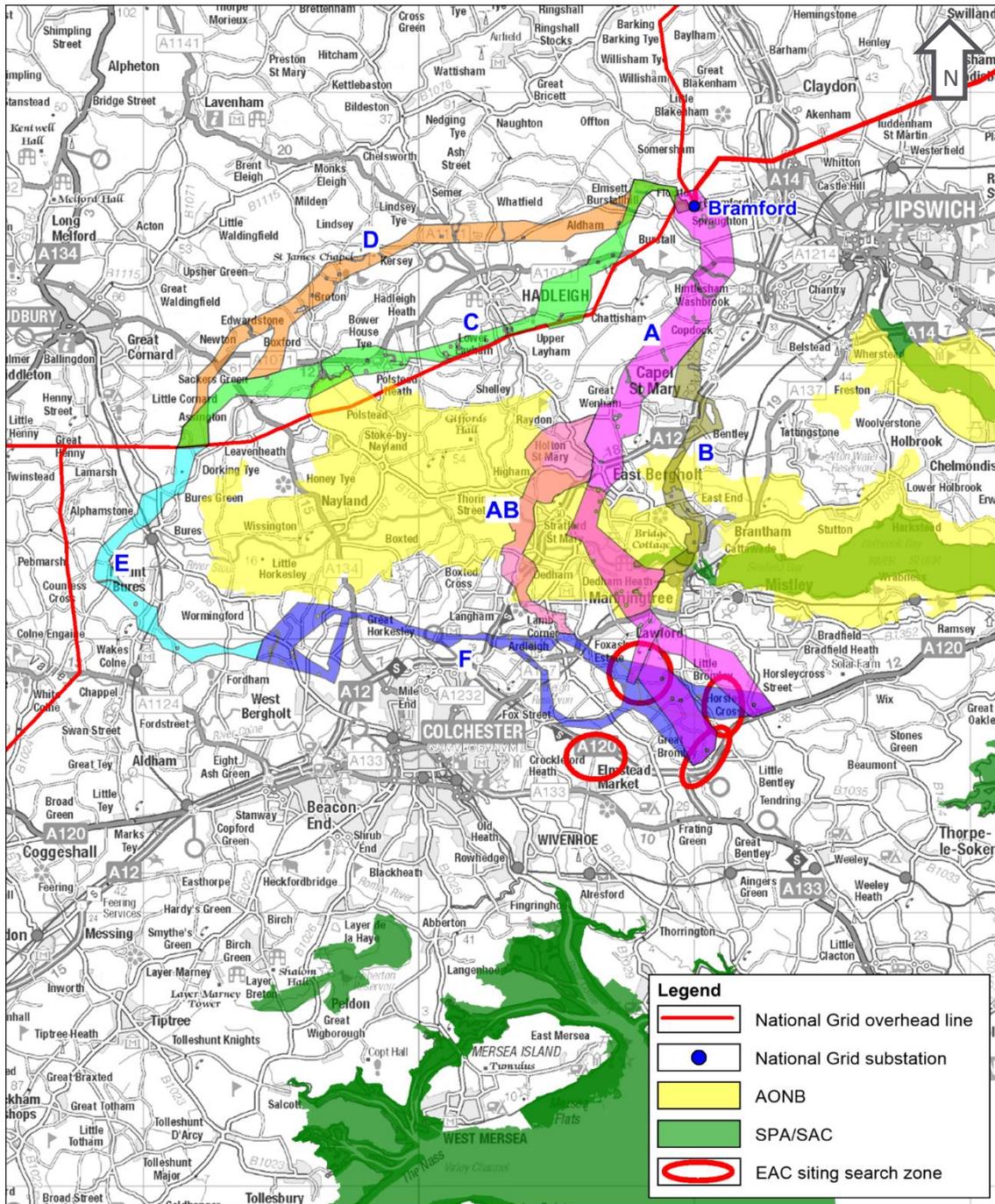
compared to Option NB4 which directly affected a Conservation Area (at Shotesham through the estate park land of the Grade I listed 'The Hall' and associated listed buildings).

- 3.4.6 From a technical perspective, Option NB1 was preferred as it had fewer constraining areas and an overall greater level of flexibility for the routing of an overhead line with reduced construction / delivery and engineering complexity than Options NB2, NB5, NB6 and NB7.
- 3.4.7 From a cost perspective, Option NB1 was the least cost. It had anticipated capital costs of £157 million. By comparison anticipated capital costs for Options NB2 to NB7 ranged from £169 million to £313 million. Option NB1 was therefore preferred from a cost perspective.

## Bramford Substation to the EACN Substation

- 3.4.8 A study area was defined to deliver the Strategic Proposal associated with the Bramford to EACN Substation section. Features were then gathered, including environmental baseline information within the defined study area. Four initial potential route corridors were then identified and appraised (BE1 (A), BE2 (north A, B, and south A), BE3 (C, E and F) and BE4 (D, E and F)).
- 3.4.9 Following the initial appraisal, a challenge and review exercise took place to analyse and discuss the outputs of the options appraisal, filter out/remove non-feasible options, and shortlist options to be taken forwards for further consideration. The exercise also identified an additional hybrid corridor (BE5 (north A, AB, and F)) to be subject to options appraisal. These are presented on Image 3.4.

Image 3.4 - Bramford Substation to the EACN Substation Options (not to scale) – as taken from the CPRSS (National Grid, 2022)



3.4.10 Once decisions had been reached following the options appraisal process, Option BE5 (consisting of the northern part of Section A, Section AB, and the eastern part of Section F) was preferred from an environmental and cost perspective.

3.4.11 Overall, a decision about which option to take forward in this area was largely driven by whether the connection should pass through the National Landscape (an AONB) or avoid it. From a landscape and visual perspective, while undergrounding through the National Landscape (an AONB) would have a temporary effect on the landscape it would facilitate a more direct route – approximately half the length compared to a route that avoids the National Landscape (an AONB). Specifically, the environmental effects of underground cabling are largely short-term and associated with the construction period, whereas those associated with overhead lines are largely long-term. As a result,

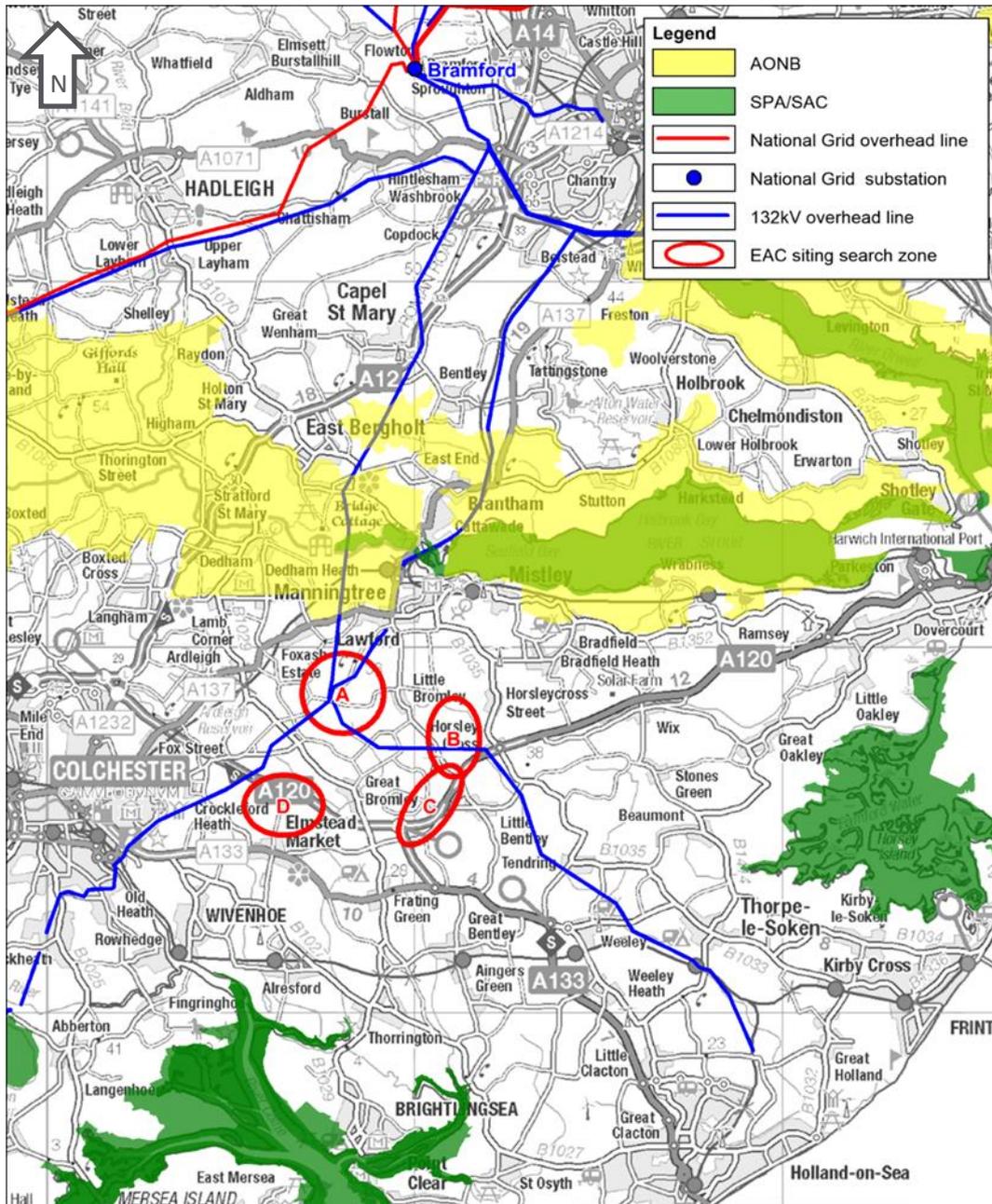
there would be a reduction in the environmental effects and cumulative effects likely to be associated with a connection of less than half the length of the alternative route passing around the National Landscape (an AONB). Of the routes that pass through the National Landscape (an AONB), Option BE5, which uses the northern part of Section A, Section AB (the section through the National Landscape (an AONB)) and the eastern part of Section F, was preferred compared to Options BE1 and BE2 - due to greater separation from particularly highly valued parts of the Dedham Vale National Landscape (an AONB).

- 3.4.12 From a historic environment perspective Option BE5 was preferred as it avoided passing through any conservation areas unlike Options BE3 and BE4 that seek to avoid the National Landscape (an AONB). (Section A did contain the edge of the Dedham Conservation Area at its central part but would be entirely avoided by using Section AB to achieve a connection, as in the preferred Option BE5).
- 3.4.13 While the westerly options were preferred from an ecology and biodiversity perspective, Option BE5 was appraised to have the least potential of those that pass through the National Landscape (an AONB) to have potential for effects resulting in likely significant effects on the Orwell Estuaries SPA.
- 3.4.14 From a socio-economics perspective Option BE5 was preferred as it achieves greater separation from areas of particular focus for visitors of the National Landscape (an AONB). It was considered that while a connection that passes through the National Landscape (an AONB) would conflict with Holford Rule 1, the use of underground cabling through this designation would minimise long term residual effects on this designation.
- 3.4.15 From a technical perspective, all options performed similarly and therefore it was not a differentiating factor.
- 3.4.16 Connections that avoided the National Landscape (an AONB), had similar costs to the costliest option through the National Landscape (an AONB) using underground cables. The preferred option costs £240 million which was in the middle of the range of costs for all options.

## EACN Substation

- 3.4.17 In view of the locations of the connecting windfarm proposals (North Falls and Five Estuaries), potential landing points on and north of the Tendring peninsula, extending from Clacton-on-Sea in the south through to sites north of Felixstowe, were considered as strategic options. The Strategic Options Report (part of the CPRSS) concluded that options associated with Clacton landing points and EACN locations on the Tendring peninsula were preferred in view of the locations of the connecting windfarm proposals (North Falls and Five Estuaries).
- 3.4.18 A study area was defined to deliver the Strategic Proposal associated with the EACN Substation. Features were then gathered, including environmental baseline information within the defined study area. A long list of 45 relatively unconstrained candidate areas were identified. An initial filtering exercise was undertaken, and the number of sites were reduced. Those remaining were grouped into four zones (A, B C and D) which were then appraised. These four zones are presented on Image 3.5.

Image 3.5 - EACN Substation Options (not to scale) – as taken from the CPRSS (National Grid, 2022)



- 3.4.19 Following the appraisal of the four zone options described above, a challenge and review exercise took place to analyse and discuss the outputs of the options appraisal and filter out/remove non-feasible options and shortlist options to be taken forward to the decision workshop. No additional options were identified.
- 3.4.20 Once decisions had been reached following the options appraisal process, Zone A was preferred from an environmental, technical, and cost perspective.
- 3.4.21 Overall, a decision about which zone to take forward as the preferred option was driven by the ‘differences between landscape, technical engineering challenges and cost. Zone A would also result in shorter length of overhead line which would mean fewer pylons and thus fewer effects compared to Zones B to D. This was assessed to be a differentiating factor between the zones as it avoided introducing further additional overhead lines into the landscape’.

3.4.22 While Zone A was considered less preferable from a landscape and visual perspective compared to Zone C when considering the substation in isolation, when account was taken of the 400 kV overhead lines, Zone A would require the shortest length of connection. The cost for a substation at Zone A would be between approximately £16 million and £20 million less than that for a substation at any of the other zones.

## EACN Substation to Tilbury Substation

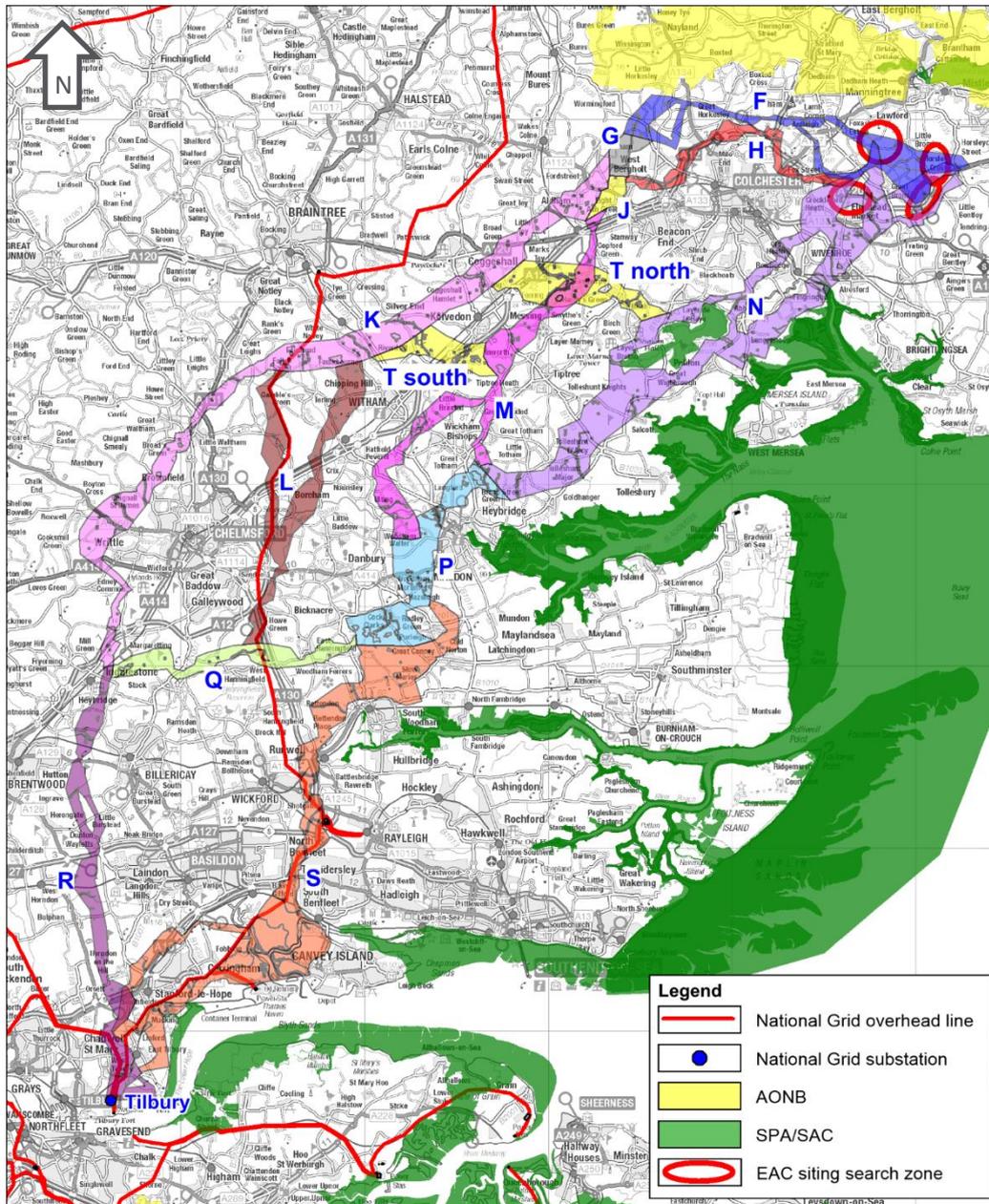
3.4.23 A study area was defined to deliver the Strategic Proposal associated with the EACN Substation to Tilbury Substation element. Features were then gathered, including environmental baseline information within the defined study area. Twelve potential route corridor sections were then identified (Section F, Section G, Section H, Section J, Section K, Section L, Section M, Section N, Section P, Section Q, Section R, Section S). The corridor sections were then subject to an iterative process which removed some parts of the corridor due primarily to engineering constraints. Additional sections were also identified and included:

3.4.24 Two additional sections south of Colchester:

- Section T North – a section that allows a link from Section N east of Colchester to continue southwards via an inland route either on Sections M or K
- Section T South – a more southerly section south of Colchester that allows a link from Section M to K to continue southward via a more inland route

3.4.25 All 14 options were taken forwards to options appraisal and are presented on Image 3.6.

Image 3.6 - EACN Substation to Tilbury Substation Options (not to scale) – as taken from the CPRSS (National Grid, 2022)



3.4.26 Following the appraisal, a challenge and review exercise took place to analyse and discuss the outputs of the options appraisal, filter out/ park non-feasible options, and shortlist options to be taken forward to the decision exercise. The exercise also identified six additional permutations of sections already identified as being potentially viable to be taken forward:

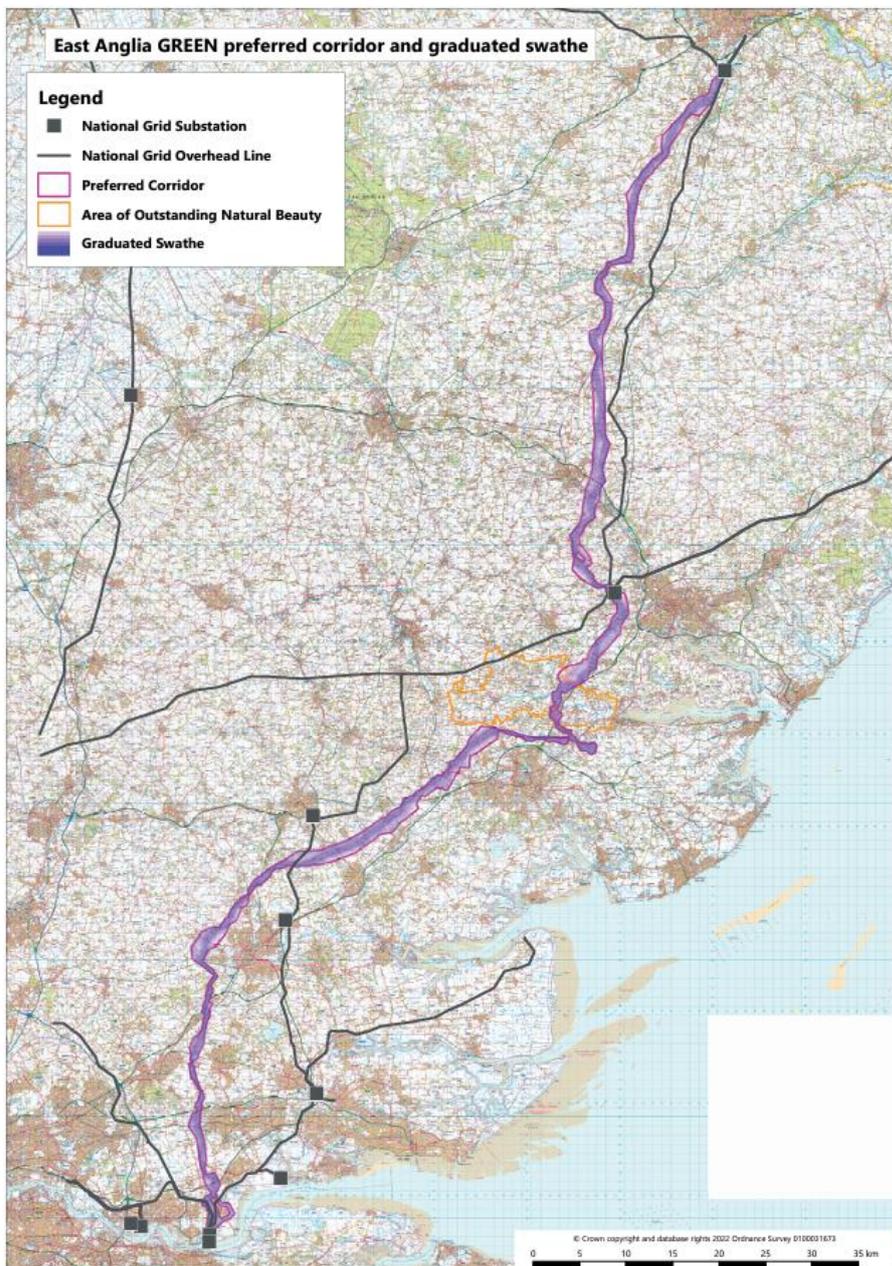
- ET1 (F and G or H and J plus K and R)
- ET2 (N, P and S)
- ET3 (F, G and J or H and J plus M, P and S)
- ET4 (F, G and J or H and J plus M, P, Q and R)
- ET5 (F and G or H and J plus K, L Q and R)
- ET6 (N and T north or N, T north, M and T south plus K and R)

- 3.4.27 Following the decision exercise, the options appraisal process was complete and hybrid option ET1 (a combination of Sections F, G, K and R) was preferred from an environmental, technical, and cost perspective.
- 3.4.28 Overall, a decision about which option to take forward was largely driven by whether to take a coastal route or a more inland route. A coastal route had greater potential to result in likely significant effects on a range of international and nationally designated ecological sites, including SPAs and Ramsar sites, SACs and SSSIs. There was consequently a high risk that a coastal connection would require a Habitat Regulations Assessment process to be undertaken due to potential effects on the qualifying species and habitats of the sites. This means if alternatives are identified that will not lead to an adverse effect on the integrity of the designated sites they should be taken forward in preference, which in this case are those options further inland which are less likely to affect qualifying features of the sites.
- 3.4.29 In addition, coastal Section P would pass through the Chelmer and Blackwater Navigation Conservation Area, which could not be avoided by routeing, due to the east / west extent of its coverage, resulting in a negative effect on the historic environment. Other corridors either avoid conservation areas or have sufficient space for alignments within a corridor to avoid conservation areas.
- 3.4.30 From a technical perspective, Option ET1 was deemed to be the preferred option for the routeing of an overhead line. This was largely due to fewer constraints in Section K when compared to Section N, and upon entry into Tilbury via Section R when compared to Section S. The other options utilising Sections M, P, L and Q, whilst similar were less favourable than using Sections K and R alone as they provided no tangible benefits and in some instances additions of construction/delivery and engineering complexity. Section R was deemed favourable to Section S as the latter would necessitate complex engineering designs which would lead to significant programme risk and at additional cost. Option ET1 was considered technically preferable. Option ET2, utilising Sections N, P and S was not preferred.
- 3.4.31 When comparing more inland connections, Option ET1 was preferred over corridors using central connecting sections (Sections M, L, Q and T, within Options ET3, ET4, ET5 and ET6) based on fewer effects on biodiversity and ecology and fewer technical complexities compared to routeing east of Chelmsford in Sections L and Q.
- 3.4.32 A more inland connection was also preferred on the basis it was £107 million less than a coastal route (£353 million for Option ET1 compared to £460 million for Option ET2). Option ET1 was marginally more expensive than the least cost inland option (Option ET5) with the difference in cost being £1 million and for the reasons set out above Option ET1 was preferred on environmental and technical grounds compared to the other options.

## 2022 Non-Statutory Consultation - Preferred Option

- 3.4.33 Following the routeing and siting stage, a preferred option, presented on Image 3.7 was consulted on at the 2022 non-statutory consultation.

Image 3.7 - Preferred Corridor and Graduated Swathe Presented at the 2022 Non-Statutory Consultation – as taken from the CPRSS (National Grid, 2022)



## 3.5 Changes following 2022 Non-Statutory Consultation

- 3.5.1 A total of 3,787 feedback submissions were received during the 2022 non-statutory consultation period from local communities, stakeholders and other consultees. Following the 2022 non-statutory consultation the 2023 preferred draft alignment was developed. The 2023 preferred draft alignment comprised an overhead line route, underground cable sections, locations for CSE compounds and the location of the EACN Substation.
- 3.5.2 The feedback obtained at the 2022 non-statutory consultation helped to shape and guide the development of the 2023 preferred draft alignment. All feedback provided was considered and taken into account in the context of environmental and socio-economics constraints and opportunities, engineering feasibility and cost, and planning policy considerations.

A summary of the key changes identified in response to the 2022 non-statutory consultation, subsequent development of the Project design, and further technical assessment is provided in the bullet points that follow. Where the 2023 preferred draft alignment was routed outside of the 2022 preferred corridor these are referred to as '*Changes outside the 2022 Preferred Corridor*' and where the 2023 preferred draft alignment was routed outside of the graduated swathe these are referred to as '*Changes within the 2022 Preferred Corridor*':

- Changes outside the 2022 Preferred Corridor:
  - East of Wortham Ling – The 2023 preferred draft alignment diverted from the crossing of the A1066 to pass to the east of Wortham Ling, it then re-joined the preferred corridor to the south-east of Diss at the crossing of the A143. This was developed to reduce potential effects on heritage assets, business activity and woodland
  - North of Flowton – The 2023 preferred draft alignment diverted from the preferred corridor to the east at the south of Offton, and then followed a route to parallel the existing 132 kV overhead line route to the north and east of Flowton and connected into Bramford Substation. This was developed to reduce potential impacts on heritage assets, residential amenity, and cumulative effects
  - West of Great Wenham – The 2023 preferred alignment was developed to increase the amount of proposed underground cabling through the Dedham Vale National Landscape (an AONB) to a proposed CSE compound to the south of Notley Enterprise Park, the alignment was then developed to pass to the west and north of Notley Enterprise Park and continue east towards Bramford Substation re-joining the preferred corridor south-east of Wenham Grange. The CSE compound and draft alignment outside of the preferred corridor in this location was developed to reduce potential impacts on heritage assets, residential amenity, and the Dedham Vale National Landscape (an AONB)
  - Further east of Ingatestone – The 2023 preferred draft alignment was routed outside of the preferred corridor and further east of Ingatestone diverting from the crossing of the A12 to the east of Stock Lane, and then continued south passing to the east of the sewage treatment works, re-joining the preferred corridor north of the crossing of Rayleigh Road. This was developed to reduce potential impacts on heritage assets
  - West of Writtle - The 2023 preferred draft alignment was routed slightly west of Writtle deviating outside the 2022 consultation corridor (by up to approximately 110 m for approximately 400 m) to avoid a historic landfill site south-east of Newney Green and positioning pylons on unsuitable ground
- Changes within the 2022 Preferred Corridor
  - The 2023 preferred draft alignment deviated from the graduated swathe to the northern half of the preferred corridor broadly parallel with the existing 132 kV overhead line to the north-west of Barking and Barking Tye. This was developed to reduce potential impacts on residential amenity and flight activities at Wattisham Flying Station
  - The 2023 preferred draft alignment deviated from the graduated swathe to the south of Bramford Substation to facilitate an alignment to the east of the preferred corridor. This was developed to reduce potential impacts on residential amenity in Burstall

- The 2023 preferred draft alignment included additional lengths of underground cables through the National Landscape (an AONB) to the EACN Substation. This also allows adjustment of the overhead line (EACN Substation to Tilbury) near Ardleigh to increase the separation of the overhead line from the village
- The 2023 preferred draft alignment included underground cable technology in the vicinity of Great Horkesley for approximately 5.3 km<sup>18</sup> from a CSE compound in the east between Horkesley Plantation and Harrow Wood and in the west on land to the west of Crabtree Lane and north of the B1508 to reduce potential impacts on the Dedham Vale National Landscape (an AONB)
- The 2023 preferred draft alignment deviated from the graduated swathe to the south-east of the 2022 consultation corridor at Aldham to avoid the potential oversail of properties and gardens to the north
- The 2023 preferred draft alignment deviated from the graduated swathe to facilitate an alignment to the north of Fairstead with a section of underground cable between CSE compounds under the existing 400 kV overhead line
- The 2023 preferred draft alignment deviated from the graduated swathe to pass to the east of Bushey Wood to increase distance from properties on Woodhall Hill
- The 2023 preferred draft alignment deviated from the graduated swathe to the eastern edge of the preferred corridor to reduce interaction with the Dunton Hills Garden Village development proposal
- The 2023 preferred draft alignment included underground cable technology from the north of the Lower Thames Crossing (LTC) proposals into Tilbury Substation to facilitate construction of LTC and the Project as efficiently as possible and respond to extent of flood storage areas. This change of technology also favoured routing to the east of both existing overhead lines beneficially reducing the potential for interaction with the proposed development to the east of Chadwell St Mary

3.5.4 Maps and further details of the above together with the main alternatives considered and subsequently discounted are provided within the 2023 Design Development Report (National Grid, 2023)<sup>19</sup>.

## 2023 Non-Statutory Consultation - Preferred Option

3.5.5 The 2023 preferred draft alignment (including pylon locations, areas of underground cable, CSE compounds and the location of the EACN Substation) was subject to non-statutory consultation – the 2023 non-statutory consultation.

3.5.6 Prior to the 2023 non-statutory consultation, a backcheck and review of the preferred option identified within the CPRSS was also conducted and reported within the 2023 Design Development Report (National Grid, 2023). The backcheck and review identified what had and has not changed since the CPRSS was produced, and whether changes would affect the selection of the preferred corridor and substation location options set out in the CPRSS, and whether the Project would continue to meet its stated objectives. The review concluded that the preferred Strategic Proposal, as presented in the 2023

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<sup>18</sup> An update to this number is presented in Section 5 of the Design Development Report.

<sup>19</sup> [www.nationalgrid.com/electricity-transmission/document/149161/download](http://www.nationalgrid.com/electricity-transmission/document/149161/download)

non-statutory consultation remained valid and an appropriate basis on which to take the Project forward.

## 3.6 Changes following the 2023 Non-Statutory Consultation

- 3.6.1 A total of 4,167 feedback submissions were received during the 2023 non-statutory consultation period from local communities, stakeholders and other consultees. The feedback obtained at the 2023 non-statutory consultation has helped to shape and guide the development of the Project into the 2024 preferred draft alignment together with the draft Order Limits and all associated temporary works presented within this PEIR. All feedback provided was considered and taken into account in the context of environmental and socio-economics constraints and opportunities, engineering feasibility and cost, and planning policy considerations.
- 3.6.2 The areas where the most extensive changes to the 2023 preferred draft alignment have been made (or have been considered) are listed in the bullet points that follow<sup>20</sup>:
- South of Norwich Main Substation
    - Pylons RG001 to RG007<sup>21</sup> have been repositioned to the west of Sprow's Pits Woodland. The draft Order Limits in this location are also wider to the east to allow flexibility to change the 2024 preferred draft alignment should planning consent not be granted for a battery storage facility to the south of the substation
  - Around 2 km in the Waveney Valley (potential for the use of underground cable)
    - National Grid develops its projects on the basis that the baseline position is an overhead line connection as established by NPS EN-5 (paragraph 2.9.7). It then varies from this baseline position as guided by NPS EN-5 (paragraph 2.9.20) and further considers (in line with NPS EN-5 paragraph 2.9.23) whether there are specific locations where the combination of circumstances presented by potential effects (including on landscape, heritage and recreational amenity) justify the additional costs and effects that would arise from the use of underground cables as set out in the Secretary of State decision making considerations (NPS EN-5 2023 paragraph 2.9.25). The crossing of the Waveney Valley is one such location where National Grid is considering whether such a combination of effects arises and approximately 2 km of underground cable with two CSE compounds adjacent to RG084 and north of RG091 are therefore being considered
  - East of Wortham near Brook Farm Airstrip
    - The 2024 preferred draft alignment has been amended between RG90 to RG099 to allow the safe continuation of flight activities at Brook Farm Airstrip. The Project now routes to the east rather than west of St John's House and transfers effects (that have been reduced) from one planned solar farm development to another. On balance it was considered that the small effect on the solar proposals to allow continued safe flight activities was preferred to the closure of the airstrip. This change also results in benefits to residential amenity, with increased separation to

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<sup>20</sup> Further detail on these changes, and other alternatives considered can be found in the Detailed Design Report (National Grid, 2024).

<sup>21</sup> RG relates to pylon reference numbers which are presented on Figure 4.1: Proposed Project Design in Volume II.

some properties offsetting greater effects occurring to other properties as a result of reduced separation

- North and west of Mellis
  - The 2024 preferred draft alignment has been amended to adopt the route of the existing 132 kV overhead line (to be reinstated as underground cable) to pass to the north side of Mellis, before turning to pass to the west of Mellis (RG102 to RG117). This alignment reduces impacts on a heritage assets (notably the moat to the east of RG112)
- South of Offton
  - A change has been made to the 2023 preferred draft alignment, extending the alignment to the south-east at RG195 before turning east to rejoin the route of 2023 preferred draft alignment at RG200 which has been repositioned to the north-west of its location in the 2023 preferred draft alignment. This change reduces socio-economics effects on an equestrian business and overall is considered to reduce effects on residential amenity
- To the north of the Dedham Vale National Landscape (an AONB), moving the CSE compound to the north of Raydon airstrip
  - The 2024 preferred draft alignment shows an amended location for the siting of the CSE compound to the north of the Dedham Vale National Landscape (an AONB), proposed to be sited to the north of the airstrip and woodland at Wenham Grove but to the south of the disused railway. This change is as a result of feedback requesting an altered alignment to allow continued safe flight activities from Raydon airstrip and additional information on potential effects on heritage assets
- Moving the western CSE compound at Fairstead to the east
  - A realignment of the overhead line further to the north, avoiding the plantation willows and allows both CSE compounds at Fairstead to be positioned within the same field to the east of Fairstead Road where landform and existing woodland and hedgerow screening can be strengthened has been taken forward. The 2024 preferred draft alignment moves closer to some residential properties (at around 250 m separation) but overall is preferred. As a consequence of the repositioning of the CSE compounds the overhead line alignment is slightly modified between TB103 and TB119 to optimise the CSE compound positioning and reduce effects
- Adoption of the existing gas pipeline corridor at Dunton Hills for the overhead line alignment
  - The 2024 preferred draft alignment has been amended to closely follow the gas pipeline near to Dunton Hills Garden Village proposals, reducing interactions of the Project with this development and additional housing developments to the east. This does increase the potential for interaction with the Park Farm Solar development though it is considered that the potential loss of panels can be minimised

3.6.3 Further details of the above together with the main alternatives considered and subsequently discounted are provided within the 2024 Design Development Report (National Grid, 2024).

## Strategic Options Backcheck

- 3.6.4 The Norwich to Tilbury 2024 Strategic Options Backcheck and Review (2024 SOBR) has been prepared by National Grid as part of the ongoing strategic options assessment and decision-making process involved in promoting new transmission projects.
- 3.6.5 The 2024 SOBR explains that, without reinforcement, the transmission system in East Anglia will have insufficient capacity to accommodate contracted and predicted growth in generation connecting in the area.
- 3.6.6 The 2024 SOBR has been prepared in accordance with National Grid's document '*Our Approach to Consenting*', which was published in April 2022. The SOBR appraises the ability of both onshore and offshore options to meet the system need while balancing cost, technical performance and environmental and socio-economics effects. The SOBR backchecks and reviews the conclusions of the April 2022 CPRSS, which was substantively complete at the point the Approach to Consenting was adopted.
- 3.6.7 Following consideration of options to meet system need the 2024 SOBR proposes to continue to take forward an interim preference of an onshore combination of:
- Overhead line from Norwich Main Substation to Bramford Substation
  - Overhead line from Bramford Substation via a new substation to Tilbury Substation, with undergrounding through the Dedham Vale National Landscape (an AONB)
- 3.6.8 As part of the backcheck and review process, costs have been reviewed and updated in accordance with the latest costing information. These may therefore, in some cases, supersede previously published costings.

## 2024 Statutory Consultation - Preferred Option

- 3.6.9 Following the 2023 non-statutory consultation feedback the Project has been developed to form the 2024 preferred draft alignment – including an overhead line alignment (with pylon locations), sections of underground cable, locations of CSE compounds, the location of the EACN Substation, third party utilities diversion works, permanent access roads (where necessary), permanent drainage, environmental mitigation ('Environmental Areas'), areas identified for onsite BNG ('Environmental Areas') and all associated temporary works associated with the construction and operation (and maintenance) of the Project. The Project is described further in Chapter 4: Project Description and will be consulted on at the 2024 statutory consultation.

# 4. Project Description

# 4. Project Description

## 4.1 Introduction

- 4.1.1 This chapter provides a description of the Project for the purposes of identifying and reporting the likely significant effects of the Project in this PEIR.
- 4.1.2 This chapter sets out the description of the Project and represents the current understanding of the design parameters and incorporates feedback received during both the 2022 non-statutory consultation and the 2023 non-statutory-consultation, together with further ongoing environmental and design work. Following statutory consultation, a detailed description of the Project for which consent will be sought will be included in the ES.
- 4.1.3 Current draft proposals for the Project, referred to as the 2024 preferred draft alignment, which are the subject of the 2024 statutory consultation, comprise:
- A new 400 kV electricity transmission connection of approximately 184 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation comprising:
    - Approximately 159 km of new overhead line supported on approximately 510 steel lattice pylons (approximately 50 m in height) some of which are gantries (typically up to 15 m in height) within proposed CSE compounds or existing or proposed substations
    - Approximately 25 km of 400 kV underground cabling (some of which is located through the Dedham Vale National Landscape (an AONB))
  - Six new CSE compounds each with a permanent access, to connect the overhead lines to the underground cables
  - A new 400 kV EACN Substation, with a new permanent access, on the Tendring Peninsula. This is proposed to be an AIS substation
  - Substation extension works at the existing Norwich Main, and Bramford Substations and works within the existing Tilbury Substation to connect and support operation of the new transmission connection
  - Temporary works associated with the construction of the Project
- 4.1.4 The Waveney Valley Alternative is also being considered and is the subject of consultation and ongoing assessment. The design alternative, if taken forward, would result in changes to those elements of the Project set out below. This would comprise:
- Installation of approximately 157 km of new 400 kV overhead line
  - Installation of approximately 27 km of 400 kV underground cabling (some of which is located through the Dedham Vale National Landscape (an AONB))
  - Eight new CSE compounds (each with a permanent access) to connect the overhead lines to the underground cables

- 4.1.5 All other works other than those listed above would remain consistent with either alternative.
- 4.1.6 The Waveney Valley Alternative, if taken forward and based on the 2024 preferred draft alignment would comprise approximately 2 km less new 400 kV overhead line and approximately an additional 2 km of 400 kV underground cabling and two additional new CSE compounds, each with a permanent access, to connect the overhead lines to the underground cables.
- 4.1.7 In addition, third party utilities diversions and / or modifications would also be required to facilitate the construction of the Project. There would also be land required for mitigation, compensation and enhancement of the environment including BNG.
- 4.1.8 As well as the permanent infrastructure, land would also be required temporarily for construction activities including for example working areas for construction equipment and machinery, site offices, welfare, storage and temporary construction access.
- 4.1.9 Figure 4.1: Proposed Project Design in Volume II presents permanent access routes associated with other elements of the work, including to specific pylon locations. However, there would be no physical works associated with these permanent access routes, they are proposed rights of access only to allow for any maintenance or refurbishment required.
- 4.1.10 The Project would be designed, constructed, and operated in accordance with applicable health and safety legislation. The Project would also need to comply with design safety standards including the NETS SQSS, which sets out the criteria and methodology for planning and operating the NETS. This informs a suite of National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, and operating assets such as proposed on the Project.
- 4.1.11 The remainder of this chapter is divided into the following sections:
- Section 4.2: Project Sections: This provides an overview of the Project's key features, the proposed technology solution (i.e., overhead line or undergrounding) by section which are being presented at statutory consultation
  - Section 4.3: Environmental Mitigation Measures
  - Section 4.4: Good Design Principles: This describes the good design principles that have been considered including reducing the use of raw materials and waste generation. It also sets out how the Project has been designed to be resilient to climate change.
  - Section 4.5: Application of the Rochdale Envelope and Design Alternatives
  - Section 4.6: Draft Order Limits and Limits of Deviation (LoD)
  - Section 4.7: Construction – General: This describes Project assumptions for the construction phase that have been used for undertaking the preliminary assessment presented within this PEIR, including construction programme, working hours, estimated construction workforce, number of vehicles and working methods.
  - Section 4.8: Construction – Temporary Features: This describes how the Project would be constructed including the temporary work features, e.g., site compounds and haul roads
  - Section 4.9: Construction – Permanent Features: This describes the permanent features of the Project that would be in place once the Project is operational.

- Section 4.10: Operation and Maintenance: This describes the activities that are anticipated during the operation stage including site inspections and routine maintenance.
- Section 4.11: Decommissioning: This describes what would happen once the Project reaches the end of its design life and/or was no longer required.

## 4.2 Project Sections

4.2.1 As described in Chapter 1: Introduction, the Project has been broken down into eight sections based largely on local authority boundaries. The eight sections are described below and presented on Figure 1.1: Site Location Plan and Project Sections in Volume II.

- Section A: South Norfolk Council
- Section B: Mid Suffolk District Council
- Section C: Babergh District Council, Colchester City Council and Tendring District Council
- Section D: Colchester City Council
- Section E: Braintree District Council
- Section F: Chelmsford City Council
- Section G: Brentwood Borough Council and Basildon Borough Council (and part of Chelmsford City Council)
- Section H: Thurrock Council

4.2.2 Table 4.1 outlines details of each of the sections the Project is split into. The details in Table 4.1 should be read in conjunction with Figure 4.1: Proposed Project Design in Volume II. Figure 4.1: Proposed Project Design in Volume II also includes individual pylon locations with pylon reference numbering every five pylons with an identification reference RG, JC and TB used before each number.

Table 4.1 – Description of the Project, from North to South, by Section

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
A	South Norfolk Council	31	<p>The Project starts at the existing National Grid Norwich Main 400 kV Substation. Works to extend the existing substation are required. The draft Order Limits head south by south-west of Dunston through arable fields before crossing an unnamed river between Flordon and Toprow. This river is connected to the SSSI Flordon Common located approximately 400 m to the south-east of the draft Order Limits. The draft Order Limits continue south through arable fields and crossing some narrow lanes, passing between Forncett St Mary and Forncett End. The draft Order Limits pass within 200 m of an area of Ancient Woodland (Bunwell Wood) at Bunwell Hill. The draft Order Limits then cross the river Tas, and continues south approximately 1.7 km to the west of Tibenham Airfield. The Project then crosses the B1134 at Long Row. The Project continues south through arable fields, before crossing another unnamed river, approximately 250 m south-east of Shelfanger Meadows SSSI. The Project then heads west, crossing the B1077 (Shelfanger Road) and then another unnamed river before heading south around Snow Street, crossing the A1066 to the east of the Bressingham Steam Museum and Gardens and west of the Grade I listed Church of St Remigius before heading south-east coinciding with the north of Wortham Ling SSSI, crossing into Section B, north of Ling Road.</p>	<p>Norwich Main Substation                      Unnamed river x3                      Flordon Common SSSI                      Bunwell Wood (Ancient Woodland)                      River Tas                      B1134                      B1077                      A1066                      Bressingham Steam Museum and Gardens                      Church of St Remigius (Grade I)                      Wortham Ling SSSI                      River Waveney                      Priors and Tibenham Airfields</p>	<p>Works at the existing Norwich Main Substation</p> <p>Pylons and overhead line</p> <p>Waveney Valley Alternative (and underground cable CSE compounds)</p>

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
B	Mid Suffolk District Council (and Babergh District Council north of the existing Bramford Substation)	41	<p>The Project enters Section B and continues to the south past Wortham Ling, through arable fields before crossing the A143 at Bury Road. Shortly after, the Project crosses an unnamed river. The Project continues south past Mellis and the Mellis conservation area, around the Moatyard Plantation to the south-west, before crossing an unnamed river located to the north-east of Gislingham. It then continues south before crossing the Great Eastern Main Line between Diss and Stowmarket, travelling north-east to south-west across the path of the draft Order Limits. It then continues south past Finningham and Mendlesham Green, with the Ancient Woodland Gipping Great Wood being located within 800 m of the draft Order Limits to the west and crossing the River Gipping. The Project continues south before crossing the A1120 at Bell's Lane, then continues south until crossing the A14 east of Stowmarket. Shortly after, it crosses an unnamed river and another section of the River Gipping. The draft Order Limits then cross the Ipswich to Ely railway line between Stowmarket and Needham Market before crossing the B1113. South of the B1113 there are areas of Ancient Woodland, including Keyfield Groves and Little Newton Wood which are within 300 m of the draft Order Limits. At this point, the Project also crosses another unnamed river and passes Great Newton Wood which is adjacent to the draft Order Limits, and further south the Project is located adjacent to Lower Wood Ancient Woodland. The Project continues south before crossing the B1078 between Barking Tye and Ringshall Stocks. Here, the draft Order Limits split in two, continuing south on either side and adjacent to the Middle Wood (an area</p>	<p>A143            Unnamed river x5            Mellis Conservation Area            Railway line            Gipping Great Wood            River Gipping x2            A1120            A14            B1113            Unnamed Ancient Woodland x3            B1078            Offton Middle Wood            Ofton Castle            The Channel            Somersham Park            Bullen Wood            Round Wood            Bramford 400 kV Substation</p>	<p>Works at the existing Bramford Substation</p> <p>Pylons and overhead line</p> <p>Waveney Valley Alternative (and underground cable CSE compounds)</p>

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			<p>of Ancient Woodland and SSSI) and crosses a river known as 'The Channel'. The two sections of the draft Order Limits cross Bildeston Road and the Project continues to the south-east to the north of Flowton where the two sections join again, and the Project continues south-east adjacent to Somersham Park Ancient Woodland, before heading south into Bramford 400 kV Substation. The draft Order Limits coincide with Bullen Wood and Round Wood Ancient Woodlands at this location. Works would be required at the existing substation. Section B ends to the south of Round Wood Ancient Woodland.</p>		
C	Babergh District Council, Colchester City Council and Tendring District Council	28	<p>The Project in Section C starts adjacent to the north of Burstall Long Wood Ancient Woodland and continues south in two sections. One section heads south-south-east following the existing overhead lines ending at the A1071 at Valley Lodge Farm. The other Project section heads south and crosses the A1071 at Thorpe's Hill. Shortly afterwards it heads south-west and crosses an unnamed river and Spring Brook. The Project then heads south-west through arable fields, crossing Chattisham Road, before continuing south-west adjacent to Brimlin Wood Ancient Woodland. The Project then transitions from overhead line to underground cable at a CSE compound to the north of Notley Enterprise Park and to the north of the airstrip. The underground cables are routed between Raydon and Holton St Mary, and into Dedham Vale National Landscape (an AONB) designated for its meadows, fens, and Ancient Woodland. The Project stays within the National Landscape located in both Babergh District and Colchester City Council. Within</p>	<p>Burstall Long Wood A1071 Spring Brook Brimlin Wood Ancient Woodland B1070 B1068 River Stour Black Brook A12 Dedham Vale National Landscape (an AONB)</p>	<p>Underground cable CSE compound (North of the National Landscape (an AONB))  Underground cable  Pylons and overhead line  New EACN Substation</p>

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			<p>the National Landscape to the north-west of Stratford St Mary the route crosses the River Stour, and to the north-east of Langham crosses the Black Brook. Once in Colchester City it heads south-east, crossing the A12 and re-entering the National Landscape to the east of Langham before exiting Colchester to the south-east. From the Colchester and Tendring boundary south of Lamb Corner, the Project heads east crossing the B1029 at Dedham Road. The underground cabling continues south, crossing the A137 and railway before the connection enters the proposed EACN 400 kV substation located to the east of Hungerdown Lane. The Project then exits the EACN Substation west as overhead line, following the route back on itself until it crosses the A137 before turning west and crossing part of the Ardleigh Reservoir and continuing to the A12, where this section ends.</p>	<p>B1029 A137 Railway line Unnamed river</p>	
D	Colchester City Council	19	<p>In Section D, the Project heads to the west at the A12 Ipswich Road. The overhead line continues west, and then is undergrounded at a CSE compound to the north-east of Great Horkesley. The Project then continues west underground and then transitions back to overhead lines via a further CSE compound positioned to the north-west of Great Horkesley just east of Grove Lodge. At this point, the Project crosses the B1508 and heads south-west until it crosses the River Colne. Just south-east of the River Colne Fiddlers Wood Ancient Woodland is adjacent to the draft Order Limits. It then continues south-west crossing the A1124 at Fordstreet Hill. The Project then continues south past Aldham and Aldhamhall Wood Ancient Woodland, located adjacent to the draft Order Limits. The</p>	<p>A12 A134 Pitch bury Wood B1508 River Colne Stitching Wood Hillhouse Wood Fiddler's Wood A1124 Unnamed Ancient Woodland</p>	<p>Pylons and overhead line  Underground cable CSE compounds  Underground cable</p>

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			Project then turns south-west at Aldham Hall Farm, with Church House Wood Ancient Woodland located adjacent to the draft Order Limits to the north, and Marks Tey Brickpit SSSI approximately 50 m south of the draft Order Limits, crosses the railway line between Marks Tey and Chappel and Wakes Colne, before crossing the Roman River. The Project continues through arable fields past Little Tey before entering Section E.	Aldham Wood Railway line Roman River Marks Tey Brickpit SSSI	
E	Braintree District Council	16	At the start of Section E, the Project crosses the A120 at Colchester Road. The Project continues south-west of Coggeshall Hamlet and crosses the River Blackwater, before crossing the B1024 at Coggeshall Road. It continues south-west and passes two small areas of Ancient Woodland, Storey's Wood within 700 m of the draft Order Limits to the north, and Rivenhall Thicks adjacent to the south of the draft Order Limits between Silver End and Rivenhall. The Project continues south-west, crossing the B1018 at Cressing Road. It then crosses a railway line connecting White Notely and Witham before crossing the River Brain. At this point, the Faulkbourne Hall registered Park / Garden is located approximately 400 m to the south of the draft Order Limits. It then continues west through arable fields; the Ancient Woodland Troy's Wood is within 200 m of the draft Order Limits and Ivy Wood is within 900 m to the south. Further west, the Project then crosses an unnamed tributary of the River Ter. At this point, the existing Braintree – Pelham – Rayleigh 400 kV overhead line intersects the Project necessitating the need for the proposed overhead line to be undergrounded for a short section. This would require CSE compounds to be	A120 River Blackwater B1024 Unnamed Ancient Woodland Rivenhall Thicks Tarecroft Wood B1018 Railway line River Brain Faulkbourne Hall registered park/ garden Troy's Wood Ivy Wood Unnamed Tributary Braintree – Pelham –	Underground cable CSE compounds to cross existing overhead line  Underground cable  Pylons and overhead line

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			positioned in one field to the east of Fairstead Road to facilitate the transition. As the Project goes back to overhead lines, there are also five small areas of Ancient Woodland, Galleycable Wood, Hallhook Row, Faitsteadhall Wood, Brickhouse Wood and Hookley Wood. Hallhook Row is adjacent to the draft Order Limits. The Project continues south-west, with the draft Order Limits adjacent to Mann/Parsons Wood Ancient Woodland, and Section E concluding at the boundary between Braintree and Chelmsford.	Rayleigh 400 kV overhead line Brickhouse Wood Hookley Wood Mann/ Parsons Woods Ancient Woodland	
F	Chelmsford City Council	20	Section F of the Project continues south-west through arable fields until crossing the River Ter. At this point, the draft Order Limits are less than 250 m from the River Ter SSSI. The Project then continues south-west through arable fields coming within 300 m of Lyonshall Wood Ancient Woodland before crossing the A131 (Braintree Road). Just east of the A131 the Project is adjacent to Sheepcotes Ancient Woodland. It then crosses the B1008 and the River Chelmer between Great Waltham and Little Waltham conservation areas. At this point, the Project is also adjacent to the Langley's historic park/garden area. It then continues south-west, where Sparrowhawk Wood Ancient Woodland is located adjacent to the draft Order Limits just south of Broad's Green. The Project then continues south, to the west of Broomfield Hospital, before turning south-west again at Bushy Wood Ancient Woodland, located adjacent to the draft Order Limits to the north. The Project then passes south of Chignal St James and crosses the River Can. Just further south-west of this point (within the Project boundary) is the Chelmsford Compressor Station where three gas	River Ter River Ter SSSI A131 Lyonshall Wood Sheepcotes Woodland B1008 River Chelmer Little Waltham Conservation Area Great Waltham Conservation Area Langley's Historic Park/ Garden Sparrowhawk Wood	Pylons and overhead line

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			<p>pipelines converge. It then crosses the A1060 at Roxwell Road and Roxwell Brook. From here the Project heads south crossing the A414 at Ongar Road and then Sandy Brook. The Project continues heading south at Edney Common and adjacent to large areas of Ancient Woodland including King Wood and Writtle-Writtle Park Wood, crossing two unnamed watercourses before concluding the section at the border between Chelmsford and Basildon, adjacent to Bushey Wood and Osbourne Wood Ancient Woodlands.</p>	<p>Bushy Wood River Can Chelmsford Compressor Station A1060 Roxwell Brook A414 Sandy Brook Writtle-Writtle Park Wood King Wood Osbornes Wood Bushey Wood Chapel Wood</p>	
G	Basildon Borough Council and Brentwood Borough Council (and part of Chelmsford City Council)	15	<p>At the start of Section G, the Project continues south, crossing the A12 and B1002 at Margareting, it then heads south by south-east and crosses a railway line linking Stratford and Chelmsford. It continues south-south-east, crossing the River Wid, before heading south and crossing Stock Brook. The Project then heads south-west again, crossing different sections of the River Wid twice and Stock Brook before passing less than 150 m of Harespring Wood Ancient Woodland. It continues south, passing within 500 m of Wid Wood and Clapgate Wood Ancient Woodlands to the north-west of the draft Order Limits before crossing the railway line linking Billericay and Shenfield. The project then crosses the A129 at</p>	<p>A12 B1002A Railway Lines Harespring Wood River Wid Stock Brook Wid Wood Unnamed Ancient Woodland A129 James Wood</p>	<p>Pylons and overhead line</p>

Section Name	Local Authority	Approximate Section Length (km)	Description	Principal Features	Principal Permanent Project Infrastructure
			<p>Rayleigh Road and continues south past Havering's Grove with areas of Ancient Woodland less than 200 m from the draft Order Limits (James Wood and Bluntswall Wood just south of Havering's Grove). The Project then crosses an unnamed river before continuing south through arable fields passing Little Burstead to the east and Parkhill Wood Ancient Woodland to the west before crossing the A127 at Southend Arterial Road. At this point, the Project is within 30 m of Frieren Manor Wood Ancient Woodland. The Project continues south through arable fields concluding this section at the border of Thurrock at the crossing of another railway line between Laindon and West Horndon.</p>	<p>Bluntshall Wood A127 Frieren Manor Wood</p>	
H	Thurrock Council	14	<p>Section H of the Project continues south through arable fields before crossing the River MarDyke and then Doesgate Lane. Langdon Ridge SSSI is within 200 m of the draft Order Limits to the east. It then continues south through arable fields and some areas of sparse woodland, passes to the west of housing at Horndon on the Hill, before crossing the A13 at Standford Hope By-Pass and the A1013 at Standford Road. It then continues south before the Project transitions from overhead line to underground cables at Mucking Heath and would remain underground until its conclusion at Tilbury Substation. There is a CSE compound for this transition to the south of Orsett Golf Course. The Project continues south to the west of Linford and East Tilbury. There are also multiple existing overhead lines which run through this area, adjacent to and crossing the draft Order Limits. Additionally, the Project crosses the Tilbury Loop railway at a conflux of existing overhead lines. The draft Order</p>	<p>River MarDyke Langdon Ridge SSSI A13 A1013 Tarmac Linford Blocks Plant Multiple overhead lines Tilbury Loop railway Mucking Heath Lower Thames Crossing Orsett Golf Course</p>	<p>Pylons and overhead line Underground cable CSE compound (where the Project connects to Tilbury Substation) Underground cables Works at the existing Tilbury Substation</p>

<b>Section Name</b>	<b>Local Authority</b>	<b>Approximate Section Length (km)</b>	<b>Description</b>	<b>Principal Features</b>	<b>Principal Permanent Project Infrastructure</b>
			Limits conclude at the existing Tilbury Substation with the underground cabling connecting from the north.		

## 4.3 Environmental Mitigation Measures

- 4.3.1 Three types of mitigation have been assumed to be incorporated into the Project and preliminary assessment – embedded, standard, and additional mitigation. Further information is provided in the paragraphs that follow.
- 4.3.2 Environmental mitigation measures have been defined within each environmental topic chapter and where relevant to construction are presented in Appendix 4.1: Draft Outline Code of Construction Practice (CoCP) in Volume III or the Draft Outline Construction Traffic Management Plan (CTMP). Environmental mitigation that relates to the permanent assets will be outlined within the Landscape and Ecology Management Plan (LEMP) submitted as part of the ES.

### Embedded Mitigation Measures

- 4.3.3 Environmental appraisal has been an integral part of the Project design process since conception, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 4.3.4 National Grid has also embedded mitigation measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation of the Project.
- 4.3.5 Embedded mitigation measures are those that are intrinsic to and built into the design of the Project. Table 4.2 outlines the key embedded measures that have been incorporated into the design to date.
- 4.3.6 The design of the Project will be continually reviewed in line with assessment work and consultation feedback as it progresses to the detailed design. The environmental assessment will continue to influence the design, whereby mitigation measures may be embedded into the design, to help avoid and reduce significant effects arising from the Project. Table 4.2 will be updated in the ES to document any further embedded mitigation measures that have been developed and that are considered as part of the design presented in the ES.

Table 4.2 – Embedded Mitigation Measures

Embedded Measures	Benefits
<b>Whole Project/Route</b>	
The Project has committed to delivering minimum 10% BNG	The Project will deliver an overall net improvement to biodiversity in the area through a combination of on-site and off-site mitigation. This would be reported in an appendix to Chapter 8: Ecology and Biodiversity to avoid overlap or double counting of any required EIA mitigation.
Sensitive Routeing and Siting to develop the draft Order Limits	Avoid and reduce as far as practicable impacts on identified environmental and socio-economics receptors. The draft Order Limits have been designed to avoid large

Embedded Measures	Benefits
	<p>residential and urban areas and consequently avoid areas of existing poor air quality.</p> <p>The route alignment and siting have been designed as far as practicable to avoid sensitive noise and vibration features. This included avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby Noise Sensitive Receptors (NSRs) being isolated dwellings and small settlements.</p> <p>Avoiding sensitive features/receptors, as far as is practicable, such as groundwater Source Protection Zone 1, landfills, and geological SSSIs, through the routeing and siting stages.</p>
Underground cable	Underground cable is proposed in up to five locations, including through and in proximity to the Dedham Vale National Landscape (an AONB). The Dedham Vale National Landscape is a nationally important and designated landscape. With the proposed underground cable, the impact on views and setting would be reduced. This will also reduce potential impacts to the setting of heritage assets located within the National Landscape.
The Project would include triple Araucaria conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons)	Due to its geometrical configuration, the triple Araucaria design is the least electrically stressed conductor system that National Grid uses. It is the best design for reducing the effects of line crackle (corona discharge) and would reduce the generation of noise from the proposed overhead lines during operation.
Incorporating full line tension gantries	The Project allows for the use of full line tension gantries at CSE compounds (where design allows). The use of full tension gantries may remove the need for a bulkier terminal pylon adjacent to the CSE compound which would reduce visual clutter and therefore help to reduce landscape and visual effects.
The Project will be designed in accordance with National Grid design standards and would be compliant with the guidelines and policies relating to Electric and Magnetic Fields (EMF) stated in NPS EN-5 (DESNZ,	Compliance with these guidelines and policies mean that the Project would already have designed out potential effects from EMF to a level to meet health and safety standards.

Embedded Measures	Benefits
2024), including the ICNIRP guidelines (ICNIRP, 1998)	
The Project will be designed to comply with design safety standards including NETS SQSS and the suite of National Grid policies and processes which contains details on design standards required to be met when designing, constructing, and operating its projects	Existing National Grid processes are designed to identify potential safety risks during construction and operation (and maintenance) and to design these out at each stage of Project development.
The design will allow for landscape planting around CSE compounds and the new EACN Substation	This will reduce effects on views and landscape setting. This would also support BNG. Draft areas for landscape planting (and BNG) labelled 'Environmental Areas' are presented on Figure 4.1: Proposed Project Design in Volume II.
The design includes a largely continuous haul road along the Project alignment to support construction of the Project	Reduce the effects of construction movements on the local public highway network during construction.
Large or sensitive watercourses, for example those designated as main river, and those with Water Framework Directive (WFD) status, will be crossed by the temporary haul road using temporary clear span bridges	Reduce the effects on watercourses, their banks, and water quality as a result of removing works from within the watercourse.
Rationalisation of existing electricity transmission infrastructure	Prior to the commencement of construction works for the Project, several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected. The Project would follow along (or be located close to) the route of existing 132 kV overhead lines north of Flowton and north of Mellis, where the existing 132 kV overhead lines would be undergrounded.
Materials of new above ground infrastructure	National Grid will consider the proposed materials and colour palette for the CSE compounds and new substation / substation extensions, including buildings, security fencing, equipment, and surfacing; this will include options for surfacing of permanent access roads. Proposed details will be provided in the ES.

Embedded Measures	Benefits
Replacement planting	Replacement planting would be undertaken at the earliest opportunity given the right planting season.
Substations – noise control measures: The proposed new substation will include any required noise mitigation measures by design. Mitigation may include, plant selection, siting, screening, and enclosures, as appropriate	Reduce the noise outputs of the new EACN Substation and therefore reduce effects on receptors.
Substations – vibration control measures: Plant with moving parts, such as cooling equipment and transformers, would be expected to be mounted on suitable anti-vibration mounts to protect the plant from potential vibration impacts and to attenuate vibration generated by the plant	Reduce the generation of vibrations and therefore reduce the effects on receptors.

## Standard Mitigation Measures

- 4.3.7 Standard measures comprising management activities and techniques, would be implemented throughout construction of the Project to limit impacts through adherence to good site practices. These are outlined in Appendix 4.1: Draft Outline CoCP in Volume III (each mitigation has been assigned a specific reference and these are referenced in each topic specific chapter). An updated version will be submitted as part of the application for development consent.

## Additional Mitigation and BNG

- 4.3.8 Additional mitigation comprises measures over and above embedded and standard mitigation measures to reduce environmental effects. This would include, but not be limited to, landscape and visual mitigation such as tree planting and reinstatement of hedgerows.
- 4.3.9 The Environment Act 2021 includes a requirement for NSIPs to deliver at least 10% biodiversity net gain from November 2025. The NPS EN-1 (Department for Energy Security and Net Zero) also states that *‘Although achieving biodiversity net gain is not an obligation on applicants, Schedule 15 of the Environment Act 2021 contains provision, which when commenced, mean the Secretary of State may not grant an application for a Development Consent Order unless satisfied that a biodiversity gain objective is met in relation to the onshore development in England to which the application relates’*. National Grid has committed to 10% Net Gain in environmental value<sup>22</sup>, including as a minimum 10% biodiversity net gain across all its construction

<sup>22</sup> [The natural environment | National Grid Group](#)

projects. The 10% target for the Project is voluntary as it is not mandated for NSIPs until November 2025.

- 4.3.10 Therefore, National Grid is working with appointed technical specialists, environmental organisations, and landowners to identify potential opportunities for delivering areas of BNG, and where practicable also linked to wider environmental gains such as recreation improvement.
- 4.3.11 Preliminary areas identified for additional mitigation and BNG (called ‘Environmental Areas’) have been identified through a desk-based review and habitat condition survey site visits and are presented on Figure 4.1: Proposed Project Design in Appendix II.
- 4.3.12 As further baseline data is collected, and discussions take place with consultees and landowners, the Environmental Areas will be refined. In addition, the biodiversity baseline will be quantified during the EIA and design process using the Biodiversity Metric 4.0 (or future update). This information will be used to calculate the loss in biodiversity units because of construction of the Project, as well as the number of biodiversity units which will need to be created to achieve minimum 10% BNG. This will also determine the land required to achieve those gains on the Project. Therefore, some of the Environmental Areas may not be taken forward and others may only require minor enhancements such as hedgerow improvements rather than works to the whole Environmental Area. Final proposals will be included as part of the application for development consent.

## 4.4 Good Design Principles

- 4.4.1 This section describes the good design principles that have and will be taken regarding the design process including reducing use of raw materials and waste generation. It also sets out how the Project has been designed to be resilient to climate change.
- 4.4.2 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the project, including NPS EN-1 and NPS EN-5. Paragraph 4.7.1 of NPS EN-1 states: *‘The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object — be it a building or other type of infrastructure — including fitness for purpose and sustainability, is equally important.’* Paragraph 4.7.2 goes on to state that *‘Applying “good design” to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.’*
- 4.4.3 The Project has been designed in line with the National Grid options appraisal as previously outlined in Section 3.2. The Project will also be designed to comply with existing National Grid standards and relevant external guidance and processes, such as the ICNIRP guidelines (ICNIRP, 1998) for reducing effects in relation to EMFs. These measures will mean that the design will meet the functions required.

## Approach to Material Assets (and Waste)

- 4.4.4 The nature of the Project means that it is not possible to use secondary sources of material during construction, as this can affect the operation and the design life of the Project. However, National Grid has existing processes in place to source materials from sustainable sources and to use recycled materials where these do not compromise the required design standards and operational life, where practicable.
- 4.4.5 As per the EIA Scoping Report (National Grid, 2022) temporary materials, such as hardcore for the haul road and site compounds, works cabins and security fencing would be required during construction. It is assumed that these would be sourced from within the region, where possible, and would be reused after completion of the Project where possible.
- 4.4.6 Waste materials would be produced by the Project. The Main Works Contractor(s) would produce a Site Waste Management Plan (SWMP) prior to construction (a draft SWMP would be included as an appendix to the Outline CoCP within the DCO application). This would set out the measures to reduce the generation of waste in the first place and appropriate measures to reuse and recycle materials where practicable. It would also identify appropriate waste facilities to dispose of materials.
- 4.4.7 National Grid would adopt good construction and management practices to ensure waste is minimised as far as possible and that the storage, transport and eventual disposal of any waste have no significant environmental effects. The management and collection of waste arisings would be carried out under the requirements of the UK waste regulatory regime. The effects of any waste producing development would be addressed as part of the relevant environmental aspects and associated strategies, for example the transport effects from the management of waste arisings would be considered in Chapter 16: Traffic and Transport, Chapter 7: Air Quality and Chapter 14: Noise and Vibration where appropriate.
- 4.4.8 As detailed within section 5.7 of the EIA Scoping Report (National Grid, 2022) and agreed through the Scoping Opinion provided by the Planning Inspectorate (2022) on behalf of the Secretary of State, a separate materials and waste chapter is not provided within this PEIR and will not be provided in the ES. Instead the Project Description within the ES will include information regarding material and waste and individual aspect chapters will assess impacts from waste, including Chapter 16: Traffic and Transport, Chapter 7: Air Quality and Chapter 14: Noise and Vibration where appropriate.

## Design Resilience to Climate Change

- 4.4.9 The need for the Project is to support the connection and transfer of green, renewable energy into the NETS network. The Project would support the UK's net zero target to achieve net zero emissions by 2050 through the connection in East Anglia of new low carbon energy generation, and by reinforcing the transmission network. Therefore, the operational, medium to long term benefits of delivering the Project on a national level are considered to outweigh any short-term impacts of greenhouse gas (GHG) emissions because of material use and construction activities.
- 4.4.10 In terms of vulnerability of the Project to climate change, overhead lines are designed to withstand extreme weather conditions, such as high winds and ice formation on the conductors. National Grid has previously investigated whether climate change might require overhead lines to be redesigned but found there is more likely to be a reduction in the risk of ice on the wires and intense wind gusts occurring simultaneously. The

vulnerability of the Project (all permanent assets) to future flooding would be considered as part of the Flood Risk Assessment (FRA).

- 4.4.11 The Project Description within the ES will detail likely construction materials. This will be supported by a simple estimate of the GHG emissions associated with the construction phase of the Project, comparing this against UK emissions to determine if the Project is likely to have a material impact on the ability of the Government to meet its carbon reduction targets. The assessment will also look to identify potential opportunities to save carbon.

## 4.5 Application of the Rochdale Envelope and Design Alternatives

- 4.5.1 Advice Note 9: The Rochdale Envelope (Planning Inspectorate, 2018) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be parameters of a project's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst-case variations to ensure that the likely significant environmental effects of the Project have been assessed.
- 4.5.2 Within the PEIR, the description of the Project reflects what is currently known, at the time of statutory consultation, as only limited Front End Engineering Design (FEED) has been undertaken to date. However, as the Project evolves sufficient flexibility within the design would be allowed to provide the future design and build Main Works Contractor(s) with sufficient scope for value engineering through innovative design and / or construction techniques and to respond to unknown information such as ground conditions. As such, the Project design presented in the ES and the accompanying assessment, will both reflect the need for this flexibility and the requirements of Advice Note 9: Rochdale Envelope (Planning Inspectorate, 2018) to ensure that the likely significant effects of the Project are assessed. Furthermore, the design will be informed by the EIA with the design reflecting iterative working between the designers and the environmental specialists.
- 4.5.3 The preliminary assessment of likely significant effects in this report is based on the description of the design, construction, operation (and maintenance) of the Project presented in this chapter. Consideration has been given to the potential for variation in some individual components of the Project.
- 4.5.4 There are also elements of the Project which have not been determined at statutory consultation. To assess the potential effects of elements that have not been determined, either a realistic worst-case scenario has been identified and considered in the preliminary assessment or a design alternative has been assessed and presented. Further detail is presented in Table 4.3 as to how each element has been assessed within this PEIR.

Table 4.3 – Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation

<b>Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation</b>	<b>How elements not yet fixed at Statutory Consultation have been Assessed</b>	<b>Summary where Assessed in the PEIR</b>
Waveney Valley	<p>Two design alternatives have been assessed within this PEIR:</p> <ol style="list-style-type: none"> <li>1. Waveney Valley overhead line This includes an overhead line being constructed through the Waveney Valley as per the alignment presented at the 2023 non-statutory consultation with two pylons located within sensitive peat soil habitats. It is anticipated that a haul road would be provided to facilitate the construction of the two pylons, including a single crossing of the smaller River Waveney channel to the south by a haul road. Design and construction methods would be subject to further Ground Investigations, surveys, design development and engagement with stakeholders, including the Environment Agency and Natural England.</li> <li>2. Waveney Valley Alternative This includes a section of underground cable in the vicinity of Roydon Fen County Wildlife Site and Wortham Ling SSSI designations (the designations would not be directly affected) and constructing two CSE compounds. It is anticipated that the cable design for this option would include both open cut and trenchless construction techniques, with the design being subject to further Ground Investigations, surveys, design development and engagement with stakeholders, including the Environment Agency, Historic England and Natural England. This is owing to the sensitive nature of the area which includes the River Waveney (and its associated floodplain), peat soils and views from heritage assets. For the purpose of our assessment, a construction swathe of approximately 120 m for the open cut sections, widening up to 180 m to accommodate the two trenchless crossings in the vicinity of the River Waveney. The two trenchless crossings approximately 150 m long (worst-case) under the River Waveney and its tributary would include a drive pit and exit pit for each trenchless crossing. These drive pits would be approximately 180 m x 10 m wide and approximately 2 m deep (with the trenchless crossings continuing deeper)</li> </ol>	<p>A preliminary assessment of the Waveney Valley overhead line and the Waveney Valley Alternative (underground cable) is presented in each topic chapter. A qualitative assessment is provided within Chapter 7: Air Quality, Chapter 14: Noise and Vibration and Chapter 16: Traffic and Transport.</p>

Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation	How elements not yet fixed at Statutory Consultation have been Assessed	Summary where Assessed in the PEIR
	<p>within the sensitive soils. A haul road would be provided to the north and south of each drive and exit pit with a single crossing of the smaller River Waveney channel to the south.</p> <p>Refer to Figure 4.1: Proposed Project Design in Volume II.</p> <p>Primary Access Routes between the two design alternatives would remain the same except for the cable drum deliveries associated with the Waveney Valley Alternative which would access the site from the west (from Thetford) along the A1066 to avoid highway constraints through Diss.</p>	
Norwich Main Substation	<p>Figure 4.1: Proposed Project Design in Volume II shows an overhead line alignment exiting the Norwich Main Substation (RG001 to RG007). The draft Order Limits in this location have been widened to the east to allow flexibility to change the 2024 preferred draft alignment should planning consent not be granted for a battery storage facility to the south of the substation.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should the battery storage facility not be consented and an alternative alignment be required to be progressed.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter. Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapters.</p>
South of Coggeshall	<p>Figure 4.1: Proposed Project Design in Volume II shows an overhead alignment between TB081 and TB086. However, the draft Order Limits have been widened in this location to allow flexibility to change the 2024 preferred draft alignment to reduce impacts on a potential mineral extraction site should it be identified as an allocation in a future mineral plan.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should an alternative alignment be required to avoid the mineral extraction site.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter. Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapter.</p>

<b>Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation</b>	<b>How elements not yet fixed at Statutory Consultation have been Assessed</b>	<b>Summary where Assessed in the PEIR</b>
Buckingham Hill Landfill area	<p>Figure 4.1: Proposed Project Design in Volume II shows an overhead alignment between TB254 and TB260 that reduces effects on the proposed Southfields development. The draft Order Limits have been widened between TB254 and TR260 to allow flexibility if the housing development doesn't go ahead, as the alignment could then move to the west, removing two crossings of Buckingham Hill Road, a crossing of a historic landfill site and pylons situated within parkland and a quarry site.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should an alternative alignment be required.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter. Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapter.</p>
South of Rivenhall	<p>The draft Order Limits have been widened at TB091 to TB094. This has been included to allow flexibility to amend the 2024 preferred draft alignment which currently avoids proposed solar farm development. Should the proposed solar farm not be granted planning consent there is flexibility for the alignment to be amended.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should an alternative alignment be required.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter. Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapter.</p>
Development near Wick Lane	<p>The draft Order Limits have been widened at between TB020 and TB021 as there are a number of planning applications associated with the Flying Trade Group and Crown Quarry Developments adjacent to the A12 between TB020 and TB021. The widened order limits are to allow flexibility for an alternative alignment should the distribution warehouses not be consented.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing'</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter. Widened draft Order Limits assessed within the 'sensitivity</p>

<b>Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation</b>	<b>How elements not yet fixed at Statutory Consultation have been Assessed</b>	<b>Summary where Assessed in the PEIR</b>
	section which indicates any changes to the preliminary assessment should an alternative alignment be required.	testing' section within each topic chapter.
Crossing of the railway line at Ardleigh	<p>The draft Order Limits have been widened at the railway line crossing to the east of Ardleigh to allow flexibility for the most appropriate crossing location to be selected once the results of ground investigations are known.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should an alternative alignment be required.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter.</p> <p>Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapter.</p>
Crossing the River Stour	<p>The PEIR assumes a worst-case that two trenchless crossing locations of the River Stour are required. Further environmental baseline data, ground investigations and engagement with stakeholders are ongoing. Subject to this additional work, it may be determined that a single crossing within the Source Protection Zone 1 would be presented in the ES.</p> <p>The PEIR assesses the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a 'sensitivity testing' section which indicates any changes to the preliminary assessment should an alternative alignment be required.</p>	<p>Design presented on Figure 4.1: Proposed Project Design in Volume II is assessed in each preliminary assessment section within each topic chapter.</p> <p>Widened draft Order Limits assessed within the 'sensitivity testing' section within each topic chapter.</p>
Construction compounds	<p>There are two options for a satellite compound in Basildon, this is due to a planning application for Brentwood Housing Development (21/01525/OUT) which has yet to be determined. Only one satellite compound would be taken forward depending upon the outcome of the planning application. The two options include: 1) a compound off Brentwood Road, near TB220, Brentwood (TB-Sate2A) and 2) a compound at Lower Dunton Road, near TB230, Thurrock (TB-Sate2B). The PEIR assesses both options.</p>	<p>Option 2A is assessed within the preliminary impacts section in each topic chapter and option 2B is covered within the 'sensitivity testing' section within each topic chapter.</p>

Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation	How elements not yet fixed at Statutory Consultation have been Assessed	Summary where Assessed in the PEIR
Trenchless cable installation – Lower Thames Crossing	<p>There are two options for cable installation where the Project interacts with the Lower Thames Crossing Project, located to the west of Tarmac and Muckingford Road:</p> <ul style="list-style-type: none"> <li>• Cables would be laid in ducts pre-installed as part of the proposed Lower Thames Crossing Project</li> <li>• If the two projects are unable to coordinate due to programme or other factors, the cables would be installed by trenchless methods</li> </ul> <p>If the Lower Thames Crossing Project does not go ahead, the crossings associated with this project would be removed and the cables would be installed via open trench methods.</p> <p>The PEIR assesses installation of cables in this location via trenchless methods as it represents worst-case. Locations of the trenchless crossings are shown on Figure 4.1: Proposed Project Design in Volume II. However, each topic chapter includes a ‘sensitivity testing’ section which indicates any changes to the preliminary assessment should cables be pre-installed.</p>	The preliminary assessment of Option 1 is presented in the preliminary assessment section of each topic chapter. Option 2 is covered within the ‘sensitivity testing’ section within each topic chapter.
EACN Substation Access	The Primary Access Route to the EACN Substation is proposed along the permanent private site between Bentley Road and Ardleigh Road accessed off the A120. However, in addition to this Primary Access Route an alternative offline and shared haul road with the North Falls and Five Estuaries Windfarm Projects is also being considered (and shown on Figure 4.1: Proposed Project Design in Volume II). This alternative is only possible if the construction programmes for the Project align with the construction programme for the North Falls and Five Estuaries windfarm projects. If the North Falls and Five Estuaries construction corridor and associated haul road between Bentley Road and Ardleigh Road is available for use by the Project, this haul road would be used for construction traffic as an alternative to the route described above.	The Primary Access Route to the EACN Substation proposed via Bentley Road is assessed in each preliminary assessment section within each topic chapter. The offline shared haul road is assessed within the ‘sensitivity testing’ section within each topic chapter.

Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation	How elements not yet fixed at Statutory Consultation have been Assessed		Summary where Assessed in the PEIR									
	The PEIR assesses as a worst case that all traffic would use Bentley Road for the construction phase. However, each topic chapter includes a ‘sensitivity testing’ section which indicates any changes to the preliminary assessment should the offline shared haul road be utilised during construction.											
Draft Highways Order Limits	<p>A number of areas outside the draft Order Limits have been identified as mitigation to make the existing the highway suitable for construction vehicles. Indicative locations of these works are presented on Figure 16.1: Primary Access Routes in Volume II and on the Construction Access Plans as ‘Indicative highway mitigation draft Order Limits’. However, design is at a very early stage and discussions with the Highways Authority are ongoing. A brief description of the indicative areas together with high-level environmental commentary is provided below:</p> <table border="1"> <thead> <tr> <th>Location</th> <th>Description</th> <th>High Level Environmental Commentary</th> </tr> </thead> <tbody> <tr> <td>Section A - B1135 Wymondham Road</td> <td>Carriageway potentially to be widened into land assumed to be privately owned, to provide passing places or carriageway widening to accommodate vehicle movements.</td> <td>No designated environmental sites have been identified at this location.</td> </tr> <tr> <td>Section B - B1113 Finningham Road</td> <td>Traffic may need to slow / give way whilst passing. Appropriate temporary signage may need to be provided where necessary. Vegetation may need to be cut back to increase visibility around the bend. Where space is insufficient,</td> <td>No designated environmental sites have been identified at this location. However, works would be located opposite a Grade II listed property – this will</td> </tr> </tbody> </table>		Location	Description	High Level Environmental Commentary	Section A - B1135 Wymondham Road	Carriageway potentially to be widened into land assumed to be privately owned, to provide passing places or carriageway widening to accommodate vehicle movements.	No designated environmental sites have been identified at this location.	Section B - B1113 Finningham Road	Traffic may need to slow / give way whilst passing. Appropriate temporary signage may need to be provided where necessary. Vegetation may need to be cut back to increase visibility around the bend. Where space is insufficient,	No designated environmental sites have been identified at this location. However, works would be located opposite a Grade II listed property – this will	The draft Highways Order Limits are not assessed further in this PEIR, however, a full assessment will be presented in the ES.
Location	Description	High Level Environmental Commentary										
Section A - B1135 Wymondham Road	Carriageway potentially to be widened into land assumed to be privately owned, to provide passing places or carriageway widening to accommodate vehicle movements.	No designated environmental sites have been identified at this location.										
Section B - B1113 Finningham Road	Traffic may need to slow / give way whilst passing. Appropriate temporary signage may need to be provided where necessary. Vegetation may need to be cut back to increase visibility around the bend. Where space is insufficient,	No designated environmental sites have been identified at this location. However, works would be located opposite a Grade II listed property – this will										

Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation	How elements not yet fixed at Statutory Consultation have been Assessed			Summary where Assessed in the PEIR
		passing places may also need to be considered.	need to be considered when designing works at this location.	
	Section B - Wickham Road / Eastlands Lane	Junction geometry of Wickham Road junction with Eastlands Lane identified to be narrow width for design vehicle movements and has poor visibility turning from Eastlands Lane onto Wickham Road. Vegetation to be cut back to increase visibility around the junction. Traffic may need to slow and give way whilst approaching the junction. Appropriate temporary signage to be provided where necessary. Carriageway to be widened into land assumed to be privately owned, to provide passing places to accommodate design vehicle movements.	No designated environmental sites have been identified at this location. However, works would be located directly adjacent to deciduous woodland and within Flood Zone 3 – this will need to be considered when designing the works at this location.	
	Section B - Bullen Lane / B1113 Loraine Way	Temporary traffic management may be needed to allow vehicle to straddle across both carriageway lanes. Carriageway may need to be widened into land assumed to be privately owned.	No designated environmental sites have been identified at this location. However, works would be located directly adjacent to deciduous woodland –	

Elements of the 2024 preferred draft alignment not yet fixed at Statutory Consultation	How elements not yet fixed at Statutory Consultation have been Assessed			Summary where Assessed in the PEIR
		In addition, the B1113 Loraine Way / Bullen Land junction may need to be widened into land assumed to be privately owned, to facilitate abnormal indivisible loads (AIL) movements.	this will need to be considered when designing the works at this location.	
	Section C - B1070 / A12 Ipswich Road	Merge taper may need to be increased according to relevant design standard. Merge taper may also need to be increased into land assumed to be privately owned to facilitate safe design vehicle movements.	No designated environmental sites have been identified at this location.	
	Section F – Ivy Barns Lane and A12	Crane and two-way Heavy Goods Vehicle (HGV) traffic may need to slow while passing. Temporary traffic management may need to be employed to allow vehicles to straddle across both carriageway lanes. Appropriate temporary signage to be provided where necessary.  Where space is insufficient the carriageway may need to be widened into assumed privately owned land to allow for two-way HGV movements.	No designated environmental sites have been identified at this location. However, works would be located within Flood Zone 3 – this will need to be considered when designing the works at this location.	

## 4.6 Draft Order Limits and Limits of Deviation (LoD)

- 4.6.1 The draft Order Limits are defined as the maximum extent of land within which the Project, as defined within this PEIR, may be carried out, and includes both permanent and temporary land required to build and operate the Project.
- 4.6.2 The draft Order Limits also include Limits of Deviation (LoD), which represent the maximum deviation for permanent infrastructure. The LoD allow for the adjustment to the final positioning of the Project features to avoid localised constraints or unknown or unforeseeable issues that may arise. The LoD will be defined further within the application for development consent and described within the ES.
- 4.6.3 The draft Order Limits are shown on Figure 4.1: Proposed Project Design in Volume II. The following assumptions have been made at the PEIR stage:
- New overhead line: The draft Order Limits are generally 100 m wide, i.e. 50 m either side of the centre line. This lateral LoD allows flexibility to move pylon positions for unforeseen circumstances, such as poor ground conditions or archaeological finds, and to cater for maximum conductor (overhead line) swing. The vertical LoD would be to any extent not exceeding 6 m upwards from the pylon design heights presented within the DCO application to allow for variations in heights between pylons to allow extra height to clear existing features, maintaining electrical clearance to the ground
  - New substation and modifications to existing substations: There is no defined lateral LoD for the works to substations, these would fall within the draft Order Limits. The vertical LoD could be up to 10% higher than shown on the layout and elevation plans
  - New underground cable: The draft Order Limits are generally 220 m wide, with a lateral LoD of 100 m (50 m either side of the cable construction swathe). There is no defined vertical LoD as the extent would be as the undertaker considers necessary or convenient, however the minimum depth between the top of the protective tiles would be approximately 0.9 m
  - Removal of the existing and new 132 kV overhead lines: The draft Order limits include a 110 m LoD for the underground cable installation
- 4.6.4 Where uncertainty in design remains, the LoD may differ from those defined above. Further details are included in Table 4.3.

## 4.7 Construction – General

### Construction Programme

- 4.7.1 Should consent be granted in 2026, it is anticipated that access and construction of the Project would commence in 2027, starting with enabling works including, site clearance activities, the installation of construction compounds and access roads. It is expected the main construction works would continue through to 2031 (four years). While the phasing of the programme is yet to be confirmed, further information will be outlined in the ES.

### Construction Working Hours

- 4.7.2 It is assumed that the core working hours for construction would be:

- Mondays to Fridays: 07:00–19:00
- Saturdays, Sundays, and Bank Holidays: 08:00–17:00

4.7.3 The following operations may take place outside of the core working hours:

- The jointing of underground cables, except for cable cutting which would take place only during core working hours
- The installation and removal of conductors, cables, pilot wires and associated protection across highways, railway lines or watercourses
- The completion of operations commenced during the core working hours which cannot safely be stopped
- Any highway works requested by the highway authority as necessary to be undertaken outside of core working hours (where possible)
- Oil processing of transformers or reactors in substation sites
- Testing or commissioning of any electrical plant installed as part of the authorised development
- The completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities
- Security monitoring and surveys
- Trenchless crossing operations
- Deliveries of abnormal indivisible loads (AILs), for example the cable drums which may be outside of core working hours
- Large concrete pours that cannot be reasonably complete within core hours

## Construction Workforce and Vehicles

### Estimated Workforce

4.7.4 National Grid has estimated the number of construction workers that it would require on the Project and how these would be spread across the construction programme. Preliminary construction worker numbers are estimated to be approximately 800 Full Time Equivalent (FTE) gross direct employees throughout the four-year construction duration.

4.7.5 The number of workers will be reviewed as part of the ongoing design work and any final updates will be presented in the ES.

### Estimated Construction Vehicles

4.7.6 National Grid has estimated the flows / volumes of construction vehicles that it anticipates would be required to construct the Project. These estimates are provided in Appendix 16.2: Future Baseline in Volume III. The current numbers are based on worst-case assumptions.

## Existing Features during Construction

4.7.7 The paragraphs that follow outline assumptions relating to existing features during construction, they are based on a reasonable worst-case scenario.

### Land Drainage

4.7.8 Where appropriate, pre-construction field drainage would be installed where relevant to working areas to:

- Help prevent possible waterlogging of working areas and therefore the need for temporary dewatering during construction
- Enable the landowner's current drainage system to continue working throughout construction
- Help prevent damage to the soil structure
- Aid recovery from construction activities
- Help prevent any future drainage problems

4.7.9 Landowners would be consulted on the design of the land drainage proposals. The design would pay particular attention to the need to reduce risk so that the drains do not act as pathways for contamination or cause flooding off-site. The Lead Local Flood Authorities (LLFAs) would also be consulted on drainage design where necessary. Following construction, the land would be reinstated to its former condition (unless otherwise agreed) including a replacement drainage scheme, where appropriate.

4.7.10 A specialised drainage contractor(s) would review the drainage designs and provide advice to National Grid and the Main Works Contractor(s) during all relevant construction and reinstatement activities. Permanent records of the land drainage locations would be made and passed to the landowners/occupiers.

### Public Rights of Way (PRoW)

4.7.11 A number of PRoW would be affected by construction of the Project; the existing PRoW intersecting the Project can be seen on Figure 15.4: Recreational Land and Recreational Routes in Volume II. Discussions with PRoW officers are ongoing to discuss the preferred method for managing, diverting or temporary closure of PRoW. A Draft PRoW Management Strategy is provided in Annex B of Appendix 4.1: Draft Outline CoCP in Volume III.

## 4.8 Construction – Temporary Features

### Introduction

4.8.1 This section describes how it is anticipated that the Project would be constructed including temporary features, such as, construction compounds and haul roads.

4.8.2 Temporary works outlined in the paragraphs that follow would evolve as the design of the Project progresses and further consultation including with stakeholders, landowners, and persons with an interest in the land is undertaken.

## Temporary Construction Compounds

- 4.8.3 There would be an element of preparatory works in anticipation of construction at all temporary construction sites. The working areas would be demarcated and secured by temporary fencing appropriate to the location, for example, provision of stockproof fencing in grazing areas. Gated entrances would be installed at the entrance to the working areas, to secure the site. Once secured, the working area, site compounds and proposed cable sections would generally be stripped of the upper layers of soil which would be stored appropriately.
- 4.8.4 Construction compounds would be established early in the construction programme. Site cabins (standard modular units) may be up to double storey and may be raised to take account of potential flood risk.
- 4.8.5 The following types of compounds are proposed to facilitate construction of the Project:
- Main Works Compounds (overhead line) – two No. proposed – act as the key focal points for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and power generator(s) for the project delivery teams. Main Works Compounds would be approximately 275 m x 200 m. They would be typically surfaced with stone chippings over geogrid
  - Satellite Compounds (overhead line) – four No. proposed – positioned at strategic locations along the Project. They are smaller than the Main Works Compounds, approximately 130 m x 110 m and serve as specific working areas to provide local welfare facilities for staff and points for delivery of materials to the working areas. They would be typically surfaced with stone chippings over geogrid
  - Primary cable compounds – three No. proposed – these would provide storage for approximately 54 cable drums, with approximate dimensions of 155 m x 155 m. These would allow for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and crane platforms for unloading cable drums. They would be typically surfaced with stone chippings over geogrid
  - Secondary cable compounds – six No. proposed – these would provide storage for approximately 27 cable drums, with approximate dimensions of 100 m x 100 m. These would allow for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and crane platforms for unloading cable drums. They would be typically surfaced with stone chippings over geogrid
  - Tertiary cable and CSE compounds – 11 No. proposed – these would provide storage for approximately nine cable drums, with approximate dimensions of 72 m x 55 m. These would allow for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and crane platforms for unloading cable drums. They would be typically surfaced with stone chippings over geogrid
  - Substation compounds – four No. proposed – these would be appropriately positioned at substation and CSE locations. The dimensions for substation compounds are typically 2.25 ha, specific dimensions being defined within the ES. CSE compounds would utilise the tertiary cable compound, as described above. They would be typically surfaced with stone chippings over geogrid
- 4.8.6 The location of construction compounds are identified on Figure 4.1: Proposed Project Design in Volume II and detailed in Table 4.4.

Table 4.4 – Proposed Construction Compounds

Compound Name (reference)	Project Section	Compound Type
Land to north of Norwich Substation, South Norfolk (RG-CC01)	Section A	Substation
Diss Road, near RG054, South Norfolk (RG-Sate1)	Section A	Satellite Compounds (overhead line)
Land north of Fen Lane, Diss (RG-CC02) <sup>23</sup>	Section A	Tertiary (CSE)
Land south of Fen Lane, Diss (RG-CC03) <sup>24</sup>	Section A	Secondary (cable)
Land south of Ling Road, Diss (RG-CC04) <sup>25</sup>	Section B	Tertiary (CSE)
Land south of Ling Road, Diss (RG-CC05) <sup>26</sup>	Section B	Tertiary (cable)
Bury Road, near RG098, Mid Suffolk (RG-Main)	Section B	Main Works Compounds (overhead line)
Site set back from Bells Lane, near RG150, Mid Suffolk (RG-Sate2)	Section B	Satellite Compounds (overhead line)
Land to the east of Bramford Substation, Mid Suffolk (RG-CC06)	Section B	Substation
Land east of Wenham Grove, north of Raydon (JC-CC01)	Section C	Tertiary (CSE)
Land off B1070, Babergh (JC-CC02)	Section C	Primary (cable)
Land south of Dedham Road, north of Langham (JC-CC03)	Section C	Secondary (cable)
Land south of Birchwood Road, to the west of Lamb Corner, Colchester (JC-CC04)	Section C	Primary (cable)
Land south of Little Bromley Road, Bradley Hall, Tendring (JC-CC05)	Section C	Secondary (cable)

<sup>23</sup> Compounds are associated with the Waveney Valley Alternative. These compounds would not be required should the Waveney Valley overhead line design be progressed. Further details can be found in Table 4.3.

<sup>24</sup> Compounds are associated with the Waveney Valley Alternative. These compounds would not be required should the Waveney Valley overhead line design be progressed. Further details can be found in Table 4.3.

<sup>25</sup> Compounds are associated with the Waveney Valley Alternative. These compounds would not be required should the Waveney Valley overhead line design be progressed. Further details can be found in Table 4.3.

<sup>26</sup> Compounds are associated with the Waveney Valley Alternative. These compounds would not be required should the Waveney Valley overhead line design be progressed. Further details can be found in Table 4.3 above.

<b>Compound Name (reference)</b>	<b>Project Section</b>	<b>Compound Type</b>
Land at the EACN Substation, Tendring (JC-CC06)	Section C	Substation <sup>27</sup>
Land east of Broad Lane, Colchester (TB-CC01)	Section D	Tertiary (CSE)
Land to the east of A134, Tye Green, Colchester (TB-CC02)	Section D	Tertiary (cable)
Land to west of A134, Tye Green, Colchester (TB-CC03)	Section D	Secondary (cable)
Land west of Crabtree Lane, north of Bellmead, Colchester (TB-CC04)	Section D	Tertiary (CSE)
Great Tey Road, near TB068, Colchester (TB-Sate1)	Section D	Satellite Compounds (overhead line)
Land east of Fairstead Road, north of Fairstead (TB-CC05)	Section E	Tertiary (CSE)
Land west of Fairstead Road, north of Fairstead (TB-CC06)	Section E	Secondary (cable and CSE)
Off Braintree Road, near TB130, Chelmsford (TB-Main)	Section F	Main Works Compounds (overhead line)
Land east of A131, near Sheepcotes Wood (TB-CC07)	Section F	Tertiary (CSE and cable)
Off Brentwood Road, near TB220, Basildon (TB-Sate2A) <sup>28</sup>	Section G	Satellite Compounds (overhead line)
Lower Dunton Road, near TB230, Basildon (TB-Sate2B) <sup>23</sup>	Section H	Satellite Compounds (overhead line)
Site north of Holford Road, adjacent to Orsett Golf Course, Thurrock (TB-CC08)	Section H	Tertiary (CSE)
Site north of Muckingford Road, Thurrock (TB-CC09)	Section H	Tertiary (cable)
Site south of Cooper Shaw Road, Thurrock (TB-CC10)	Section H	Primary (cable)
Site to east of Tilbury Substation, Thurrock (TB-CC11)	Section H	Secondary (cable)
Site south of Tilbury Substation, Thurrock (TB-CC12)	Section H	Substation

<sup>27</sup> Includes an additional laydown area that may be used for substation, cabling, or overhead line works.

<sup>28</sup> There are two options for satellite compounds in Basildon, due to pending planning applications. Only one compound will be taken forward. Further details can be found in Table 4.3.

4.8.7 In addition to the construction compounds listed in Table 4.4 a number of temporary construction laydown areas have been identified at the site access points (or bellmouths<sup>29</sup>) where the Primary Access Route meets the draft Order Limits. These are presented on Figure 4.1: Proposed Project Design in Volume II. These areas have been identified to, in-part, facilitate the construction of the haul road and stone storage would typically only be needed for the first 12 months of construction (however, this will be confirmed within the ES). These laydown areas have been selected to avoid sensitive environmental features and would likely store material to a maximum of 4 m in height at any one time.

## Overhead Line

4.8.8 The working areas at each new pylon would be cleared of vegetation and fenced appropriately. A temporary stone pad would be required adjacent to each new pylon location, on which to place plant such as cranes and piling rigs. The stone working areas would typically be 60 m x 60 m (or 70 m x 70 m for angle/terminal structures). Materials would be brought to site on HGVs and would include concrete for pylon foundations, the steelwork for the pylons and the conductors wrapped around large drums.

4.8.9 The base of the pylons would involve the excavation of the soil. Piling (which may include percussive) may be required at some pylon locations, subject to the ground conditions. This would be confirmed through a programme of ground investigations which would in turn inform the foundation designs. Further details on the need for piling and specific locations will be set out within the ES.

4.8.10 Different foundation types can be used for lattice pylons, such as pad and column, vertical tube piles or bored mini pile foundations, depending on the local ground conditions. The type of foundation to be used is typically identified during the detailed designs stages by the Main Works Contractor(s) following intrusive ground investigation surveys.

### Standard Pad and Column Foundations

4.8.11 For lattice suspension pylons, pad and column foundations are typically used. For tension and terminal pylons, larger and deeper foundations are required.

4.8.12 The following works are required to install these foundations:

- Large excavations are required for each pylon leg
- Foundation formwork (mould) is then inserted, cast, and filled with concrete
- The concrete is left to harden (set)
- The excavated hole is backfilled to ground level
- Any remaining sub soil would require spreading around the foundation legs

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<sup>29</sup> An access route proposed to be used by construction vehicles (typically for HGVs) to access the haul road

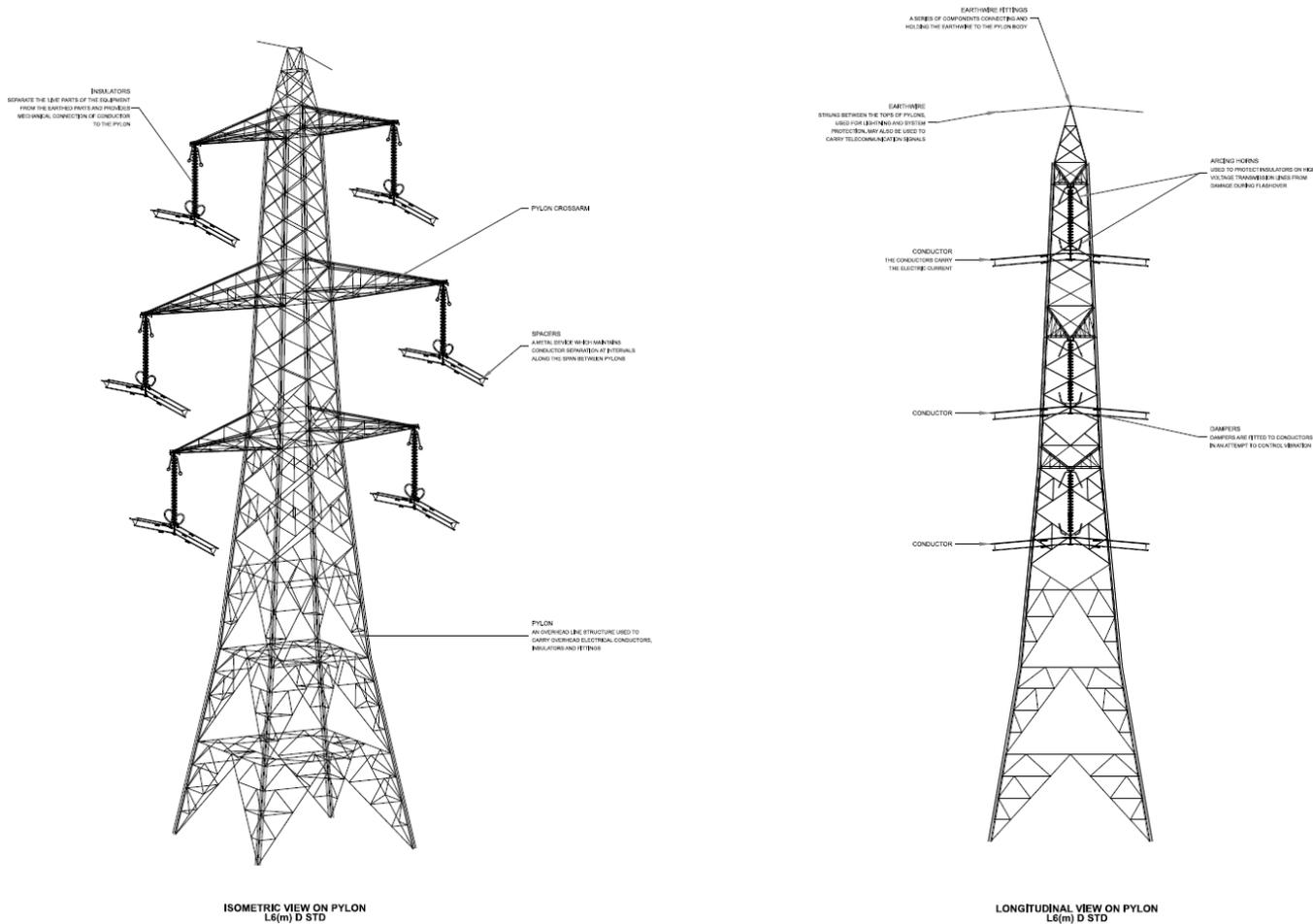
## **Piled Foundations – Tube or Bored Mini-Pile**

- 4.8.13 In areas with poorer ground conditions that are unsuitable for pad and column foundations, vertical steel tube pile foundations or bored mini pile foundations can be used. These are connected by a pile cap at or below ground level.
- 4.8.14 Using a piling hammer supported by a piling rig, steel tube piles are driven into the ground. A maximum transportable length of up to 15 m is driven at a time and if longer piles are required, additional sections are welded together before continuing the drive.

## **Pylon Assembly and Erection**

- 4.8.15 Following the installation of working areas and the appropriate foundations, pylon steelwork can be assembled, and the pylons can be assembled and erected.
- 4.8.16 Lattice pylons comprise of many separate steel members. These are delivered to site in sections. The steelwork for the pylons would be bolted together on the ground and each pylon would be assembled in sections beginning with each leg being fastened to the foundation stubs. The pylon would be erected using a mobile crane to lift the assembled steelwork into position. Linesmen help guide the sections into place and bolt the pylon together.
- 4.8.17 The insulators would be fastened to the pylons in preparation for installing the aluminium conductors (as shown on Image 4.1). The conductors would typically be installed in sections between tension pylons, where the line changes direction. A bow-tie shaped pulling site would be established (approximately two to three times pylon height radius from the pylon centre), for tension/angle pylons, at one end of the section with the conductors running out from a tensioning site at the other end of the section, to keep the wires off the ground. Pilot wires would be used to pull conductors between pylons. Additional fittings, such as spacers (to prevent the conductors from touching each other) and dampers (to prevent oscillations in the overhead line), would then be fitted to the conductors. An earth wire would run along the top of the pylons and contain optical fibres to allow transmission of data around the system.

Image 4.1 - Example of a 400 kV double circuit lattice pylon



## Vegetation Clearance for overhead lines

4.8.18

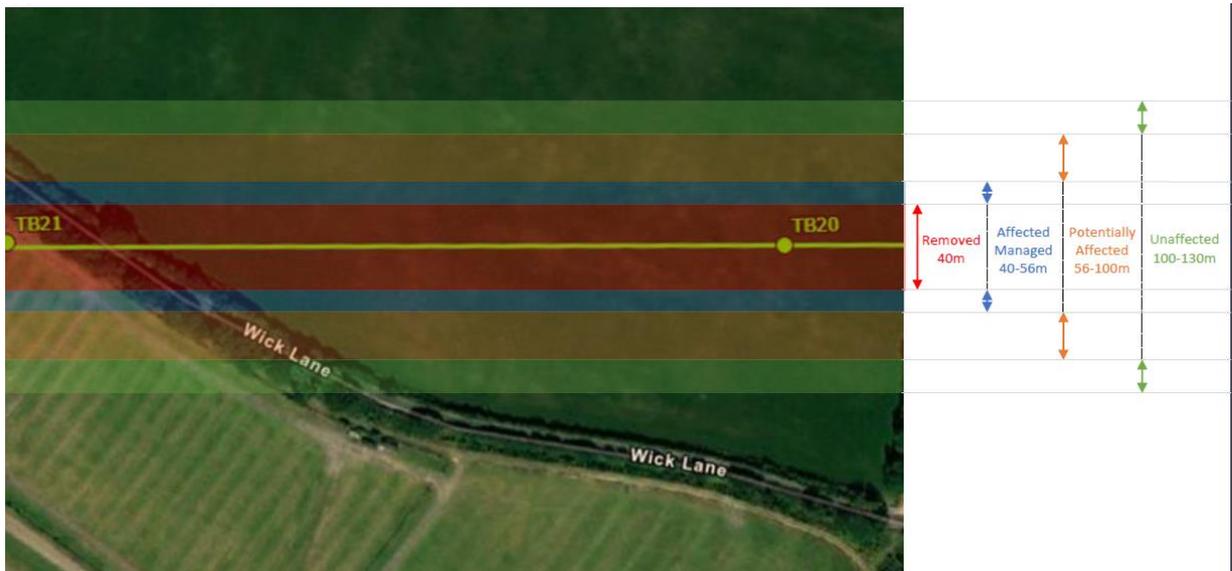
For the purposes of the PEIR, a general approach has been assumed (unless otherwise stated) that where the Project interacts with woodland, trees and hedgerows, clearance would comprise the following approach for the overhead lines (refer to Image 4.2):

- Vegetation removed (to ground level or sufficient height to meet electrical clearances plus an allowance for growth): A 40 m wide swathe of removed vegetation to allow for the construction and operation (and maintenance) of the overhead line (to include all physical infringements to conductor, including conductor swing<sup>30</sup> (45° blown-out conductor); i.e., 20 m either side of each overhead line centreline)
- Vegetation affected/managed: An additional up to 8 m of vegetation either side of the 40 m would then be managed during construction and operation (and maintenance) to allow for electrical clearance from the conductor to be maintained (assumes a generalised allowance of 0.5 m growth per year over a 5-year period)
- Vegetation potentially affected: A further, up to 22 m of vegetation either side of the 8 m would be potentially affected, which includes allowances for design flexibility as per the proposed lateral LoD

<sup>30</sup> Conductor swing is the lateral deflection of a conductor system from its normal vertical position due to wind, which varies based on the length of the span and sag conditions; swinging from the crossarm tip of the pylon.

- Vegetation unaffected: Vegetation beyond the 22 m is expected to be unaffected

Image 4.2 – Expected Overhead Line vegetation clearance requirements



- 4.8.19 Additional detail will be included within the ES, for example, details of veteran trees to be avoided / removed that have been identified through surveys, and temporary construction works impacts.
- 4.8.20 Appendix 4.1: Draft Outline CoCP in Volume III include a commitment that following detailed design and prior to construction all vegetation would be subject to a full tree / vegetation survey and site-specific assessment where vegetation removal may be reduced further than the generalised approach assessed in the PEIR and ES.

### Crossing Protection

- 4.8.21 Where the new overhead line crosses a road, railway line or navigable watercourse, scaffolding would be used to protect the crossing during construction. During site set up, scaffolding would be placed on either side of the feature. Each scaffold would be designed for the individual crossing that it would protect. The work area required for scaffold protection is dictated by the angle at which the overhead line crosses the asset which it is protecting.
- 4.8.22 It would be made from steel scaffolding, with a net made up of steel wire bonds anchored from scaffold to scaffold. Polypropylene netting would be pulled across using karabiners to connect it to the steel wire bonds. The scaffold would be capable of withstanding a conductor being dropped on it in the unlikely event that this were to occur. The working area around the scaffold would be sufficient to erect the scaffold and to install and accommodate ground anchors or kentledge blocks required to stabilize the structure and catenary wires supporting the nets.

### Substations

- 4.8.23 The Project requires reinforcement works to the existing National Grid network, including substation extensions at Norwich Main and Bramford and works at the existing Tilbury Substation, as well as constructing the new AIS EACN 400 kV Substation. Other substations would contain either AIS or Gas Insulated Switchgear (GIS). Each

substation design would be unique, dependent on the proposed equipment and site-specific conditions. However, they would follow a similar typical construction sequence and programme. The typical construction sequence to install an electrical substation required for the Project would involve:

- Vegetation clearance and stripping of topsoil from the proposed permanent site area and any working areas (topsoil would be stored in bunds on site, for reuse)
- Set up of temporary access, construction compounds and temporary drainage (including temporary fencing, laying and compaction of granular material (and asphalt where required, proposed at the construction laydown areas), excavation of drainage attenuation features, installation of pipes, etc.)
- Earthworks for construction of permanent site access and platform (including the forming temporary soil bunds for storing excavated material). Where practicable the temporary and permanent access would be combined
- Civil engineering works, to include permanent fencing, access, drainage and foundations (which may include piling of larger structures and/or equipment that is sensitive to ground settlement)
- Installation of structures (e.g: gantries)
- Building works, if the site is to include proposed GIS bays and switchgear
- Overhead line or underground cabling works, as necessary
- Mechanical and electrical equipment installation
- Testing of equipment
- Commissioning/energisation
- Reinstatement of working areas outside the permanent substation boundary (including environmental mitigation (including planting/landscaping as required))

## Cable Sealing End (CSE) compounds

4.8.24 Although the Project predominantly comprises of overhead line, the 2024 preferred draft alignment includes up to five sections of underground cables.

4.8.25 Where overhead conductors transition to underground cables (and vice versa), a CSE compound is required. This would comprise high voltage equipment, including CSEs and gantry structures, to enable the transition between underground cables and overhead conductors. An example is presented in Image 4.3.

Image 4.3 – Example CSE compound with Gantry<sup>31</sup>



- 4.8.26 A CSE compound is required at each interface between the new overhead line and the new underground cable. The typical construction sequence to install a CSE compound required for the Project would be similar to the text above relating to substations.
- 4.8.27 The preliminary assessment set out in this report assumes that piling is required at all CSE compounds. Percussive piling may be required in the CSE compounds. This will be confirmed through a programme of ground investigations which would inform the foundation designs. Further details on the need for piling and specific locations will be set out within the ES.

## Underground Cables

- 4.8.28 Table 4.5 outlines the sections of underground cables proposed as part of the Project. The transfer from overhead line to underground cable would be facilitated by the CSE compounds, as detailed above.

Table 4.5 - Proposed Underground Cable Requirements

Cable Section	Approximate Length (km)
Dedham Vale National Landscape (an AONB)	16 (approximately 4km is within the National Landscape designation)
Great Horkesley	4

<sup>31</sup> Gantries, and compound sizes and/or layouts within the Project may differ from that presented in this image.

<b>Cable Section</b>	<b>Approximate Length (km)</b>
Fairstead	0.15
North Tilbury	5
Waveney Valley Alternative	2
<b>Approximate (maximum) total length</b>	<b>27</b>

- 4.8.29 The standard means of installing underground cables comprises open cut techniques. Typically, for open cut construction, a permanent easement approximately 50 m wide and a construction corridor 120 m wide is required for a double circuit 400 kV route. The 120 m width includes the temporary haul road, soil storage, pre-construction drainage areas, communications cables and typically six cable trenches for 18 cables (three cables per phase) assumed to be to a typical minimum depth of 1.2 m and suitably spaced apart to allow for the required heat dissipation between cables and circuit phases.
- 4.8.30 Standard open cut installation typically involves the following processes:
- Appropriately fencing off the working area to secure the site from trespass and livestock
  - Vegetation would be removed where necessary, topsoil would be stripped and subsoil removed and both stored appropriately for re-use
  - A temporary haul road would be installed along the route to provide access for construction vehicles to the working areas
  - Several open trenches (typically six trenches each accommodating three cables) would be excavated, ducts would be installed and placed in a surround of Cement Bound Sand (CBS). Then cables would be winched into position from each joint bay. Telecommunication and ancillary cables are usually placed adjacent to the main cables and within the CBS surround prior to backfilling
- 4.8.31 The preferred approach for this Project is to use ducting. A ducted system would result in a more flexible construction programme, enable quicker reinstatement of ground when compared to a traditional direct burial method, where the trench would remain open for much longer. There may be locations where ducting is not the best solution, such as where topography limits installation techniques. In such cases, standard open cut methods would be employed (i.e., direct burial).
- 4.8.32 The underground cables would typically be delivered to the working area using specialist low-loading articulated lorries. The cable would be transported on cable drums and a crane would be used to offload these from the delivery vehicles. The underground cables would be pulled off the drums onto rollers in the trenches using winches. The cables would then be pulled through the ducts and would need to be jointed together at joint bays. Depending on the cable manufacturer and length of cable drums available for each section, joint bays would typically be required every 500 m – 1 km. These would be constructed on site in controlled conditions and the finished joints would be suitably protected.
- 4.8.33 Once the cables have been installed, the temporary works including any temporary haul roads and compound areas would be removed. The land would be reinstated to its previous condition and use (or a condition agreed with the landowner), subject to any

planting restrictions, for example, trees cannot be planted over the top or within 10 m of underground cables.

### Trenchless Installation

- 4.8.34 Where open trench is not feasible, for example, where the proposed route crosses an existing live railway line, or other drivers, such as for environmental mitigation, trenchless installation may be required, an example of which is Horizontal Directional Drilling (HDD). Typically, for HDD a typical permanent easement approximately 180 m wide and a construction corridor 200 m wide is required.
- 4.8.35 The underground cable would be installed using a drilling or boring method (or a suitable alternative method) to pass beneath features. There are different trenchless methods that could be used, and each method would have a different construction footprint. Depending on the technique, there may need to undertake several passes to make the hole wide enough to allow the ducts (pipes) to be pulled through.
- 4.8.36 Trenchless installation is an expensive option, often one of the noisiest activities during construction, requires a longer programme and can be technically challenging in areas of less suitable geology. Therefore, open cut trench installation is the preferred technique where there are no constraints.
- 4.8.37 Temporary discharges may be required relating to dewatering and over-pumping in the cable sections, particularly where deeper working is required such as at the trenchless crossing. It is anticipated these would be made to ground, rather than to watercourses. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents. Further detail will be included and assessed within the ES.
- 4.8.38 There are currently up to 10 trenchless crossings proposed to construct the Project. A summary of the trenchless crossings are provided in Table 4.6 (they are also presented on Figure 4.1: Proposed Project Design in Volume II. The locations of the trenchless crossing presented in Table 4.6 are subject to further engineering design which will be informed by Ground Investigations. The ES will provide an assessment of confirmed trenchless crossing locations.

Table 4.6 – Proposed Trenchless Crossings

Name	Project section(s)	Approximate length (m)
Higham Road	Section A	320
River Stour (north part)	Section C	140
River Stour (south part)	Section C	230
Woodland crossing near St Mary's Church Langham	Section C	360
A12 highway crossing	Section C	150
Railway crossing (east of Ardleigh)	Section C	100

Name	Project section(s)	Approximate length (m)
Lower Thames Crossing (west of Tarmac) <sup>32</sup>	Section H	120
Lower Thames Crossing (Muckingford Road) <sup>30</sup>	Section H	250
Tilbury Loop Railway and existing overhead lines (NGET and DNO)	Section H	220
Waveney Valley Alternative (north channel)	Section A	150
Waveney Valley Alternative (south channel)	Section A	150

### Vegetation Clearance for Underground Cabling

4.8.39 For the purposes of the PEIR, it has been generally assumed (unless otherwise stated) that where the Project interacts with woodland, trees and hedgerows, clearance would comprise the following phased approach for underground cabling:

- To facilitate the construction of the underground cable a typical 120 m wide swathe of vegetation is expected to be removed. Hedgerow removal would be within the 120 m construction swathe and removal would be reduced where possible (restricted to the footprint of the cable swathe and required haul roads and soil would not be stored over hedgerows). Following construction, hedgerows would be replanted, however, trees would not be replanted above the cable sections and vegetation would be managed to ensure it does not affect the buried cables
- A further, up to 50 m of vegetation either side of the maximum 120 m swathe would be potentially affected during construction, allowing for the LoD (50 m either side). Vegetation beyond the 50 m is expected to be unaffected

4.8.40 As for the overhead line section above, additional detail would be included within the ES, for example, details of veteran trees to be avoided / removed that have been identified through survey and isolated specific areas where vegetation removal could be reduced further than the generalised approach as described above. In addition, as previously described a commitment to undertake detailed surveys following detailed design and prior to construction are provided in Appendix 4.1: Draft Outline CoCP in Volume II.

## Temporary Construction Access and Haul Roads

### Access Strategy

4.8.41 Construction traffic would use the Strategic Road Network (SRN) and Major Road Network (MRN) to access the Project. From the MRN and SRN construction traffic would be routed along a Primary Access Route (PAR) to a site access point. From these site access points; traffic would be routed off the public highway along haul roads to access the construction sites.

<sup>32</sup> Subject phasing of the two schemes, ideally pre-installed ducts below the LTC alignment – refer to Table 4.3.

- 4.8.42 A PAR has been identified for access to each section of haul road, with additional PARs proposed for longer sections of continuous haul road where appropriate roads for designation as a PAR have been identified. Generally, PARs are proposed to access each end of a haul road section, allowing construction traffic to enter the haul road at one end, travel along the haul road and exit the other end (if required). Dead-end haul roads have been avoided as far as practicable. However, due to site specific constraints, there are some instances of haul roads with only one PAR.
- 4.8.43 There may be circumstances where traffic movements on the SRN and/or LRN are compromised, which may affect the construction vehicles using agreed PARs and site access points. In the event of any incident occurring which affects the safe and efficient operation of the road network, additional mitigation measures would be considered, which may include contingency routes – which will be identified in the Outline CTMP which will form part of the DCO application.
- 4.8.44 Site access points have been sited based on site specific constraints and highway safety considerations. The locations of the site access points on the public highway are generally close to the underground cabling and overhead line construction corridors. The most suitable location for the proposed access point, and access to the haul roads, have been determined with consideration of road geometry, maximising junction visibility and other site-specific constraints. Locations have, where appropriate, been chosen to minimise the impact on trees and hedgerows. Existing land/field accesses have been used where they are considered to be suitable locations as determined by the above assessment criteria. When forming site access points, connectivity for active travel users (footways and cycleways) would be preserved, where safe and practicable.
- 4.8.45 The site access point layouts are designed to allow for two-way HGV movements to occur, whereby HGVs entering the junction can make the movement whilst a second HGV is waiting to exit the site access point. A standard detail showing the typical layout of the site access points, including the junction layout and visibility splays, is shown on drawing Typical Access Bellmouth and Visibility Splay (AENC-NG-ENG-DWG-0002) submitted as part of statutory consultation.

## **Haul Roads**

- 4.8.46 The haul roads are proposed to be constructed adjacent to the underground cable corridor or to provide a continuous access route between overhead lines pylons.
- 4.8.47 The proposed haul road is only discontinuous at major obstructions along the underground cable and overhead line corridor such as major roads, railways, areas of environmental or historical significance and major watercourses.
- 4.8.48 The haul road would be typically 8 m wide to allow for a two-way running track for construction vehicles. The typical cross section of the haul road would be 21 m wide, to allow for topsoil and subsoil storage, drainage, and demarcation fencing.
- 4.8.49 For the assessment of haul road construction, it is currently assumed that topsoil (and some subsoil) would be stripped and aggregate (e.g. stone) placed on top of the subsoil, this would be delivered to site by HGVs. Further development of haul road construction, including consideration of bespoke construction methodologies, will be considered within the ES based on site specific constraints and ground conditions.
- 4.8.50 Within the underground cable sections, the haul road would be positioned central to the alignment i.e., with cable trenches located either side of the haul road. Therefore, no additional vegetation clearance would be required. In some locations, overhead line

construction corridors would require access from the underground cable alignment corridors. In these locations, a haul road is proposed to be constructed adjacent and parallel to the cable construction corridor to access the overhead lines. This would be provided to separate the overhead line construction vehicle movements from the works associated with the cable corridor construction.

### **Temporary EACN Substation Access Arrangement**

- 4.8.51 The construction access route to the EACN Substation is proposed via the A120, Bentley Road (a proposed permanent private access road) between Bentley Road and Ardleigh Road. Under this proposed access arrangement, all construction traffic would utilise this route.
- 4.8.52 If the North Falls and Five Estuaries windfarm projects construction corridor and associated haul road between Bentley Road and Ardleigh Road is available for use by the Project then this haul road is expected to be used by the Project. If this alternative shared haul road arrangement is used it is proposed that construction vehicles, including HGVs, would be routed to the EACN Substation via the A120, Bentley Road, the North Falls and Five Estuaries cable construction corridor haul road between Bentley Road and Ardleigh Road. The proposed private permanent access road between Bentley Road and Ardleigh Road would still be constructed in this scenario to provide access for ALLs and light vehicles.

### **Public Highway and Traffic Management**

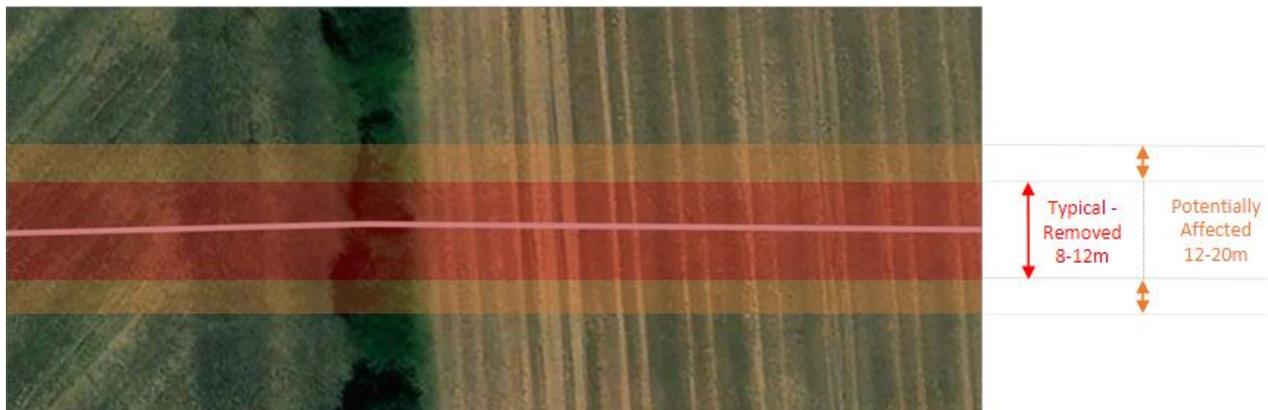
- 4.8.53 Works to the existing highway network (including potential for works outside the existing highway boundary in some locations such as road widening, associated construction laydown areas and other highway measures (which may include removal of some street furniture) may also be required in certain locations along Primary Access Routes as mitigation in order to make the existing highway more suitable for construction vehicles. It is also possible that certain traffic regulation orders might be required. Indicative locations of these works are presented on Figure 16.1: Primary Access Routes in Volume II (presented as 'Indicative Highway Mitigation draft Order Limits') and on the Construction Access Plans.
- 4.8.54 The location of these works are at an early stage of design development, and discussions with the Highways Authorities are ongoing. Therefore, commentary on these works outside the draft Order Limits is provided in Table 4.3 and they are not assessed further within the PEIR. However, works will be fully assessed in the ES following further design work and agreement with the Highways Authorities.
- 4.8.55 Traffic management would be used where required to maintain public or workforce safety. This would occur when working in the vicinity of existing highway network, for instance constructing and removing site access points, erecting/dismantling scaffolding and where the underground cables cross the public highway. Traffic management may be necessary during the operation (and maintenance) of site access points, and at some locations on the PAR where mitigation measures are required. Further details for Traffic Management can be found in the Draft Outline CTMP.
- 4.8.56 National Grid would discuss any traffic management, road closures and diversions with the relevant Highways Authority and the emergency services. Further details, including any proposed road closures and diversions will be set out within the Transport Assessment submitted with the application for development consent.

## Vegetation Clearance for Haul Roads

4.8.57 To facilitate the construction of the haul road vegetation clearance would be required. Expected worst case vegetation removal/ management would comprise (see also Image 4.4):

- A typical 12 m swathe of removed vegetation (including hedgerows), allowing for the 8 m wide haul road and 2 m either side to allow for two-way vehicle movements and drainage
- A further 4 m either side of the 12 m swathe would be potentially affected, which includes LoD. Therefore, up to 20 m of vegetation falls within the potentially affected category

Image 4.4 - Expected haul road vegetation clearance requirements



4.8.58 Where the haul road falls within areas being cleared for the overhead line / underground cable, no additional vegetation clearance would be required.

4.8.59 Temporary crossings would be required over watercourses, streams, and field ditches to maintain the haul road along the Project, these would likely consist of temporary bridges or culverts.

4.8.60 At interfaces with the road network, additional vegetation clearance is anticipated. Vegetation clearance associated with site access points to form appropriate visibility splays, and any traffic management requirements will be included within the ES. Visibility splays have been developed to inform the draft Order Limits in accordance with the Design Manual for Roads and Bridges and with consideration to site specific conditions, up to a maximum distance of 215 m.

## Removal of Existing National Grid Pylons

4.8.61 No existing National Grid overhead line infrastructure is proposed to be removed as part of the Project.

## Watercourse Crossings

4.8.62 The Project requires the crossing of multiple ditches, drains and watercourses. The method of crossing a watercourse would depend upon several factors. For example, large or important watercourses, and those with WFD status require clear span bridges.

Whereas smaller watercourses would likely require the use of culverts. Detail of proposed watercourse crossings will be presented in the ES.

## Bridges

- 4.8.63 Depending on the watercourse crossing and on localised conditions, it may be possible to install a modular bridge. Typically, the components of these bridges are delivered directly to site and the bridge is installed and positioned as required with minimal additional construction works.
- 4.8.64 If site conditions do not allow for a modular bridge to be used, other bridge structures may be used that require additional construction works, for example, creating concrete abutment or driving sheet piles into ground adjacent to the watercourse and using gabion baskets for the bridge to be laid on.

## Culverts

- 4.8.65 For smaller and non-designated watercourses, culverts are typically used for crossings. The conditions of the watercourse such as its size, depth, ecological properties and strength and volume of flow would determine the components (i.e., twin wall pipes or box culverts) to be used. The most common method, based on a circular culvert installation, with box culverts used for large ditches or small watercourses.

## Third Party (Statutory Undertakers) Works

- 4.8.66 Prior to the commencement of construction works for the Project, several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected. This is largely where they interface with the Project, for example, with proposed new overhead line crossings, along Primary Access Routes or at site access point locations.
- 4.8.67 The required mitigation methods, and duration (i.e., permanent, or temporary mitigation) need to be confirmed with the asset owners prior to any works being carried out. However, third-party works that are required include:

- **DNO 33 kV and 132 kV pylons** – Works to remove, underground and divert existing 33 kV and 132 kV pylon overhead line DNO infrastructure is shown on Figure 4.1: Proposed Project Design in Volume II.

Works typically would include site set up and access requirements similar to the construction of the new pylons and underground cables (Section 4.8), but reduced in scope due to scale of the assets to be removed, undergrounded or diverted.

It may be necessary to establish a temporary diversion of the overhead line while the mitigation works are undertaken to ensure security of supply to end users by keeping one of the circuits live. To maintain supply, one live circuit is routed on temporary poles, masts or pylons around the area of work so that pylon removal can be undertaken in an electrically isolated safe area. A working area with an approximate 50 m radius at pylon locations and 20 m either side of centreline along the spans to be removed / temporarily diverted would be required. Typically, this area would not be stoned, instead trackway may be used.

Dismantling of pylons would involve firstly removing the conductors then lowering the insulators and fittings to the ground. Where a pylon is in a clear area and it is

safe to do so, the pylon would be removed by ‘felling’ the whole structure. Alternatively, a mobile crane would dismantle the structure in sections which would then be lowered to the ground. Once dismantled, the pylon steelwork would typically be broken up on site then removed. The reinforced concrete foundation would then be removed (for the purposes of the assessment this is assumed to be a depth of approximately 1.5 m below ground level), the remaining section of the pylon leg cut off, the excavation backfilled, ground reinstated and any waste removed from site to a suitable licensed waste management facility.

To facilitate the underground cable section a CSE platform would be required either on an existing or new tension/terminal pylon to facilitate the transition from overhead line to underground cable. From here the underground cable route would be installed as per the 400 kV cable but reduced in scope due to scale of the assets. An underground cable limit of deviation of 110 m has been applied.

- **DNO 11 / 33 kV and BT wood pole infrastructure** - Vehicles and equipment would be similar to that of the main new overhead line and underground cable works but at a reduced scale relevant to the works. A terminal pole would be installed at each of the section to be underground to facilitate the transition from overhead line to underground cable. The installation of underground cable diversions are assumed to be in a single trench typically up to 1,000 mm in width which would be routed either within the existing highway, highway verges or across farmland (using existing gaps through hedgerows where possible). Sensitive features would be avoided such as heritage assets, woodland including Ancient Woodland, ecologically valuable habitats including SSSIs, County Wildlife Sites (CWS) and Local Wildlife Sites (LWS). Any residential dwellings and gardens oversailed by the draft Order Limits reflect existing oversail by existing BT, 11 kV and 33 kV infrastructure and access to such areas is required to facilitate the removal.

It is assumed works would be completed using suitable vehicles (for example standard 4X4 or agricultural type vehicles and an excavator (size relevant to the works) etc) which would use the public highway or existing agreed access routes (for the wood pole line), field gates and hedgerow gaps (where possible), it is assumed that there is no requirement to create new physical temporary access tracks.

- **Pipeline Cathodic Protection<sup>33</sup> (including gas, oil and water pipelines)** – Protection works are shown on Figure 4.1: Proposed Project Design in Volume II. A buffer of 30 m is shown around existing infrastructure to allow for the works to be undertaken which includes some flexibility.

It is assumed that the works would comprise a working width of 20 m (10 m either side of the pipeline). Works would include marking out the pipeline with white markers - this is to prevent hitting the pipeline. Trenches would then be dug along both sides of the existing pipeline approximately 1-2 m away to the depth of the pipeline. Zinc wire would then be laid within both trenches. At various locations i.e. every 20 m or 100 m the zinc wire (dependent on the length of the zinc) would be connected to the pipeline via perpendicular trenches.

A number of zinc joint boxes below ground (approximately 12 m x 3) with a link pillar above ground, would also be needed together with test posts at either end of the zinc wire. Frequency of joint boxes would be subject to site specifics.

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<sup>33</sup> Technology used to guard against erosion.

It is assumed works would be completed using suitable vehicles (for example standard 4x4 or agricultural type vehicles and a small excavator etc) which would use the public highway or existing agreed access routes (for the wood pole line), field gates and hedgerow gaps (where possible), it is assumed that there is no requirement to create new physical temporary access tracks.

4.8.68 Further details of third-party works will be included within the ES.

## Reinstatement

4.8.69 Once the Project has been constructed and commissioned, the working areas would be removed, and the site reinstated. Temporary construction haul roads (including temporary bridges and culverts) are likely to be removed unless identified as offering a long-term improvement to the environment and land usage during the design (and agreed with the landowner, LLFA and / or the Environment Agency (where required)). Temporary features such as site welfare, fencing and scaffolding would be removed. Any stripped topsoil would be reinstated, and the site would be returned to its former use, subject to any planting restrictions or agreements with landowners.

4.8.70 Reinstatement would also include landscaping. This is likely to include reseeding grassland areas, replanting hedgerows, and trees. It would also include additional landscape planting in some areas to help screen the new infrastructure from sensitive receptors.

4.8.71 Details of reinstatement will be provided within the ES which may include further additional mitigation.

## 4.9 Construction - Permanent Features

### Introduction

4.9.1 This section describes the permanent features of the Project. It is split into four main components:

- Overhead lines (including CSE compounds)
- Underground cables
- The new EACN Substation
- Substation extensions and works at the existing Norwich Main Substation, Bramford Substation and Tilbury Substation

### Overhead Line (Including CSE compounds)

4.9.2 The National Grid standard for overhead lines operating at 400 kV is for pylons carrying two circuits one each side of the pylon each of three phases i.e., double circuit configuration.

4.9.3 Pylons are designed to provide safe support of the electrical conductor system and earthwire. The Project would involve approximately 159 km of overhead lines comprising approximately 510 steel lattice pylons (this includes 20 gantries (four gantries for the Waveney Valley Alternative) within CSE compounds or substations) and triple Araucaria conductors (or alternative technology that performs to the same or

better standard in relation to noise on standard lattice pylons). There would be three types of pylons:

- Suspension pylons - used in straight line positions to suspend the conductor on vertical suspension insulator strings. These pylons have a standard maximum deviation angle of two degrees, sometimes referred to as 'D2' type structures (presented in Image 4.5)
- Tension (also called angle) steel lattice pylons - which support the overhead line where the line changes direction (presented in Image 4.6). Tension pylons, may also be used in a straight-line situation to break up a long section of suspension pylons for loading and stringing purposes
- Terminal pylons - a type of tension pylon used at the ends of overhead lines where they connect to substations or to underground cables via a CSE compound or substation

- 4.9.4 The current design assumes standard steel lattice pylons which would be approximately 50 m in height (compared to approximately 30 m for the existing 132 kV pylons in the area and would be of a similar size to the existing 275 / 400 kV pylons in the area). Pylon extensions would be required in some locations to allow extra height to clear existing features and maintaining electrical clearance to the ground.
- 4.9.5 The pylon base would consist of concrete foundations and potentially sheet piling depending on ground conditions and would typically be 10 m x 10 m for standard suspension lattice pylons. Pylons would typically be at 330 m spacing, subject to site constraints.
- 4.9.6 Where new pylons are erected parallel to the existing 400 kV infrastructure, an 85 m separation distance would be required. Indicative pylon locations have been assumed for the assessment, as per the location shown on Figure 4.1: Proposed Project Design in Volume II, however, National Grid would seek consent for horizontal and vertical LoD within which the final alignment would lie and will not be seeking approval for a specific alignment (including pylon locations).
- 4.9.7 Alternative pylon designs may also be considered, particularly where mitigation (e.g., interactions with airfields) is required. The designs which may be considered are:
- 4.9.8 National Grid has considered alternative pylon design and the outcome is set out in Appendix C to the 2024 Design Development Report which provides a description of the key features associated with 'traditional' lattice and the T-pylon and considers the different characteristics and potential landscape and visual effects of the alternative pylon types.

Image 4.5 - Typical suspension steel lattice pylon



Image 4.6 - Typical tension/angle lattice pylon



## Cable Sealing End Compounds

- 4.9.9 The CSE compounds, as described previously, typically occupy a footprint of approximately 90 m x 65 m for a 400 kV double circuit compound. Each CSE compound would have two gantries (typically 26 m wide by 15 m tall) within the CSE compound which then connect to the CSEs via HV busbars and other HV electrical equipment. In addition, a small portable relay room may be required in each compound. Each compound would be surrounded by security fencing typically up to 4 m high, to protect the equipment.
- 4.9.10 There would be a permanent access road installed to connect the CSE compounds to the local road network providing access for operation and maintenance activities. Vegetation planting would be provided around each CSE compound to help screen the site, any surplus spoil would be incorporated into landscaping proposals and drainage would also be required, refer to Figure 4.1: Proposed Project Design in Volume II.

## Underground Cables

- 4.9.11 The proposed sections of underground cable have been identified above. Other areas may also potentially be undergrounded; however, this would be determined through further assessment work, engagement, and consultation. Any additional areas would be considered within the ES.
- 4.9.12 The underground cables would typically comprise of 18 transmission cables. Each cable within the corridor would be approximately 150 mm diameter and buried within a series of six trenches excavated to typically a minimum of 1.4 m and would be surrounded by

an additional layer of cement bound sand to provide a thermally resistant barrier, this is then topped with protective warning tile tape which aids protect the cables from accidental excavation.

- 4.9.13 For the purposes of the assessment, a permanent easement of 50 m is assumed for open cut installation, and typically 180 m for trenchless installation. This would be reduced to consider sensitive features or may increase subject to site conditions.
- 4.9.14 Depending on the cable manufacturer and availability of cable lengths, joint bays would be required every 500 m to 1 km. At these locations, above ground link boxes would be required. The dimensions, frequency and specific locations of the link boxes are to be confirmed through detailed design, however where practicable they would be located near field boundaries, with typical dimensions of 2 m x 0.7 m x 1.5 m plus for example a timber fenced area around them, typically 3 m x 4 m.

## Proposed EACN Substation

- 4.9.15 A new 400 kV/ 132 kV connection node substation would be located on the Tendring Peninsula where the customers would connect (customer connections would be subject to separate consents). This would include 400 kV / 132 kV transformers and other typical equipment associated with a HV substation.
- 4.9.16 The operational footprint of the substation is likely to be approximately 520 m x 230 m with heights of approximately 15 m excluding any requirement for landscaping and cable / overhead line connections.
- 4.9.17 In addition, several small buildings would be constructed to house electrical equipment, battery storage, workshops, together with suitably sized office / amenity buildings. The site would be surrounded by security fencing to protect the equipment.
- 4.9.18 Exterior and interior lighting would be provided at the site to allow for safe movement and the operation of equipment. All lighting would be designed in accordance with the appropriate design standards.
- 4.9.19 Vegetation planting would be provided at the EACN Substation to help screen the site, and any surplus spoil would be incorporated into landscaping proposals.
- 4.9.20 Improvements to the public highway along the Primary Access Route (carriageway widening and associated works to Bentley Road and Ardleigh Road) and the proposed permanent private site access road between Bentley Road and Ardleigh Road, to the southwest of Little Bromley would be retained permanently. These would be retained to provide permanent access to the EACN Substation for HGVs and AILs during operation. This permanent site access road would remain private and be gated to prevent unauthorised access.

## Modifications to Existing Substations

- 4.9.21 Modifications to existing substations are required as part of the Project. The details of the likely works required at existing substations are outlined below.

### Norwich Main Substation

- 4.9.22 An extension would be needed at the existing Norwich Main Substation. The extension would comprise:

- Extension of the existing site compound with use of existing site access arrangements
- Equipment up to a maximum typical height of 15 m
- Mix of impermeable concrete ground surfaces surrounded by permeable stone chippings
- Electrified palisade fence typically up to 4 m high
- Exterior and interior lighting to allow for safe movement and the operation (and maintenance) of equipment. Lighting would be designed in accordance with the appropriate design standards
- Vegetation planting would be provided to help screen the site

### **Bramford Substation**

4.9.23 An extension would be needed at the existing Bramford Substation. The extension would comprise:

- Extension of the existing site compound with use of existing site access arrangements
- Equipment up to a maximum typical height of 15 m
- Mix of impermeable concrete ground surfaces surrounded by permeable stone chippings
- Electrified palisade fence typically up to 4 m high
- Exterior and interior lighting to allow for safe movement and the operation (and maintenance) of equipment. Lighting would be designed in accordance with the appropriate design standards
- Vegetation planting would be provided to help screen the site, and any surplus spoil would be incorporated into landscaping proposals

### **Tilbury Substation**

4.9.24 Works at Tilbury Substation are proposed within the existing substation site. The works would likely comprise:

- Line landing gantries up to a maximum height of 15 m
- Substation building 80 m x 18.5 m x 18 m with associated annex at 80 m x 8 m x 5 m
- Noise enclosures 15 m x 10 m x 7 m
- Firewalls up to 10 m high
- Electrified palisade fence typically up to 4 m high
- Exterior and interior lighting to allow for safe movement and the operation (and maintenance) of equipment. Lighting would be designed in accordance with the appropriate design standards

## 4.10 Operation and Maintenance

### Introduction

- 4.10.1 This section describes the activities that are anticipated during the operation stage including site inspections and routine maintenance. It is split into overhead lines (including CSE compounds), underground cables and the EACN Substation.

### Operational Workforce and Vehicles

- 4.10.2 Operational and maintenance activity undertaken would require a limited workforce, further details are outlined in the paragraphs that follow.

### Overhead Line (Including CSE compounds)

- 4.10.3 The typical lifespan of an overhead line and the CSE compound would be at least 40 years, depending on use and location. Over this time, the overhead line and CSE compound would be subject to regular inspection from the ground (using a small van) or by helicopter to check for visible faults or signs of wear in line with existing maintenance requirements at any point in time. The inspections would confirm when refurbishment is required and indicate if plant / tree growth or development were at risk of affecting safety clearances.
- 4.10.4 Maintenance activity carried out on lattice pylons would involve climbing the pylon to access the work area (i.e., conductors). Access to the pylons may require temporary access works to gain entry to site.
- 4.10.5 There are two main types of overhead line refurbishment:
- Fittings only refurbishment would be undertaken if the conductors were still in good condition. The refurbishment involves removing and replacing the insulators, their associated fittings and the spacers that keep the conductors separate in the spans between pylons. The insulators and fittings have a life expectancy of approximately 20-40 years
  - Full refurbishment would typically be needed at the end of the lifespan (40 years although pylons have a typical life expectancy of 80 years) of the overhead line and works would be subject to separate permissions, to consider the latest site conditions and up to date legislation
- 4.10.6 Refurbishment would usually be carried out in two stages because the overhead line has two circuits, one on each side of the pylon. This means that work can be undertaken on one side only, so that the other side can be kept 'live'. Once all the work has been completed on the first side, the circuit would be re-energised, and the opposite side switched off, so that the work could be carried out on the other side.
- 4.10.7 The refurbishment works would require temporary access tracks, a small compound and, potentially, scaffolding to protect roads and other features during the work. Vans are used to carry workers in and out of site and trucks are used to bring new materials and equipment to site and remove old equipment. Temporary works including installation of access routes and installation of scaffolding to protect roads, railways and footpaths would be required as necessary (like the initial construction requirements).

- 4.10.8 The typical design life of a CSE compound would be at least 40 years, depending on use and location. The CSE compound would contain equipment that would be monitored remotely. Site inspections would include visual checks for signs of damage or wear of the condition of non-mechanical equipment, structures, and buildings. Mechanical (manually operated) earth switches would require inspection and servicing as part of these visits. Intermittent upgrades and repairs would be complete as and when required to ensure their ongoing operation.

## Underground Cables

- 4.10.9 Underground cables have a typical design life of at least 40 years. Over this time, the cables would be subject to regular checks. Inspections using the fibre-optic cables that were installed alongside the underground cables during construction, would be undertaken approximately every three years. This would identify whether cable repairs were required.
- 4.10.10 When a repair is needed, the area where the fault is located would be accessed using a temporary access track. A working area would be established, like that used for construction, and the ground would be excavated. If a cable needs to be replaced, then that section of the cable (between two joints) would need to be removed and new joints constructed. A benefit of ducting these cables is that the whole length to be removed does not need to be excavated.
- 4.10.11 As outlined in the description of construction activities. There would be restrictions regarding works directly above the underground cables, for example, trees cannot be planted over the top or within 10 m of underground cables.

## EACN Substation and other Substation Modifications

- 4.10.12 The EACN Substation and other substations modified as part of the Project would typically be unmanned during periods of general operation, however routine site visits would be required to visually inspect the condition of the equipment, structure, and buildings for signs of wear and tear. Routine maintenance would also need to be undertaken on a three-year cycle for each circuit. This involves electrical isolation of the equipment and checks to the equipment which may lead to maintenance of certain moving parts, electrical contacts etc to ensure the system continues to operate without fault. In addition, there would be maintenance of the auxiliary systems which would be tested monthly and maintained as required. The proposed works are not likely to change the current activity patterns within the substations.
- 4.10.13 Under the SQSS, National Grid have a duty, that following the occurrence of a secured event on the onshore transmission system, measures shall be taken to re-secure the system to the above operational criteria as soon as reasonably practicable. To meet this duty the EACN Substation permanent site access road is to be retained to maintain ALL access to the site.

## 4.11 Decommissioning

### Introduction

- 4.11.1 NPS EN-1 paragraph 4.3.5 states that the ES should cover the decommissioning of a project. There are currently no specific plans to decommission the Project. It is expected

that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. To date, relatively few transmission projects have been decommissioned since the main expansion of such infrastructure in the 1950s and 1960s. The cables and pylons for overhead transmission lines are replaced periodically, ordinarily under National Grid’s permitted development rights.

- 4.11.2 The pylons comprise open, lattice structures which can be easily dismantled. It is expected that proposals for decommissioning would be subject to separate consenting procedures, including environmental assessment of the proposed activities, and taking account of the baseline as it exists at the time of decommissioning. Undertaking an assessment of the potential decommissioning of the Project infrastructure at this stage is expected to be so heavily based on assumptions that it would not serve any useful purpose. Consequently, decommissioning has been scoped out of the ES. However, a high-level summary of potential effects for each environmental topic would be included in an appendix to the Project Description chapter within the ES, including a description of likely methods for decommissioning a summary is provided in Table 4.7.
- 4.11.3 It is assumed that decommissioning would only be undertaken if there were substantial changes to how electricity is transmitted around the country or significant changes to the sources of generation and areas of demand. At the point where the Project requires decommissioning, National Grid would consider and implement an appropriate decommissioning strategy taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements.

**Table 4.7 – Decommissioning Summary**

<b>Project Component</b>	<b>Summary</b>
Overhead Line (Including CSE compounds)	Decommissioning sections of the overhead line would follow the same methods set out in ‘removal of existing pylons’ (see Section 4.8: Construction - Temporary Features), which describes the removal of existing sections of the existing 132 kV and 400 kV overhead lines during construction of the Project.  The above ground features of the CSE compounds would be removed by dismantling conductors and removing any other above ground features. The foundations of the CSE compounds would be excavated to approximately 1.5 m below ground level, and subsoil and topsoil reinstated. Any temporary access tracks and working areas required would be removed and the site reinstated.
Underground Cables	Decommissioned underground cables are likely to be left in the ground <sup>34</sup> with any above ground structures, such as link pillars removed. These works would be localised and short term in duration. Access to the above ground features requiring removal would likely be provided by trackway matting or another alternative. Once works are completed, any temporary access tracks and working areas required would be removed and the site reinstated to its former use.

<sup>34</sup> Cables are not oil filled and therefore are not anticipated to pose risk of environmental damage or contamination.

<b>Project Component</b>	<b>Summary</b>
Substations	<p>If the proposed new substation and proposed substation modifications are to be decommissioned, discussions would be held with UK Power Network to agree alternative requirements for providing power to local communities and businesses, likewise arrangements would need to be made with any connected generators too as so not to constrain their generation.</p> <p>Typically, the above ground features of the substations would be removed (unless otherwise agreed). Any above ground buildings would be demolished and taken off site for suitable disposal along with any other above ground features. Any temporary access tracks and working areas required would be removed and the site reinstated to its former use.</p> <p>If the Project, or any part of it, is to be decommissioned, a written scheme of decommissioning would be submitted for approval by the relevant planning authorities at least six months prior to any decommissioning works. The decommissioning works would follow National Grid processes at the time for assessing and avoiding or reducing any environmental impacts and risks.</p>

# 5. EIA Approach and Method

# 5. EIA Approach and Method

## 5.1 Introduction

5.1.1 EIA is a process that is used to identify the likely significant effects that could occur because of a project. The information gathered is considered by the decision-making body when determining consent. Three main documents are produced by the applicant as part the NSIP pre-application process:

- EIA Scoping Report: The EIA Scoping Report sets out the likely significant effects from a project (scope). It also presents the data collected and the proposed assessment methodology and approach that would be used during the EIA. The EIA Scoping Report for the Project was issued to the Planning Inspectorate in November 2022 (National Grid, 2022) and the Scoping Opinion was received in December 2022 (Planning Inspectorate, 2022). Appendix 5.1: Scoping Opinion in Volume III summarises the key points raised within the Scoping Opinion and how National Grid has or intends to address points raised
- PEIR (this is the current stage of the Project): The PEIR sets out the information that *'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development'* (Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate 2020)). The PEIR is used by consultees to inform their consultation responses during the statutory consultation. The PEIR is produced at a time when there may not be a full understanding of all environmental effects, and the detailed assessment may not have been undertaken. The PEIR sets out the level of work undertaken to reach the conclusion as to whether there are likely to be significant effects for each scoped in aspect. It also outlines any further work that would be presented in the ES to validate these conclusions
- ES: The ES presents the results of the assessment carried out as part of the EIA process undertaken for a project. It identifies the likely significant effects that would result if the Project is implemented, and any proposed mitigation to avoid or reduce those significant effects to a non-significant level. The ES is submitted as part of the application for development consent and is considered during the decision-making process

5.1.2 In addition to the documents above, there will be additional documents produced as part of the DCO application, which will form the securing mechanisms for the environmental measures and mitigation identified within the EIA. These will include the following documents as a minimum:

- Outline CoCP: The Outline CoCP will set out mitigation measures that would be implemented on the Project – Appendix 4.1: Draft Outline CoCP in Volume III provides a draft of this this document

- Outline Site Waste Management Plan (SWMP): The Outline SWMP will set out the measures to reduce the generation of waste in the first place and appropriate measures to reuse and recycle materials where practicable. It will also identify appropriate waste facilities to dispose of materials. The Outline SWMP will be provided as an Annex to the Outline CoCP issued with the DCO application
- Outline CTMP: The Outline CTMP will provide details on construction routes and any required road diversions or closures – The Draft Outline CTMP provides a draft of this document
- Outline LEMP: The Outline LEMP will provide details on how vegetation will be retained and protected during construction. It will also provide details on reinstatement planting and aftercare. This document will be provided as part of the DCO application

## 5.2 General EIA and PEIR Approach

- 5.2.1 This chapter describes the methodology which will be used to assess the potential significance of effects on the natural, human, and built environment because of the Project, as informed by the Scoping Opinion, within the ES and also describes the methodology which has been used to undertake the preliminary assessment within this PEIR.
- 5.2.2 In accordance with the EIA Regulations, the assessments undertaken and presented in the ES will evaluate and identify the likely significant environmental effects arising from the Project for the construction and operation (and maintenance) phases. Methodology, baseline, mitigation, residual effects, interrelationship of effects and cumulative effects will also be identified for each environmental topic. This environmental assessment will be presented in an ES.
- 5.2.3 The scope of the assessment presented in the ES will be based on that presented within the EIA Scoping Report (National Grid, 2022) and where relevant superseded by comments received in the Scoping Opinion (Planning Inspectorate, 2022). Where the Planning Inspectorate has requested that aspects should be scoped back into the assessment, these will be included within the assessment presented in the ES, unless further information (also documented in the ES) is provided to justify scoping out.
- 5.2.4 In general, the assessment within the ES will follow a receptor-based approach. Receptors are those aspects of the environment which are sensitive to change because of sources such as dust, noise, and construction activities.
- 5.2.5 The assessments presented in this PEIR provide preliminary assessments undertaken for each environmental topic to inform statutory consultation. Each chapter outlines methodology, baseline (including survey data collected up to the end of September 2023 aside from dormouse survey results and traffic surveys where these are reported up to the end of November 2023), mitigation and residual effects (including a prediction of likely significant effects) informed by the EIA Scoping Report (National Grid, 2022) and Scoping Opinion (Planning Inspectorate, 2022). The PEIR also follows a receptor-based approach. As noted in Section 1.4.3, all conclusions and assessments presented within this PEIR are preliminary and are based on the proposed project design and assumptions described within this PEIR. All assessment work has and continues to

apply a precautionary principle, in that where limited information is available (in terms of the Project detail), a realistic worst-case scenario is assessed.

- 5.2.6 The PEIR sets out the level of work undertaken to reach the conclusion as to whether there are likely to be significant effects for each scoped in aspect. It also outlines any further work that would be presented in the ES to validate conclusions.
- 5.2.7 As per the ES, the preliminary assessment presented in this PEIR generally follows a receptor-based assessment approach (unless otherwise stated in each chapter). When deciding on which receptors to include within the PEIR, consideration was given to Regulation 5(2) and Schedule 4 paragraph 4 of the 2017 EIA Regulations.

## 5.3 Geographical Scope

- 5.3.1 The draft Order Limits encompass the land required permanently and temporarily to build and operate the Project. The draft Order Limits comprise the working width to construct the Project, including the construction compounds, road access points, the land required for permanent above and below ground features, and rights of access, both temporary during construction and permanent for maintenance.
- 5.3.2 The draft Order Limits include the Limits of Deviation (LoD) which, as previously noted, represent the dimensions within which the final alignment and associated features could be installed. The preliminary assessment within this PEIR and the assessment within the ES will assume that the alignment could lie anywhere within the LoD and take a reasonable worst-case approach when undertaking the assessment. This allows for minor deviations without triggering the need to revise assessment.
- 5.3.3 The study area for this PEIR and within the ES is and will be based on the distance over which an impact is likely to occur. Study areas are defined in each of the topic chapters within this PEIR and vary between topics. Study areas may also vary in topic chapters between the construction and operation (and maintenance) phases and between identified receptors (during construction and operation (and maintenance)). For example, direct physical impacts during construction may only occur within the construction footprint during construction; occur wider than the construction footprint i.e. impacts on water quality at crossings may extend further downstream than upstream and the visual impact of the Project works during construction may occur over a longer distance. The geographical scope may be refined within the ES following statutory consultation.

## 5.4 Temporal Scope

- 5.4.1 Should the application be successful, construction works are expected to start no earlier than the grant of development consent and would be completed by 2031<sup>35</sup>.
- 5.4.2 This PEIR (and ultimately the ES) considers separately the effects that are expected to arise during the construction and operation (and maintenance) phases and compares

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<sup>35</sup> Note: Although these are expected construction dates, the DCO may authorise a time limit for commencement of development up to five years after receiving consent.

them with the current and future baseline. This is covered within each of the topic chapters.

5.4.3 The preliminary environmental assessment in this PEIR uses defined temporal scales to characterise the duration of potential effects. Short-term is used in some topic sections to reflect the transient nature of the construction works. For the purposes of the preliminary assessment, the following definitions have been applied (unless defined differently in the specific topic chapters to remain consistent with recognised assessment methodologies):

- Short term: This is assumed to be up to 2032 which covers construction plus one-year reinstatement
- Medium term: This is assumed to be 2033 to 2048 which is based on year 2-15 post construction
- Long term: This is assumed to be 2049 onwards and it used to describe effects with a duration that extends longer than 15 years post construction

5.4.4 The temporal nature of effects may be different to the phase in which the effects occur. For example, effects because of vegetation clearance during construction may be felt for several years after construction has been completed, before any replanted habitats have matured. For the purposes of the PEIR, the effects are described under the phase within which the impact arises, i.e., construction in relation to vegetation loss.

5.4.5 This approach will also be adopted within the ES.

## **5.5 Embedded, Standard and Additional Mitigation Measures (and Enhancement)**

5.5.1 As defined within Section 4.3 above, three types of mitigation have been assumed to be incorporated into the Project and preliminary assessment – embedded, standard, and additional mitigation.

5.5.2 Environmental mitigation measures (as noted in Schedule 4, Paragraph 7 of the EIA Regulations) have been defined within each topic chapter in this PEIR and where relevant to construction are presented in Appendix 4.1: Draft Outline CoCP in Volume III or the Draft Outline CTMP. Environmental mitigation that relates to the permanent assets will be in the outline LEMP submitted as part of the ES.

5.5.3 Any opportunities for environmental enhancement over and above required mitigation measures (if identified) and BNG will be outlined within the ES.

## **5.6 Assessment of Residual Effects and Determination of Significance**

5.6.1 The preliminary assessment within this PEIR provides an assessment of residual effects within each topic chapter – i.e. effects likely to arise following the implementation of mitigation together with an indication of whether effects are likely to be significant.

- 5.6.2 Advice Note Seven: EIA: Process, Preliminary Environmental Information and Environmental Statements (Planning Inspectorate, June 2020) states the ‘a good PEI document is one that enables consultees (both specialist and non-specialist) to understand the likely environmental effects of the Proposed Development’ in addition Advice Note 7 requires the PEIR to provide sufficient information for ‘consultees to develop an informed view of the likely significant environmental effects of the development (and of any associated development)’ (Regulation 12(2)(b) of the EIA Regulations 2017). Therefore, to aid understanding of potential environmental effects and likely significance of effects, the preliminary assessments within this PEIR describe effects as positive, negative or neutral. Professional judgement has then been used (taking into consideration relevant standard assessment methodologies for each topic where relevant) to determine if effects are likely to be significant – in some chapters further definition of significant and non-significant effects are provided. This approach has also been taken as the baseline and Project details at this stage are not always sufficient to allow a more precise or quantitative prediction of the level of significance at this stage. A precautionary approach has been taken to ensure that where there is uncertainty as to any significant effects, a realistic worse-case assessment has been determined.
- 5.6.3 The assessment of residual effects and determination of significance within the ES submitted with the application for development consent will be reviewed and updated to comply with the EIA Regulations.
- 5.6.4 Regulation 5(2) of the EIA Regulations state that ‘the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on: (a) population and human health, (b) biodiversity, (c) land, soil, water, air and climate, (d) material assets, cultural heritage and the landscape; and e) the interaction between the factors referred to in subparagraphs (a) to (d)’.
- 5.6.5 Schedule 4 paragraph 5 of the EIA Regulations requires a description of the likely significant effects of the development on the environment.
- 5.6.6 The assessment of significance within the ES will be based on a three-step process. The first step will be to assign a sensitivity or an inherent value to a receptor. Sensitivity is how easily the receptor is affected by change; value is a measure of its inherent worth. Table 5.1 provides broad definitions of sensitivity or value. The sensitivity or value of aspects specific to each topic will be defined in every topic chapter.

**Table 5.1 - Value and Sensitivity Criteria**

<b>Value/sensitivity</b>	<b>General Criteria</b>
Very high	Of value, importance, or rarity on an international scale and with very limited potential for substitution; very sensitive to change or has very little capacity to accommodate change.
High	Of value, importance, or rarity on a national scale and with limited potential for substitution; and/or sensitive to change or has little capacity to accommodate change.

<b>Value/sensitivity</b>	<b>General Criteria</b>
Medium	Of value, importance, or rarity on a regional scale and with limited potential for substitution; and/or moderately sensitive to change, or moderate capacity to accommodate change.
Low	Of value or importance on a local scale; not particularly sensitive to change or has considerable capacity to accommodate change.
Negligible	Abundant or of little environmental value; resistant to or has a considerable capacity to accommodate change.

5.6.7 The second step of the assessment will determine the likely magnitude of the potential impact. This is the scale of the change caused to the baseline conditions considering both the degree of change from the baseline conditions and the duration and/or reversibility of the effect. The assessment of magnitude will take into consideration all embedded mitigation, standard mitigation and additional measures. Table 5.2 presents generalised magnitude criteria. These criteria will form the basis for the individual topic magnitude definitions within the ES which will be further tailored to the topic area.

**Table 5.2 - Magnitude of Change Criteria**

<b>Magnitude</b>	<b>General Criteria</b>
Large	Adverse: Total loss or major alteration to key elements or features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed. Beneficial: Large scale or major improvement of quality; extensive restoration or enhancement; major improvement in attribute quality.
Medium	Adverse: Loss or alteration to one or more key elements or features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed. Beneficial: Benefit to, or addition of key characteristics, features or elements; improvements of attribute quality.
Small	Adverse or beneficial: Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be like the pre-development situation.
Very small	Adverse or beneficial: Very little change from baseline conditions. Change is barely distinguishable from the pre-development situation.
No change	Adverse or beneficial: No change from baseline conditions.

5.6.8 As the third step in the process, the significance of an effect on a receptor will be considered in relation to the sensitivity or value of the receptor and the magnitude of the potential impact. Assigning significance is subjective, particularly where the assessment

is qualitative rather than quantitative. To aid transparency in the assessment process, the matrix shown in Table 5.3 will be used as the basis for assigning significance to an effect. A highly sensitive receptor subject to a large magnitude of change would suffer a major effect. A low sensitivity receptor with a medium magnitude of change would suffer a minor effect.

- 5.6.9 Professional judgement (as adopted in the PEIR) will also be used in the ES when allocating significance. This will be of relevance where the assessment is based on a qualitative approach and the significance of effect is a matter of judgement rather than a quantified outcome. Explanatory text will be provided to explain how professional judgement, where used, has determined the significance value. Where the matrix indicates two or more levels of significance are possible, professional judgement will be applied to determine the level of significance.
- 5.6.10 The assessment of significance will include the reasoned argument setting out the rationale for the value, magnitude, and significance of effect.

Table 5.3 - Matrix of Significance

Value/Sensitivity of Receptor	Magnitude of Change			
	Large	Medium	Small	Very Small
High	Major	Major	Moderate	Minor / Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor / Negligible	Negligible	Negligible	Negligible

- 5.6.11 The influence of impact duration and reversibility on the overall significance of effect will also be considered as part of the determination of magnitude and sensitivity to change.
- 5.6.12 Under the EIA Regulations, the significant effects of the Project on the environment must be reported in the ES. A significant effect in relation to the EIA Regulations within the ES will be taken to mean one of moderate or major adverse or beneficial significance. While the effects of minor or negligible significance are not considered to be significant effects on the environment, they will be reported in the ES to acknowledge that there would be some differences from the baseline conditions.

## 5.7 Assessment of Design Alternatives and where Flexibility is Needed

- 5.7.1 A description of design alternatives and where flexibility remains in the Project at this stage is outlined in Section 4.5. Table 4.3 also provides details of how flexibility and options have been assessed within this PEIR.

## 5.8 Sensitivity Testing

5.8.1 Each topic chapter includes a section on sensitivity testing. These sections give consideration to how the preliminary assessment outlined for each topic may be affected if:

- Construction commenced in any year up to five years from the granting of the DCO
- Pylon locations were to change along the route alignment
- Planning consent is granted for a battery storage facility to the south of Norwich Main substation then the alignment could change (the draft Order Limits have been widened in this area to allow flexibility)
- A potential mineral extraction south of Coggeshall is identified as an allocation in a future mineral plan and the alignment needs to change to reduce effects (the draft Order Limits have been widened in this area to allow flexibility)
- A housing development (Southfields) doesn't go ahead at the Buckingham Hill Landfill area, then the alignment could move to the west, removing two crossings of Buckingham Hill Road, a crossing of a historic landfill site and pylons situated within parkland and a quarry site (the draft Order Limits have been widened in this area to allow flexibility)
- Planning consent is not granted for a solar farm south of Rivenhall, then the alignment could change (the draft Order Limits have been widened in this area to allow flexibility)
- Planning permission for a number of distribution warehouses is consented near to Wick Lane and the alignment needs to change (the draft Order Limits have been widened in this area to allow flexibility)
- Should the alignment need to change crossing the railway line at Ardleigh following the completion of ground investigations (the draft Order Limits have been widened in this area to allow flexibility)
- Following further engagement with the Environment Agency and interested water companies a single crossing of the River Stour would be an acceptable solution within a Source Protection Zone 1 rather than two crossings (the draft Order Limits have been widened in this area to allow flexibility)
- The location of a satellite construction compound (Option 2A) in Basildon is affected by Brentwood Housing Development (21/01525/OUT) then Option 2B would be acceptable
- The Lower Thames Crossing Project is unable to coordinate with the Project then the cables would need to be installed via trenchless methods – rather than cables being installed as part of the Lower Thames Crossing project

5.8.2 Further information is provided in Table 4.3.

## 5.9 Monitoring

- 5.9.1 Schedule 4, Paragraph 7 of the EIA Regulations is clear that, where appropriate, the ES should include a description of any proposed monitoring arrangements where likely significant effects have been identified. The monitoring of significant effects requirements would be detailed within the ES topic chapters to include clear and proportionate objectives for monitoring, the parameters to be monitored, the methodology for the monitoring, a timescale for implementation, identification of the party who would be responsible for the monitoring, and an outline of the remedial actions to be undertaken should results be adverse.

## 5.10 Environmental Topics

- 5.10.1 Table 5.4 outlines the topics that will be considered within the ES and have been considered within this PEIR together with how they relate to the topics identified in the EIA Regulations.
- 5.10.2 The focus for the EIA is the impact of effects on receptors. The main receptors are people and local communities; biodiversity; land use and land quality; landscape and views; and surface and groundwater resources.

Table 5.4 - Environmental Topics

<b>Environmental Factors to be considered (EIA Regulations, Regulation 5(2), and Schedule 4</b>	<b>Topics</b>
Population and human health	Health and Wellbeing Traffic and Transport Socio-economics, Recreation and Tourism
Biodiversity (flora and fauna)	Ecology and Biodiversity
Land (for example land take)	Geology, Soils and Agriculture Agriculture and Soils Socio-economics, Recreation and Tourism
Soil (for example organic matter, erosion, compaction, sealing)	Contaminated Land, Geology and Hydrogeology Agriculture and Soils
Water (for example, hydromorphological changes, quantity, and quality)	Hydrology and Land Drainage
Air	Air Quality
Climate (for example, greenhouse gas emissions, impacts relevant to adaptation) and vulnerability of the Project to climate change	Carbon emissions from construction plant and embodied carbon in materials used in construction and operation will be considered as part of the description of the Project.

<b>Environmental Factors to be considered (EIA Regulations, Regulation 5(2), and Schedule 4</b>	<b>Topics</b>
	<p>The benefit of the Project in connecting renewable sources of energy will be considered as part of the description of the Project.</p> <p>The vulnerability of the Project to climate change will be considered as part of the description of the Project in so far as the vulnerability affects the siting of Project components and design principles for drainage and pylon design.</p> <p>The vulnerability of the Project to future flooding will be considered in the Flood Risk Assessment.</p>
Material assets	<p>This topic is concerned with the interference of the Project with other infrastructure, including utilities, highways, and rail. The mitigation is to avoid the need for crossings and where this is unavoidable, to agree to the form of crossing or divert utilities with the statutory undertaker or private enterprise. This is a construction engineering issue and is addressed as part of the description of the Project.</p>
Cultural heritage (including architectural and archaeological aspects)	Historic Environment
Landscape	Landscape and Visual
The interaction between the factors listed above	Cumulative Effects
Vulnerability of the development to risks of major accidents and / or disasters	<p>The EIA Regulations require the environmental assessment to identify, describe and assess major accidents and/ or disasters.</p> <p>All potential effects were scoped out from further assessment, as there are no likely significant effects. A standalone major accident and/ or disasters chapter is therefore not proposed. Where appropriate, relevant environmental aspects, would identify the likely risks to the Project in relation to potential areas of vulnerability. For example, any flood risk concerns are considered within Chapter 12: Hydrology and Land Drainage and would be addressed as part of the Flood Risk Assessment submitted with the ES.</p>

5.10.3 The technical topic chapters presented in this PEIR are:

- Agriculture and Soils
- Air Quality
- Ecology and Biodiversity
- Contaminated Land, Geology and Hydrogeology
- Health and Wellbeing
- Historic Environment
- Hydrology and Land Drainage
- Landscape and Visual
- Noise and Vibration
- Socio-economics, Recreation and Tourism
- Traffic and Transport
- Cumulative Effects

# 6. Agriculture and Soils

# 6. Agriculture and Soils

## 6.1 Introduction

6.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Agriculture and Soils. The chapter covers effects on the following, during construction and operation (and maintenance):

- Soils
- ALC, including Best and Most Versatile (BMV) land
- Land Use

6.1.2 There are interrelationships related to the potential effects on Agriculture and Soils and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 8: Ecology and Biodiversity
- Chapter 9: Contaminated Land, Geology and Hydrogeology
- Chapter 10: Health and Wellbeing
- Chapter 12: Hydrology and Land Drainage

6.1.3 This chapter is supported by the following figures in Volume II:

- Figure 6.1: Agriculture and Soils Study Area
- Figure 6.2: Provisional ALC Mapping
- Figure 6.3: Detailed ALC Mapping (Post-1988)
- Figure 6.4: Agri-environmental and Forestry Schemes
- Figure 6.5: Woodland Grant Schemes
- Figure 6.6: Soilscales Mapping

## 6.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

6.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024). EN-1 states that energy projects have the potential to have adverse effects on Agriculture and Soils which has been considered within this chapter.

6.2.2 Paragraph 5.11.12 of EN-1 states '*Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the*

*Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5)'.*

- 6.2.3 Paragraph 5.11.13 of EN-1 states '*Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed*'.
- 6.2.4 Paragraph 5.11.34 of EN-1 states '*The Secretary of State (SoS) should ensure that applicants do not site their scheme on the best and more versatile agricultural land without justification. Where schemes are to be sited on best and more versatile agricultural land the SoS should take into account the economic and other benefits of that land. Where development of agricultural land is demonstrated to be necessary, areas of poorer quality should be preferred to those of a higher quality*'.
- 6.2.5 NPS EN-5 sets out limited policy in relation to soils and agriculture. In relation to Electro-magnetic fields (EMFs) it states in paragraph 2.9.58 EN-5 that '*There is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequences*'.
- 6.2.6 Paragraph 2.9.25 (final bullet point) of NPS EN-5 in relation to proposals for undergrounding states in that they should consider: '*...the applicant's commitment, as set out in their ES, to mitigate the potential detrimental effects of undergrounding works on any relevant agricultural land and soils, particularly regarding Best and Most Versatile land. Such a commitment must guarantee appropriate handling of soil, backfilling, and return of the land to the baseline Agricultural Land Classification (ALC), thus ensuring no loss or degradation of agricultural land. Such a commitment should be based on soil and ALC surveys in line with the 1988 ALC criteria and due consideration of the Defra Construction Code of Practice for Sustainable Use of Soils on Construction Sites*'.

## Other National Legislation and Policy

- 6.2.7 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- Environmental Improvement Plan (Defra, 2023)
  - The Agricultural Land (Removal of Surface Soil) Act (1953)
  - NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance

## Regional and Local Policy

- 6.2.8 Chapter 2: Key Legislation and Planning Policy Context lists relevant regional and local policy. Key local policy relevant to Agriculture and Soils, that has informed this PEIR and will inform the assessment within the ES, comprises:
- South Norfolk Council Development Management Policies Document (South Norfolk Council, adopted 2015)

- Braintree District Council Local Plan 2033 (Braintree District Council, adopted 2021)
- Chelmsford Local Plan 2013-2036 (Chelmsford City Council, adopted 2020)
- Brentwood Borough Council Local Plan 2016-2033 (Brentwood Borough Council, adopted 2022)
- Thurrock Council Core Strategy and Policies for Management of Development (Thurrock Council, adopted 2015)
- Tendring District Local Plan 2013-2033 and Beyond: Section 2 (Tendring District Council, adopted 2022)

## Guidance

6.2.9 Relevant guidance, specific to Agriculture and Soils, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Safeguarding our Soils: A Strategy for England (Defra, 2009)
- Technical Information Note 049. ALC Protecting the Best and Most Versatile Agricultural Land (Natural England, 2012)
- Guide to assessing development proposals on agricultural land (Natural England, 2021)
- Guidance Note: Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (The British Society of Soil Science, 2022)
- British Standard Specification for Topsoil and Requirements for Use (BS3882:2015)
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009)
- Good Practice Guide for Handling Soils. Cambridge: The Farming and Rural Conservation Agency (Ministry of Agriculture, Fisheries and Food (MAFF), 2000)
- Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (MAFF, 1988)
- A new perspective on land and soil in Environmental Impact Assessment (IEMA, 2022)

## 6.3 Scoping Opinion

6.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.

6.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Agriculture and Soils is provided in Appendix 5.1: National Grid's

response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 6.4.

## 6.4 Project Engagement and Consultation

- 6.4.1 National Grid has held several meetings with relevant consultees including Natural England.
- 6.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 6.1.

Table 6.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Natural England June / July 2022	A letter was issued to Natural England setting out the proposed methodology and scope, and this was presented to Natural England in a meeting in July 2022 and a thematic group in July 2022. Natural England advised that applicants should seek to minimise effects on BMV agricultural land, ensure the appropriate handling of soils in line with published guidance (Defra, 2009) and use experienced soil scientists to advise on and supervise soil handling.	The presence of BMV land would be addressed through the desk-based study, with detailed ALC surveys to be undertaken to inform the assessment presented in the ES. All soil handling would be undertaken in line with the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and a requirement included for those advising on and supervising works to have the appropriate skills and qualifications.

## 6.5 PEIR Approach and Methods

- 6.5.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology / approach used to undertake the preliminary assessment on Agriculture and Soils. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

- 6.5.2 The study area for Agriculture and Soils comprises the area directly affected by the Project, as defined by the draft Order Limits (see Figure 6.1: Agriculture and Soils Study Area in Volume II). A ‘wider study area’ is also considered, which extends to 1 km

around the draft Order Limits to provide environmental context and identify potential receptors. This is considered an appropriate study area based on professional judgement, knowledge of similar projects and the Design Manual for Roads and Bridges (DMRB) LA09: Geology and Soils (National Highways, 2019) and was not raised as a concern in the Scoping Opinion (Planning Inspectorate, 2022) received for the Project.

## Existing Baseline

### Data Collection

6.5.3 The baseline information has drawn on the following key information sources:

- British Geological Survey (BGS) online mapping for bedrock and superficial geology (BGS Geology Viewer, 2022)
- OS mapping and aerial photography to establish land use and settlement patterns
- Soilscape mapping showing the distribution of main soil types was assessed on the Land Information System website (Cranfield University/Defra, 2021)
- ALC mapping, including provisional and (where available) detailed ALC mapping from the MAGIC website (Defra, 2022)
- Extent of agri-environmental, and woodland and forestry schemes from the MAGIC website (Defra, 2022)

### Further Data to be collected to inform the ES

6.5.4 In addition to the data collected for this PEIR, the ES will be informed by the following additional third-party data and data obtained through surveys:

- Detailed agricultural land classification surveys – commenced in September 2023 and, subject to access permissions, would be finished in Autumn 2024 and will be undertaken in accordance with the published ALC guidelines (MAFF, 1988). *Note: Survey information already collected has not been incorporated within this PEIR as it requires processing and collating with the full survey data set and therefore will inform the baseline in the ES.*
  - Soil and ALC surveys have been, and will continue to be undertaken within the draft Order Limits (not including the 1 km wider study area), with additional auger points located where the draft Order Limits are wider to accommodate, for example, substation and CSE compounds
  - Preliminary areas proposed for land use change for BNG will also be covered by surveys where required (for example where the BNG habitat would constitute a change in land use away from agricultural production or which may result in a change in the land grade (for example rewetting of agricultural land). In addition, a peat survey will be undertaken where the Project crosses the River Waveney floodplain to determine the actual extent of fen peat soils
- Climatic data and Land Information System Soil Site Report

## PEIR Assessment Methodology

- 6.5.5 The preliminary Agriculture and Soils assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 6.5.6 The assessment draws on guidance set out by IEMA on how land and soil should be assessed in EIA (IEMA, 2022), and set out within the EIA Scoping Report.
- 6.5.7 The IEMA guidance seeks to move practice away from a narrow focus on quantifying and financially compensating effects on agricultural land and advocates a new and wider approach to assessing the soil functions, ecosystem services and natural capital provided by land and soils.
- 6.5.8 Published guidance relating to soils and land grade (as defined by the ALC system) is limited and therefore the approach is based on technical knowledge and previous experience. This takes account of highways guidance as set out in the DMRB LA109 which relates to soils and land grade and promotes assessment that is proportionate to the scale and nature of the Project and the likely effects on soils.
- 6.5.9 The assessment draws on the guidance above to determine preliminary residual effects.

## Preliminary Assessment Key Parameters and Assumptions

- 6.5.10 The assessment has been undertaken based on the preliminary Project design information. This information is iterative and will be updated in the ES as the design evolves and any changes are made. Which may lead to changes in land-take and soil disturbance, both of which will be accounted for in the assessment presented in the ES.
- 6.5.11 For the preliminary assessment, it is assumed that all areas temporarily disturbed during construction would be reinstated and the existing land use resumed. Permanent land take relates to the CSE compounds, pylon bases, new EACN Substation and modified substations at Norwich Main, Bramford and Tilbury. All areas will be reassessed in the ES based on the design presented in the DCO application when further details are available about the proposals and extent of land use change.
- 6.5.12 The key parameters and assumptions will be reviewed based on the design presented in the DCO application and where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

## Further Assessment within the ES

- 6.5.13 The ES will present a detailed assessment in accordance with IEMA guidance with the significance of the effect on a receptor presented during construction and operation

(and maintenance) (where relevant), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.

- 6.5.14 The value / sensitivity of receptors will be informed by the ALC surveys undertaken which will classify agricultural land affected by the Project and provide details of the characteristics of the soils and the nature of the functions they provide.
- 6.5.15 Professional judgement will also be used when allocating significance. This is of relevance where the assessment is based on a qualitative approach and the significance of effect is a matter of judgement rather than a quantified outcome. Explanatory text will be provided to explain how professional judgement, where used, has determined the significance value. Where the matrix indicates two or more levels of significance are possible, professional judgement will be applied to determine the level of significance.
- 6.5.16 The assessment of significance will include the reasoned argument setting out the rationale for the value, magnitude, and significance of effect.

## 6.6 Baseline Conditions

- 6.6.1 Baseline conditions have been gathered from desk-based information, and presented with reference to the section of the Project that they are located.

### Geology

- 6.6.2 The solid geology underlying the northern section (Sections A and B, South Norfolk District and Mid Suffolk District) of the study area is predominately described as comprising of the Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk. Most of this northern section is also overlain by superficial sedimentary deposits of Lowestoft formation - diamicton, formed during the Quaternary period (BGS Geology Viewer, 2022).
- 6.6.3 For the remainder of the Project, south of Ipswich (Sections C-H), there are multiple bedrock formations mapped as being present, primary amongst them are the Thames Group - Clay, silt and sand, and the London Clay Formation (BGS Geology Viewer, 2022).
- 6.6.4 Further detail is included within Chapter 9: Contaminated Land, Geology and Hydrogeology.

### Soils

- 6.6.5 Predominant soil types within the study area are slightly acidic loamy and clayey soils with impeded drainage with moderate to high fertility, and slowly permeable seasonally wet, slightly acidic but base-rich loamy and clayey with moderate fertility. The soil types through the southern section (Sections C-H; Babergh District, Colchester District and Tendring District through to Thurrock) of the study area also show a high prevalence of soils described as freely draining, slightly acidic loamy soils. The study area also includes small areas of fen peat soils near Roydon and Diss in south Norfolk (Sections A and B) (Figure 6.6: Soils Mapping in Volume II).

6.6.6 The main Soil Associations (representing a group of soil series (soil types) which are typically found occurring together in the landscape) have been identified within the study area (Soil Survey of England and Wales, 1983) as follows:

- Burlingham 3: Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some fine or coarse loamy over clayey soils and some deep well drained coarse loamy over clayey, fine loamy and sandy soils
- Beccles 2: Slowly permeable seasonally waterlogged fine and coarse loamy over clayey soils. Some deep sandy soils affected by groundwater
- Mendham: Deep peat soils associated with clayey over sandy soils, in part very acid with high groundwater levels and risk of flooding
- Ashley: Fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging associated with similar but wetter soils. Some calcareous and non-calcareous slowly permeable clayey soils
- Hanslope: Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils, all with a slight risk of erosion
- Beccles 3: Slowly permeable seasonally waterlogged fine loamy over clayey soils and similar soils with only slight seasonal waterlogging. Some calcareous clayey soils especially on steeper slopes
- Melford: Deep well drained fine loamy over clayey, coarse loamy over clayey and fine loamy soils, some with calcareous clayey subsoils
- Tendring: Deep often stoneless coarse loamy soils. Some slowly permeable seasonally waterlogged coarse and fine loamy over clayey soils
- Oak 2: Slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some clayey soils with chalky subsoil
- Ludford: Deep well drained fine loamy, coarse loamy and sandy soils, locally flinty in places over gravel. Slight risk of water erosion
- Stretham: Deep well drained calcareous clayey soils associated with similar but slowly permeable soils
- Windsor: Slowly permeable seasonally waterlogged clayey soils mostly with brown subsoils. Some fine loamy over clayey and fine silty over clayey soils and, locally on slopes, clayey soils with only slight seasonal waterlogging
- Fyfield 4: Deep well drained often stoneless coarse loamy and sandy soils. Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging and some slowly permeable seasonally waterlogged fine loamy over clayey soils. Risk of water erosion

## Agricultural Land Classification

6.6.7 Provisional ALC mapping, presented on Figure 6.2: Provisional ALC Mapping in Volume II, shows that the study area is comprised of predominately Grade 2 and Grade 3 land,

with Grade 1 largely recorded around the Burnt Heath area (Section C). This mapping, at a scale of 1:250,000, does not distinguish between Grades 3a and 3b (and cannot be used to inform site specific assessments) but provides an indication of the likely land classification. The Provisional ALC information available suggests that a large proportion of the study area may comprise BMV land. BMV land comprises land in Grades 1, 2, and 3a.

- 6.6.8 Climate is unlikely to pose an overall limitation on ALC grade in relation to the criteria set out in the ALC Guidelines (MAFF, 1988). Climate does, however, have an important influence on the interactive limitations of soil wetness and soil droughtiness, which is the balance between rainfall and water losses from the soil. The study area has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.
- 6.6.9 Desk based detailed ALC mapping is only partially available for the study area and is presented on Figure 6.3: Detailed ALC Mapping (Post-1988) in Volume II. The small areas of surveyed land (MAGIC website (Defra, 2022)) show ALC grades ranging from Grade 1 through to Grade 3b, confirming the likelihood of BMV land being present within the study area.
- 6.6.10 Due to the scale of the Project, information presented in the profiles of the National Character Areas (NCAs) provides an indication of the extent of each grade of land (Natural England, 2014), which can be compared to the extent of each grade at a national level. Nationally, 65.1% of land in England (Ministry of Agriculture, Fisheries and Food, 1983) is provisionally graded as Grades 1, 2 and 3 (and therefore likely to comprise BMV land). A draft is set out in Table 6.2.

**Table 6.2 - Provisionally mapped Best and Most Versatile land across the Project**

<b>Area</b>	<b>Project Section(s)</b>	<b>Extent of Grades 1, 2 and 3 land (ha)</b>	<b>% proportion</b>
England	-	8,493,646	65.1
South Norfolk District	A	81,993	90.2
Mid Suffolk District	B	83,878	96.3
Babergh District	C	57,058	95.6
Colchester District	C/D	26,798	80.3
Tendring District	C	27,183	80.7
Braintree District	E	58,547	95.7
Chelmsford District	F	29,280	85.5
Brentwood District	G	12,809	83.7
Basildon District	G/H	5,969	54.1
Thurrock	H	9,662	58.7

6.6.11 The Project extends through six NCAs (NCA78, NCA79, NCA80, NCA83, NCA86 and NCA111 - from Central North Norfolk to the Northern Thames Basin). Table 6.3 presents the extent of each grade Provisionally mapped across the NCAs.

Table 6.3 - Provisional Agricultural Land Classifications by area (ha) for the NCA profiles across the Project

<b>ALC Grade</b>	<b>NCA 78: Central North Norfolk [Area (%)]</b>	<b>NCA 79: North East Norfolk and Flegg [Area (%)]</b>	<b>NCA 80: The Broads [Area (%)]</b>	<b>NCA 83: South Norfolk and High Suffolk Claylands [Area (%)]</b>	<b>NCA 86: South Suffolk and North Essex Claylands [Area (%)]</b>	<b>NCA 111: Northern Thames Basin [Area (%)]</b>
Grade 1	973 (1%)	9,018 (37%)	6,004 (10%)	0 (0%)	0 (0%)	23 (<1%)
Grade 2	18,169 (25%)	7,639 (31%)	7,701 (13%)	30,596 (15%)	199,378 (61%)	28,676 (11%)
Grade 3	41,178 (57%)	5,659 (23%)	31,078 (55%)	171,364 (80%)	109,676 (33%)	120,556 (48%)
Total extent of Grades 1, 2 and 3	60,320 (83%)	22,316 (91%)	44,783 (78%)	210,960 (95)	309,054 (94%)	149,255 (60%)
Grade 4	1,888 (3%)	0 (0%)	3,036 (5%)	11,530 (5%)	2,280 (1%)	5,418 (2%)
Grade 5	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	39 (<1%)
Non-agricultural	6,547 (9%)	762 (3%)	6,795 (12%)	169 (<1%)	4,620 (1%)	19,032 (8%)
Urban	3,280 (5%)	1,573 (6%)	1,676 (3%)	857 (<1%)	13,034 (4%)	70,745 (28%)

6.6.12 This information shows that in the regions that the Project passes through there is generally a greater proportion of higher-grade agricultural land than compared to the average for England. Whilst the Provisional ALC mapping does not distinguish between Grades 3a and 3b, and thus does not correlate directly with the proportion of BMV present, it provides an indication that these areas are likely to comprise a greater extent of BMV land than compared to the average for England.

## Land Use

6.6.13 Detailed aerial photography and OS Mapping shows the agricultural land use across the study area appears to be a combination of arable and pasture land.

- 6.6.14 There are areas of land within the study area under Countryside Stewardship Agreements (Middle and Higher Tier<sup>36</sup>), and areas of land to the south of Great Tey (Section D) and Edney Common (Section F) designated as being under both entry level plus higher-level stewardship, as well as organic entry level plus higher-level stewardship agreements. This is shown on Figure 6.4: Agri-environmental and Forestry Schemes in Volume II. Multiple small areas of land across the whole study area are also noted as being under Woodland Grant schemes<sup>37</sup>, as presented in Figure 6.5: Woodland Grant Schemes in Volume II.

## Future Baseline

- 6.6.15 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 6.6.16 It is considered that the baseline in relation to soils and ALC grades would not change from that described in the baseline within the timeframe for the construction of the Project. While there may be potential changes in relation to climate change, including greater rainfall intensity and frequency of droughts, that could affect soil conditions, land grade, and farming practices, it is likely that these would only be visible over longer time frames.
- 6.6.17 There could potentially be changes to land management practices and business approaches across the landowners/ land managers over the construction and operation (and maintenance) of the Project.

## 6.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 6.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 6.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 6.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Those relevant to Agriculture and Soils include:

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<sup>36</sup> Higher Tier agreements are for multi-year options and capital items for the most environmentally important sites, including commons and woodlands. These are usually in places that need complex management, such as creating or restoring habitats and improving woodland. Middle Tier agreements aim to protect and enhance the natural environment through multi-year management grants and capital grants to improve diversity of wildlife, water quality, air quality and natural flood management.

<sup>37</sup> Woodland Grant Schemes (WGS) comprise grants and other incentives for woodland creation, maintenance, management and tree health. WGS 1, 2 and 3 were time based, with WGS1 being replaced by WGS2 etc.

- The Project has committed to delivering minimum 10% BNG - The Project would deliver an overall net improvement to biodiversity in the area through a combination of on-site and off-site mitigation. A full BNG assessment will be submitted with the application. Biodiversity enhancements are likely to benefit several soil functions
- Sensitive routeing and siting - Avoid and reduce as far as practicable effects on identified environmental and socio-economics receptors
- The design would allow for landscape planting around CSE compounds and the new EACN Substation - This would reduce the effects on views and landscape setting. This would also support BNG

## Standard Mitigation

- 6.7.4 Standard mitigation measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 6.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant good practice measures relating to Agriculture and Soils. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- GG03: A CoCP will be produced prior to the defined 'commencement' of construction – which will be defined within the DCO
  - GG06: A record of condition will 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
  - GG07: Land used temporarily will be reinstated where practicable to its pre-construction condition and use (or a condition discussed with the landowner). Hedgerows, fences, and walls (including associated earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed, in discussion with the with landowner and to the satisfaction of National Grid
  - GG10: The Project will be constructed in compliance with the required Environmental Control Plans (ECPs). Those which are relevant to this chapter which are anticipated to be required, at this stage include a LEMP and Soil Resources Plan (including but not limited to details of soil resources present, soil management and storage, and measures for soil restoration) (details of the contents of this plan will be included within the Outline CoCP)
  - GG29: Earthwork mounds and stockpiled soil will be protected (to avoid dust generation) by covering, seeding, or using water suppression where appropriate (to be determined by the soil types and the likely storage duration)
  - GG34: Where necessary, stone pads will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used. The stone pads will

provide stable working areas and will reduce disturbance to the ground by spreading loads and reducing soil compaction. Also refer to the detail provided for AS10 below

- AS01: Soil management measures will be detailed in a Soil Resources Plan (SRP) which will form part of the CoCP (a draft SRP will be appended to the Outline CoCP within the DCO application). Measures will include but not be limited to the following:
  - Details of the soil resources present
  - How the topsoil and subsoil will be stripped and stockpiled
  - Suitable conditions for when handling soil will be undertaken
  - Indicative soil storage locations
  - How soil stockpiles will be designed taking into consideration site conditions and the nature/ composition of the soil
  - Specific measures for managing sensitive soils
  - Suitable protective surfacing where soil stripping can be avoided, based on sensitivity of the environment and proposed works
  - Approach to reinstating soil that has been compacted, where required
  - Details of measures required for soil restoration
- AS02: Land required temporarily for construction will be returned to its former use / condition or a use / condition as discussed with the landowner, where practicable
- AS03: Where practicable and safe to do so, existing access to and from residential, commercial, community and agricultural land uses will be maintained throughout the construction phase or as agreed through landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels will be communicated to affected parties at the start of the Project / at the start of the relevant sections, with any changes communicated in advance of the change being implemented. Where field-to-field access points require alteration because of construction, alternative field access will be provided in consultation with the landowner/ occupier
- AS04: Existing water supplies for livestock that have been notified to the project by the landowner before construction commences will be maintained or alternatives put in place in advance of any disturbance. Where supplies will be lost or access compromised by construction works, temporary alternative supplies will be provided where necessary. Water supplies will be reinstated following construction, where practicable
- AS05: Consultation with affected landowners will be carried out to investigate the current extent of land drainage. A scheme of pre-construction land drainage will be designed with the intent of maintaining the efficiency of the existing known land drainage system and to assist in maintaining the integrity of the working area during construction. The Project may include a system of 'cut-off' drains which feed into a new header drain and the Project will also consider surface water runoff measures. The Main Works Contractor(s) would ensure any affected land drains, within the

draft Order Limits, as a result of the Project, would be reinstated. Those outside the draft Order Limits will be the responsibility of the landowner

- AS06: Should animal bones be discovered during construction, which may indicate a potential burial site, works will cease, and advice will be sought from the Animal Health Regional Office on how to proceed, relevant to the origin and age of the materials found
- AS07: In the event of a notification by the Department for Environment, Food and Rural Affairs (Defra) of a disease outbreak in the vicinity of the site that requires the cessation of activities all movement of plant and vehicles between fields will cease. Advice will be sought from Defra to develop suitable working methods required to reduce the biosecurity risk associated with the continuation of works
- AS08: Where deemed necessary, clay bungs or other vertical barriers will be constructed within trench excavations by a suitably experienced person, to prevent the creation of preferential drainage pathways
- AS10: Stone pads will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used, as outlined in GG35. The stone pads will provide stable working areas and will reduce disturbance to the ground. The stone pad area will be stripped of the topsoil (and subsoil where required), which will be stored and reinstated (following removal of the stone pad material) in accordance with the soil management measures contained in the Outline CoCP

6.7.6 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

6.7.7 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

6.7.8 The assessment undertaken within this PEIR has not identified any requirements for additional mitigation at this stage.

## Waveney Valley Alternative

6.7.9 The Waveney Valley Alternative is likely to require the need for greater mitigation as the underground cabling would likely affect fen peat soils. Mitigation would need to be discussed and agreed with Natural England once soil characteristics are understood following the completion of surveys, if this option was taken forwards.

## 6.8 Potential Residual Effects and Preliminary Likely Significant Effects

6.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It

assumes that all mitigation - embedded (design measures) and standard practice measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).

- 6.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 6.8.3 A full detailed assessment will be presented within the ES submitted with the Development Consent Order application.

## Preliminary Construction Effects

### Soils and ALC

- 6.8.4 During construction there would be a potential loss of BMV land (ALC Grades 1, 2 and 3a) from agricultural productivity. To undertake this assessment, publicly available Provisional ALC data, and detailed data where available, has been used; as the Provisional ALC mapping does not differentiate between Grade 3a (BMV) and Grade 3b (non-BMV), a worst-case perspective has been taken and all land provisionally mapped as Grade 3 has the potential to be BMV land.
- 6.8.5 There would also be disturbance to soils, either from access for overhead line installation / removal, or due to the soil stripping required for underground cable installation, pylon footings, CSE compounds, substations and areas required temporarily (such as construction compounds, haul roads). There would also be the potential for effects on the ecosystem services the soils provide. Effective measures are set out within the Outline CoCP (submitted as part of the DCO application) (Appendix 4.1: Draft Outline CoCP is provided in Volume III) for soil handling, storage and reinstatement which would reduce effects on soils.
- 6.8.6 From the data available, it is calculated that 3,882 ha would be temporarily removed from agricultural production during construction, accounting for 97.60% of the total area within the draft Order Limits. Of this, 3,858 ha are provisionally mapped as Grades 1, 2 and 3 (therefore assumed to comprise BMV land) and as such the temporary removal is considered to have a temporary negative effect which would be significant. Construction phasing is likely to affect the amount of time land is removed from agricultural production, further detail will be presented in the ES.
- 6.8.1 The stripping and stockpiling of soil resources would have a temporary effect on the soil ecosystem services provided. This would include effects to floodplain and fen peat soils, potentially effecting soil hydrology and soil carbon storage. The implementation of effective soil handling, storage and reinstatement measures would therefore be critical in ensuring minimisation of effects on these functions and their successful restoration. Given the scale of the Project and construction activity required it is considered that the effect of the construction phase on soil quality and its associated ecosystem services is assessed as being a negative and significant effect.
- 6.8.2 All land required (including areas where soils have been disturbed) temporarily would be reinstated by the end of the construction phase.

### Waveney Valley Alternative

- 6.8.3 A design alternative, comprising a section of underground cable, is currently being considered at the crossing of the Waveney Valley, as described in Table 4.3 in Chapter 4: Project Description.
- 6.8.4 The Waveney Valley Alternative design is considered to have the same potential effects on the same receptors as described above, albeit effects may be different in magnitude depending on the construction approach used for undergrounding.
- 6.8.5 The use of open cut techniques in the Waveney Valley Alternative could increase the risk of damage and effects on soil materials. The implementation of good practice handling and soil management practices should minimise the potential for permanent reduction in soil quality and function, although special consideration will be needed for areas of sensitive peat soils within the draft Order Limits. Should trenchless techniques be used where there are fen peat soils this will limit the potential effects to this sensitive receptor.
- 6.8.6 The design alternative at the Waveney Valley would not alter the overall assessment of significance set out in paragraphs 6.8.6 and 6.8.7 above which is a temporary negative effect on BMV land and soils (which would be considered significant).

### Land Use

- 6.8.7 During construction there would be potential effects on agricultural operations due to disturbance (where livestock are present), fragmentation, access restrictions or disruption to water supplies or land drainage. Commitments set out within the Outline CoCP (submitted as part of the DCO application) to maintain access throughout construction, would minimise the effects on agricultural landholdings. Potential effects on land drainage are covered in Chapter 12: Hydrology and Land Drainage.
- 6.8.8 By the end of construction, all land required temporarily would be reinstated and effects on agricultural operations during the construction phase would be dealt with through compensation agreements (which lies outside of the EIA process). It is therefore considered this would result in a neutral effect and would not be significant on land use.

### Waveney Valley Alternative

- 6.8.9 The Waveney Valley Alternative design is expected to result in broadly similar effects on land use as the overhead line design as the alternative may still affect agricultural operations, fragmentation, access restrictions or disruption to water supplies or land drainage – however, by the end of construction effects would likely be neutral and not significant.

## Preliminary Operational (and Maintenance) Effects

### Soils and ALC

- 6.8.10 During operation (and maintenance), there would be a permanent loss of areas of agricultural land and associated soils for the permanent infrastructure. The land grades

and soil types (including peat) affected permanently will be confirmed following surveys and fully assessed in the ES.

- 6.8.11 Preliminary assessments estimate that 48 ha of land would be permanently required for the footprint of the permanent infrastructure (including substation extensions or improvement works, one new substation and six CSE compounds (for the overhead line design at the Waveney Valley); additional land areas required for permanent access are still to be confirmed). Of this, 40 ha of land would be removed from agricultural production with 100% being provisionally classified as Grades 1, 2 and 3 (and thus for the purposes of this preliminary assessment assumed to comprise BMV land).
- 6.8.12 An additional 5 ha would also be required for the pylon footprints, with 98% of the pylons situated in areas also assumed to comprise BMV land. Available detailed mapping (from ALC surveys) confirms that part of the Norwich Main Substation footprint and the locations of pylons RG001, RG002, RG003, RG004, RG005, TB020, TB155, TB258 and TB259 overlap with BMV land (Grades 2, 3a and 3b).
- 6.8.13 An additional 6 ha land take is calculated for the permanent land take through the construction of the access roads associated with the CSE compounds and substations. Of this, just over 5ha (86%) is Provisionally classified as BMV land.
- 6.8.14 It is therefore considered that the permanent removal of 59 ha, of which 85% is considered likely to comprise BMV land, would be negative and have a significant effect.

### Waveney Valley Alternative

- 6.8.15 The Waveney Valley Alternative would result in an additional two CSE compounds, although fewer pylons than the overhead line design. Although the CSE compounds would affect more land than the pylon bases (equating to approximately an additional 1.1 ha of permanent land take), the Waveney Valley Alternative when compared to the overhead line design would have broadly similar potential effects on the same receptors and result in the same assessment conclusions – negative and a significant effect.

### Land Use

- 6.8.16 During operation (and maintenance), there would be limited effects on agricultural operations. There is the potential for restrictions to existing activities immediately over or adjacent to buried cables or under overhead lines, however, these would be dealt with through compensation agreements (which lie outside of the EIA process). Any maintenance or repair works required which would result in disturbance to agricultural operations would be undertaken in accordance with standard practice. Therefore, no significant effects on agricultural landholdings during operation (and maintenance) are anticipated and this aspect is proposed to be scoped out of the ES. This would be confirmed once the design to be presented in the DCO application has been reviewed in relation to the affected land uses.

## Waveney Valley Alternative

- 6.8.17 If the Waveney Valley Alternative were to be taken forwards, the predicted effects on land use during operation (and maintenance) would be broadly similar to those for the overhead line design for the reasons set out above.

## 6.9 Sensitivity Testing

### Flexibility in Construction Programme

- 6.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative Project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Section 6.9.

### Flexibility in Design

- 6.9.2 This chapter has assessed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing considering alternative pylon locations and underground cable route within the proposed LoD, has shown that there would be no new or different likely significant effects. The assessment produced in this chapter has considered all the land contained within the current draft Order Limits and as such any alternative locations for pylon position / cable route, within the proposed LoD, would have no significant effect on the assessment as reported in this chapter.

### Flexibility due to Design elements not fixed at Statutory Consultation

- 6.9.3 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that none of the alternatives would result in any new or different effects than reported in this PEIR chapter.

# 7. Air Quality

# 7. Air Quality

## 7.1 Introduction

7.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Air Quality. This chapter covers effects of the following during construction:

- Dust
- Traffic emissions
- Generator and Non-Road Mobile Machinery (NRMM) emissions

7.1.2 There are interrelationships related to the potential effects on Air Quality and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 8: Ecology and Biodiversity
- Chapter 10: Health and Wellbeing
- Chapter 11: Historic Environment
- Chapter 15: Socio-economics, Recreation and Tourism
- Chapter 16: Traffic and Transport

7.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III.

- Figure 7.1: Air Quality Study Area and Constraints
- Figure 7.2: Air Quality Background Concentrations (2019)
- Figure 7.3: Air Quality Background Concentrations (2028)
- Figure 7.4: Air Quality Construction Dust Study Area
- Figure 7.5: Air Quality Affected Road Network
- Figure 7.6: Air Quality Verification
- Appendix 7.1: Air Quality Assessment Methodology
- Appendix 7.2: Air Quality Baseline Data
- Appendix 7.3: Air Quality Assessment Results

## 7.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statements (NPS)

- 7.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the EN-1 (DESNZ, 2024). This is supported by NPS EN-3 (DESNZ, 2024). EN-1 states that energy projects have the potential to have adverse effects on Air Quality which has been considered within this chapter.
- 7.2.2 Paragraph 5.2.9 of EN-1 states that a project Environmental Statement (ES) should describe:
- *‘Existing air quality concentrations and the relative change in air quality from existing levels.*
  - *Any significant air quality effects mitigation action taken and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project.*
  - *The predicted absolute emission levels of the proposed project, after mitigation methods have been applied.*
  - *Any potential eutrophication impacts’*
- 7.2.3 Paragraph 5.2.13 states *‘The Secretary of State (SoS) should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. The SoS should have regard to the Air Quality Strategy in England or any successor to it and should consider relevant advice within Local Air Quality Management guidance’.*
- 7.2.4 NPS EN-5 makes no specific reference to Air Quality.
- 7.2.5 This assessment has been carried out in accordance with the NPS EN-1.

### Other National Legislation and Policy

- 7.2.6 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- Environment Act 2021
  - Air Quality Standards Regulations 2019
  - Environmental Protection Act (EPA) 1990
  - Air Quality (England) Regulations 2000
  - The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018
  - NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance

## Regional and Local Policy

7.2.7 Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy. Key local policy relevant to Air Quality, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Babergh and Mid Suffolk Joint Local Plan – Part 1 (Babergh and Mid Suffolk District Council, 2023)
- Basildon District Council Local Plan (Basildon District Council, 2007)<sup>38</sup>
- Braintree District Local Plan 2033 (Braintree District Council, 2021)
- Brentwood Local Plan 2016 – 2033 (Brentwood Borough Council, 2022)
- Chelmsford Local Plan (Chelmsford City Council, 2020)
- Colchester City Local Plan (Colchester City Council, 2022)
- Joint Core Strategy for Broadland, Norwich, and South Norfolk (Broadland, Norwich and South Norfolk District Council, 2014)
- Ipswich Local Plan 2018-2036 (Ipswich Borough Council, 2022)
- Thurrock Core Strategy and Policies for Management and Development (Thurrock Council, 2015)

## Guidance

7.2.8 Relevant guidance, specific to Air Quality, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Guidance on the Assessment on Dust from Demolition and Construction V2.2 (Institute of Air Quality Management (IAQM, 2024)
- Land Use Planning and Development Control: Planning for Air Quality (IAQM, 2017)

## Air Quality Objectives

7.2.9 Table 7.1 sets out the national air quality standards for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

Table 7.1 - Air Quality Standards

Pollutant	Averaging Period	Air Quality Standard
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour mean	200 µg/m <sup>3</sup> , not to be exceeded more than 18 times a year (99.79 <sup>th</sup> percentile)
	Annual mean	40 µg/m <sup>3</sup>

<sup>38</sup> A new Local Plan is currently in development

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Air Quality Standard</b>
Particulate matter (PM <sub>10</sub> )	Daily mean	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year (90.4 <sup>th</sup> percentile)
	Annual mean	40 µg/m <sup>3</sup>
Particulate matter (PM <sub>2.5</sub> )	Annual mean	12 µg/m <sup>3</sup>
		10 µg/m <sup>3</sup>
<p>Note: The current target for PM<sub>2.5</sub> is 20 µg/m<sup>3</sup>, however the Environmental Targets (Fine Particular Matter) (England) Regulations 2023, state that the annual mean level of PM<sub>2.5</sub> in ambient air must be equal to or less than 10 µg/m<sup>3</sup> ('the target level') by 31 December 2040. The Environmental Improvement Plan (2023) sets an interim target of 12 µg/m<sup>3</sup>, to be achieved by 31 January 2028.</p>		

### 7.3 Scoping Opinion

- 7.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate (2022) on behalf of the Secretary of State, following the submission of the Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 7.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Air Quality is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 7.4.

### 7.4 Project Engagement and Consultation

- 7.4.1 National Grid has held several meetings with relevant consultees including local authorities along the Project.
- 7.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 7.2.

Table 7.2 - Stakeholder Engagement

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
Babergh District Council, Mid Suffolk District Council, Thurrock Borough Council, South Norfolk District Council, Mid Suffolk District Council, Essex County	A letter was issued to Local Planning Authorities setting out the proposed methodology and scope. Generally, responses outlined agreement with the proposed methodology. Responses outlined that construction dust should be assessed fully in a Code of Construction Practice (CoCP) and that	Construction traffic emissions have been scoped into assessment, and consideration of construction dust is assessed, and mitigation is included

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Council, Braintree District Council, Chelmsford City Council, Basildon Borough Council, Colchester City Council, September 2022	most recent available baseline data must be used for assessment. It was recommended that the basis for the sensitivity and magnitude criteria, and the assessment matrix, are provided in the EIA Scoping Report to clarify under what conditions effects would be regarded as significant.	within Appendix 4.1: Draft Outline CoCP in Volume III. The details of the sensitivity and magnitude criteria used in the assessment are provided in Table 7.3 and will be included within the ES.

## 7.5 PEIR Approach and Methods

7.5.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology / approach used to undertake the preliminary assessment on Air Quality. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

#### Baseline

7.5.2 The baseline study area has included a review of sources and available monitoring data within 2 km of the draft Order Limits. The 2 km area reflects industry standard / good practice and considered appropriate in order to understand the effects from local sources such as roads and industrial processes and to gather a suitably representative baseline monitoring data set.

#### Construction Dust

7.5.3 As defined in the EIA Scoping Report (National Grid, 2022), the study area for construction dust comprises:

- 250 m from the draft Order Limits (50 m for ecological effects)
- 50 m from the routes used by construction vehicles on the public highway, up to 250 m from the construction site entrance along haul roads used by HGVs

7.5.4 The study area is in accordance with the IAQM dust guidance (IAQM, 2024). The study areas' sensitivity to dust soiling, health and ecological effects has been determined through assessing the number of receptors and their sensitivity to dust soiling and health effects within 20 m, 50 m, 100 m, and 250 m from the draft Order Limits. This study area is presented on Figure 7.4: Air Quality Construction Dust Study Area in Volume II.

## Construction Traffic

7.5.5 The study area for construction traffic emissions has been determined from the Primary Access Routes (shown on Figure 16.1: Primary Access Routes in Volume II) and predicted traffic numbers. For the assessment of construction traffic emissions, the criteria from the IAQM/EPUK guidance (IAQM, 2017) have been used to determine the affected road network (ARN). The ARN includes all roads in the traffic model which are predicted to experience changes (as a result of the Project), due to:

- A change of Light Duty Vehicle (LDV)<sup>39</sup> flows of more than 100 Annual Average Daily Traffic (AADT) movements within or adjacent to an Air Quality Management Area (AQMA), or more than 500 AADT elsewhere, and
- A change of Heavy-Duty Vehicle (HDV)<sup>40</sup> flows of more than 25 AADT movements within or adjacent to an AQMA, or more than 100 AADT elsewhere

7.5.6 In areas where the above criteria are met, human receptors within 200 m of the road within the ARN are scoped into the assessment. The study area for the construction traffic assessment is shown in Figure 7.5: Air Quality Affected Road Network in Volume II.

## Generator Use/NRMM

7.5.7 No specific guidance exists on the definition of a study area from NRMM and generator emissions due to the large variation in potential effects from different types of sources. For the purposes of this assessment, a study area of up to a 100 m radius from the compound areas listed within Chapter 4: Project Description is considered appropriate given the potential size and duration of the operations to be undertaken and the likely size of plant required. Beyond this distance it is considered that the effect of any emissions on local Air Quality would be very limited. The scoping report suggested that the NRMM and generators in other areas, due to their size and temporary use, to be scoped out from the assessment. However, this assumption was not approved in the EIA Scoping Opinion (Planning Inspectorate, 2022). Therefore, additional assessment is required in the ES (refer to paragraph 16.4.29). The compound areas and associated study areas are presented on Figure 7.4: Air Quality Construction Dust Study Area in Volume II.

## Temporal Scope

7.5.8 The Air Quality assessment considers the following scenarios:

- Baseline (2019 (as agreed with the Local Highways Authority) to align with the traffic baseline data)
- 2028 'Without Development' without Project construction traffic (or Do-Minimum (DM)) and

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<sup>39</sup> LDV (vehicles up to 3.5 tonnes)

<sup>40</sup> HDV (vehicles greater than 3.5 tonnes, e.g. heavy good vehicles (HGVs), buses, coaches and 'vocational' vehicles such as gritters, refuse collection vehicles). HGVs are relevant for construction impacts, therefore they are the only type of HDV used for the Project. Also, the best practice mitigation refers to HGVs.

- 2028 ‘With Development’ with Project construction traffic (or Do-Something (DS))

7.5.1 The maximum annual average daily traffic flows are predicted to occur in 2028 and therefore this year has been used as the future scenario.

## Existing Baseline

### Data Collection

7.5.2 To provide an assessment of the significance of any new project (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area(s). The baseline year for this assessment is 2019, to align with the traffic baseline data. This provides a reference level against which any potential changes in air quality can be assessed. Since the baseline air quality is predicted to change in the future (mainly because vehicle emissions are changing), the future baseline situation has also been predicted for 2028 to present a reasonable worst-case assessment. The DM scenario is the predicted future baseline for the relevant assessment year without the Project and includes any other development with a high level of certainty of being built.

7.5.3 The baseline assessment has drawn on the following key information sources:

- Defra Background Air Quality Archive (2019-base year) (Defra, 2021)
- Defra AQMA dataset (Defra, 2022)
- Local Air Quality Management Reports (as listed in the baseline section)
- Environment Agency register on industrial installations
- OS mapping to identify sensitive human receptors such as, residential properties, schools, hospitals, and care homes
- Magic Mapping to identify statutory and non-statutory designated sites including, SPAs, SACs, Ramsar Sites, SSSIs, NNRs, LNRs and areas of Ancient Woodland

7.5.4 No site surveys to gather baseline information have been undertaken as background air quality information is available and has been sourced from Defra and the relevant planning authorities as part of their obligations under the Environment Act 2021.

### Further Data to be collected to inform the ES

7.5.5 In addition to the data collected for this PEIR, the ES will be informed by any baseline data required if there are changes to the study area(s), for example because of updated draft Order Limits or changes to traffic flows.

## PEIR Assessment Methodology

7.5.6 The preliminary Air Quality assessment determines if effects arising from the Project, following the implementation of mitigation, are likely to be significant. All conclusions and assessments are by their nature preliminary.

## Construction Dust Assessment Methodology

- 7.5.7 The effects from construction of the Project have been assessed using the qualitative approach described in the latest guidance by the IAQM (IAQM, 2024), which considers the potential for dust emissions from demolition, earthworks, construction and trackout<sup>41</sup> activities.
- 7.5.8 For each of these dust-generating activities, the guidance considers three separate effects:
- Annoyance due to dust soiling
  - Harm to ecological receptors
  - The risk of health effects due to a significant increase in PM<sub>10</sub> exposure
- 7.5.9 The methodology considers the scale on which the above effects are predicted to be generated (classed as small, medium, or large), the levels of background PM<sub>10</sub> concentration and the distance to the closest receptor, to determine the sensitivity of the area. This is then taken into consideration when determining the overall risk for the Project. Suitable mitigation measures are also proposed to reduce the risk of the Project. Further detail on the construction dust assessment methodology, including sensitivity and magnitude criteria, is included in Appendix 7.1: Air Quality Assessment Methodology in Volume III.

## Construction Traffic Assessment Methodology

- 7.5.10 The assessment of the effects of emissions from construction traffic is based on the IAQM Air Quality for Planning guidance (IAQM, 2017). This provides screening criteria (as mentioned in Section 7.5.4 above) indicating the thresholds above which an assessment may be necessary. There are thresholds for the daily flows of light duty vehicles and heavy-duty vehicles (>3.5 t), which vary depending on whether AQMA are present or not. Meeting either of the respective criteria indicates that detailed dispersion modelling of the road traffic emissions is necessary. Further detail on the construction traffic assessment methodology, is included in Appendix 7.1: Air Quality Assessment Methodology in Volume III.
- 7.5.11 Traffic data for the Project represents the annual average daily traffic flows, with reference to the following parameters:
- AADT flow, defined as vehicles/hour
  - Percentage Heavy Duty Vehicles (HDV)
  - Traffic speeds

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<sup>41</sup> IAQM guidance defines the Trackout as the transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

- 7.5.12 The available traffic data indicates that the screening threshold of 100 AADT of HDVs (>3.5 t) outside of AQMAs is exceeded on the local road network. There are two roads that are adjacent to the AQMAs where the screening threshold of 25 AADT of HDVs have been applied. The A1089 Ferry Road, west of Fort Road which is adjacent to the AQMA 24 (Thurrock Borough Council) and the A12 road south of Eight Ash Green which is adjacent to Area 4 - Lucy Lane North, Stanway AQMA. Therefore, a detailed assessment has been carried out to determine the concentrations of pollutants in ambient air at human or ecological receptors adjacent to the ARN. The ARN is shown at Figure 7.5: Air Quality Affected Road Network in Volume III.
- 7.5.13 Effects from changes to air pollutant concentrations because of additional road traffic have been predicted using Atmospheric Dispersion Modelling Software (ADMS) and the specific model used for the PEIR is ADMS-Roads. The model verification and model set up are detailed in Appendix 7.3: Air Quality Assessment Results in Volume III.
- 7.5.14 In order to carry out model verification and the process of comparing modelling outputs with real world monitoring results, the model was extended to assess the concentrations at locations where existing monitoring is located. Verification site locations are identified on Figure 7.6: Air Quality Verification in Volume II.
- 7.5.15 Annual mean concentrations of NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> have been estimated for comparison with the relevant air quality standards (refer to Table 7.1).

### Impact Magnitude

- 7.5.16 The magnitude of change for construction traffic emissions has been assigned based on the criteria from IAQM Land-use Planning and Development Control: Planning for Air Quality. v1.2 (IAQM 2017) which is presented in Table 7.3.

Table 7.3 - IAQM Impact Magnitude Criteria

Long-term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to the Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

### Significance

- 7.5.17 Preliminary likely significant effects have been assessed using professional judgement considering the sensitivity (or value) of the receptor, 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.

- 7.5.18 It is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

### **Generator Use/NRMM Assessment Methodology**

- 7.5.19 At the time of writing, the locations and usage of generators/NRMM are unknown. Within this PEIR, a qualitative assessment based on expected locations and use of generators/NRMM during construction has been carried out to inform likely effects. This includes indicating if effects are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. This assessment considers any mitigation and commitments on emission standards for engines and plant to be used in construction, included within Appendix 4.1: Draft Outline CoCP in Volume III.
- 7.5.20 The effect of NRMM and generator use on ecological sites is scoped out of the assessment as generator operation would be intermittent and occur for sporadic periods at differing locations within the draft Order Limits throughout the temporary construction stage. It is not considered that emitted pollutants would occur over a long enough time to have a material effect on rates of pollutant deposition.

### **Preliminary Assessment Key Parameters and Assumptions**

- 7.5.21 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes accounted for in the assessment.
- 7.5.22 All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project).
- 7.5.23 The key parameters and assumptions will be reviewed based on the final design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

### **Construction Dust Assumptions and Limitations**

- 7.5.24 Dust effects have been assumed to occur across the full area within the draft Order Limits, this is a conservative assumption included to cover all potential effects.
- 7.5.25 Where there is uncertainty on volumes of earth works a 'large' magnitude has been assumed to provide a worst-case assessment.

### **Construction Traffic Assumptions and Limitations**

- 7.5.26 Air quality dispersion modelling has inherent areas of uncertainty, including:
- Traffic data used in the model
  - Traffic emissions data

- Simplifications in model algorithms and empirical relationships that are used to simulate complex physical and chemical processes in the atmosphere;
- Background concentrations
- Meteorological data

7.5.27 These limitations have been overcome as far as possible by verifying the modelled concentrations against monitoring results in appropriate locations. The traffic data used is appropriate for the purposes of this air quality assessment.

7.5.28 The PEIR considers two design alternatives at the Waveney Valley, as detailed in Table 4.3 in Chapter 4: Project Description, an overhead line design and an underground cable alternative. The quantitative preliminary assessment within this chapter uses traffic data, provided by the FEED, for the overhead line solution at the Waveney Valley. However, for the Waveney Valley Alternative, this chapter provides text describing how the traffic numbers would differ from the overhead line solution which are based on recently received data and professional judgement. An assessment of the preferred option will be provided within the ES.

### **Generators and NRMM Assumptions and Limitations**

7.5.29 As generator and NRMM information is not available at this stage a further review will be carried out and presented in the ES. The assessment will include, where possible information on the type, number, location, or operational hours of such machinery.

### **Further Assessment within the ES**

7.5.30 The ES will present a detailed assessment in accordance with industry good practice guidance as detailed in the methodology (section 7.5).

7.5.31 The following assessment will be conducted and presented within the ES:

- Construction dust assessment
- Construction traffic assessment
- Generators and NRMM assessment

## **7.6 Baseline Conditions**

7.6.1 This section provides a description of the existing and future air quality conditions in the 2 km buffer from the draft Order Limits, which is defined as the study area for the baseline assessment. Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic, and natural sources.

7.6.2 Baseline conditions have been gathered from desk-based information and presented with reference to the section of the Project that they are located.

## Sources of Air Pollution

### Industrial Processes

- 7.6.3 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, regulated through the Pollution Prevention and Control (PPC) system. The larger more polluting processes (Part A) are regulated by the Environment Agency, and the smaller fewer polluting ones (Part B) by the local authorities. Local authorities tend also to regulate only for emissions to air, whereas the Environment Agency regulates emissions to air, water and land.
- 7.6.4 There are nine Part A industrial processes with emissions to air identified within the 2 km buffer from the draft Order Limits, as shown in Table A7.2.1: Part A Processes of Appendix 7.2: Air Quality Baseline in Volume III and presented on Figure 7.1: Air Quality Study Area and Constraints in Volume II. An area of 2 km is included for the review of Part A processes as they are large emitters which can have an effect on local air quality. The distance of 2 km is selected following Environment Agency guidance which sets the screening distances for Part A processes. There is one Part A industrial process located within the draft Order Limits. This process is Chelmsford Compressor Station operated by National Grid (Permit EPR/LP3839LV).
- 7.6.5 The contribution of all industrial processes to local air quality are assumed to be included in the background concentrations presented in this section.

### Road Traffic

- 7.6.6 In recent decades, atmospheric emissions from transport on a national basis have grown to match or exceed other sources in respect to many pollutants, particularly in urban areas. The local air quality around the Project is expected to be influenced by vehicle emissions.
- 7.6.7 Where local roads are scoped into the ARN their emissions have been explicitly modelled. Due to the limited extent of the road network, emissions from vehicles have not been removed from the background data provided by Defra.

## Local Air Quality Management

- 7.6.8 The Environment Act 2021 requires local authorities to report to Defra on local air quality and local air quality management within their local authority area. This also requires an assessment of compliance with the relevant limit or objective values. The Project and draft Order Limits pass through ten district and unitary authority areas (together with an additional three county councils) (refer to Figure 1.1: Site Location Plan in Volume II). In addition, there are a further two local authorities within 2 km of the draft Order Limits.
- 7.6.9 The 12 local authorities within the 2 km of the draft Order Limits comprise:
- Babergh District Council

- Basildon Borough Council
- Braintree District Council
- Brentwood Borough Council
- Chelmsford City Council
- Colchester City Council
- Gravesham Borough Council
- Ipswich Borough Council
- Mid Suffolk District Council
- South Norfolk District Council
- Tendring District Council
- Thurrock Borough Council

7.6.10 Where air quality objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an Air Quality Action Plan (AQAP) which includes measures to improve air quality in the AQMA.

7.6.11 There are three AQMAs within 2 km of the draft Order Limits (Figure 7.1: Air Quality Study Area and Constraints in Volume II) comprising:

- 239 Doc Road AQMA 24 (Thurrock Borough Council) (Section H)
- Gravesham A226 One-way system (Gravesham Borough Council) (Section H).
- Northfleet Industrial Area AQMA (Gravesham Borough Council) (Section H)

7.6.12 Additionally, AQMA Area 4, located in Lucy Lane North, Stanway (Colchester City Council) (Section D) although, not within the 2 km of the draft Order Limits, is within 200 m of the ARN.

7.6.13 These AQMAs have all been declared for exceedance of the NO<sub>2</sub> objective and limit value of 40 µg/m<sup>3</sup>. These AQMAs have identified road traffic as a predominant source of pollution.

## Local Air Quality Monitoring

7.6.14 The baseline study area (2 km from the draft Order Limits) extends into 12 local authorities (listed above paragraph 7.6.9). These local authorities carry out diffusion tube and automatic monitoring within the study area. Information from the monitoring has been used to establish baseline air quality conditions and is provided in the paragraphs that follow.

### Automatic Monitoring

7.6.15 There are three automatic monitoring stations, within 2 km of the draft Order Limits, located in Chelmsford City Council and Thurrock Borough Council. These are presented

in Table A7.2.2 of Appendix 7.2: Air Quality Baseline in Volume III and shown on Figure 7.1: Air Quality Study Area and Constraints in Volume II.

- 7.6.16 The most recent results for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are shown in Tables A7.2.3, Table A7.2.4, Table A7.2.5 respectively, within Appendix 7.2: Air Quality Baseline in Volume III.
- 7.6.17 No exceedances of the NO<sub>2</sub> annual mean objectives (40 µg/m<sup>3</sup>) were recorded at automatic monitoring stations between 2018 to 2022. No exceedances of the hourly mean NO<sub>2</sub> objective have been recorded between 2018 and 2022.
- 7.6.18 No exceedances of the PM<sub>10</sub> annual mean or 24-hour PM<sub>10</sub> mean objectives have been recorded at the automatic monitoring sites between 2018 and 2022.
- 7.6.19 No exceedances of the PM<sub>2.5</sub> annual mean objectives (interim target of 12 µg/m<sup>3</sup>, to be achieved by 31 January 2028) have been recorded at the automatic monitoring sites between 2018 and 2022.

### **Diffusion Tube Monitoring**

- 7.6.20 There are 49 diffusion tubes within 2 km of the draft Order Limits. The details of these monitors are provided in Table A7.2.6 within Appendix 7.2: Air Quality Baseline in Volume III and shown in Figure 7.1: Air Quality Study Area and Constraints in Volume II. The annual mean NO<sub>2</sub> concentration for 2018 to 2022 are shown in Table A7.2.7 within Appendix 7.2: Air Quality Baseline in Volume III. There are five roadside diffusion tube sites (GR13, GR24, GR31 GR47 and TILB (in Section H)) that exceeded the annual Air Quality Objective (AQO) of 40 µg/m<sup>3</sup>, within 2 km buffer of the draft Order Limits, in 2019. The maximum NO<sub>2</sub> concentration recorded by these sites in 2019 was 46.1 µg/m<sup>3</sup> at the GR13 roadside diffusion tube site approximately 1.8 km south-west of the draft Order Limits.
- 7.6.21 All other monitoring sites within 2 km of the draft Order Limits are below the AQO, in 2019.

### **Background Pollutant Concentrations**

- 7.6.22 Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and non-stationary sources, such as roads and industrial processes. The Defra website (Defra, 2021) includes estimated background pollutant concentrations for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> for each 1 km x 1 km OS Grid square in the UK.
- 7.6.23 The Defra background concentrations for NO<sub>2</sub> are well below the objective of 40 µg/m<sup>3</sup> across the draft Order Limits. The highest background NO<sub>2</sub> concentration, in 2019, was 23.3 µg/m<sup>3</sup> at East Tilbury (Section H). The lowest NO<sub>2</sub> background concentration was 6.8 µg/m<sup>3</sup> near to Gislingham (Section B) - refer to Figure 7.2: Air Quality Background Concentrations (2019) in Volume II.
- 7.6.24 The background concentrations of NO<sub>x</sub> (relevant to ecological receptors) in 2019 are generally below the objective within the draft Order Limits, however there are some exceedances of the limit value for the protection of vegetation of 30 µg/m<sup>3</sup>. The highest

background concentration of NO<sub>x</sub> is 36.1 µg/m<sup>3</sup> in East Tilbury (Section H), the minimum concentration is 8.6 µg/m<sup>3</sup> near to Gislingham (Section B).

- 7.6.25 The 2019 background concentrations of PM<sub>10</sub> did not exceed the objective (40 µg/m<sup>3</sup>). The highest concentration within the draft Order Limits was 20 µg/m<sup>3</sup> south of Aldham (Section D) and the lowest is 14.2 µg/m<sup>3</sup> east of Upper Layham (Section C).
- 7.6.26 In 2019, the highest background concentrations of PM<sub>2.5</sub> within the draft Order Limits was 12.3µg/m<sup>3</sup> north of Colchester (Section D) and the lowest concentration is 8.9 µg/m<sup>3</sup> at Newton Flotman (Section A).

## Receptors – Sensitive to Construction Dust

- 7.6.27 For the assessment of construction dust, the identification of receptors and their sensitivity to dust effects followed IAQM guidance (IAQM, 2024).
- 7.6.28 Sensitive human receptors are defined as residential properties, schools, hospitals, and care homes which are in areas which may experience a change in pollutant concentrations.
- 7.6.29 Along the draft Order Limits sensitive receptors include residential receptors, schools, and ecological receptors, which are shown on Figure 7.4: Air Quality Construction Dust Study Area in Volume II.
- 7.6.30 The draft Order Limits pass within 250 m of residential receptors in settlements such as Gislingham, Offton, Ardleigh, Little Waltham and Thurrock. There are also schools within 250 m of the draft Order Limits, including those in Little Waltham and Ardleigh.
- 7.6.31 A number of ecological receptors have been identified within the 50 m of the draft Order Limits. Details of the sensitive ecological receptors are provided in Table 7.4.

Table 7.4 – Sensitive Ecological Receptors within 50 m

Designated sites	Ecological Sites	Site Name
Statutory	Sites of Special Scientific Interest (SSSI)	Middle Wood, Offton (Section B)
		Marks Tey Brickpit (Section D)
		Wortham Ling (Section B)
Non-statutory	Local Nature Reserves (LNR)	Roydon Fen (Section A)
	Ancient Woodland (AW)	Aldamhall Wood (Section D)
		Brimlin Wood (Section C)
		Brickhouse Wood (Section E)
		Bullen Wood (Section B)
		Burstall Long Wood (Section C)
		Bushey Wood (Section F)
		Bushy Wood (Section F)

Designated sites	Ecological Sites	Site Name
		Chapel Wood (Section F)
		Fiddlers Wood (Section D)
		Friern Manor Wood (Section G)
		Harespring Wood (Section G)
		James's Wood (Section G)
		Lower Wood (Section B)
		Mann/parsons Woods (Section F and E)
		Middle Wood (Section B)
		Millers Wood (Section B)
		Osbornes Wood (Section F)
		Parkhill Wood (Section G)
		Rook Wood (Section F)
		Round Wood (Section B)
		Sheepcotes Wood (Section F)
		Somersham Park (Section B)
		Sparrowhawk Wood (Section F)
		Stitching Wood (Section D)
		Writtle-James Spring (Section F)
		Writtle-Writtlepark Wood (Section F)

## Future Baseline

- 7.6.32 The future baseline relates to known or anticipated changes to the current baseline in the future which will be assessed as part of the Project in the ES.
- 7.6.33 Even if the Project were not to come forward, there is likely to be a change to the future baseline conditions because of other factors and developments in proximity. The future baseline represents the conditions that would prevail 'Without Development' in place. The 'Without Development' scenario is used, where appropriate, as a comparator for the assessed case, to show the effect of the Project against an appropriate reference point.
- 7.6.34 Background air pollutant concentrations are currently available using 2018 base year for projections (Defra, 2021). These are predicted to improve over time due to reductions in emissions resulting from:
- Reductions in transport emissions resulting from improvements in fuel efficiency and uptake in low emission vehicles

- General reduction in the use of fossil fuels
- Reductions in pollutant emissions from agricultural sources due to improvements in management envisaged in the 2019 Clean Air Strategy (Defra, 2019)
- Improved emission standards for Non-Road Mobile Machinery and static generators

- 7.6.35 The 2028 Defra background concentrations for NO<sub>2</sub> are well below the objective of 40 µg/m<sup>3</sup> across the draft Order Limits. The highest background NO<sub>2</sub> concentration, in 2028, is 20.0 µg/m<sup>3</sup> at East Tilbury (Section H). The lowest NO<sub>2</sub> background concentration is 5.4 µg/m<sup>3</sup> near to Gislningham (Section B) - refer to Figure 7.3: Air Quality Background Concentrations (2028) in Volume II.
- 7.6.36 The 2028 background concentrations of NO<sub>x</sub> (relevant to ecological receptors) are below the limit value for the protection of vegetation of 30 µg/m<sup>3</sup> within the draft Order Limits. The highest background concentration of NO<sub>x</sub> is 29.9 µg/m<sup>3</sup> in East Tilbury (Section H), the lowest concentration is 6.7 µg/m<sup>3</sup> near to Gislningham (Section B).
- 7.6.37 The 2028 background concentrations of PM<sub>10</sub> do not exceed the objective (40 µg/m<sup>3</sup>). The highest concentration within the draft Order Limits is 18.6 µg/m<sup>3</sup> south of Aldham (Section D) and the lowest is 13.1 µg/m<sup>3</sup> east of Upper Layham (Section C).
- 7.6.38 The 2028 Defra background concentrations are below the recent PM<sub>2.5</sub> air quality guideline (12µg/m<sup>3</sup> to be achieved by 2028). The maximum concentration within the draft Order Limits is 10.8 µg/m<sup>3</sup> west of Colchester (Section D) and the lowest concentration is 8.1 µg/m<sup>3</sup> north of Winfarthing (Section A).
- 7.6.39 The Defra modelled concentrations for the year 2028 show reductions in both NO<sub>2</sub> and NO<sub>x</sub> levels within the draft Order Limits compared to the 2019 forecast. The forecast shows minimal changes in concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> between 2019 and 2028. Therefore, it is considered that the baseline in relation to Air Quality would not change significantly from that described in the baseline within the timeframe for the construction of the Project.

## 7.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 7.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 7.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 7.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. The alignment and associated draft Order Limits have been designed to avoid large residential and urban areas and consequently avoids areas of existing poor air quality. In addition, an almost continuous haul road is proposed as part of the design to reduce construction traffic using the local highway network.

## Standard Mitigation

- 7.7.4 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 7.7.5 Appendix 4.1: Draft Outline CoCP in Volume III (Reference AQ1) contains a list of relevant standard mitigation practice measures relating to Air Quality. These include but are not limited to:
- Management of HGV speeds on haul roads
  - Prohibiting bonfires and waste burning
  - Use of Euro VI HGVs
  - Locating generators away from sensitive receptors where possible
- 7.7.6 Mitigation from the IAQM guidance for control of dust and construction emissions is also incorporated into Appendix 7.3: Air Quality Assessment Results in Volume III and Appendix 4.1: Draft Outline Code of Construction Practice in Volume III.
- 7.7.7 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

- 7.7.8 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.
- 7.7.9 There are no additional mitigation measures proposed to minimise effects on air quality at this stage.

## Waveney Valley Alternative

- 7.7.10 The Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 from Thetford, which would be used to bring in cable drums. All other standard mitigation as per the overhead line design listed above would be needed for the Waveney Valley Alternative.

## 7.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 7.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to the construction phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation - embedded (design measures) and standard practice mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).

- 7.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 7.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

## Preliminary Construction Effects

### Construction Dust

- 7.8.4 The preliminary likely significant effects of the Project have been considered based upon currently available data relating to the construction phase of the Project.
- 7.8.5 The construction effects have been assessed following the IAQM methodology (IAQM, 2016). The level of dust risk to dust soiling and human health during each phase has been summarised in Table 7.5 and further details can be found in Appendix 7.3: Air Quality Assessment Results in Volume III.
- 7.8.6 Due to the risks identified, without applying mitigation measures, there would be the potential for significant effects. However, proposed standard mitigation measures for high-risk sites are set out in Appendix 4.1: Draft Outline CoCP in Volume III. Following the implementation of the proposed standard mitigation measures, the effects of construction on dust soiling and human health are anticipated to be not significant, in line with IAQM guidance (IAQM, 2024).
- 7.8.7 The application of mitigation measures within the Appendix 4.1: Draft Outline CoCP in Volume III would be applied in a proportionate manner based on the risk criteria set out in the IAQM guidance. For example, in areas where there are no receptors within 250 m of works there would be a much lower risk from dust impacts and as such the mitigation would be applied in a suitable manner based on risk.

Table 7.5 - Summary of Construction Dust Effects (prior to mitigation)

Activity	Dust soiling	Human health
Removal of Existing Infrastructure	Medium Risk	Medium Risk
Earthworks	High Risk	High Risk
Construction	High Risk	High Risk
Trackout	High Risk	High Risk

### Waveney Valley Alternative

- 7.8.8 No additional negative effects from construction dust have been identified in relation to the Waveney Valley Alternative. Although there may be more construction activity associated with undergrounding when compared to the overhead line design, risks associated with dust soiling and to human health would still be high – as per the overhead line design. Following the implementation of the proposed standard good

practice mitigation measures, the effects of construction on dust soiling and human health are anticipated to be not significant, in line with IAQM guidance (IAQM, 2024).

## Construction Traffic

### Modelled concentrations at human receptors

- 7.8.9 Full results for construction traffic data are provided in Appendix 7.3: Air Quality Assessment Results in Volume II.
- 7.8.10 Annual mean pollutant concentrations for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> which were predicted at 40 sensitive human receptors all resulted in a predicted negligible magnitude of change.
- 7.8.11 No locations are predicted to exceed the NO<sub>2</sub> annual mean standard in 2028. The maximum predicted concentration was 19.8 µg/m<sup>3</sup> at receptor HR\_28, located within the AQMA 24 and adjacent to A1089 Ferry Road, west of Tilbury (Section H).
- 7.8.12 Changes to annual mean PM<sub>10</sub> and PM<sub>2.5</sub> are predicted to be negligible at all receptors and all concentrations are below the air quality standards.
- 7.8.13 Therefore, the effects of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> at human receptors, as a result of the Project, are predicted to be not significant.

### Modelled concentrations at ecological receptors

- 7.8.14 Full results for construction traffic data are provided in Appendix 7.3: Air Quality Assessment Results in Volume III.
- 7.8.15 Pollutant concentrations for annual mean NO<sub>x</sub> are predicted at 17 sensitive ecological receptors, where 16 receptors are either geological features not sensitive to nitrogen, or critical load data was not available. The increase in nutrient nitrogen deposition as a result of the Project in 2028 is predicted to be <0.1kg N/ha/yr (to one decimal place) at receptor ER\_17. At this location, there is a 0.93% increase in N deposition as a percentage of the lower critical load for the relevant habitat (15 kg N/ha/yr). The impact is less than 1% of the relevant lower critical load and therefore considered to be not significant.

### Waveney Valley Alternative

- 7.8.16 Traffic flows used to inform this preliminary assessment are based on the overhead line design at the Waveney Valley. It is understood that for the Waveney Valley Alternative there would be additional traffic movements. For the overhead line design, there would be a worst-case daily increase of 1% in total vehicles and an increase of 12% in HGVs on daily 24 hour flows. Should the Waveney Valley Alternative be taken forwards, there would be a worst-case daily increase of 3% in total vehicles and an increase of 26% in HGVs on daily 24 hour flows. The available traffic data indicates that the screening threshold of 100 AADT of HDVs (>3.5 t) outside of AQMAs is exceeded at A1066 High Road and Lion Road. However, these are not of a magnitude which could result in a new significant effect.
- 7.8.17 This conclusion is drawn from consistently low Defra background concentrations and predicted concentrations at nearby receptors within the Waveney Valley Alternative. In

2028, Defra recorded NO<sub>2</sub> concentrations well below the 40 µg/m<sup>3</sup> objective, averaging only 6.5 µg/m<sup>3</sup> across the area. Notably, at the closest receptor, R\_22, located at the intersection of Bentley Road with A120, the annual mean NO<sub>2</sub> concentration in 2028 was 7.6 µg/m<sup>3</sup>, well below the standard of 40 µg/m<sup>3</sup>.

- 7.8.18 Further assessment of construction traffic air quality, however, will be undertaken in the ES.

### **Generator use/NRMM**

- 7.8.19 Generators and NRMM have not been assessed in detail as described previously. However, it is assumed generator effects would be sufficiently mitigated by measures including, but not limited to, locating away from sensitive receptors, increasing the release height of emissions for sufficient dispersion, and relevant abatement technology.
- 7.8.20 The use of construction non-road mobile machinery is unlikely to result in significant effects on local air quality according to the guidance from Local Air Quality Management– Technical Guidance (TG22) paragraph 7.30 (LAQM, TG22, 2022). This guidance is provided based on previous assessments of the emissions of non-road mobile machinery, which determined that emissions are unlikely to make a significant effect on local air quality with suitable controls and site management in place. Standard mitigation measures in Appendix 4.1: Draft Outline CoCP in Volume III states that non-road mobile machinery and plant, including generators, would meet the European Stage VI engine emission standards (European Parliament and Council, 2016).
- 7.8.21 Therefore, it is considered that emissions from construction equipment and plant are likely to be neutral and not significant.

### **Waveney Valley Alternative**

- 7.8.22 If the Waveney Valley Alternative is taken forwards it is anticipated that effects would be similar to the overhead line design and therefore not significant. Although there may be more construction activity associated with undergrounding when compared to the overhead line design, it is assumed, as per for the overhead line design generator effects would be sufficiently mitigated by measures including, but not limited to, locating away from sensitive receptors, increasing the release height of emissions for sufficient dispersion, and relevant abatement technology.

## **7.9 Sensitivity Testing**

### **Flexibility in Construction Programme**

- 7.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Qualitative sensitivity testing considering alternative Project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in this chapter.

## Flexibility in Design

- 7.9.2 This chapter has assumed the pylon locations provided as part of the 2024 preferred draft alignment. Qualitative sensitivity testing considering alternative pylon and underground cable route locations, within the proposed LoD, has shown that there would be no new or different likely significant effects because of the infrastructure being placed in a different location within the LoD.

## Flexibility due to Design elements not fixed at Statutory Consultation

- 7.9.3 There are also elements of the Project which have not been fixed at statutory consultation, as detailed in Table 4.3 of Chapter 4: Project Description.
- 7.9.4 The air quality assessment has taken conservative assumptions and provided best practice mitigation measures therefore it allows flexibility to the design uncertainty at this stage.
- 7.9.5 For the offline shared EACN access route, it is anticipated that there would be no new significant effects if it was included as part of the Project instead of the access being along Bentley Road / Little Bromley. This is due to the combined effect from the low existing background pollutant concentrations and small impact the change in design would have on air quality effects.

# 8. Ecology and Biodiversity

# 8. Ecology and Biodiversity

## 8.1 Introduction

8.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Ecology and Biodiversity. The chapter covers effects on the following receptors, during construction and operation (and maintenance):

- Statutory designated sites
- Non-statutory designated sites
- Protected and notable habitats (including Ancient Woodland and habitats of principal importance)
- Terrestrial and aquatic biodiversity (including protected, notable, and non-native and invasive flora and fauna)

8.1.2 There are interrelationships related to the potential effects on Ecology and Biodiversity and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 6: Agriculture and Soils
- Chapter 7: Air Quality
- Chapter 9: Contaminated Land, Geology and Hydrogeology
- Chapter 12: Hydrology and Land Drainage
- Chapter 13: Landscape and Visual (particularly in relation to arboricultural features (e.g. Tree Preservation Orders and veteran trees) which are not considered in this Chapter)
- Chapter 14: Noise and Vibration
- Chapter 16: Traffic and Transport

8.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 8.1: Statutory Sites Designated for Biodiversity
- Figure 8.2: Non-Statutory Sites Designated for Biodiversity
- Appendix 8.1: Habitat Report
- Appendix 8.2: Terrestrial Invertebrate Report
- Appendix 8.3: Reptile Report
- Appendix 8.4: Breeding Bird Report
- Appendix 8.5: Wintering/Passage Bird Report

- Appendix 8.6: Bat Roosting Report
- Appendix 8.7: Bat Activity Report
- Appendix 8.8: Hazel Dormouse Report
- Appendix 8.9: Otter and Water Vole Report
- Appendix 8.10: Species of Principal Importance Report
- Appendix 8.11: Badger Report (confidential)

8.1.4 Scientific names for the plant and animal species referred to in this chapter are provided in Appendices 8.1 – 8.11 in Volume III and are not repeated within this chapter.

## 8.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statements (NPS)

8.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the Overarching NPS for Energy (EN-1) (DESNZ, 2024a). This is supported by NPS EN-5 (DESNZ, 2024b).

#### Overarching NPS for Energy (EN-1)

8.2.2 Section 4.6 (Environmental and Biodiversity Net Gain) outlines the consideration for environmental and biodiversity net gain within energy projects. Paragraph 4.6.2 states that *'projects in England should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver biodiversity net gain'*.

8.2.3 Paragraph 4.6.6 states energy NSIP proposals should *'seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity, and the wider environment where possible'* with Paragraph 4.6.7 advising that applicants *'are encouraged to use the latest version of the biodiversity metric<sup>42</sup> to calculate their biodiversity baseline and present planned biodiversity net gain outcomes. This calculation data should be presented in full as part of their application'*.

8.2.4 Paragraph 4.6.8 states that where possible, biodiversity metric calculation data *'should be shared, alongside a completed biodiversity metric calculation, with the Local Authority and Natural England for discussion at the pre-application stage'*.

8.2.5 Paragraph 4.6.11 states that *'we encourage details of any off-site delivery of biodiversity net gain to be set out within the application for development consent'*.

8.2.6 Paragraph 4.6.12 further advises that *'when delivering biodiversity net gain off-site, developments should do this in a manner that best contributes to the achievement of relevant wider strategic outcomes, for example by increasing habitat connectivity, enhancing other ecosystem service outcomes, or considering use of green infrastructure strategies. Reference should be made to relevant national or local plans'*

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<sup>42</sup> Currently the Statutory Biodiversity Metric (GOV.UK, 2023a).

*and strategies, to inform off-site biodiversity net gain delivery. If published, the relevant strategy is the Local Nature Recovery Strategy (LNRS). If an LNRS has not been published, the relevant consenting body of planning authority may specify alternative plans, policies or strategies to use’.*

- 8.2.7 Paragraph 4.6.13 states that *‘in addition to delivering biodiversity net gain, developments may also deliver wider environmental gains and benefits to communities relevant to the local area, and to national policy priorities such as...the enhancement, expansion or provision of trees and woodlands’.*
- 8.2.8 Paragraph 4.6.15 states that *‘applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider environmental net gains have been considered, and where appropriate, incorporated into proposals’.*
- 8.2.9 Paragraph 4.6.1 [numbering out of sync in NPS] states that *‘although achieving biodiversity net gain is not currently an obligation on applicants<sup>43</sup>, Schedule 15 of the Environment Act 2021 contains provisions which, when commenced, mean the Secretary of State may not grant an application for Development Consent Order unless satisfied that a biodiversity gain objective is met’.* Paragraph 4.6.2 of the forthcoming EN-1 states that *‘the biodiversity gain objective will be set out in a biodiversity gain statement<sup>44</sup>’.*
- 8.2.10 The Project has committed to delivering a minimum of 10% BNG (see paragraph 8.5.25) and will submit a full BNG assessment (based on the most up to date version of the biodiversity metric) with the application. The Project will discuss off-site BNG delivery with relevant stakeholders during project design and share BNG calculations with relevant stakeholders prior to the application. In addition to BNG, the application will also include information relevant to the delivery of environmental net gains which will be considered as part of project design.
- 8.2.11 Section 5.4 (Biodiversity and Geological Conservation) details the requirement for a HRA to assess the implications of a project. Paragraph 5.4.5 states that the assessment should also apply to *‘sites identified, or required, as compensatory measures for adverse effects’* on designated, potential/possible/proposed sites within the national site network. The Project will take this into account and include any relevant sites within the HRA Screening Report and AA.
- 8.2.12 In relation to Sites of Special Scientific Interest (SSSIs), Paragraph 5.4.8 states that *‘development on land within or outside a SSSI, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits (including need) of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national networks of SSSIs’.*

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<sup>43</sup> At the time of writing, biodiversity net gain is not anticipated to be mandatory for NSIPs until November 2025 (GOV.UK, 2023b)

<sup>44</sup> At the time of writing, the biodiversity gain statement relevant to NSIPs is anticipated to be published in September 2024 (GOV.UK, 2023b).

- 8.2.13 Paragraph 5.4.17 states that *‘where the development is subject to EIA [Environmental Impact Assessment] the applicant should ensure the ES [Environmental Statement] 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, including irreplaceable habitats’*.
- 8.2.14 Paragraph 5.4.19 states that *‘the applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests’* while Paragraph 5.4.20 states that *‘applicants should consider wider ecosystem services and benefits of natural capital when designing enhancement measures’*.
- 8.2.15 Paragraphs 5.4.20 – 5.4.34 advise on measures and action to be taken during design (e.g. consideration of wider ecosystem services within enhancement measures and consideration of effects on mobile/migratory species) and providing appropriate information to allow the Secretary of State to determine whether a HRA is required and/or conduct an AA. This advice will be considered during the Project design.
- 8.2.16 Paragraph 5.4.35 details measures and actions that should be demonstrated as part of the application e.g. timing construction to avoid/limit disturbance and restoring habitats (where practicable) after construction. The Project will address these measures within the design and/or Outline CoCP which will be submitted with the DCO application.
- 8.2.17 Paragraph 5.4.36 states that *‘applicants should produce a Biodiversity Management Strategy’*. The Project will submit a Biodiversity Management Strategy with the application.
- 8.2.18 Paragraph 5.4.42 states that *‘development should, in line with the mitigation hierarchy, aim to avoid significant harm to biodiversity and geological conservation interest, including through consideration of reasonable alternatives...Where significant harm cannot be avoided, impacts should be mitigated and as a last resort, appropriate compensation measures should be sought’*.
- 8.2.19 Paragraph 5.4.44 states that *‘any habitat creation or enhancement delivered including linkages with existing habitats for compensation or biodiversity net gain should generally be maintained for a minimum period of 30 years, or for the lifetime of the project, if longer’*. The applicant has committed to maintain any compensatory measures and/or habitat creation/enhancement delivered as part of BNG for a minimum period of 30 years.
- 8.2.20 Paragraph 5.4.53 states that *‘the Secretary of State should not grant development consent for any development that would result in the loss or deterioration of any irreplaceable habitats, including ancient woodland, and ancient and veteran trees unless there are wholly exceptional reasons<sup>45</sup> and a suitable compensation strategy exists’*.

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<sup>45</sup> E.g. where the public benefits (including need) of the nationally significant energy infrastructure would clearly outweigh the loss of deterioration of the habitat.

8.2.21 Paragraph 5.4.55 states that *'the Secretary of State should refuse consent where harm to a protected species and relevant habitat would result, unless there is an overriding public interest and the other relevant legal tests are met'*.

8.2.22 The Project will consider opportunities to enhance ecosystem services and natural capital within the design which follows the mitigation hierarchy to avoid and minimise effects to biodiversity receptors. Where effects to biodiversity receptors are unavoidable, the design would incorporate appropriate mitigation and/or compensation measures. Where required, a derogation licence and/or SSSI assent issued by Natural England would be sought to ensure compliance with legal requirements. The Project will assess effects on all biodiversity receptors within the ES which will include justification of any residual effects.

### **NPS for Electricity Networks Infrastructure (EN-5)**

8.2.23 Section 2.9 (Applicant assessment), paragraph 2.9.3 states that *'electricity networks infrastructure pose a particular risk to birdlife including large birds, such as swans and geese, and perching birds'* and Paragraph 2.9.4 advises that *'applicants should consider measures to make lines more visible such as bird flappers and diverters'*.

8.2.24 Paragraph 2.9.6 states that *'particular consideration should be given to feeding and hunting grounds, migration corridors and breeding grounds, where they are functionally linked to sites designated or allocated under the 'national site network' provisions of the Conservation of Habitats and Species Regulations'*.

8.2.25 Paragraphs 2.10.2 to 2.10.4 state that *'careful siting of a line away from, or parallel to, but not across, known flight paths can reduce the numbers of birds colliding with overhead lines considerably'*.

8.2.26 *'Making lines more visible by methods such as the fitting of bird flappers and diverters to the earth wire, which swivel in the wind, glow in the dark and use fluorescent colours designed specifically for bird vision can also reduce the number of deaths. The design and colour of the diverters will be specific to the conditions – the line and pylon/transmission tower specifications and the species at risk'*.

8.2.27 *'Electrocution risks can be reduced through the design of lattice steel tower crossarms, insulators and the construction of other parts of high voltage power lines so that birds find no opportunity to perch near energised power lines on which they might electrocute themselves'*.

8.2.28 Potential collision risk will be assessed at areas as agreed with Natural England, (such as rivers and green corridors) through bird survey work and mitigation measures designed and installed as appropriate.

### **Other National Legislation and Policy**

8.2.29 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations) (HMSO, 2019a)

- The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)
- The Natural Environment and Rural Communities (NERC) Act (HMSO, 2006)
- Countryside and Rights of Way Act 2000 (HMSO, 2000)
- The Hedgerows Regulations (HMSO, 1997)
- The Invasive Alien Species (Enforcement and Permitting) Order (Invasive Species Order) (HMSO, 2019b)
- The Environment Act (HMSO, 2021)
- NPPF (Department for Levelling Up, Housing and Communities, 2023), including PPG on the Natural Environment (Department for Levelling Up, Housing and Communities, 2019)
- Keepers of Time: ancient and native woodland and trees policy in England (Defra, 2022)

## Regional and Local Policy

8.2.30 Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy. Key local regional and local policy relevant to Ecology and Biodiversity, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Suffolk's Nature Strategy (Suffolk County Council, 2015)
- Stowmarket Area Action Plan (Mid Suffolk District Council, 2013)
- Essex Green Infrastructure Strategy (Essex County Council, 2020)
- Colchester City Council's Biodiversity Supplementary Planning Document (Colchester City Council, 2023)
- Dedham Vale National Landscape (an Area of Outstanding Natural Beauty) and Stour Valley Project Area Management Plan 2021 – 2026 (Dedham Vale National Landscape (an AONB) and Stour Valley Project Area Partnership, 2021)

## Guidance

8.2.31 Relevant guidance, specific to Ecology and Biodiversity, that has informed this PEIR and will inform the assessment within the ES comprises:

- Environmental Improvement Plan 2023 (Defra, 2023a)
- The UK Post-2010 Biodiversity Framework (2011-2020) (JNCC and Defra, 2012)
- Guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland: terrestrial, freshwater, coastal and marine (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018)
- Biodiversity Net Gain: Good Practice Principles for Development (CIRIA, 2019)
- BS 42020:2013 Biodiversity: Code of Practice for Planning and Development (British Standards Institution, 2013)

- Essex Green Infrastructure Standards Technical Guidance (Essex County Council, 2022)

8.2.32 It should be noted that good practice CIEEM guidance (CIEEM, 2018) uses the term Important Ecological Feature (IEF), in this chapter the term biodiversity receptor is used and is defined as an equivalent term for a feature/receptor that is of sufficient ecological value to be important in the decision-making process.

### 8.3 Scoping Opinion

- 8.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 8.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Ecology and Biodiversity is provided in Appendix 5.1: National Grid’s response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 8.4.

### 8.4 Project Engagement and Consultation

- 8.4.1 National Grid has held several meetings with relevant consultees including Natural England and Local Authorities.
- 8.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment is provided in Table 8.1.

Table 8.1 – Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Natural England, June to September 2022	<b>Wintering / Passage Birds</b> – A technical note was issued to Natural England to outline the proposed scope for wintering/passage bird surveys, in support of the HRA and EIA. A subsequent meeting was held to discuss and agree the scope.	Agreement of wintering/passage bird survey scope with Natural England. Agreed on 13 September 2022.
Natural England District Licensing Team, August 2022	<b>Great Crested Newts</b> – A meeting was held with Natural England to discuss the use of great crested newt District Level Licencing (DLL) for the Project.	Agreement that DLL can be used for the Project. Letter of comfort received from Natural England DLL team in August 2022.
Natural England, May to June 2023	<b>Breeding Birds, Bats and Dormouse</b> – A technical note	In broad agreement on survey methodology to be in line with

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	issued to Natural England outlining the proposed scope for breeding bird, dormouse, and bat static surveys.	best practice and approach to defining survey areas.
Natural England, August 2023	<b>Wintering / Passage Birds –</b> Following one year of survey effort for wintering/passage bird surveys, a technical note was issued to Natural England to outline the proposed approach to obtaining baseline information in support of the HRA.	An agreement of HRA scoping and approach to establishing ornithological baseline in support of the HRA was made on the 19 September 2023. Further requests were made by Natural England in 2023 to survey land at Tilbury. Results of wintering bird surveys will be presented in the ES and HRA.
Various meetings were undertaken with relevant local stakeholders <sup>46</sup>	<b>Biodiversity Net Gain –</b> Discussions regarding potential offsite Biodiversity Net Gain schemes/initiatives which could be used for the Project, if required.	Discussions are ongoing to help inform the BNG strategy for the Project. Further detail will be included within the ES.

8.4.3 In addition to stakeholder engagement, meetings have been held with the North Falls and Five Estuaries wind farm project teams. These wind farms are proposed to be located off the coast of East Anglia and connect into the proposed EACN Substation. Both projects involve the construction of new substations, which are proposed to be located adjacent to the EACN Substation. Project teams have worked collaboratively to reduce potential cumulative effects. Engagement with a third customer, an interconnector being progressed by Tarchon, has to date been more limited due to the earlier stage of their project development. Collaborative engagement will continue to inform the assessments in the ES.

## 8.5 PEIR Approach and Methods

8.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology/approach used to undertake the preliminary assessment on Ecology and Biodiversity. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

<sup>46</sup> Suffolk Wildlife Trust, August 2023; Norfolk Local Planning Authority Ecology Team, August 2023; Essex Wildlife Trust, August 2023; Thurrock Local Planning Authority Ecology Team, August 2023; Norfolk Wildlife Trust, September 2023; Suffolk Local Planning Authority Ecology Team, September 2023; Essex Local Planning Authority Ecology Team, September 2023; Essex Local Planning Authority Planning Officer, Suffolk Local Planning Authority Planning Officer and Norfolk Local Planning Authority Planning Officer, September 2023

## Study Area

- 8.5.2 The CIEEM EclA guidelines (CIEEM, 2018) require assessments to be focused on ‘Zones of Influence’ (Zol) – defined as being the area over which changes arising from construction, operation (including maintenance) and decommissioning<sup>47</sup> could lead to ecologically significant effects.
- 8.5.3 As defined in the EIA Scoping Report (National Grid, 2022), the study areas used to inform the assessment are presented in Table 8.2. These were formalised through professional judgement of perceived impact pathways, good practice guidelines and engagement with stakeholders and are used as a starting point for baseline data collection.
- 8.5.4 The study areas may be refined as more information becomes available regarding the potential ecological effects of the Project and through consideration of presence, distribution and abundance and will form the Zol (which will vary between different biodiversity receptors) which will be defined within the ES.

**Table 8.2 – Study Areas for Biodiversity Receptors**

<b>Biodiversity Receptor</b>	<b>Study Area for Assessment</b>
Statutory designated sites of international importance (National Site Network and Ramsar sites)	2 km for Special Areas of Conservation (SAC; extended to 30 km where bats are the qualifying feature) and 20 km for Special Protection Areas (SPA) and Ramsar Sites; see Figure 8.1: Statutory Sites Designated for Biodiversity in Volume II
National and local sites designated for biodiversity (statutory and non-statutory)	2 km from draft Order Limits (extended to include several national sites more than 2 km from the draft Order Limits at the request of Natural England); see Figures 8.1: Statutory Sites Designated for Biodiversity and 8.2: Non-Statutory Sites Designated for Biodiversity in Volume II
Habitats (Ancient Woodland and Habitats of Principal Importance in England)	200 m from draft Order Limits; see Figure A8.1.2: Protected/Notable Habitat and Plant Desk Study Map in Appendix 8.1: Habitat Report in Volume III
Protected/notable species	2 km from draft Order Limits except for bats which was extended to 6 km (as requested by Natural England through consultation); see Figures associated with Appendices 8.2 to 8.11 in Volume III

<sup>47</sup> Decommissioning is scoped out as agreed within the EIA Scoping Opinion received from the Planning Inspectorate (2022)

<b>Biodiversity Receptor</b>	<b>Study Area for Assessment</b>
Invasive plant species	2 km from draft Order Limits; see Figure A8.1.2: Protected/Notable Habitat and Plant Desk Study Map in Appendix 8.1: Habitat Report in Volume III

## Existing Baseline

### Data Collection

8.5.5 The baseline assessment has been informed by a desk study which has drawn from the following key information sources:

- Aerial imagery (APEM, 2022) – Project commissioned imagery captured using fixed-wing aircraft at a resolution of 3 cm
- Google Earth (Google Earth, 2023) – Freely available aerial photography reviewed to inform the baseline for habitats and species
- Multi-agency Geographic Information for the Countryside (MAGIC, 2023) – To identify habitats and locations for designated habitats and protected species
- Various environmental record centres – data requests have been made to environmental record centres to obtain data in support of baseline assessments; relevant data sources are set out in the appendices in Volume III

### Site Visit and Surveys

8.5.6 Survey data obtained through field surveys undertaken between September 2022 and the end of September 2023 has also informed this chapter (although dormouse survey data until the end of November 2023 is also included). Full details of field surveys undertaken from October 2023 (including those programmed to be completed in 2024) will be included within the ES.

8.5.7 The ecological survey programme outlined in Table 8.3 is based on the field surveys undertaken to date and those planned, results of the desk study, good practice guidance and previous consultation/engagement. Further engagement and consultation with relevant consultees regarding the survey programme is on-going and may influence the information provided within Table 8.3, which will be reported within the ES.

**Table 8.3 – Ecological Survey Programme**

<b>Survey Type</b>	<b>Overview and Survey Area</b>	<b>Survey Status</b>
Habitats and Trees: Refer to Appendix 8.1: Habitats Report in	Habitats within 50 m of the draft Order Limits were digitally mapped using aerial drone survey data and online mapping with reference to definitions outlined in the Phase 1 Handbook (JNCC, 2010).	Digital mapping using drone survey and online mapping data complete; ground-truthing surveys conducted between April

Survey Type	Overview and Survey Area	Survey Status
Volume III for further information.	<p>Field surveys were commenced in 2023 and will be continued in 2024 to:</p> <ul style="list-style-type: none"> <li>• Validate Phase 1 habitat classifications.</li> <li>• Collect UK Habitat Classification information.</li> <li>• Assess 166 watercourses to determine whether they meet the requirements for a River Condition Assessment for Biodiversity (Defra, 2023b).</li> <li>• Evaluate 166 watercourses for suitability to support protected/notable macrophytes.</li> <li>• Undertake Hedgerows Regulations surveys (Defra, 2007).</li> <li>• Identify habitats that may qualify as Habitats of Principal Importance and undertake National Vegetation Classification (NVC) surveys (in line with the NVC Users' Handbook: Rodwell, 2006) on such habitat likely to be significantly affected by the Project.</li> <li>• Map the presence of invasive plants.</li> </ul>	<p>and October 2023, to be continued in 2024.</p> <p>Approximately 44% of the land area within the draft Order Limits has been subject to field surveys between May and the end of September 2023. The rest will be surveyed in the 2024 survey season (April to October).</p> <p>Targeted botanical surveys will be completed in 2024.</p>
Invertebrates: Refer to Appendix 8.2: Terrestrial Invertebrate Report in Volume III for further information.	<p>A review of suitable habitat and existing data has been undertaken to identify areas where terrestrial invertebrate scoping surveys will be undertaken in early 2024. Targeted surveys will be undertaken in these locations to confirm the presence/absence of notable invertebrates in 2024.</p>	<p>Surveys will be completed in 2024. The scope and survey programme are to be determined following initial scoping visits.</p>
Aquatic Ecology	<p>166 watercourses could be affected by the Project. Targeted field surveys, in conjunction with a desk study and consultation with the Environment</p>	<p>Surveys will be completed in 2024.</p>

Survey Type	Overview and Survey Area	Survey Status
	<p>Agency will be undertaken where watercourses of value to aquatic macrophytes, aquatic invertebrates or fish would be affected by the Project.</p>	
<p>Reptiles: Refer to Appendix 8.3: Reptile Report in Volume III for further information.</p>	<p>Aerial imagery and desk study records were used to identify potential Key Reptile Sites (KRS) that could be affected by the Project and to determine where occupancy surveys are required. Surveys will be undertaken within land affected by construction assessed as having the potential to qualify as a key reptile site, except for areas where:</p> <ul style="list-style-type: none"> <li>• The existing baseline is sufficiently robust to inform the mitigation solution.</li> <li>• Displacement through habitat manipulation is considered the most appropriate/satisfactory mitigation solution, and,</li> <li>• Any access constrained areas (e.g., due to health and safety concerns such as busy roadside verges).</li> </ul>	<p>Surveys will be undertaken between April and October 2024.</p>
<p>Breeding Birds Refer to Appendix 8.4: Breeding Bird Report in Volume III for further information.</p>	<p>Three survey areas have been identified and agreed with Natural England for breeding bird surveys, subsequently updated to six survey areas following a design change to remain consistent with the methodology. Surveys comprise six visits between April and June (inclusive) in line with best practice. A territory mapping approach has been undertaken to establish breeding territories across each survey area.</p>	<p>Approximately 10% of the six survey areas have been completed in 2023; remaining areas to be completed in 2024.</p>
<p>Barn Owl</p>	<p>Trees and structures likely to be affected by the Project to be assessed for their suitability to support breeding barn owl in parallel with the bat ground level tree assessments (GLTA). Trees considered to be suitable to be subjected to further survey work to confirm breeding status.</p>	<p>GLTA completed between November 2023 and March 2024. Follow-up surveys for barn owl would be undertaken pre-construction.</p>

Survey Type	Overview and Survey Area	Survey Status
<p>Wintering Birds: Refer to Appendix 8.5: Wintering/Passage Bird Report in Volume III for further information.</p>	<p>2022/2023 surveys comprised walked transects (four locations) and vantage point (15 locations) surveys to record flight path and height, field use, distribution, and abundance. 2023/2024 surveys comprise vantage point surveys (six locations) to record flight path and height.</p>	<p>Surveys conducted between September 2022 and March 2023 and between October 2023 and March 2024 as agreed with Natural England.</p>
<p>Bats – Roosting: Refer to Appendix 8.6: Bat Roosting Report in Volume III for further information.</p>	<p>The desk study was extended to 6 km for bat records as requested by Natural England through engagement. Surveys to be conducted in accordance with best practice guidance (Collins, 2023) to identify bat tree roosts that could be affected. To comprise GLTA and assessments of woodlands to determine where any further surveys are required, such as aerial inspection surveys, dusk emergence surveys or the use of advanced bat licensed survey techniques (such as radiotracking).</p>	<p>GLTA completed between November 2023 and March 2024. Follow-up surveys to be undertaken between May and September 2024 (radio-tracking). Aerial inspections/dusk emergence/dawn re-entry surveys to be undertaken pre-construction unless associated with tracking surveys in 2024.</p>
<p>Bats – Foraging and Commuting: Refer to Appendix 8.7: Bat Activity Report in Volume III for further information.</p>	<p>Surveys conducted in accordance with best practice guidance (Collins, 2023). Automated static detectors placed in suitable habitat according to a bespoke criteria to obtain information on species assemblage and an indication of activity levels across the draft Order Limits. Radiotracking surveys proposed to understand effects upon species of high value conservation concern.</p>	<p>Automated static detector surveys were undertaken between May and September 2023 and will continue in 2024 along with radiotracking surveys.</p>
<p>Hazel Dormouse (dormouse): Refer to Appendix 8.8: Hazel Dormouse Report in Volume III for further information.</p>	<p>Habitats suitable to support dormouse, such as woodland, scrub and hedgerows, were initially mapped using aerial imagery. Each area was visited, land access permitting, to assess the habitat suitability (vegetation structure, diversity, and connectivity to the wider landscape). Where habitats were considered suitable, a minimum of 50 dormouse nest tubes were installed within each area (referenced numerically) and these</p>	<p>Monthly tubes checks were undertaken from June to November 2023. Surveys will continue in 2024.</p>

Survey Type	Overview and Survey Area	Survey Status
	<p>were inspected monthly to confirm the presence or potential absence of dormouse in line with survey guidance set out in the Dormouse Conservation Handbook (English Nature, 2006).</p> <p>To date, dormouse presence has been confirmed in one survey area within the draft Order Limits.</p>	
<p>Otter and Water Vole: Refer to Appendix 8.10: Otter and Water Vole Report in Volume III for further information.</p>	<p>166 watercourses that could be affected by the Project to be assessed for their suitability to support otter and water vole. Targeted surveys undertaken up to 200 m upstream and downstream of the potential watercourse crossings.</p>	<p>Surveys were undertaken between August and September 2023 and will continue from mid-April to September 2024.</p>
<p>Species of Principal Importance (SPI): Refer to Appendix 8.10: Species of Principal Importance in Volume III for further information.</p>	<p>Most SPI have been considered under the relevant species or groups for example habitat surveys will consider plants that are SPI, terrestrial invertebrates considers SPI. Five species (common toad, brown hare, harvest mouse, hedgehog and polecat) have been identified that have the potential to be present at low densities within the draft Order Limits and so may be affected by the Project. No targeted survey work for these five species is proposed, but their presence is to be recorded if they are encountered during other surveys and their presence will be assumed where suitable habitat is present.</p>	<p>No dedicated surveys are being undertaken for SPI. Species have been incidentally recorded since September 2022 and will continue into 2024.</p>
<p>Badger: Refer to Appendix 8.11: Badger Report in Volume III for further information.</p>	<p>The presence of badger within the draft Order Limits has been confirmed. Evidence/signs of badger will continue to be recorded during ecological surveys in 2024. A dedicated badger survey will be undertaken pre-construction to confirm the status of badger setts.</p>	<p>Approximately 44% of the land area within the draft Order Limits has been surveyed in parallel with the habitat surveys. Surveyors will continue to make note of any badger setts during ecological surveys in 2024.</p>

## Further Data to be collected to inform the ES

- 8.5.8 In addition to the data collected for this PEIR, the ES will also be informed by the following additional third-party data and data obtained through surveys:
- Natural England Open Data Geoportal will be consulted for protected species licence returns and freshwater ecology datasets
  - Environment Agency – Results of Environment Agency freshwater river macroinvertebrate, white-clawed crayfish, aquatic macrophyte and fish survey data and information relating to monitoring locations within or close to the study area
  - Further ecological baseline survey data – as outlined in Table 8.3, ecological surveys will continue into 2024 survey season and will inform the environmental baseline within the ES

## PEIR Assessment Methodology

- 8.5.9 The preliminary Ecology and Biodiversity assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 8.5.10 The assessment methodology is aligned to Guidelines for Ecological Impact Assessment (CIEEM, 2018). The assessment is based upon not only the results of the desk study and field survey work undertaken to date, but also relevant published information (such as the status, distribution, and sensitivity to environmental changes of ecological features), consultation with Natural England and other key consultees and professional judgement.

## Significance Methodology

- 8.5.11 When considering potentially significant effects on biodiversity receptors, whether these are negative or positive, the following characteristics of environmental change are considered:
- Extent – the special or geographical area over which the environmental change
  - Magnitude – the size, amount, intensity, or volume of the environmental change
  - Duration – the length of time over which the environmental change may occur
  - Frequency – the number of times an environmental change may occur
  - Timing – the periods of times an environmental change may occur
  - Reversibility – whether the environmental change can be reversed through restoration actions or regeneration
- 8.5.12 A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for a biodiversity receptor(s) or for biodiversity in general

(CIEEM, 2018). For example, providing a long-term connection between two isolated populations of a protected species such as dormouse would be considered a significant positive effect, supporting population growth and expansion whereas activities that result in the loss of irreplaceable habitat (e.g. Ancient Woodland) would be considered significant negative effects.

### **Preliminary Assessment Key Parameters and Assumptions**

- 8.5.13 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are made.
- 8.5.14 The draft Order Limits currently interact with four areas of Ancient Woodland (Round Wood (Section B), Bullen Wood (Section B), Writtle – Writtlepark Wood (Section F) and Bushey Wood (Section F). The assessment within this PEIR includes the following assumptions at these sites:
- Following third party mitigation works proposed to remove the existing 132 kV overhead line through Round Wood (Section B) and 11 kV wood poles overhead line through Writtle-Writtlepark Wood (Section F) the woodland habitat would be allowed to regenerate naturally
  - The construction swathe to relocate and underground the UKPN PHB and PLD circuits at Bramford would be located outside the boundary of Bullen Wood
  - Any third-party works proposed for the cathodic protection of the gas pipeline adjacent to Bushey Wood (Section F) would be undertaken within the original installation works footprint of the gas pipeline which has been continuously managed. No additional effects on the Ancient Woodland are envisaged
- 8.5.15 The key parameters and assumptions will be reviewed based on the design presented in the DCO application and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

### **Further Assessment within the ES**

- 8.5.16 The ES will present a detailed assessment in accordance IEMA guidance with the significance of the effect on a receptor presented, where relevant, during construction and operation (and maintenance), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.
- 8.5.17 In addition, a BNG assessment and details of DLL for great crested newt will be appended to the ES, further details are provided in the paragraphs that follow. The HRA will also be undertaken in parallel with the ES to evaluate if the Project could result in significant effects on the integrity of a European site and its conservation objectives, either alone or in combination with other plans/projects.
- 8.5.18 The assessment of significance will include the reasoned argument setting out the rationale for the value, magnitude, and significance of effect in accordance with CIEEM EclA guidelines (CIEEM, 2018).

## North Thames Estuary and Marshes Proposed SSSI

- 8.5.19 Natural England are considering an extension to Mucking Flats and Marshes SSSI (referred to as North Thames Estuary and Marshes Proposed SSSI in Section 8.6). This proposed SSSI affects several land parcels within and immediately adjacent to the draft Order Limits. It is understood that this land, most of which supports open mosaic habitat on previously developed land, is of high importance for invertebrates, birds, and flora. The area of interest does not define a future SSSI boundary but does identify areas of potential importance.
- 8.5.20 It is anticipated that the SSSI notification would occur before the application for Development Consent for this Project would be submitted. Natural England have agreed to share survey data collected as part of their assessment with the Project, allowing a robust assessment of the importance of biodiversity receptors in this area to be included within the ES.

## Biodiversity Net Gain

- 8.5.21 A full BNG assessment will be provided as an appendix to the ES, and will follow industry good practice methodologies comprising:
- Biodiversity Net Gain: Good Practice Principles for Development (CIRIA, 2019)
  - Statutory Biodiversity metric (Defra, 2023c) (or the most recent version at the time of assessment)
- 8.5.22 The application of the standardised methods as a BNG assessment results in the calculation of a baseline biodiversity value, a post-development biodiversity (or post intervention) value and a net change in biodiversity value due to the Project.
- 8.5.23 Baseline data has been and will continue to be collected in UK habitat classification typology to enter this data into the metric (this survey which includes a condition assessment is being undertaken in parallel with the Phase 1 habitat ground-truthing survey).
- 8.5.24 Calculations for both on and off-site biodiversity units pre- and post-development will be included within a BNG technical report to be appended to the ES. Habitat creation from the DLL process will not be included in accordance with Natural England guidance.
- 8.5.25 The quantitative outcome of the assessment will be dependent on the biodiversity units and linear units for the Project to achieve an overall net gain. The Project has committed to delivering a minimum of 10% BNG.
- 8.5.26 Quantitative outcomes of the calculations are a singular element of a BNG assessment. The outcome of a BNG assessment also requires consideration of adherence to the Good Practice Principles (CIRIA, 2019). BNG would be delivered for the Project through a mix of on and off-site measures for the creation and enhancement of habitats.
- 8.5.27 A high-level BNG calculation (including baseline habitat calculations, an initial impact assessment and mitigation / compensation) has been completed based on the draft Order Limits. It is the intention that this initial run of the metric will be used to gain an understanding of required mitigation and the scope of need for offsite compensation and subsequently aid in the ongoing engagement with stakeholders. However, it should be

noted that the high-level BNG calculations are based on a working metric and are likely to change as further information is known.

- 8.5.28 The baseline habitat calculations are based on a combination of detailed onsite survey and aerial imagery (approximately 50% for each). The results of the working metric found the value of the habitats within the draft Order Limits total **11,235** biodiversity units (bu)<sup>48</sup> for area habitats. It is our intention to undertake further onsite habitat work in 2024, which will be provided with the DCO application. No calculation has currently been run for hedgerows or watercourses as this information has not been confirmed (but will be in the DCO application).
- 8.5.29 An initial impact assessment has been undertaken based on the current design as presented at statutory consultation and our current understanding of construction methods and programme. A precautionary reasonable worst-case scenario has been applied within the impact assessment. Following the input of post-intervention habitat information (following habitat replacement, enhancement and creation), the Project is currently achieving **-6%** BNG for area habitats within the draft Order Limits.
- 8.5.30 In order to achieve the commitment of 10% BNG, National Grid will follow the mitigation hierarchy, first looking to avoid effects, then to mitigate within the draft Order Limits, before looking at off-site compensation solutions.

### **Great Crested Newt**

- 8.5.31 DLL is an alternative approach to mitigation licensing to develop sites which could affect great crested newts. The approach aims to increase the number of great crested newts by providing new/better habitats in targeted areas to benefit their wider population.
- 8.5.32 The DLL approach includes strategic area assessment, the identification of risk zones and strategic opportunity area maps. Where a DLL scheme is in place, developers can make a financial contribution to strategic, habitat compensation (documented within an Impact Assessment and Conservation Payment Certificate (IACPC)) instead of applying for a separate licence or conducting individual detailed surveys.
- 8.5.33 There are three risk categories under the Natural England DLL scheme (red, amber, and green) and DLL is only available for development within amber and green zones. The draft Order Limits extend through amber and green risk zones only and Natural England have agreed that the DLL approach to great crested newt conservation can be taken forward for the Project (see Table 8.1).

### **Aquatic Ecology (Fish, Aquatic Invertebrates and Macrophytes)**

- 8.5.34 The results of the desk study and targeted surveys, if required, will be presented in the ES following completion of the surveys in 2024. The initial step to establishing effects on aquatic ecology would be to undertake a desk study and gap analysis. This would also identify where aquatic effects may occur and via what construction or operational process. Public databases will be interrogated to identify if adequate ecological baseline data are available from which potential for significant effects could be assessed.

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<sup>48</sup> A measure of biodiversity calculated using the statutory metric, taking into account for example, the size, habitat type and habitat condition.

Recommendations for field survey would be made to fill data gaps, if necessary, for example through conducting macrophyte, benthic algae (phytobenthos), macroinvertebrate, fish, white-clawed crayfish, or habitat surveys to inform baseline conditions.

### **Hedgerow Regulations Assessment Survey**

- 8.5.35 The results of the Hedgerows Regulations Assessment Survey will be presented in the ES following completion of the surveys in 2024.

### **National Vegetation Classification (NVC) Surveys**

- 8.5.36 NVC surveys will be undertaken in the 2024 survey season, where targeted surveys are deemed necessary to confirm the presence of Priority Habitats, to assess their botanical value or inform mitigation measures. Surveys will focus on habitats within the draft Order Limits that would be affected by the haul road, underground cable, pylon locations or where overhead lines pass through woodland or wetland habitats. Where overhead lines pass over dry grassland and heathland habitats, and no potential impact pathways are identified NVC surveys will not be undertaken.

### **Ground Water Dependent Terrestrial Ecosystems (GWDTE)**

- 8.5.37 The results of the BNG and NVC surveys will be used to identify where habitats associated with GWDTE are present within the draft Order Limits. Desk study data will also be reviewed to identify the Priority Habitats and statutory and non-statutory designated sites that support habitats associated with GWDTE that have the potential to be affected by the Project. Effects would be due to the potential for the disruption of hydrological links where the Project comprises underground cables or where large above ground installations, such as CSE compounds, are proposed.
- 8.5.38 Where the Project has the potential to affect surface water flows the potential for effects of habitats associated with GWDTE will also be investigated due to the potential for hydrological links between surface and subsurface waterbodies.

## **8.6 Baseline Conditions**

- 8.6.1 Baseline conditions have been gathered from desk-based information and site surveys, and presented with reference to the section of the Project that they are located (as shown on Figure 1.1: Site Location Plan and Project Sections in Volume II).

### **Statutory Designated Sites of International Importance**

- 8.6.2 There are no SACs with bats as the qualifying feature within 30 km of the draft Order Limits.
- 8.6.3 A total of 29 internationally important sites designated for biodiversity are located within the study area. However, a HRA screening exercise – undertaken in parallel to this

PEIR has identified that the potential for effects is limited to five sites<sup>49</sup> (this will be concluded as part of the HRA screening). Therefore, these additional 24 sites are not considered further within this chapter.

8.6.4 All identified internationally important designated site for biodiversity situated within the study area are shown in Figure 8.1: Statutory Sites Designated for Biodiversity in Volume II. The five sites considered to have potential impact pathways as a result of the Project are listed in Table 8.4.

**Table 8.4 - International Sites Designated for Biodiversity with Potential Impact Pathways**

<b>Site</b>	<b>Designation</b>	<b>Approximate distance from the draft Order Limits (km)</b>
<b>Section A</b>		
Norfolk Valley Fens	SAC	0.14
<b>Section C</b>		
Stour and Orwell Estuaries	Ramsar Site	3.07
Stour and Orwell Estuaries	SPA	3.07
<b>Section H</b>		
Thames Estuary and Marshes	Ramsar Site	1.66
Thames Estuary and Marshes	SPA	1.66

## Statutory Designated Sites of National Importance

8.6.5 Twenty-one nationally important sites designated for biodiversity (all SSSIs) are located within the study area<sup>50</sup>; an additional three SSSIs (Hangman’s Wood and Deneholes, Cattawade Marshes and Stour Estuary) that are beyond the 2 km study area have also been considered following Natural England’s response to the EIA Scoping Report (National Grid, 2022).

8.6.6 Seventeen of these sites have been identified with potential impact pathways with the Project. All nationally important designated sites for biodiversity within the study area

<sup>49</sup> The land affected by the Project does not support the habitats or species associated with any of the other 24 sites within the study area and given the nature of the Project it is considered unlikely that the Project would lead to hydrological or air quality effects that would extend as far as 2 km from the draft Order Limits.

<sup>50</sup> SSSIs designated for geological features only are considered within Chapter 9: Contaminated Land, Geology and Hydrogeology.

are shown in Figure 8.1: Statutory Sites Designated for Biodiversity in Volume II and those with potential impact pathways are listed in Yable 8.5.

**Table 8.5 - SSSIs Designated for Biodiversity with Potential Impact Pathways**

<b>Site</b>	<b>Approximate distance from the draft Order Limits (km)</b>	<b>Potential impact pathway</b>
<b>Section A</b>		
Flordon Common	0.14	Indirect: construction pollution (e.g. air quality/dust); hydrological connectivity to the draft Order Limits
Shelfanger Meadows	0.17	Indirect: construction pollution (e.g. air quality/dust); hydrological connectivity to the draft Order Limits
Forncett Meadows	1.01	Indirect: hydrological connectivity to the draft Order Limits.
Aslacton Parish Land	1.27	Indirect: hydrological connectivity to the draft Order Limits.
<b>Section B</b>		
Wortham Ling	0 - Within	Direct: Direct impacts to Wortham Ling SSSI are anticipated to be greater for the Waveney Valley Alternative – although both the overhead line design and the Waveney Valley Alternative comprise the same extent of limited vegetation clearance alongside Ling Road to facilitate access during the construction period, the Waveney Valley Alternative also requires additional clearance and installation of outfalls for temporary drainage. Indirect: construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Middle Wood, Offton	0 – immediately adjacent	Indirect: construction pollution (e.g. air quality/dust).
Barking Woods	0.21	Indirect: construction pollution (e.g. dust).
Gipping Great Wood	0.64	Indirect: hydrological connectivity to the draft Order Limits.
Gypsy Camp Meadows, Thrandeston	0.91	Indirect: construction pollution (e.g. air quality) as located within 120m of Primary Access Route.

<b>Site</b>	<b>Approximate distance from the draft Order Limits (km)</b>	<b>Potential impact pathway</b>
<b>Section C</b>		
Cattawade Marshes	3.07	Indirect: underpins Stour and Orwell Estuaries SPA and Ramsar site – draft Order Limits may be functionally linked.
Stour Estuary	3.47	Indirect: underpins Stour and Orwell Estuaries SPA and Ramsar site – draft Order Limits may be functionally linked
<b>Section D</b>		
Marks Tey Brickpit	0.04	Indirect: hydrological connectivity to the draft Order Limits.
<b>Section F</b>		
River Ter	0.18	Indirect: construction pollution (e.g. air quality/dust); hydrological connectivity to the draft Order Limits.
<b>Section H</b>		
North Thames Estuary and Marshes Proposed	0 - Within	Direct: habitat loss/fragmentation as a result of open-cut construction for underground cabling. Indirect: construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Mucking Flats and Marshes	1.66	Indirect: hydrological connectivity to the draft Order Limits.
South Thames Estuary and Marshes	1.80	Indirect: hydrological connectivity to the draft Order Limits.
Hangman's Wood and Deneholes	2.24	Indirect: hibernation site for three bat species and woodland habitat for bat foraging – draft Order Limits may be functionally linked.

8.6.7 Seven sites have been identified with no potential impact pathways with the Project. These sites are detailed in Table 8.6.

Table 8.6 - SSSIs Designated for Biodiversity with no Potential Impact Pathway

Site	Approximate distance from the draft Order Limits (km)
Section B	
Burgate Wood	0.36
Combs Wood	1.41
Section C	
Elmsett Park Wood	1.14
Hintlesham Woods	1.52
Sections C and D	
Bullock Wood	1.32
Section G	
Thorndon Park	1.26
Sections G and H	
Langdon Ridge	0.07

- 8.6.8 One of the sites (Hintlesham Woods) is designated for breeding birds but is located approximately 2.1 km from areas surveyed for breeding birds and therefore not considered to be functionally linked.
- 8.6.9 The remaining six sites are designated for woodland and ground flora features and the following potential impact pathways have therefore been considered:
- Hydrological connectivity to the draft Order Limits – not present for any of the sites
  - Construction dust – all of the sites are located more than 350 m from the draft Order Limits and therefore not affected by construction dust (as detailed in Chapter 7: Air Quality)
  - Air quality – all of the sites are located more than 200 m from the Primary Access Routes and therefore not affected by reduced air quality (as detailed in Chapter 7: Air Quality)
- 8.6.10 Given the lack of potential impact pathways, these seven sites will not be considered further in this report or the ES.

## Statutory Designated Sites of Local Importance

- 8.6.11 Thirteen locally important statutory sites designated for biodiversity (all Local Nature Reserves (LNRs)) are located within the study area.

- 8.6.12 Ten of these sites have been identified with potential impact pathways with the Project. One of these sites (Roydon Fen LNR) is partially located within the draft Order Limits for both the overhead line design and the Waveney Valley Alternative
- 8.6.13 All LNRs within the study area are shown in Figure 8.1: Statutory Sites Designated for Biodiversity in Volume II and those with potential impact pathways are listed in Table 8.7.

Table 8.7 - LNRs Designated for Biodiversity

Site	Approximate distance from the draft Order Limits (km)	Potential impact pathway
Section A		
Roydon Fen	0 – Within draft Order Limits and Waveney Valley Alternative draft Order Limits	Direct: habitat loss/fragmentation as a result of drainage installation (Waveney Valley Alternative) or to facilitate third party works. Indirect: construction pollution (e.g. noise/vibration/air quality/dust/light); hydrological connectivity to the draft Order Limits and the Waveney Valley Alternative draft Order Limits.
Dunston Common	0.35	Indirect: construction pollution (e.g. dust)
Section B		
Fen Alder Carr	0.23	Indirect: construction pollution (e.g. air quality/dust)
Needham Lake	1.40	Indirect: hydrological connectivity to the draft Order Limits
Section C		
Railway Walk, Hadleigh	0.27	Indirect: construction pollution (e.g. dust)
Section E		
Brockwell Meadows	1.90	Indirect: hydrological connectivity to the draft Order Limits
Section F		
Chelmer Valley Riverside	1.80	Indirect: hydrological connectivity to the draft Order Limits
Section G		

<b>Site</b>	<b>Approximate distance from the draft Order Limits (km)</b>	<b>Potential impact pathway</b>
Mill Meadow	1.91	Indirect: construction pollution (e.g. air quality/noise/dust) as located immediately adjacent to a Primary Access Route
<b>Section H</b>		
Linford Wood	0.54	Indirect: hydrological connectivity to the draft Order Limits
Grove House Wood	0.86	Indirect: hydrological connectivity to the draft Order Limits

8.6.14 Three LNRs have been identified with no potential impact pathways with the Project. These sites are detailed in Table 8.8.

**Table 8.8 - LNRs Designated for Biodiversity with no Potential Impact Pathway**

<b>Site</b>	<b>Approximate distance from the draft Order Limits (km)</b>
<b>Section A</b>	
Smockmill Common	1.31
<b>Section B</b>	
Bramford Meadows	1.18
<b>Section G</b>	
Hutton Country Park	0.46

8.6.15 These sites are designated for floodplain meadows, invertebrates, ditches with diverse aquatic and flora species (Bramford Meadows LNR) and woodland and grassland habitats (Smockmill Common LNR) and the following potential impact pathways have therefore been considered:

- Hydrological connectivity to the draft Order Limits – not present for either of the sites
- Construction dust – both sites are located more than 350 m from the draft Order Limits and therefore not affected by construction dust (as detailed in Chapter 7: Air Quality)
- Air quality – both sites are located more than 200 m from the Primary Access Routes and are therefore not affected by reduced air quality (as detailed in Chapter 7: Air Quality)

8.6.16 Given the absence of potential impact pathways with the Project, these sites are not considered further in this report or will be in the ES.

## Non-Statutory Designated Sites of Local Importance

- 8.6.17 397 non-statutory sites designated for biodiversity (CWS, Local Wildlife Sites (LWS) and Roadside Nature Reserves (RNR)) are located within the study area.
- 8.6.18 168 of these sites have been identified with potential impact pathways with the Project. 38 of these sites are located within the draft Order Limits.
- 8.6.19 All non-statutory sites designated for biodiversity are shown in Figure 8.2: Non-Statutory Sites Designated for Biodiversity in Volume II and those with potential impact pathways are listed in Table 8.9.

Table 8.9 - Local Non-Statutory Sites Designated for Biodiversity

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Section A				
Brick Kiln Lane, Bunwell Hill	CWS	0 - Within	Habitat loss/fragmentation as a result of overhead line installation and maintenance activities.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Norton's Wood	CWS	0 - Within	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Roydon Fen	CWS	0 - Within	Habitat loss/fragmentation as a result of drainage installation (Waveney Valley Alternative only) or to facilitate third party works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits and Waveney Valley Alternative draft Order Limits.
Brock's Watering	CWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Carlton Rode Fen	CWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Bunwell Wood	CWS	0.11	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Squire's Wood	CWS	0.13	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Hapton Common	CWS	0.14	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Flordon Meadow (West)	CWS	0.21	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Flordon	RNR	0.27	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Bressingham	RNR	0.30	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Flordon Meadow (East)	CWS	0.32	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Gissing Common	CWS	1.69	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
<b>Section B</b>				
Bullen Wood	CWS	0 - Within	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual)

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Fore and Bushey Groves	CWS	0 - Within	Habitat loss/fragmentation as a result of third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Great Newton Wood	CWS	0 - Within	Habitat loss/fragmentation as a result of access route construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Miller's Wood	CWS	0 - Within	Habitat loss/fragmentation as a result of access route improvements.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
River Gipping (Sections)	CWS	0 - Within	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
River Waveney (Sections)	CWS	0 - Within	Habitat loss/fragmentation as a result of drainage installation, open-cut construction for underground cabling (Waveney Valley Alternative only) or to facilitate third party works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
RNR 200	CWS	0 - Within	Habitat loss/fragmentation as a result of access route construction and third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Round Wood and Elms Grove	CWS	0 - Within	Habitat regeneration following removal of existing overhead line.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Somersham Park	CWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Thornham Estate Woods	CWS	0.03	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Burgate Little Green	CWS	0.11	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Keyfield Groves	CWS	0.12	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Burgate Little Green	CWS	0.15	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
RNR 48	CWS	0.20	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Fen Alder Carr	CWS	0.21	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
The Marsh	CWS	0.24	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Keyfield Groves	CWS	0.25	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Mellis Common	CWS	0.31	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Thornham Estate Woods	CWS	0.33	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Muckinger Wood	CWS	0.35	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Thrandeston Marsh	CWS	0.67	None.	Hydrological connectivity to the draft Order Limits.
Suffolk Business Park Meadow - Formerly EEB	CWS	0.86	None.	Construction pollution (e.g. air quality) as located within 25m of Primary Access Route.
Railway Meadows	CWS	0.91	None.	Construction pollution (e.g. air quality) as located within 35m of Primary Access Route.
RNR 211	CWS	1.11	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
RNR 169	CWS	1.34	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
River Gipping (Sections)	CWS	1.37	None.	Hydrological connectivity to the draft Order Limits.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
River Gipping (Sections)	CWS	1.54	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route; hydrological connectivity to the draft Order Limits.
Flordon Road Grassland	CWS	1.55	None.	Hydrological connectivity to the draft Order Limits.
<b>Sections B and C</b>				
Bushey Ley Farm (Arable Fields)	CWS	0 - Within	Habitat loss/fragmentation as a result of third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Burstall Long Wood	CWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Little Newton Wood	CWS	0.07	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
<b>Section C</b>				
Black Brook	LWS	0 - Within	Habitat loss/fragmentation as a result of drainage installation.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Higham Meadow	CWS	0 - Within	Habitat loss/fragmentation as a result of drainage installation.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Sproughton Park	CWS	0 - Within	Habitat loss/fragmentation as a result of third party mitigation works, access road construction, drainage installation, overhead line installation and maintenance activities; habitat regeneration following removal of existing overhead line	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits and Waveney Valley Alternative draft Order Limits.
The Coombs	LWS	0 - Within	Habitat loss/fragmentation as a result of third drainage installation.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Gun Hill Place	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Brimlin Wood	CWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Wenham Thicks	CWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
St Mary's Churchyard, Langham Hall	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Wasses Marshes	CWS	0.05	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Gun Hill Grassland	LWS	0.06	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Little Bromley Churchyard	LWS	0.12	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Raydon Great Wood	CWS	0.13	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Birch Wood	LWS	0.21	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Langham SRV	LWS	0.24	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Hadleigh Railway Walk	CWS	0.27	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Manning Grove	LWS	0.28	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Birch Wood, Langham	LWS	0.28	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Dalethorpe Park	LWS	0.58	None.	Hydrological connectivity to the draft Order Limits.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Ardleigh Reservoir Wood	LWS	0.70	None.	Construction pollution (e.g. air quality) as located within 175m of Primary Access Route; hydrological connectivity to the draft Order Limits.
Bridges Farm	LWS	0.83	None.	Hydrological connectivity to the draft Order Limits.
Sproughton Churchyard	CWS	0.85	None.	Hydrological connectivity to the draft Order Limits.
Hazel Wood	CWS	0.87	None.	Hydrological connectivity to the draft Order Limits.
Ardleigh Reservoir Grassland	LWS	0.98	None.	Hydrological connectivity to the draft Order Limits.
Bramford Meadows	CWS	1.17	None.	Hydrological connectivity to the draft Order Limits.
Bentley Long Wood	CWS	1.87	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
Dedham Old River Marshes	LWS	1.95	None.	Hydrological connectivity to the draft Order Limits.
<b>Section D</b>				

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Fiddler's Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of access route improvements	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Harrow Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Stonefield Strip	LWS	0 - Within	Habitat loss/fragmentation as a result of third access road construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Church House Wood	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Aldham Hall Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Wood near Fordham Place	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Fordham Bridge Meadow	LWS	0.10	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Marks Tey Brick Pit	LWS	0.11	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual);

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
				hydrological connectivity to the draft Order Limits.
Little Tey Churchyard	LWS	0.13	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Langham Road Grassland	LWS	0.14	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Kiln Wood	LWS	0.21	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Fordham Churchyard	LWS	0.22	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
West Bergholt Alderwoods	LWS	0.27	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Hillhouse Wood	LWS	0.50	None.	Hydrological connectivity to the draft Order Limits.
Aldercar Wood	LWS	0.54	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Stitching Wood	LWS	0.87	None.	Hydrological connectivity to the draft Order Limits.
Seven Star Green	LWS	1.20	None.	Construction pollution (e.g. air quality) as located within 25m of Primary Access Route.
<b>Section E</b>				
Coggeshall Hall Farm	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction, drainage installation and overhead line installation and maintenance activities.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Parson's and Queen's Wood	LWS	0 - Within	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Rivenhall Thicks	LWS	0 - Within	Habitat loss/fragmentation as a result of third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Hallhook Row	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Troys Wood	LWS	0.12	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Upney Wood	LWS	0.19	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Sandy Wood	LWS	0.31	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Brickhouse Wood	LWS	0.34	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
St Mary the Virgin, Great Leighs	LWS	0.54	None.	Hydrological connectivity to the draft Order Limits.
Feering Marsh	LWS	0.84	None.	Hydrological connectivity to the draft Order Limits.
Sheepcote Wood	LWS	1.05	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
Hoo Hall Meadow	LWS	1.09	None.	Hydrological connectivity to the draft Order Limits.
Witham Marsh	LWS	1.45	None.	Hydrological connectivity to the draft Order Limits.
Brockwell Meadows	LWS	1.90	None.	Hydrological connectivity to the draft Order Limits.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Sections E and F				
Mann/Parson's Wood	LWS	0.04	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Section F				
Bushey Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Bushy Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Great/Little Edney Woods	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction and overhead line installation and maintenance activities.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Langleys Deer Park	LWS	0 - Within	Habitat loss/fragmentation as a result of overhead line installation and maintenance activities and third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Lowley's Farm Meadow	LWS	0 - Within	Habitat loss/fragmentation as a result of access route improvements.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Writtlepark Woods	LWS	0 - Within	Habitat loss/fragmentation as a result of third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Sheepcotes Wood	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Osborne's Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
James's Spring	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Stonage Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Sparrowhawk Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Border Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
King Wood	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Lady Grove	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Border Wood Lake	LWS	0.12	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Little Waltham Village Meadows	LWS	0.14	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Lee Wood	LWS	0.16	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Galleycable Wood	LWS	0.19	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Chapel Wood	LWS	0.22	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Rook Wood	LWS	0.23	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Lyonshall Wood	LWS	0.26	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Chathamhall Spring	LWS	0.27	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Straw Brook Plantation	LWS	0.32	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Hylands Park	LWS	0.33	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Broomfield - Little Waltham Chelmer	LWS	0.45	None.	Hydrological connectivity to the draft Order Limits.
Oak Stables Meadow	LWS	0.52	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
Writtle High Woods	LWS	0.82	None.	Hydrological connectivity to the draft Order Limits.
Chelmer Valley Riverside	LWS	1.77	None.	Hydrological connectivity to the draft Order Limits.
<b>Section G</b>				
Blind Lane	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction and third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
James's Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual);

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
				hydrological connectivity to the draft Order Limits.
Little Bladen's Wood	LWS	0 - Within	Habitat loss/fragmentation as a result of third party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Parkhill Wood Meadow	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
St Margarets Wood and Lane	LWS	0 - Within	Habitat loss/fragmentation as a result of open-cut construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Little Burstead Common	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Spearshill Wood	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Round Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Botneyhill Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Primstock	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Parkhill Wood	LWS	0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Spring Wood	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Friern Manor Wood	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Langdon Complex	LWS	0.02	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Harespring Wood	LWS	0.04	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Bladen's Wood	LWS	0.06	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
All Saints Churchyard, Hutton	LWS	0.07	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Clapgate Wood	LWS	0.08	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Mountnessing Hall Woods	LWS	0.10	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Buckwyns Wood	LWS	0.11	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Southfields Washland	LWS	0.16	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
St Giles Churchyard, Mountnessing	LWS	0.17	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Gravelpit Wood	LWS	0.18	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Bluntswall Wood	LWS	0.23	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Dog Wood	LWS	0.26	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Little Burstead Wood	LWS	1.41	None.	Construction pollution (e.g. air quality) as located within 125m of Primary Access Route.
Laindon Common	LWS	1.43	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
Mill Meadows LNR	LWS	1.90	None.	Construction pollution (e.g. air quality) as located immediately adjacent to Primary Access Route.
<b>Section H</b>				
Buckingham Hill	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction, drainage installation, overhead line installation and maintenance activities and third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Linford Pit	LWS	0 - Within	Habitat loss/fragmentation as a result of third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Mucking Heath Complex, Southfields	LWS	0 - Within	Habitat loss/fragmentation as a result of access route construction, overhead line installation and maintenance activities and third-party mitigation works.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Rainbow Wood and Ashen Shaw	LWS	0 - Within	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Tilbury Power Station	LWS	0 - Within	Habitat loss/fragmentation as a result of open-cut construction for underground cabling and access route construction.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual);

Site	Designation	Approximate distance from the draft Order Limits (km)	Potential Impact Pathway	
			Direct	Indirect
				hydrological connectivity to the draft Order Limits.
West Tilbury Church	LWS	<0.01	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
West Tilbury Hall	LWS	0.05	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual).
Tilbury Marshes	LWS	0.06	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Low Street Pit	LWS	0.08	None.	Construction pollution (e.g. noise/vibration/air quality/dust/light/visual); hydrological connectivity to the draft Order Limits.
Coalhouse Fort Marshes, East Tillbury	LWS	1.78	None.	Hydrological connectivity to the draft Order Limits.

8.6.20 229 non-statutory sites have been identified with no potential impact pathways<sup>51</sup> with the Project and are not considered further in this report nor will be in the ES.

## Habitats

8.6.21 A detailed desk study relating to habitats is presented within Appendix 8.1: Habitat Report in Volume III; a summary of the preliminary results is provided below.

8.6.22 Forty five blocks of Ancient Woodland fall within the study area. Of these, four blocks are located within the draft Order Limits (Bullen Wood (Section B), Round Wood in Section B and Writtle-Writtlepark Wood and Bushey Wood in Section F). Ancient Woodland includes all woodland that has existed continuously since 1600. However, any woodlands less than 2 hectares (ha) are not included on the inventory, and so small woodlands and linear features are excluded from the inventory. Targeted surveys will continue to determine if wooded areas affected by the Project support Ancient Woodland and to identify veteran and/or ancient trees. This information will be included within the ES.

8.6.23 The desk study identified the presence of several habitats listed on the Priority Habitat Inventory (Natural England, 2023b) within the draft Order Limits. These are detailed in Table 8.10.

**Table 8.10 - Priority Habitats within the draft Order Limits**

<b>Priority Habitat</b>	<b>Area (ha)</b>	<b>% of total draft Order Limit area</b>
Coastal and floodplain grazing marsh	64.25	1.58
Deciduous woodland	52.20	1.28
Good quality semi-improved grassland	5.08	0.12
No main habitat but additional habitats present	3.29	0.08
Traditional orchard	0.26	0.01
Lowland heathland	0.04	<0.01

<sup>51</sup> The following potential impact pathways have been considered:

- Hydrological connectivity to the draft Order Limits – not present for any of the sites
- Construction dust – all sites are located more than 350 m from the draft Order Limits and therefore not affected by construction dust (as detailed in Chapter 7: Air Quality)
- Air quality – all sites are located more than 200 m from the Primary Access Routes and are therefore not affected by reduced air quality (as detailed in Chapter 7: Air Quality)

Priority Habitat	Area (ha)	% of total draft Order Limit area
Lowland fens	0.01	<0.01
Lowland calcareous grassland	<0.01	<0.01

8.6.24 The following habitats listed on the Priority Habitat Inventory (Natural England, 2023b) were also identified within the study area but outside of the draft Order Limits:

- Coastal saltmarsh
- Lowland dry acid grassland
- Lowland meadows
- Purple moor grass and rush pastures

8.6.25 The location of Priority Habitats is illustrated on Figure A 8.1.2: Protected/Notable Habitat and Plant Desk Study Map in Appendix 8.1: Habitat Report in Volume III. Further surveys will determine whether Habitats of Principal Importance, as listed under section 41 of the Natural Environment and Rural Communities (NERC) Act (HMSO, 2006) are present within the draft Order Limits.

8.6.26 Small areas of fen peat soils have been identified in the River Waveney floodplain (as detailed in Chapter 6: Agriculture and Soils) and further surveys would include peat surveys (as detailed in Chapter 6: Agriculture and Soils) and NVC surveys within the River Waveney floodplain to determine the extent of fen peat soils and associated peat-dependent habitats. There is a high likelihood (based on current available data) that these peat-dependent habitats meet the criteria for priority habitat lowland fen and would therefore be considered 'irreplaceable'. The results of all further surveys will be included within the ES.

8.6.27 Approximately 44% of the land area within the draft Order Limits has been subject to field survey and the preliminary results of the ongoing Phase 1 Habitat, BNG and hedgerow survey are presented within Appendix 8.1: Habitat Report in Volume III (and illustrated on Figure A8.1.1: Phase 1 Habitat Map within Appendix 8.1 in Volume III).

8.6.28 An initial review of habitats across the draft Order Limits revealed that most of the land comprised arable and pastoral farmland; however, multiple parcels of semi-improved grassland, woodland and areas of open mosaic habitat on previously developed land have been identified, along with boundary features (such as hedgerows, ditches, and watercourses). Full results of the habitat surveys will be provided within the ES.

## Protected/Notable and Invasive Non-Native Species

### Flora/Fungi

8.6.29 Records of 86 protected/notable flowering plant species, one protected fungi species and one notable bryophyte species have been identified within the study area. 15 of these species have been recorded within the Order Limits (a moss (*Tortula schimperii*), Stinking Chamomile, Field Scabious, Sulphur Clover, Harebell, Lesser Calamint,

Stinking Hellebore, Bluebell, Devil's-bit Scabious, Large-leaved lime, Chicory, Field pepperwort, Autumn Squill, Clustered Clover and Dittander). No protected/notable flora/fungi species have been identified through habitat surveys to date. Surveys will continue into 2024 and any findings will be presented within the ES.

- 8.6.30 Further information on protected/notable flora is included in Appendix 8.1: Habitat Report in Volume III.

### Terrestrial Invertebrates

- 8.6.31 The habitats within the draft Order Limits largely comprise intensive agricultural land which is of limited value to terrestrial invertebrates. From a review of desk study data, areas that have been identified to be of potential value for terrestrial invertebrates include tree-associated landscapes and post-industrial landscapes. Thirty-nine areas within the draft Order Limits have been identified as potentially supporting habitat that may support species of conservation concern including stag beetle, white admiral, white-letter hairstreak, shrill carder bee, brown-banded carder bee and grizzled skipper. These areas would be subject to a scoping survey in early 2024 to assess their potential importance to invertebrates and subject to targeted surveys if habitats/features of potential value to species of conservation concern are identified.
- 8.6.32 South Essex is a significantly key area for terrestrial invertebrates with areas proposed to be designated as SSSI, partly for invertebrate interest.
- 8.6.33 Further information on invertebrates is included in Appendix 8.2: Terrestrial Invertebrate Report in Volume III.

### Reptiles

- 8.6.34 Slow worm, common lizard, grass snake and adder have been recorded within the draft Order Limits and the wider study area.
- 8.6.35 Slow worm is common and widespread across most of the study area.
- 8.6.36 Common lizard is common and widespread within suitable habitats in Essex and Thurrock. It is absent from Norfolk and Suffolk, in areas where the draft Order Limits are located.
- 8.6.37 Grass snake is common and widespread across the study area with the greatest abundance in Essex and Thurrock.
- 8.6.38 Adder is widely distributed across suitable habitats within the Thurrock unitary authority area. It is absent in Norfolk and Suffolk in areas where the draft Order Limits are located.
- 8.6.39 Full results will be included within the ES once surveys are complete.
- 8.6.40 Further information on reptiles is included in Appendix 8.3: Reptile Report in Volume III.

### Breeding Birds

- 8.6.41 Results of the breeding bird surveys undertaken in 2023 found 82 bird species within the draft Order Limits of which twenty-seven were confirmed/breeding. Of the 82

species recorded, 55 species are protected or of conservation concern. Most notable is the presence of Cetti's warbler (a protected species) with four breeding territories confirmed.

- 8.6.42 The species assemblage recorded during the 2023 surveys is typical of farmland habitats and is of no more than local importance. Full results will be included within the ES once surveys are complete.
- 8.6.43 Further information on breeding birds is included in Appendix 8.4: Breeding Bird Report in Volume III.

### Wintering Birds

- 8.6.44 The draft Order Limits contain extensive areas of habitat suitable for wintering birds including large arable fields suitable for foraging/roosting waders and hedgerows along field boundaries which are suitable for wintering farmland species.
- 8.6.45 More than 26,000 desk study records have been identified within the study area, of which more than 1,000 are of species associated with the Stour and Orwell Estuary or Thames Estuary and Marshes SPA/Ramsar sites. Lapwing and golden plover are the SPA/Ramsar associated species most likely to use habitats within the draft Order Limits.
- 8.6.46 Surveys of land functionally linked to these SPA/Ramsar sites have been undertaken to establish a baseline for HRA Screening and recorded 64 species.
- 8.6.47 Surveys also targeted species considered to be at risk of collision with the overhead line, of which nearly 6,000 desk study records were identified within the study area. Collision-risk species recorded during surveys include primarily waterbirds using existing waterways. Full results will be included within the ES once surveys are complete.
- 8.6.48 Further information on wintering birds is included in Appendix 8.5: Wintering/Passage Bird Report in Volume III.

### Bats

- 8.6.49 Desk study records revealed 298 confirmed or likely roosts for ten bat species within the study area, including one soprano pipistrelle roost within the draft Order Limits.
- 8.6.50 Twelve bat species have been recorded within 6 km of the draft Order Limits (non-roost records) of which ten (common pipistrelle, soprano pipistrelle, noctule, brown long-eared bat, serotine, Leisler's, Daubenton's, natterers, whiskered/brandt's and Barbastelle) as well as unidentified pipistrelle species, unidentified Myotis species and unidentified bat species, have been recorded within the draft Order Limits. Full results will be included within the ES once surveys are complete.
- 8.6.51 Further information on bats is included in Appendix 8.6: Bat Roosting Report in Volume III.

## Hazel Dormouse

- 8.6.52 Twenty-eight records of hazel dormouse were identified within the study area, with none within the draft Order Limits. Hazel dormouse is considered absent from Norfolk and large parts of Suffolk.
- 8.6.53 Results of nest tube surveys conducted to date within the draft Order Limits have found evidence of dormouse within Bushey Wood, west of Margaretting, Essex and an incidental observation of a possible dormouse nest within King Wood, south-east of Chelmsford. Surveys will continue in 2024 following best practice guidance (English Nature, 2006). Full results will be included within the ES once surveys are complete.
- 8.6.54 Further information on dormouse is included in Appendix 8.8: Dormouse Report in Volume III.

## Otter and Water Vole

- 8.6.55 The desk study has revealed that otter and water vole are present throughout the study area. Surveys for otter and water vole are ongoing, however results to date have confirmed the presence of otter on three watercourses within the draft Order Limits. No conclusive evidence of water vole has been recorded in 2023. Full results will be included within the ES once surveys are complete.
- 8.6.56 The methodology and results of the otter and water vole survey desk study and survey work undertaken to date is provided within Appendix 8.9: Otter and Water Vole Report in Volume III.

## Species of Principal Importance (SPI)

- 8.6.57 Most SPI species will be considered under baseline conditions for species or groups of conservation concern. The following are the SPI that have not been considered elsewhere within this chapter:
- Brown hare
  - Common toad
  - Harvest mouse
  - Hedgehog
  - Polecat
- 8.6.58 All species (except for pool frog<sup>52</sup>) have been recorded within the study area and potential for effects on these species will be considered in the ES following the completion of all baseline surveys where incidental records or SPI are being recorded.
- 8.6.59 Further information on SPI is included in Appendix 8.10: Species of Principal Importance Report in Volume III.

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<sup>52</sup> Pool frog have been scoped out of further assessment within the ES as they have a very restricted distribution limited to places where they have been re-introduced. Full results will be included within the ES once surveys are complete.

## Badger

- 8.6.60 291 records of badger were identified within the study area including six that were situated within the draft Order Limits. Badgers are known to be widespread across East Anglia with historical records from all Project sections.
- 8.6.61 To date, surveys to identify badger setts within 30 m of the draft Order Limits have identified 115 confirmed or potential setts including 33 main setts.
- 8.6.62 Full results will be included within the ES.
- 8.6.63 Further information on badgers is included in Appendix 8.11: Badger Report (confidential) in Volume III.

## Invasive non-native species (INNS)

- 8.6.64 Eight species of invasive non-native plants have been identified within the study area, including three (Japanese knotweed, New Zealand Pigmyweed and Rhododendron) which have been recorded within the draft Order Limits.
- 8.6.65 One INNS, Himalayan balsam, has been recorded within the draft Order Limits during field surveys to date. Surveys will continue into 2024 and the results will be presented in the ES.
- 8.6.66 Further information on invasive non-native plants is included in Appendix 8.1: Habitat Report in Volume III.

## Future Baseline

- 8.6.67 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 8.6.68 The current land use associated with the draft Order Limits is predominantly agricultural, and it is unlikely that any change to ecological conditions would occur unless agricultural practices (or other current management regimes) cease, in which case natural habitat succession would be expected. Therefore, it is reasonable to assume that if the Project does not proceed and current conditions are maintained, species abundance and distribution is unlikely to change significantly.
- 8.6.69 The Waveney and Little Ouse Recovery Project is led by Suffolk Wildlife Trust and aims to deliver landscape-scale restoration in the Waveney and Little Ouse River catchments on the Suffolk / Norfolk border. Currently in a pilot phase until the end of 2024, the exact extent and details (including timeframe) of the project are largely unknown but (if extended beyond the pilot phase) are anticipated to lead to a long-term increase in biodiversity within the catchment.
- 8.6.70 Future developments within the draft Order Limits are likely to be limited given the rural setting of most of the route and are likely to be localised, industrial-related developments on land close to existing development. Anticipated and committed developments that have considerable overlap with the draft Order Limits and therefore potential to significantly affect the current baseline are detailed below. These (and other (committed)) developments have also been identified with the potential for them to have cumulative effects with the Project; see Chapter 17: Assessment of Cumulative Effects.

## Bramford Substation

- 8.6.71 There are three proposed connections into Bramford Substation that are likely to be undertaken before or alongside the Norwich to Tilbury proposed works. The National Grid Bramford to Twinstead project, which is also part of the Great Grid Upgrade, would include overhead line and underground cable entry into Bramford Substation to the south-west of the substation. The East Anglia Three Wind Farm project has a proposed connection to the north-east and a further proposed connection to the east of the substation would connect to a battery storage proposal. In addition, a project to replace the Super Grid Transformer (SGT) at Bramford is also proposed.
- 8.6.72 These schemes (aside from the replacement SGT) also include landscaping proposals and opportunities for ecological enhancement. The anticipated presence of new line entries and associated landscaping measures at Bramford Substation have been considered and the design teams for the Project and the Bramford Substation are liaising closely to ensure a joined up ecological strategy.

## Dunton Hills Garden Village

- 8.6.73 The proposed Dunton Hills Garden Village covers approximately 225.75 ha of agricultural land and golf course to the west of Basildon, Essex. Approximately 19.5 ha of Dunton Hills Garden Village intersects with the draft Order Limits and much of this area forms landscaping within Dunton Hills Garden Village.
- 8.6.74 The construction period is currently unknown but if approved and commenced before Project construction, would remove ecological constraints from areas where housing and other infrastructure is proposed. Ecological constraints in areas of proposed landscaping are anticipated to increase in the long-term as landscaping matures.

## Maple Park Development

- 8.6.75 Planning approval to redevelop 57 ha of agricultural land and golf course to the south-west of Stanford-Le-Hope, Thurrock, to provide 350 residential dwellings and public open space was granted in 2013. Approximately 7 ha of the public open space intersects with the draft Order Limits.
- 8.6.76 Post-construction, the public open space is subject to a Biodiversity Management Plan until at least 2033. Ecological constraints in areas overlapping with the draft Order Limits are anticipated to increase in the long-term as habitat quality improves.

## Orsett Quarry

- 8.6.77 An extension to existing mineral extraction and future site restoration is proposed at Orsett Quarry, Stanford-Le-Hope. Approximately 5 ha of the existing quarry site (predominantly comprising bare ground) intersects with the draft Order Limits.
- 8.6.78 If approved, the proposals would have little effect on ecological constraints within the draft Order Limits in the short-term; however, the longer-term proposals for site restoration (anticipated to be delivered 20 years post-commencement) would restore

the land within the draft Order Limits to grassland, increasing the likelihood of ecological constraints compared to the current baseline.

## Thurrock Flexible Generation Plant

- 8.6.79 Development for a flexible generation plant at Thurrock has been granted approval with works taking place during 2023 and 2024. Approximately 48 ha of the site intersects with the draft Order Limits.
- 8.6.80 Ecological constraints in areas overlapping with the draft Order Limits have / would largely be removed to facilitate the Thurrock Flexible Generation Plant construction; however, post-construction habitat creation and management (until approximately 2053) would increase the likelihood of ecological constraints in the future.

## Other approved developments (Flying Trade Group Food storage and distribution and Crouch Solar Farm)

- 8.6.81 If construction is commenced before Project construction, ecological constraints in areas that overlap with the draft Order Limits would have been removed prior to the Project commencing.

## Other potential developments not yet approved (Chelmsford North East Bypass (CNEB) and Tilbury Energy Centre)

- 8.6.82 If approved and commenced before Project construction, ecological constraints in areas that overlap with the draft Order Limits would have been removed prior to the Project commencing

## Lower Thames Crossing (LTC)

- 8.6.83 LTC is a proposed new road crossing connecting Kent, Thurrock, and Essex. Approximately 23 km in length, it would connect to the existing road network from the A2/M2 to the M25 with two tunnels (one southbound and one northbound) beneath the River Thames.
- 8.6.84 If approval is granted, the six year construction phase is expected to commence in 2026. Construction of the Norwich to Tilbury Project is scheduled to commence in 2027 and it is therefore possible that ecological constraints in the Thurrock area south of the A1013 would have been removed by LTC. The design teams for the Project and LTC are liaising closely to ensure compatibility with proposals including ecological mitigation, as currently plans include mitigation within the Norwich to Tilbury Order Limits.

## 8.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 8.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 8.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 8.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Those relevant to Ecology and Biodiversity include:
- The Project has committed to delivering minimum 10% BNG – The Project would deliver an overall net improvement to biodiversity in the area through a combination of on-site and off-site mitigation. This will be reported as an appendix to the ES to avoid overlap or double counting of any required EIA mitigation
  - Sensitive routing and siting – Avoid and reduce as far as practicable effects on identified environmental and socio-economics receptors
  - The design would allow for landscape planting around CSE compounds, the new EACN Substation and works at existing substations. This would reduce the effects on views and landscape setting
  - For access roads and haul roads, the Project requires the crossing of multiple ditches, drains and watercourses. Large or sensitive watercourses, for example those designated as main river, and those with WFD status, would be crossed using clear span bridges
- 8.7.4 In addition, the Project is committed to the delivery of trenchless crossings at a number of locations as detailed in Table 4.6 in Chapter 4: Project Description. This would reduce ecological effects compared to open-cut construction, particularly on the aquatic biodiversity receptors.

### Standard Mitigation

- 8.7.5 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 8.7.6 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard mitigation measures relating specifically to Ecology and Biodiversity. These include but are not limited to (note: measures have been assigned references (for example (GG01)) which align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- B01: The Main Works Contractor(s) will comply with relevant protected species legislation. Appropriate licences will be obtained where necessary from Natural

England for all works affecting protected species as identified in the ES and through pre-construction surveys. All applicable works will be undertaken in accordance with the relevant requirements and conditions set out in those licences. Where certain biodiversity receptors have been identified or where there is potential for them, and effects cannot be avoided during construction, Reasonable Avoidance Measures (RAMs) and/or Precautionary Working Methods (PWMs) may also be developed and implemented under supervision by an Ecological Clerk of Works (EcoW)

- B02: Construction effects will be designed out/minimised as far as possible through, for example, minimising land-take/habitat loss and locating access tracks/haul roads and site compound/material storage areas outside of ecologically sensitive sites/habitats (such as statutory and non-statutory designated sites, priority habitats and wetlands). Clearly demarcated, dedicated access routes will be provided during construction and any areas required for temporary works will be reinstated on completion
- B03: Best environmental practice techniques will be followed with regards to:
  - The control of dust and other emissions from construction
  - Appropriate preventative measures to prevent sediment run-off and silt dispersal into watercourses
  - Chemicals and fuels storage and pollution incidence response procedures
  - Enforced speed limits on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna
  - The control of noise and vibration to ensure it is kept to the minimum necessary
  - Appropriate protective area will be established using appropriate fencing and signage and will be inspected, repaired, and replaced as necessary. The protective areas will be shown on the Retention and Reinstatement Plans contained within the LEMP
- B04: Measures must be taken to prevent the spread of Non-Native Invasive Species (NNIS) of terrestrial and aquatic plants. Appropriate exclusion zones will be demarcated and enforced around areas of NNIS (informed by an up-to-date site walkover) to avoid spread or propagation (through seeds, rhizomes, fragments, etc.). Appropriate biosecurity measures will be documented in a method statement and implemented during construction to prevent the spread of NNIS via personnel, vehicles, plant, or machinery. Workers will be equipped with the necessary equipment, Personal Protective Equipment (PPE) and substances to implement biosecurity control measures, including effective hygiene and sanitation practices. This will most frequently comprise disinfectant tablets, sprayers, and brushes to clean and disinfect equipment and PPE prior to entering/leaving NNIS exclusion zones. Water used to clean vehicles will be controlled to prevent spreading of NNIS
- B05: Excavations must be covered or securely fenced (with no potential access points beneath fencing) when not in use (e.g., overnight) to prevent entrapment of animals. Alternatively, the excavation will include measures, such as a battered edge or ramp, that allows animals to escape

- B06: Lighting used for construction must be switched-off when not in use and positioned to minimise spill on to adjacent land or retained vegetation. Lighting should be directional, away from biodiversity receptors and kept to a minimum so that the surrounding landscape remains unlit. All lighting (i.e., construction and operation) will also be designed following the joint guidance provided by the Institution of Lighting Professionals and Bat Conservation Trust (Institution of Lighting Professionals, 2023). The lighting design will account for the potential effects on ecology by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations to decrease the potential displacement effects on the natural environment and light sensitive fauna such as bats. B07 – Construction Exclusion Zones (CEZ) will be established prior to construction to define working areas and ensure protection of habitats outside of the Order Limits, and retained habitats within, throughout development. A minimum buffer of 10 m (where practicable) will be retained around biodiversity receptors to reduce any potential direct or indirect effects on the species and habitats associated with them and the CEZ may need to be extended beyond 10 m for certain biodiversity receptors, such as woodlands and trees for example, to protect root protection zones
- B08: The avoidance of periods of sensitivity is considered best practice for a range of protected and notable species and construction activities where reasonably practicable would be planned accordingly. For example, vegetation removal would be undertaken outside of the bird breeding season (where possible) to avoid potential effects on nesting birds. If vegetation clearance is required within the bird breeding season, all such vegetation would be checked by an ecologist/EcoW for the presence of nesting birds no more than 48 hours prior to clearance. Wherever nests are found, an appropriate CEZ (species specific but minimum 15 m) would be established around the nest and no works would be permitted within that area until the ecologist/EcoW provides confirmation that the nest is no longer in use and work can proceed
- B09: Any required vegetation removal that is suitable to harbour amphibians, reptiles and small mammals will be subject to a two-stage cut and overseen by an EcoW. Firstly, vegetation will be cut to approximately 150 mm (with the arisings removed). Following a minimum of 24 hours (to allow animals to naturally disperse from the area), a second cut down to ground level will be undertaken. Vegetation will be cleared during suitable weather and seasonal conditions and using appropriate equipment based on the type of vegetation to be removed, the area affected, and the risk of mortality or injuring animals
- B10: Potential Roost Features (PRFs) will be graded as PRF-I and PRF-M (in line with current guidance) and an alternative roost structure(s), i.e., bat box(es), will be provided for all losses. The Project is committed to an artificial roost site package that provides an increase in roost site availability from the baseline. These will be situated on retained trees within the Order Limits or areas outside of the Order Limits (with landowner consent)
- B11: Method statements will be developed to ensure that any flumes installed within watercourses include suitable measures to allow the passage of animals (i.e., otters, water vole and fish) throughout construction, accounting for fluctuating water levels. For otter and water vole this may comprise an adjacent dry pipe. Where appropriate,

in-channel works will be supported using a cofferdam, and for certain watercourses this will require fish rescue to be carried out under licence from the Environment Agency. This will entail using stop nets or equivalent to enclose the area of work and electric fishing the area a minimum of three times. Rescued fish will then be released a suitable distance downstream. The duration of construction activities within watercourses will be kept to a minimum to minimise effects

## Habitats

- 8.7.7 Where temporary habitat removal is required to facilitate construction, this would be reinstated. Reinstatement would aim to provide habitats of equal or better value to those affected and permanent land take would be compensated; BNG equivalent to a 10% uplift above the Project baseline situation would be sought through the design process for the Project. Accordingly, hedgerows scheduled for removal during construction would be reinstated and, where appropriate, would be improved from their baseline condition e.g., defunct, or species-poor hedgerows would be replanted to achieve species-rich and continuous hedgerows, once re-established.
- 8.7.8 Where peat-dependent habitats are present a bespoke compensation package would be developed to compensate for any loss of this irreplaceable habitat.
- 8.7.9 The location of CEZs would be defined within the LEMP (secured by the CoCP) and informed by a pre-construction ecological walkover (to identify any changes to the baseline), a tree survey (to British Standard BS 5837:2012 (British Standards Institution, 2012)) and would be in line with regional Environment Agency and Internal Drainage Board requirements (excluding required access crossing points). The outline LEMP will also include Retention and Reinstatement Plans, defining the location of specific protective measures (i.e., fencing and signage) detailing habitat reinstatement and creation measures.
- 8.7.10 Wherever possible, habitat connectivity would be retained by using existing access routes, reducing working widths through biodiversity receptors, and maintaining connectivity through green corridors such as hedgerows and watercourses.
- 8.7.11 Where tree surgery to the crown or roots is necessary (such as where tree surgery is required to achieve electrical safety clearances), this would be undertaken in accordance with BS 3998:2010 (British Standards Institution, 2010); however, the Project, and specific construction tasks, would take a hierarchical approach to trees: aiming to retain as many trees as possible in the first instance; and avoiding total loss of habitat where possible (i.e. by pollarding and trimming, rather than complete removal, where applicable).
- 8.7.12 Following the completion of the detailed design for the Project, and prior to commencement of construction, all vegetation would be subject to a full tree/vegetation survey and site-specific assessment where vegetation removal may be reduced further than the generalised approach to vegetation detailed above.

## Fauna

- 8.7.13 Where construction activities are found to conflict with the presence of other protected or notable species, method statements would be produced and (where appropriate)

construction would only proceed under a derogation licence issued by Natural England. Natural England will only issue a derogation licence in relation to a development proposal if the licensed actions maintain the favourable conservation status of a species or provide a conservation benefit. Thus, overall effects are anticipated to be neutral/beneficial. Species- (and habitat-) specific mitigation and the requirement for pre-construction surveys and/or monitoring will be developed during production of the ES in accordance with licencing expectations.

- 8.7.14 Section 8.5 sets out the proposed approach to determine the ecological baseline for the Project defining which further field surveys and assessments have been/will be undertaken. Results from these ecological surveys (once completed) will provide a robust baseline for the ES. In addition, pre-construction ecological checks/surveys would be conducted where required.
- 8.7.15 Natural England have agreed to the use of a DLL approach to mitigate effects on great crested newt. Implementation of the DLL will be conducted and overseen by Natural England.
- 8.7.16 The embedded and standard mitigation measures and implementation of DLL is considered satisfactory for the following biodiversity receptors: INNS, amphibians (including but not limited to great crested newt), badger and other 'SPI' that may occur within the draft Order Limits (i.e., brown hare, harvest mouse, hedgehog, and polecat). No specific mitigation measures (over and above embedded and standard) are required for these biodiversity receptors, and they are not considered further within this report (with the exception of acknowledging the potential need for a badger derogation licence in paragraph 8.7.13).
- 8.7.17 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

- 8.7.18 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.
- 8.7.19 These will be developed and detailed in full within the ES and parallel HRA and include additional mitigation measures to reduce significant effects upon a range of biodiversity receptors, including but not limited to the development of receptor specific mitigation strategies and method statements. These may be developed as derogation licences for species including but not limited to bats, dormouse, otter, water vole and badger.

## Waveney Valley Alternative

- 8.7.20 Additional, peat mitigation would likely be needed for the Waveney Valley Alternative compared to the overhead line design.
- 8.7.21 Peat-dependent habitats can only be created in areas where peat and the correct physical (climatic, topographic and hydrological) and chemical (pH and low nutrient) conditions are already present. Even in these locations where conditions are optimal, peat habitats will accumulate at a very slow rate (approx. 1mm per year (IUCN UK

Peatland Programme, 2024)). Restoration can therefore be difficult, is location dependent and only achievable in the long-term. However, if the Waveney Valley Alternative is taken forwards a bespoke onsite mitigation package (worst-case this may also include possible off-site compensation with respect to BNG principles). The bespoke package of measures would be designed in consultation with the Local Planning Authority, Natural England and Suffolk Wildlife Trust and would meet requirements in relevant BNG policy and guidance. Typical measures in the bespoke package are likely to focus on scrub removal and the use of restoration techniques to restore the hydrology of the peat-dependent habitats by increasing water retention and limiting flow.

- 8.7.22 As previously stated, the Waveney Valley forms part of the Waveney and Little Ouse Recovery Project led by Suffolk Wildlife Trust which aims to deliver landscape-scale benefits for biodiversity. Many details of the Project are still unknown therefore engagement will continue to be undertaken with relevant stakeholders.
- 8.7.23 The implementation / delivery of ecological mitigation is anticipated to be more complex and extensive for the Waveney Valley Alternative compared to the overhead line design.
- 8.7.24 All other mitigation for the Waveney Valley Alternative would be as per the overhead line design.

## Enhancement

- 8.7.25 The Project is committed to adopting a sustainable approach to development by proactively taking measures to ensure that the Project leaves the environment in a better condition than it was before development (including but not limited to the delivery of 10% BNG). The Project would seek to provide strategic habitat enhancement and creation, aiming to identify and implement opportunities to improve habitat quality and connectivity and align with national nature recovery objectives and projects. Such measures may include specific habitat creation and enhancement measures and additional receptor specific measures such as the creation of habitat piles and installation of bird and bat boxes. Further details will be outlined within the ES.

## 8.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 8.8.1 The preliminary likely significant effects of the Project have been considered based upon current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined in Table 8.11 below. It assumes that all embedded mitigation (design measures), standard practice, and any additional mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).
- 8.8.2 It should be noted that this assessment is ongoing and is subject to change during ongoing development of the Project proposals.

8.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

Table 8.11 - Summary of Preliminary Likely Significant Effects

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
All Statutory designated sites of international and national importance	Construction	Direct and indirect effects to habitat (or land functionally linked to it) and species from construction pollution (vibration, dust, air quality, light, noise and visual) and disruption of hydrological links that can affect GWDTE.	The HRA/ES will document additional measures to reduce significance of effects		
Statutory designated sites of international and national importance (Thames Estuary and Marshes Ramsar Site and SPA, Stour and Orwell Estuaries Ramsar Site and SPA, Breckland SPA, Mucking Flats and Marshes SSSI and South Thames Estuary and Marshes SSSI only)	Operation (and maintenance)	Direct effects to bird species because of harm/mortality from collision with the overhead line. Degradation/fragmentation of retained habitats from adjacent land-use changes and related operational noise, light and visual disturbance.	(e.g., mitigation strategies and method statements, installation of bird diverters, habitat reinstatement, creation, and enhancement and EcoW presence).	Construction effects would be short-term, largely reversible and limited in extent. Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.	Neutral: Likely Not Significant following implementation of mitigation; further assessment required following completion of ecology surveys, to be recorded within the ES and HRA.

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
North Thames Estuary and Marshes Proposed SSSI	Construction	Potential for direct effects to habitat and species from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function), as well as disturbance, harm, or mortality of associated species.	Mitigation measures would be developed in conjunction with stakeholders as/when the SSSI boundary and designated features are formalised and these conflict with the Project.	Construction effects would be short-term, largely reversible and limited in extent. Overall residual effects are uncertain as SSSI extent and designated features are unknown currently.	Negative: Potentially Significant but uncertain at this stage; further assessment required following survey and consultation.
	Operation (and maintenance)	Direct effects to bird species because of harm/mortality from collision with the overhead line. Direct effects to habitat and species from physical disturbance because of vegetation clearance as part of maintenance activities and degradation/fragmentation of retained habitats from adjacent land-use changes and related operational noise, light and visual disturbance.		Uncertain but likely none.	Neutral: Likely Not Significant following implementation of mitigation but uncertain at present.

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Statutory designated sites of local importance	Construction	<p>Direct effects to habitat and species from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function), as well as disturbance, harm, or mortality of associated species.</p> <p>Direct, and indirect effects to habitat and species from construction pollution (vibration, dust, air quality, light, noise and visual) and disruption of hydrological links that can affect GWDTE.</p>	Additional and site-specific mitigation measures would be developed in conjunction with relevant stakeholders for sites where physical disturbance is possible.	<p>Construction effects would be short-term, largely reversible and limited in extent.</p> <p>Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.</p>	Neutral: Likely Not Significant following implementation of mitigation; further assessment required following completion of ecology surveys, to be recorded within the ES.

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Non-statutory designated sites of local importance	Construction	<p>Direct effects to habitat and species from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function), as well as disturbance, harm, or mortality of associated species.</p> <p>Direct, and indirect effects to habitat and species from construction pollution (vibration, dust, air quality, light, noise and visual) and disruption of hydrological links that can affect GWDTE.</p>	Additional and site-specific mitigation measures would be developed in conjunction with relevant stakeholders for sites where physical disturbance is possible.	<p>Construction effects would be short-term, largely reversible and limited in extent.</p> <p>Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.</p>	Neutral: Likely Not Significant following implementation of mitigation; further assessment required following completion of ecology surveys, to be recorded within the ES.
	Operation (and maintenance)	<p>Direct effects to habitat and species from physical disturbance because of vegetation clearance as part of maintenance activities and degradation/fragmentation of retained habitats from adjacent land-use changes and related operational noise, light and visual disturbance.</p>			

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Ancient Woodland	Construction	<p>Direct effects from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function).</p> <p>Also, direct, and indirect effects from construction pollution (vibration, dust, air quality, light, noise and visual).</p>	<p>Bullen Wood would be safeguarded from direct habitat loss (refer to section 8.5 Preliminary Assessment Key Parameters and Assumptions).</p> <p>If required, habitat loss within Round Wood and Writtle and Writtlepark Wood would be kept to the minimum required to facilitate the removal of existing overhead line infrastructure.</p>	<p>Construction effects would be short-term, largely reversible and limited in extent.</p>	<p>Neutral: Likely Not Significant following implementation of mitigation.</p>
	Operation (and maintenance)	<p>Direct effects from habitat regeneration following removal of existing overhead line within Round Wood and Writtle-Writtlepark Wood.</p>	<p>None</p>	<p>Operational effects would be long-term.</p>	<p>Positive: Potentially Significant as Round Wood and Writtle-Writtlepark Wood would be allowed to regenerate once the existing overhead line infrastructure is removed.</p>

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Priority habitats, Habitats of Principal Importance and GWDTE	Construction	<p>Direct effects from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function).</p> <p>Also, direct, and indirect effects from construction pollution (vibration, dust, air quality, light, noise and visual) and disruption of hydrological links that can affect GWDTE.</p>	Measures outlined within Section 8.8 above are considered sufficient.	<p>Construction effects would be short-term, largely reversible and limited in extent.</p> <p>Operational effects of habitat regeneration would be long-term.</p> <p>Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.</p>	Neutral: Likely Not Significant following implementation of mitigation and habitat regeneration; further assessment required following completion of ecology surveys, to be recorded within the ES.
	Operation (and maintenance)	<p>Direct effects from physical disturbance because of vegetation clearance as part of maintenance activities.</p> <p>Direct effects from regeneration of woodland habitat following removal of existing overhead line.</p>	Measures outlined within Section 8.8 above are considered sufficient.		

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Protected/notable flora, fungi, terrestrial invertebrates, aquatic ecology and amphibians (excluding great crested newt)	Construction	Direct effects from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function). Also, direct, and indirect effects from construction pollution (vibration, dust, air quality, light, noise and visual) and disruption of hydrological links that can affect GWDTE.	Measures outlined within Section 8.8 above are considered sufficient.	Construction effects would be short-term, largely reversible and limited in extent. Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.	Neutral: Likely Not Significant following implementation of mitigation; further assessment required following completion of ecology surveys, to be recorded within the ES.

Biodiversity Receptor	Stage	Description of Potential Effect/Change	Mitigation (in addition to the mitigations detailed in Section 8.8)	Description of Potential Residual Effect	Preliminary Likely Significant Effects
Reptiles, birds, bats, hazel dormouse, badger, SPI and INNS	Construction	<p>Direct effects to habitat and species from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function), as well as disturbance, harm, or mortality.</p> <p>Direct and indirect effects from construction pollution (dust, air quality and light).</p>	<p>Mitigation measures noted in Section 8.8 along with additional measures to be developed for Ancient Woodland and Habitats of Principal Importance are considered largely sufficient. These additional mitigation measures will be documented within the ES, and would reduce significance of effects (e.g., installation of bird diverters, artificial maintenance of important corridors through (for example) creation of temporary hedges and production of an adequate lighting strategy). Enhancement would likely include receptor specific measures such as the creation of habitat piles and installation of bird and bat boxes.</p>	<p>Construction effects would be short-term, largely reversible and limited in extent. Operational effects of habitat regeneration would be long-term. Overall construction and operation (and maintenance) residual effects are likely to be neutral, but this is to be confirmed following survey and presented in ES.</p>	<p>Neutral: Likely Not Significant following implementation of mitigation and habitat regeneration; further assessment required following completion of ecology surveys, to be recorded within the ES</p>
	Operation (and maintenance)	<p>Direct effects to habitat and species from physical disturbance because of vegetation clearance as part of maintenance activities and degradation/fragmentation of retained habitats from adjacent land-use changes and related operational noise, light and visual disturbance.</p> <p>Direct effects to bird species because of harm/mortality from collision with overhead line.</p> <p>Direct effects from regeneration of deciduous woodland Priority</p>			

<b>Biodiversity Receptor</b>	<b>Stage</b>	<b>Description of Potential Effect/Change</b>	<b>Mitigation (in addition to the mitigations detailed in Section 8.8)</b>	<b>Description of Potential Residual Effect</b>	<b>Preliminary Likely Significant Effects</b>
		habitat following removal of existing overhead line.	Additional mitigation measures specific to certain species are to be identified in the HRA and any necessary derogation licences, to be included within the ES.		

## Waveney Valley Alternative

- 8.8.4 The Waveney Valley Alternative is generally considered to result in an increased magnitude of ecological effects compared to the overhead line design, primarily as a result of its larger construction footprint and the associated effects of habitat loss on three biodiversity receptors: peat-dependent habitats, Wortham Ling SSSI and trees/woodland.

### Peat-dependent Habitats

- 8.8.5 The extent of fen peat soils within the River Waveney floodplain is not currently known; however the draft Order Limits (and associated construction footprint) for the Waveney Valley Alternative are larger than the overhead line design and it is therefore likely that they may contain a greater extent of fen peat soils (if present) and associated peat-dependent habitats, leading to an increased magnitude of ecological effects compared to the overhead line design.
- 8.8.6 Construction would result in direct and indirect effects on peat-dependent habitats in both the short and long-term due to disruption on local hydrological systems on which they depend. These effects may also extend beyond the draft Order Limits as a result of hydrological connectivity.
- 8.8.7 Lowland fens (a peat-dependent habitat), considered an irreplaceable habitat. As previously stated, if present would require the development of bespoke mitigation on site and possible off-site compensation with respect to BNG principles. The bespoke package of measures would be designed in consultation with the Local Planning Authority, Natural England and Suffolk Wildlife Trust and required to meet requirements in relevant BNG policy and guidance. Typical measures are likely to focus on scrub removal and the use of restoration techniques to restore the hydrology of the peat-dependent habitats by increasing water retention and limiting flow.
- 8.8.8 The Waveney Valley forms part of the Waveney and Little Ouse Recovery Project. As many details of the Project are still unknown, the Project may have a negative effect on the recovery projects aspirations for the area.
- 8.8.9 In the absence of mitigation, the effect on peat-dependent habitats is assessed to be negative and likely significant. However, with mitigation in place, effects are assessed as not likely to be significant (as it is anticipated a bespoke mitigation package would be designed to the satisfaction of the relevant Local Planning Authority, Natural England and Suffolk Wildlife Trust).

### Wortham Ling SSSI

- 8.8.10 The Waveney Valley Alternative is considered to result in an increased magnitude of ecological effects on Wortham Ling SSSI compared to the overhead line design due to the greater extent of vegetation clearance and temporary drainage installation required. However, with mitigation in place, as detailed in Section 8.8 and Table 8.11, effects are assessed as not likely to be significant.

## Trees/woodland

- 8.8.11 The draft Order Limits for the Waveney Valley Alternative are larger and contain more trees / woodland that would require removal compared to the overhead line design. The Waveney Valley Alternative is therefore considered to result in an increased magnitude of ecological effects on trees/woodland compared to the overhead line design however with mitigation in place, as detailed in Section 8.8 and Table 8.11, effects are assessed as not likely to be significant.

## 8.9 Sensitivity Testing

### Flexibility in Construction Programme

- 8.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative pylon locations and / or a later construction start date, has shown that there would be no new or different significant effects to those identified in the baseline scenario assessed in Section 8.9, except for:

- Habitats supporting biological receptors at several locations within the draft Order Limits may be removed if proposed developments are approved and/or approved developments are commenced (see Section 8.7)
- The boundaries of the North Thames Estuary and Marshes Proposed SSSI may change which could affect the sensitivity of habitats within the draft Order Limits. Liaison with Natural England would ensure effects are reduced as far as possible

### Flexibility in Design

- 8.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing considering alternative pylon and underground cable route locations, within the proposed Limits of Deviation (LoD), has shown that there would be no new or different significant effects because of the pylons being placed in a different location or the cable alignment being amended.

### Flexibility Due to Design elements not fixed at Statutory Consultation

- 8.9.3 There are also elements of the Project which have not been finalised at statutory consultation, as detailed in Table 4.3 of Chapter 4: Project Description.
- 8.9.4 As all of these options are within the draft Order Limits, they have been assessed within the baseline assessment and therefore it is considered that there would be no new or additional significant effects other than those discussed within Section 8.8.
- 8.9.5 However, where there is flexibility included to explore an alternative single crossing at the River Stour, this may lead to the potential for a lower magnitude of effect if this option is taken forwards and effects are anticipated to remain likely not significant as detailed in Table 8.11.

8.9.6 The offline shared haul road to the EACN Substation is generally considered to result in effects to a greater number of biodiversity receptors compared to the Bentley Road option as it is located within 350 m of two LWS (Manning Grove and Little Bromley Churchyard) – these sites have no potential impact pathway from the Bentley Road option. However, significant effects on these LWS as a result of the offline shared haul road are not anticipated with mitigation measures as outlined in Table 8.11 in place and effects on non-statutory designated sites are anticipated to remain likely not significant as detailed in Table 8.11.

# 9. Contaminated Land, Geology and Hydrogeology

# 9. Contaminated Land, Geology and Hydrogeology

## 9.1 Introduction

- 9.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Contaminated Land, Geology and Hydrogeology. This chapter covers effects on the following during construction and operation (and maintenance):
- Contaminated land and the receptors that could be affected by existing contaminants within the soil
  - Geology including designated geological sites and minerals
  - Hydrogeology including groundwater quality, levels, and flow
- 9.1.2 There are interrelationships related to the potential effects on Contaminated Land, Geology and Hydrogeology and other environmental topics. Therefore, please also refer to the following chapters:
- Chapter 6: Agriculture and Soils
  - Chapter 8: Ecology and Biodiversity
  - Chapter 10: Health and Wellbeing
  - Chapter 11: Historic Environment
  - Chapter 12: Hydrology and Land Drainage
- 9.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:
- Figure 9.1: Superficial Geology
  - Figure 9.2: Bedrock Geology
  - Figure 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure
  - Figure 9.4: Geologically Designated Sites
  - Figure 9.5: Hydrogeology and Hydrogeological Receptors
  - Figure 9.6: Sites with a Moderate and Above Risk Classification (identified within Table A9.1.12 in Appendix 9.1 in Volume III)
  - Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment
  - Appendix 9.2: Preliminary Minerals Resource Assessment

## 9.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

- 9.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024).
- 9.2.2 Paragraph 5.4.19 of EN-1 states *‘the applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.’*
- 9.2.3 Paragraph 5.11.8 of EN-1 states *‘For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination and how it is proposed to address this’*. Paragraph 5.11.18 goes on to state that *‘For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination, and where contamination is present, applicants should consider opportunities for remediation where possible’*.
- 9.2.4 Paragraph 5.11.19 of EN-1 states *‘Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place’*. Paragraph 5.11.28 also states *‘Where a proposed development has an impact upon a Mineral Safeguarding Area, the Secretary of State should ensure that appropriate mitigation measures have been put in place to safeguard mineral resource’*.
- 9.2.5 Paragraph 5.16.7 of EN-1 states that the ES should describe *‘any impacts of the proposed project on... source protection zones (SPZs) around potable groundwater abstractions’*.
- 9.2.6 Paragraph 5.4.42 of EN-1 states *‘development should at the very least aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives; where significant harm cannot be avoided, then appropriate compensation measures should be sought.’*
- 9.2.7 Paragraph 2.9.25 of EN-5 references undergrounding and states *‘the Secretary of State should only grant development consent for underground or subsea sections of a proposed line over an overhead alternative if they are satisfied that the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environmental impacts that it presents, the mitigation hierarchy has been followed, and that any technical obstacles associated with it are surmountable’*. The paragraph notes that undergrounding can have potentially very disruptive effects on a range of receptors, including , geology.

### Other National Legislation and Policy

- 9.2.8 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance
- Environmental Protection Act (HMSO, 1990) and associated statutory guidance on contaminated land (Defra, 2012)
- The Environmental Act (HMSO, 2021)
- The Contaminated Land (England) Regulations (2006) as amended by the Contaminated Land (England) (Amendments) Regulations (2012) (HMSO, 2012)
- Environmental Damage (Prevention and Remediation) Regulations (HMSO, 2015)
- Environmental Permitting (England and Wales) (Amendments)(England) Regulations (HMSO, 2023)
- Water Resources Act (HMSO, 1991)
- The Water Environment (Water Framework Directive) Regulations (HMSO, 2017)
- The Water Supply (Water Quality) Regulations (HMSO, 2016)
- Environment Agency approach to Groundwater Protection (Environment Agency, 2018)

## Regional and Local Policy

- 9.2.9 Chapter 2: Key Legislation and Planning Policy Context sets out the relevant regional and local policy. Key local policy relevant to Contaminated Land, Geology and Hydrogeology, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Norfolk Minerals and Waste Development Framework (Norfolk County Council, 2011)
  - Norfolk Minerals and Waste Local Plan Publication (Norfolk County Council, 2022) (emerging plan)
  - Suffolk Minerals and Waste Local Plan (Suffolk County Council, 2020)
  - Babergh and Mid Suffolk Joint Local Plan (Babergh and Mid Suffolk, 2021)
  - Essex Minerals Local Plan (Essex County Council, 2014)
  - Thurrock Core Strategy and Policies for Management of Development (Thurrock Council, 2015)
- 9.2.10 The Suffolk Minerals and Waste Local Plan (Suffolk County Council, 2020), Policy MP10, and the Essex Minerals Local Plan Review (Essex County Council, 2014), Policy S8 define Mineral Safeguarding Areas (MSA) and Mineral Consultation Areas (MCA). They also set out the approach to safeguarding minerals that are potentially viable to extract.
- 9.2.11 The Babergh and Mid Suffolk Joint Local Plan (Babergh and Mid Suffolk, 2021) Policy LP17 and Braintree District Council Local Plan to 2033 (Braintree District Council, 2022) Policy LPP 70, advocates that developments should take a precautionary approach where contamination is suspected and that there should be no unacceptable risk from contamination.

## Guidance

- 9.2.12 Relevant guidance, specific to Contaminated Land, Geology and Hydrogeology, which has informed this PEIR and will inform the assessment within the ES, comprises:
- Land Contamination: Risk Management (LCRM) (Environment Agency, 2023)
  - CIRIA 552: Contaminated Land Risk Assessment, A guide to good practice (CIRIA, 2001)
  - BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of Practice (British Standards Institution, 2017)
  - The Environment Agency's Guiding Principles for Managing and Reducing Land Contamination (GPLC2) (Environment Agency, 2016)
  - DMRB LA 109: Geology and soils (National Highways, 2019)
  - DMRB LA 113: Road drainage and the water environment (National Highways, 2020)
  - Environment Agency, Hydrogeological impact appraisal for dewatering abstractions (Environment Agency, 2007)

## 9.3 Scoping Opinion

- 9.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 9.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Contaminated Land, Geology and Hydrogeology is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 9.4.

## 9.4 Project Engagement and Consultation

- 9.4.1 National Grid has held several meetings with relevant consultees including the Environment Agency.
- 9.4.2 A summary of the details of discussions and how these have influenced the Project, scope and the approach to the assessment is provided in Table 9.1.

Table 9.1 – Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Thematic Meeting, Environment Agency, July 2022.	Discussions were held regarding the proposed methodology including a tiered risk-based approach for contaminated land assessment. Introduction of a non-standard 'Tier 0' assessment was proposed, to screen the whole route, effectively a high-level Tier 1 assessment. Anything not screened out at Tier 0 would go forward through the standard Tier 1, 2,3 approach as appropriate. The Environment Agency noted that this is a reasonable approach.	The methodology presented in this PEIR accords with the approach presented during the thematic meeting, and subsequent Scoping Opinion required the agreement of the Environment Agency on the methodology.
Affinity Water, November 2023	Initial discussions were held with Affinity Water to discuss feasibility of a single crossing of the Stour through a SPZ1. Affinity Water stated an NDA would need to be signed for discussions to progress.	Discussions are ongoing.
Environment Agency, February 2024	Initial discussions were held with the Environment Agency to discuss the feasibility of a potential single crossing of the River Stour through a SPZ1.	The Environment Agency confirmed that they have no objection to a single crossing option through the SPZ1 in principle. However, this will need to be subject to further assessment.

## 9.5 PEIR Approach and Methods

9.5.1 This section describes the methodology used to establish the baseline and the approach/methodology used to undertake the preliminary assessment of potential effects on geology and hydrogeology. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also describes what further assessment will be undertaken for the ES.

## Study Area

- 9.5.2 The study area for Contaminated Land, Geology and Hydrogeology comprises the area directly affected by the Project, as defined by the draft Order Limits plus a 250 m buffer for geology and contaminated land and up to 500 m for hydrogeology to provide environmental context and identify potential receptors. This is considered an appropriate study area based on professional judgement, knowledge of similar projects and the DMRB LA09: Geology and Soils (National Highways, 2019) and DMRB LA 113 Road drainage and the water environment (National Highways, 2020), and was presented within the EIA Scoping Report (National Grid, 2022).
- 9.5.3 The study area for contaminated land and geology (250 m) is presented on Figure 9.1: Superficial Geology in Volume II and the study area for hydrogeology (500 m) is presented on Figure 9.5: Hydrogeology and Hydrogeological Receptors in Volume II.

## Existing Baseline

### Data Collection

- 9.5.4 The baseline information has drawn on the following key information sources:
- British Geological Survey (BGS) 1:50,000 scale geological mapping, solid and drift edition
  - BGS GeoIndex Viewer (British Geological Survey, 2024a)
  - BGS Lexicon of Named Rock Units (British Geological Survey, 2024b)
  - BGS Hydrogeological Maps (British Geological Survey, 1976, 1977, 1981)
  - Natural England, Designated Sites View (Natural England, 2024)
  - Multi-Agency Geographic Information for the Countryside (MAGIC) interactive map (Defra, 2024)
  - Local Minerals Plans for mineral reserves/mineral safeguarded areas
  - Environment Agency, Catchment Data Explorer (Environment Agency, 2024)
  - Environment Agency Report SC040016/R, New Groundwater Vulnerability Mapping Methodology in England, and Wales (Environment Agency, 2017)
  - Information from Local Authorities regarding mineral resources and minerals infrastructure
  - Information from the Environment Agency regarding Groundwater abstractions, deregulated groundwater abstractions, discharge consents, authorised and historical landfills
  - Information from Basildon District Council, Colchester City Council, Braintree District Council, Tendring District Council, Chelmsford City Council and Babergh and Mid Suffolk District Council regarding private water supplies
  - Information from South Norfolk Council, Colchester City Council, Basildon Borough Council, Thurrock Council, Tendring District Council, Chelmsford City Council and Braintree District Council regarding potentially contaminated land

- Information from Colchester City Council, Braintree District Council, Basildon Borough Council, Babergh and Mid Suffolk District Council, South Norfolk Council, Chelmsford City Council and Tendring District Council regarding Local Geological Sites

### **Further Data to be collected to inform the ES**

- 9.5.5 In addition to the data collected for this PEIR, the ES will be informed by the following additional third-party data and data obtained through surveys:
- Information from Local Authorities regarding private water supplies which has not been received to date (information from South Norfolk Council and Thurrock Council is pending)
  - Information from Local Authorities regarding potentially contaminated sites which has not been received to date (information from Colchester City Council is pending)
  - Information from Local Authorities regarding Local Geological Sites which has not been received to date (information from Brentwood Borough Council and Thurrock Council is pending)
  - Information obtained from the ongoing ground investigations currently being undertaken on the Project will be used where required and appropriate

### **PEIR Assessment Methodology**

- 9.5.6 The preliminary Contaminated Land, Geology and Hydrogeology assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 9.5.7 The assessment methodology for Contaminated Land, Geology and Hydrogeology is based on guidance, professional judgement, and previous experience together with highways guidance as set out in the DMRB LA 109 Geology and Soils (National Highways, 2019) and DMRB LA 113 Road drainage and the water environment (National Highways, 2020). Whilst primarily intended for use in assessing the impacts of highways projects, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure projects on identified receptors. The method promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the identified receptors to change.
- 9.5.8 The methodology adopted in this assessment is qualitative with a progression from published and readily available information (stated with reasonable certainty) regarding the baseline conditions, to assessment informed by professional judgement and expression of opinions on the relative significance.
- 9.5.9 Full details of the methodology will be presented within the ES, together with further assessment detail, assigning value (sensitivity) to receptors (for example, groundwater bodies and human health) as well as criteria for assigning impact magnitude. The criteria will consider the scale/extent of the predicted change and the nature and

duration of the impact. The factors are combined to give an overall significance of effect, using a matrix.

## **Contaminated Land**

The methodology for assessing contaminated land and that has been used to develop the baseline and inform the preliminary risk assessment for contaminated land is presented within Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III. This appendix provides a Preliminary Risk Assessment (PRA) (Tier 1) of ground conditions for the Project and identifies locations where there is potential for significant sources of contamination. Further details of the methodology for the PRA are presented within the appendix.

- 9.5.10 Full details of how the contamination risk assessment will be transposed into EIA methodology will be presented in the ES, describing how it integrates the topic specific requirement for effects to be assessed via a risk-based approach into the EIA methodology requiring effects and significance of effects to be assessed. For each potential effect, the receptor sensitivity and impact magnitude will be assigned which will then be combined to give a significance of effect.

## **Geology and Hydrogeology**

- 9.5.11 There is no published assessment methodology for effects relating to geology (e.g., geo-conservation) and hydrogeology. Therefore, for consistency, a similar approach has been adopted as for contaminated land, to assess potential effects (i.e., combination of receptor identification and associated sensitivity and magnitude of potential effects).
- 9.5.12 A preliminary Qualitative Minerals Resource Assessment (MRA) has been prepared to develop the baseline and inform the preliminary assessment in relation to minerals and is presented within Appendix 9.2: Preliminary Minerals Resource Assessment in Volume III. This appendix includes the methodology used for the preliminary assessment, which has been prepared with regard for Minerals Safeguarding Practice Guidance (Minerals Products Association, 2019).

## **Preliminary Assessment Key Parameters and Assumptions**

- 9.5.13 The assessment has been undertaken based on the preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are accounted for in the assessment.
- 9.5.14 All conclusions and assessments are, by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 9.5.15 The key parameters and assumptions considered within this preliminary assessment include:
- Piling assumptions: Percussive piling may be required at some pylon locations and for the foundations of the CSE compounds and substation, depending on ground conditions. The assessment set out in this chapter assumes that piling is required at all pylon locations, at the CSE compounds and substation (as a reasonable worst-case scenario)

- Abstractions: It is assumed, based on available Project information, that no consumptive groundwater abstractions are required to facilitate construction of the Project, nor during operation (and maintenance) of the Project
- Discharges: Discharges from dewatering of open cut 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. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents (where this is the case assessment of the potential effects will be considered within Chapter 12: Hydrogeology and Land Drainage within the ES)

9.5.16 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from those presented in this preliminary assessment.

## Further Assessment within the ES

9.5.17 This assessment provides a preliminary assessment based on the development of the Project to date and the data currently obtained. The ES will present a further detailed assessment, assigning the value or sensitivity of the receptor and the magnitude of a potential impact will be presented, and the resulting significance of effect determined.

9.5.18 As part of the ES, a groundwater risk assessment will be undertaken, once the outstanding hydrogeological information has been obtained and the Project Design has evolved (so that construction methodologies are better defined). This will assess the potential effects on groundwater which relate to the specific geological/hydrogeological settings of the Order Limits and identified groundwater receptors, and will identify where additional hydrogeological risk assessment is likely to be required. Hydrogeological risk assessment will subsequently be undertaken following detailed design, in accordance with the methods described in Appendix 4.1: Draft Outline CoCP (GH11) in Volume III, to identify any additional mitigation or remediation that may be required, in relation to the sections of the Project identified in the ES.

9.5.19 Assessment of the effects on groundwater receptors will be undertaken based on the approach and methodology described in Environment Agency, Hydrogeological Impact Appraisal for dewatering abstractions guidance (Environment Agency, 2007).

9.5.20 As part of the ES, in relation to potentially contaminated sites that have been identified as a 'Moderate or above' risk, additional assessment will be undertaken to determine where site specific ground investigation and assessment is required in accordance with Commitment GH10 (see Section 9.7).

## 9.6 Baseline Conditions

9.6.1 Baseline conditions have been gathered from desk-based information, and presented with reference to the section of the Project that they are located.

# Geology

## Published Geology – Superficial Deposits

- 9.6.2 The superficial deposits that are anticipated to be present within the study area for the Project are shown on Figure 9.1: Superficial Geology in Volume II and summarised in the paragraphs that follow. Further detailed information on the anticipated superficial geology within the study area is contained within Appendix 9.1 Baseline Information and Preliminary Contamination Risk Assessment in Volume III.
- 9.6.3 The superficial geology beneath the study area within Sections A, B, D, E and F comprises the Lowestoft Formation (Diamicton). Where river valleys cross the draft Order Limits these areas comprise the Lowestoft Formation (Sand and Gravel), Alluvium, River Terrace Deposits, Head Deposits and Kesgrave Catchment Subgroup.
- 9.6.4 The superficial geology beneath the study area within Section C comprises the river valley deposits described above and large areas of Cover Sands.
- 9.6.5 The superficial geology beneath the study area within Section G and Section H is recorded to be absent within much of the sections and where present are dominated by the river valley deposits of Alluvium, River Terrace Deposits and Head Deposits.

## Published Geology – Bedrock

- 9.6.6 The bedrock geology that is anticipated to be present within the study area for the Project is shown on Figure 9.2: Bedrock Geology in Volume II and summarised in the paragraphs that follow. Further detailed information on the bedrock geology anticipated within the study area is contained within Appendix 9.1 Baseline Information and Preliminary Contamination Risk Assessment in Volume III.
- In Section A the bedrock comprises the White Chalk Subgroup
  - In Section B the bedrock comprises the White Chalk Subgroup, Newhaven Chalk Formation and Crag Group
  - In Section C bedrock comprises the Thames Group and Red Crag
  - In Sections D, E, F and G the bedrock comprises the London Clay Formation, with the Claygate Member also outcropping within Section F and Section G
  - In Section H the bedrock comprises the London Clay Formation, Lambeth Group, Thanet Formation, and the White Chalk Subgroup

## Minerals

- 9.6.7 The information in the paragraphs that follow provide a brief overview of the mineral resources, adopted sites, allocated sites and minerals infrastructure crossed by the draft Order Limits and study area. Further details on minerals are provided within Appendix 9.2 Preliminary Minerals Resource Assessment in Volume III, and accompanying Figure

### 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure in Volume II<sup>53</sup>.

#### Norfolk County Council

- 9.6.8 The current Norfolk County Council Minerals and Waste Development Framework (NMWDF) (Norfolk County Council, 2011) covers Section A. The NMWDF was adopted in September 2011 and covers the period from 2010-2026. The plan is currently under review and Norfolk County Council are preparing a Norfolk Minerals and Waste Local Plan to update the policies and extend the plan period to the end of 2038, with a current pre-submission publication of the Norfolk Minerals and Waste Local Plan dated May 2022 (Norfolk County Council, 2022).
- 9.6.9 Policy CS16 of the adopted NMWDF identifies MSAs for areas of silica sand, carstone, and sand and gravel with the pre-submission Norfolk Minerals and Waste Local Plan containing similarly worded policies around minerals safeguarding.
- 9.6.10 Information received from Norfolk County Council has provided the locations of safeguarded minerals infrastructure and/or allocated sites for mineral extraction. The data set indicates that the northern part of the study area and draft Order Limits crosses the safeguarded areas for the following active sites Swardeston Quarry, Mangreen Recycling Centre and Mangreen Quarry which are Safeguarded Sites.
- 9.6.11 The study area and draft Order Limits also cross three Adopted Sites (MIN79, MIN80 and MIN81) based on the information provided by Norfolk County Council. Aerial photography (dated 2023) appears to show MIN81 in the process of being worked. However, MIN79, MIN80 and MIN81, have been deleted in the pre-submission publication of the Norfolk Minerals and Waste Local Plan, published in May 2022, and are therefore no longer adopted and are not considered further.

#### Suffolk County Council

- 9.6.12 The Suffolk Minerals and Waste Local Plan (SMWLP) (Suffolk County Council, 2020) was adopted in July 2020, and covers Section B and the northern half of Section C. The policies map within the adopted Minerals Local Plan identifies that '*Sand and gravel resources are located throughout the County.*' The adopted plan indicates that parts of the study area are located within the Suffolk MCA, as shown on Figure 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure in Volume II.
- 9.6.13 Policy MP10 of the adopted SMWLP (Suffolk County Council, 2020) defines MSAs and MCAs within the plan area. A map appended to the SMWLP shows that the study area within Suffolk crosses through several MCAs for sand and gravel as shown on Figure 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure in Volume II.
- 9.6.14 The study area also interacts with an existing concrete batching plant (Poundfield Products), as shown on Figure 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure in Volume II. Policy MP9 of the SMWLP deals with the safeguarding of concrete manufacture and states that the County Council should be

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<sup>53</sup> Sand and gravel minerals safeguarded areas for Norfolk are not presented on the figure as information was not available at the time of production.

consulted where there is likely to be the loss of or the compromise of a facility. However, the draft Order Limits only interact with the concrete batching plant site because the Project is proposing to use the existing access roads, and the proposed pylons within this area would be positioned outside of the facility. Therefore, the Project would not cause the loss of, or compromise the works of the facility, therefore is not considered further.

## Essex County Council

- 9.6.15 The current Essex Minerals Local Plan (Essex County Council, 2014) was adopted in July 2014 and covers the southern half of the route (Sections C – G). The Essex Minerals Local Plan is currently under review, and following a Call for Sites is out for a 6 week public consultation (at the time of writing), which includes an extension of the plan period to 2040. Following the current consultation, Essex County Council will conduct technical assessments of the candidate sites to inform selection of preferred site allocations and enable further consultation. The ES will include review of the site allocations or candidate sites (depending on the stage of the mineral local plan review at the time of writing the ES).
- 9.6.16 The policies map within the adopted Essex County Council Minerals Local Plan confirms that parts of the study area are located within a MSA for sand and gravel and brickclay. The study area also interacts with some existing minerals sites and the associated MCAs.
- 9.6.17 The Essex Minerals Local Plan defines MSA as being all areas of glacial, glaciofluvial and river terrace deposits of sand and gravel identified on the British Geological Survey (BGS) mapping (and other supplementary sources of evidence).
- 9.6.18 The policies map within the adopted Minerals Local Plan identifies that ‘*extensive areas of northern and central Essex are protected by MSA for sand and gravel.*’ This includes parts of the draft Order Limits, as shown on Figure 9.3: Mineral Safeguarding Areas, Mineral Consultation Areas, and Minerals Infrastructure in Volume II.
- 9.6.19 Information obtained from Essex County Council has provided the locations of the following safeguarded existing minerals infrastructure sites that the draft Order Limits and study area interact with:
- Crown Quarry (Section C) – located inside the draft Order Limits
  - Bradwell Quarry (Section E) – Extension of Bradwell Quarry located inside the draft Order Limits
  - Blixes Farm (Section E) and the corresponding MCA are located within the study area, and a small part of the draft Order Limits also cross the MCA for this site. However, this part of the Project proposes only utilisation of an existing access road and the proposed Project infrastructure would be outside of the site’s boundary – to the north of Fuller Street (approximate NGR 583340E, 219865N)
  - Sheepcotes (Section F), located north-east of Little Waltham – is within the draft Order Limits, however the parts of the Sheepcotes site that are within the draft Order Limits only comprise existing access roads and the proposed infrastructure for the Project would be outside the site’s boundary and not within the operational part of the site

- Roxwell Quarry, Chignall St James (Section F) – is located inside the draft Order Limits, however proposed pylons within this section of the draft Order Limits are to be placed outside of the working boundary of Roxwell Quarry

## Thurrock Council

- 9.6.20 The development plan for minerals in Thurrock is comprised of the adopted Core Strategy and Policies for Management of Development (Thurrock Council, 2015) and the Essex Minerals Local Plan adopted first review (Essex Council, 1996) and covers Section H.
- 9.6.21 The Thurrock Council Local Development Framework was adopted in January 2015, and forms the Core Strategy of Thurrock’s Development Plan. The framework contains information relating to minerals planning policy in CSTP31 and CSTP32. Policy CSTP32 of the Core Strategy states that MSA in Thurrock are ‘*based on the work undertaken for the ECS*’ (Environmental Capacity Statement).
- 9.6.22 Thurrock Council’s Environmental Capacity Statement: Designation of Mineral Safeguarding Area (SKM Enviros, 2010) states that a MSA ‘*identifies and raises awareness to developers of the possible presence of workable mineral deposits. The potential for extracting these deposits must be considered when submitting and determining planning applications for non-mineral related development. This ensures valuable mineral resource are not needlessly sterilised.*’
- 9.6.23 Figure 11 of the ECS indicates that sections of the draft Order Limits are within a MSA for sand and gravel.
- 9.6.24 The following safeguarded existing minerals infrastructure sites are indicated to interact with the draft Order Limits and study area:
- Orsett Quarry (Section H) - current permitted minerals site, with a pending application for an extension to the east of the existing quarry – located within the draft Order Limits
  - Rainbow Shaw Quarry (Section H)- which is designated by Thurrock Council as an aggregate recycling site – located within the draft Order Limits, however the Project is proposing only to utilise the existing access road and the proposed infrastructure for the Project would be outside of the site’s boundary
  - Tilbury 2 CMAT (Section H) – which is designated by Thurrock Council as an aggregate terminal/recycling site – located partially within the draft Order Limits, however the project is proposing only to utilise the existing access road and the proposed infrastructure for the Project would be outside of the site’s boundary

## Geo-Conservation

- 9.6.25 Geo-Conservation covers Sites of Special Scientific Interest (SSSIs) that are designated for geological purposes, which are statutory designated sites. Geo-conservation also covers non-statutory designated sites such as Local Geological Sites (LoGS), Regionally Important Geological Sites (RIGS) and County Geodiversity Sites (CGS).

## Norfolk County Council

- 9.6.26 The websites of the Norfolk Geodiversity Partnership and the Norfolk Biodiversity Information Service (Norfolk Geodiversity Partnership, 2024) provide records of CGS (the equivalent in Norfolk of RIGS) and covers Section A.
- 9.6.27 A review of these records indicates that there are five designated CGS in South Norfolk, but that none of them are located within the study area.

## Suffolk County Council

- 9.6.28 The GeoSuffolk (2024) website provides details of CGS (the equivalent in Suffolk of RIGS) and covers Section B, and the northern half of Section C. A review of these records indicates that there are 29 CGS within Suffolk but that none of them are located within the study area.
- 9.6.29 Hascot Hill Pit is designated as a SSSI and is also identified as a Geological Conservation Review site with the only known exposure of the beach facies of the Red Crag. The site is located outside of the draft Order Limits, approximately 200 m to the west, at approximate NGR 606100E, 253800N within Section B. The location of Hascot Hill Pit is shown on Figure 9.4: Geologically Designated Sites in Volume II.

## Essex County Council and Thurrock Council

- 9.6.30 The GeoEssex (2024) and Essex Field Club (2024) websites provide details of the LoGS, the equivalent of RIGS in Essex, and covers the southern half of Section C, D, E, F, G and H.
- 9.6.31 A review of these records indicates that one site is located within the study area at White Notley, within Section E, and relates to an example of the White Notley Puddingstone. The example is a boulder of the Hertfordshire puddingstone beside a cottage gate. The site is located directly adjacent to the north-west boundary of the draft Order Limits and is shown on Figure 9.4: Geologically Designated Sites in Volume II. No further records are located within the study area. The Project draft Order Limits that are located closest to the White Notley LoGS comprise existing road infrastructure that the Project proposes to utilise.
- 9.6.32 Two geological SSSI have been identified within the study area, within the county of Essex. A description of the two SSSI are presented below, and the locations shown on Figure 9.4: Geologically Designated Sites in Volume II:
- Marks Tey Brickpit: is designated as a SSSI and a geological conservation review site and is located within Section D at approximate NGR 591100E, 224300N. The site is located outside of the draft Order Limits approximately 40 m to the south
  - River Ter: is designated as a SSSI and a geological conservation review site and is located within Section F at approximate NGR 573561E, 215848N. The site is located outside of the draft Order Limits approximately 195 m to the south-east

# Hydrogeology

## Aquifer Designation

9.6.33 A review of the aquifer designations provided on Defra’s Multi-Agency Geographic Information for the Countryside (MAGIC) online map viewer (Defra, 2024) indicates that the superficial deposits are classified as follows:

- **Secondary A Aquifers:** Alluvium, Sheringham Cliffs Formation, Happisburgh Glacigenic Formation, Lowestoft Formation – Sand and Gravel, River Terrace Deposits, Ingham Sand and Gravel Formation, Croxton Sand and Gravel Member Glaciofluvial Deposits, Kesgrave Catchment Subgroup and Stanmore Gravel Formation
- **Secondary B Aquifers:** Cover Sands
- **Secondary Undifferentiated Aquifer:** Lowestoft Formation – Diamicton and Head Deposits
- **Unproductive Strata:** Peat

9.6.34 A review of the aquifer designations provided on Defra’s Multi-Agency Geographic Information for the Countryside (MAGIC) online map viewer (Defra, 2023) indicates that the bedrock deposits are classified as follows:

- **Principal Aquifers:** White Chalk Subgroup, Crag Group, Newhaven Chalk Formation, Red Crag Formation and Chillesford Church Sand Member
- **Secondary A Aquifers:** Undifferentiated Thanet Formation, Lambeth Group, Claygate Member, Bagshot Formation and Harwich Formation
- **Unproductive Strata:** Thames Group and London Clay Formation

9.6.35 Principal Aquifers are described by the Environment Agency as rock layers that ‘*provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes, and wetlands*’ (Environment Agency, 2017).

9.6.36 Secondary A Aquifers are described by the Environment Agency as ‘*permeable layers that can support local water supplies and may form an important source of base flow to rivers*’ (Environment Agency, 2017).

9.6.37 Secondary B Aquifers are described by the Environment Agency as ‘*mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks and openings or eroded layers*’ (Environment Agency, 2017).

9.6.38 The Secondary Undifferentiated Aquifer classification is applied by the Environment Agency ‘*where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value*’ (Environment Agency, 2017).

9.6.39 Unproductive Strata are described by the Environment Agency as ‘*largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them*’ (Environment Agency, 2017).

## Groundwater Source Protection Zones

- 9.6.40 A groundwater SPZ is a zone placed around a groundwater source, such as a well, borehole or spring, by the Environment Agency to protect a drinking water supply from pollution. Groundwater SPZs are generally split into three zones showing the level of risk to a groundwater source from contamination.
- 9.6.41 A SPZ1 is defined as the inner zone which is a 50-day travel time of a pollutant to the abstraction point. A SPZ2 Outer Zone is defined as a 400-day travel time of a pollutant to the abstraction point. A SPZ3 is defined as the total catchment, which is the area around an abstraction point within which all the groundwater ends up at the abstraction (Environment Agency, 2019).
- 9.6.42 Defra's MAGIC map (Defra, 2023) indicates that most of the study area within Sections A, B, C, D, E and H are within a groundwater SPZ 3.
- 9.6.43 In addition to the SPZ3, the following more sensitive groundwater SPZs are crossed by the draft Order Limits, ordered from north to south, and presented on Figure 9.5: Hydrogeology and Hydrogeological Receptors in Volume II:
- A SPZ2 is located in the north of Section A: South Norfolk, to the east of Mangreen Quarry, this section of the draft Order Limits comprises the existing road infrastructure
  - A SPZ2 is located within Section B at Ofton, this area of the draft Order Limits includes proposals for the undergrounding of third-party infrastructure
  - A SPZ1 and corresponding SPZ2 is located to the south of Higham around the River Stour within Section C, this area of the draft Order Limits includes proposals for the undergrounding of cables
  - A SPZ2 is present to the west of Linford in Section H, this area of the draft Order Limits includes proposals for the undergrounding of cables
- 9.6.44 In addition, the following groundwater SPZs are also crossed by the study area, ordered from north to south, and presented on Figure 9.5: Hydrogeology and Hydrogeological Receptors in Volume II:
- A SPZ2 is located directly adjacent to the south-east of the draft Order Limits approximately half-way through the study area of Section A: South Norfolk, , which is associated with a SPZ1 (located just inside the study area) located at Cargate Common
  - A SPZ2 is located within Section B to the west of Needham Market and to the south-east of the draft Order Limits
  - A SPZ2 is present to the south-east of the draft Order Limits at Stratford St Mary within Section C
  - A SPZ1 is located to the north of the draft Order Limits at Ford Street at approximate NGR 592110E, 226990N within Section D of the study area
  - A SPZ1 is located to the east of the draft Order Limits partially within the study area to the west of Linford within Section H

- 9.6.45 Defra’s MAGIC map (Defra, 2024) also indicates that a small part of the draft Order Limits in the north of Section A is located within a groundwater Drinking Water Safeguarded area.

### **Groundwater Vulnerability**

- 9.6.46 Defra’s MAGIC Map (Defra, 2024) indicates that the groundwater within the study area is generally classified as ‘Medium’ vulnerability. Small discrete sections of the study area are classified as ‘unproductive’ or ‘Low’ vulnerability, where Peat or unproductive bedrock (such as the Thames Group) are located, and ‘Medium-High’ generally where more granular superficial deposits are present over the bedrock. ‘High’ vulnerability is located where Principal Aquifer bedrocks are present with no overlying superficial deposits protecting the aquifer (for example where the Red Crag is present and not protected by any overlying superficial deposits), however, these areas are extremely limited within the study area.
- 9.6.47 The Environment Agency (2017) define High vulnerability as ‘Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits,’ and areas of Low vulnerability as ‘Areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.’ Medium vulnerability is described as intermediate between Low and High vulnerability.

### **Groundwater Abstractions**

#### **Licences and Deregulated Groundwater Abstractions**

- 9.6.48 A total of 62 licenced groundwater abstractions and 83 deregulated groundwater abstractions have been identified within the study area, of which six licenced groundwater abstractions and two deregulated abstractions are located within the draft Order Limits.
- 9.6.49 Further details on these licenced and deregulated abstractions are presented within Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III and shown on Figure 9.5: Hydrogeology and Hydrogeological Receptors in Volume II.

#### **Private Water Supplies**

- 9.6.50 Data describing private water supplies has been requested from all the relevant Local Authorities. At the time of writing this chapter, data has currently only been received from Babergh and Mid Suffolk District Council, Tendring District Council, Colchester City Council, Braintree District Council and Basildon Borough Council. A list of the information currently received is presented within Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III. The information currently received indicates that there are no private water supplies within the draft Order Limits.

## Potentially Contaminative Land Uses

- 9.6.51 Most of the draft Order Limits and the 250 m study area for the Project appears to have remained as undeveloped/agricultural land and farm buildings based on a review of historical mapping (National Library of Scotland, 2024), and other data sources as described earlier. In these areas it is considered that there is a very low risk of significant sources of potential contamination.
- 9.6.52 However, there are discrete areas within the study area that have a history of potentially contaminative land use or where the current land use is potentially contaminative. Where these areas are identified, readily available information relating to the Potential Sources of Contamination (PSC) has been gathered and an initial assessment has been undertaken to provide a classification score for their potential for generating contamination. This assessment is presented in Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III.
- 9.6.53 Where the initial classification score is moderate or above within the study area these sites are taken forward for further assessment in relation to the risk to sensitive receptors, and in accordance with land contamination risk management (LCRM) (Environment Agency, 2023). These site-specific further risk assessments are also presented in Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III.
- 9.6.54 Based on the assessment presented in Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment in Volume III, the following sites are assessed as presenting a potential Moderate or above risk to sensitive receptors from existing contamination, the location of these sites are also presented on Figure 9.6 Site with a Moderate or Above Risk Classification in Volume II:
- PSC C1 – Thornbush Hall – Historical landfill
  - PSC C3 – Former RAF Raydon
  - PSC C5 – Highways Depot
  - PSC D1 – Former RAF Boxted
  - PSC H11 – Tilbury Power Station – Current and historical landfill
  - PSC H13 – Former Tilbury Power Station

## Future Baseline

- 9.6.55 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 9.6.56 There are no foreseeable significant changes anticipated in relation to Contaminated Land, Geology and Hydrogeology either prior to, or during, the construction and operation (and maintenance) phases of the Project. It is assumed that any manufactured changes (i.e., new developments or extensions) would be appropriately permitted/controlled and operated in accordance with current legislation to prevent or limit adverse effects to ground conditions or controlled waters from contamination.
- 9.6.57 Climate change predictions for the UK indicate a trend of wetter winters, drier summers, higher average temperatures, and higher intensity rainfall events. These could have an

effect on soil erosion, groundwater levels, slope stability and indirectly (through groundwater level changes) – in relation to the potential for mobilisation of contamination.

- 9.6.58 In the context of slope stability, soil erosion and groundwater levels, it is not considered these would have a significant impact on the significance of effects given the nature of the Project and the inherent engineering design. In relation to contamination, as any areas that may have a significant impact would be remediated or mitigated during design and construction of the Project, it is not considered that climate change would have a significant impact on the significance of effects for contamination.

## 9.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 9.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 9.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 9.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Relevant to Contaminated Land, Geology and Hydrogeology, these include:
- Avoiding sensitive features/receptors, as far as is practicable, such as groundwater SPZ1, landfills, and geological SSSIs, through the routeing and siting stages

### Standard Mitigation

- 9.7.4 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 9.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures relating to contaminated land geology and hydrogeology. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- GH01: Intrusive ground investigations and assessment will be undertaken prior to construction which will inform appropriate geotechnical design in relation to the site / structure specific ground conditions including ground instability/ adverse ground conditions/ ground gas
  - GH02: A Foundation Works Risk Assessment (FWRA) will be undertaken by the Main Works Contractor(s) at locations of pylons, CSE compounds, and substations (where the use of piled foundations are anticipated prior to construction. The Main Works Contractor(s) will use construction methods such as appropriate piling techniques to minimise and avoid the risk of introducing new contamination (if

required), creating new contamination pathways, and mixing of aquifer bodies. The FWRA will be undertaken once the proposed foundation solutions are known, in accordance with Environment Agency guidance 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination' (Environment Agency, 2001)

- GH03: Use of appropriate occupational health and safety measures e.g., Personal Protective Equipment (PPE), and statutory health and safety compliance (e.g., compliance with the Confined Spaces Regulations, 1997 in relation to ground gas from working in confined spaces/trenches) to minimise the risks associated with potential contamination
- GH04: Appropriate training of construction and maintenance workers in the handling and use of potentially hazardous substances and the associated risks
- GH05: All use and storage of chemicals and fuels are to be undertaken in accordance with Environment Agency guidance (Environment Agency, 2014. Environment Agency, 2017) and the Control of Pollution (Oil Storage) Regulations (UK Government, 2001). The use and storage of chemicals and fuels will also be controlled and monitored under the CoCP which will include, for example, procedures for good general construction site practices, environmental and waste management procedures, regular vehicle checks, use of spill kits, correct waste storage and disposal, use of oil-water separators as necessary (for example, for drainage from refuelling areas), collection of process water from the washout/cleaning of ready-mix concrete vehicles and equipment for treatment/disposal
- GH06: The control of earthworks or materials movement (including any re-use of materials) under appropriate Environmental Permits, exemptions, or CL:AIRE The definition of Waste: The development industry Code of Practice (CL:AIRE, 2011)
- GH07: Any temporary dewatering activities during construction will be undertaken in accordance with Environment Agency guidance (Environment Agency, 2023. Environment Agency, 2022. Environment Agency, 2021) (including appropriate assessment undertaken as required by the guidance (Environment Agency, 2007)), and if required, an Abstraction Licence and Environmental Permit (for the discharge) will be obtained, and the works will be limited to the depth and time required to facilitate construction activities
- GH08: A protocol for dealing within any unexpected contamination (this will be included within the Outline CoCP submitted with the DCO application).
- GH09: Restrictions will be applied for any work within Groundwater SPZ1 and 2, as follows: 1. Construction vehicle parking, fuel storage, de-icer storage, rock salt storage, and washout/cleaning of ready-mix concrete vehicles and equipment will be sited outside SPZ1 and where possible outside SPZ2 designations. 2. Application of salt grit (for example, to prevent access tracks freezing) to comply with recommended rates in CIRIA 648 (2006), with control of run-off during any application in SPZ's
- GH10: Where specific sites within the draft Order Limits have been assessed in the ES as presenting a moderate (or above) risk to sensitive receptors from potential existing contamination, and there is potential for ground disturbance at the sites during the construction of the Project, these sites will be individually investigated and

assessed (in accordance with guidance described within Land Contamination Risk Management (Environment Agency, 2023)) prior to construction. This will inform the assessment of the risks to receptors, and good practice measures and working methods to control those risks will be developed. The results will be discussed with the Environment Agency and/or relevant Local Authority, as appropriate, and the nature and scope of any mitigation or remediation will be agreed with the Environment Agency and Local Authority (as appropriate). Made ground and materials known or strongly suspected of being contaminated will be segregated from natural inert materials; and ground arising determined as unsuitable for reuse within the Project will be disposed of appropriately, for example to a soil treatment centre or landfill

- GH11: At trenchless crossings, and where otherwise indicated in the ES, a Hydrogeological Risk Assessment will be undertaken to assess the specific risks to groundwater and groundwater receptors (including the risk of breakout of drilling fluids, where appropriate) at those locations and identify any additional mitigation or remediation that may be required. The nature and scope of any mitigation or remediation will be agreed with the Environment Agency or other stakeholders, as appropriate
- GG40: Run-off across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency)
- GG30: Earthworks mounds and stockpiled soil will be protected (to avoid dust generation) by covering, seeding, or using water suppression where appropriate (to be determined by the soil type and the likely storage duration)

9.7.6 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

9.7.7 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

9.7.8 As part of the ES, a groundwater risk assessment will be undertaken which will inform any additional assessment and mitigation measures required to ensure that significant effects to sensitive groundwater receptors are unlikely.

## Waveney Valley Alternative

9.7.9 No additional mitigation measures in addition to those outlined above would be required for the Waveney Valley Alternative as the assessment of this section would be undertaken in the same way as other areas of undergrounding across the Project. Mitigation relevant to undergrounding is described in the sections above.

## 9.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 9.8.1 The preliminary likely significant effects of the Project have been assessed using currently available data relating to both the construction and operation (and maintenance) phases of the Project. The potential effects are outlined below. It assumes that all mitigation – embedded (design measures), standard practice, and additional mitigation measures are in place before assessing effects. This is in accordance with guidance from IEMA as part of preparing a proportional assessment (IEMA, 2022).
- 9.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 9.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

### Preliminary Construction Effects

#### Geology – Sites of Geological Importance

- 9.8.4 During construction of the Project, there could be physical disturbance and therefore damage or loss of Sites of Geological Importance. However, no Sites of Geological Importance have been identified within the draft Order Limits where construction activities are proposed to take place. While Sites of Geological Importance have been identified within the study area, construction activities and therefore physical ground disturbance is restricted to within the draft Order Limits, and therefore there is no potential for damage to or loss of these sites.
- 9.8.5 Therefore, there would be no change on Sites of Geological Importance, and therefore effects would be not significant.

#### Geology – Minerals

- 9.8.6 The draft Order Limits cross a limited number of existing mineral extraction sites (with a very high sensitivity), however the proposed built footprint of the Project would not impact significantly on the extraction sites, as described within Appendix 9.2: Preliminary Minerals Resource Assessment in Volume III. Therefore, it is considered that significant effects would be unlikely.
- 9.8.7 The effects from the sterilisation of minerals within the wider MSA and MCA is described in the operation (and maintenance) section to avoid double counting of effects.

#### Geology – Waveney Valley Alternative

- 9.8.8 The Waveney Valley Alternative would not result in any new or additional significant effects to those predicted in the assessment for other geology related construction effects within the Project as there are no Sites of Geological Importance or mineral extraction sites within the area of the Waveney Valley Alternative.

## Hydrogeology

- 9.8.9 Dewatering during construction has the potential to affect groundwater because of reducing groundwater levels, impacting groundwater quality, and affecting groundwater flows which could have a potential effect on surrounding sensitive receptors, such as groundwater abstractions. The requirement for and location of potential dewatering (such as at trenchless crossing locations) as part of the Project has currently not been confirmed. As part of the ES a groundwater risk assessment will be undertaken to assess the potential effects on groundwater and identified groundwater receptors. The groundwater risk assessment will identify where additional hydrogeological risk assessment is likely to be required once detailed design is complete, to determine any mitigation that may be required. In addition, as per commitment GH07 in Appendix 4.1: Draft Outline CoCP in Volume III, temporary dewatering would be undertaken in accordance with Environment Agency guidance and if required the appropriate permits/licences would be obtained.
- 9.8.10 At trenchless crossings and where piling is required, there is the potential for connection of aquifers that are currently separated by aquitards/aquicludes (a geological formation of low(er) permeability). However, further groundwater risk assessment and if required, localised hydrogeological risk assessment (in accordance with GH11) would be undertaken to identify any potential effects in relation to proposed construction methods and dewatering, and identify any additional mitigation required. In addition, commitment GH02 in Appendix 4.1: Draft Outline CoCP in Volume III secures the requirement for provision of a FWRA which would be undertaken once the proposed foundation solutions and construction techniques are known. The FWRA would be undertaken in accordance with Environment Agency guidance and determine any mitigation required, such that significant effects are considered unlikely.
- 9.8.11 Therefore, based on the implementation of the commitment measures mentioned above and the additional assessment required as part of the ES, it is considered that significant effects on hydrogeology receptors from dewatering and connection of aquifer units are unlikely – therefore not significant.

## Waveney Valley Alternative

- 9.8.12 The Waveney Valley Alternative may result in a greater magnitude of impact when compared to the overhead line design as it has the potential for a greater interaction with groundwater and groundwater receptors. However, it is considered that with mitigation in place the potential for significant effects could be reduced to an extent that they are unlikely to be significant. Further information will be provided within the ES.

## Contaminated Land

### Disturbance and Mobilisation of Existing Contamination

- 9.8.13 Where significant sources of potential contamination exist within the draft Order Limits, there is a risk of exposure of sensitive receptors to contamination if disturbed (e.g., excavations), or mobilised through the creation of new pathways (e.g., piling).
- 9.8.14 A baseline assessment and Preliminary Contaminated Land Risk Assessment has been undertaken in accordance with the process of contamination risk assessment defined within Land Contamination Risk Management (Environment Agency, 2023) and is

presented within Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment (PRA) in Volume III. The PRA has identified a generally 'very low/low risk' of significant existing contamination to be present within most of the draft Order Limits. A worst case 'very high' risk has been identified within small discrete sections of the draft Order Limits.

9.8.15 Where specific sites within the draft Order Limits have been assessed in the PRA as presenting a moderate (or above) risk to sensitive receptors from potential contamination, further assessment of these sites will be undertaken and presented in the ES to determine the likelihood of the Project interacting with these sites and causing ground disturbance. Where further assessment of these sites identifies the risk of ground disturbance during construction of the Project, the policy requirements of GH10, within Appendix 4.1: Draft Outline CoCP in Volume III would apply, requiring that prior to construction, each site is individually investigated and assessed in accordance with Land Contamination Risk Management (Environment Agency, 2023)) to determine any additional mitigation measures or remediation requirements. The nature and scope of any mitigation or remediation would be agreed with the Environment Agency and Local Authority (as appropriate). The current list of sites identified as presenting a moderate and above risk that would require additional assessment is as follows, and the locations of these sites are indicated on Figure 9.6: Sites with a Moderate and Above Risk Classification in Volume II:

- PSC C1 – Thornbush Hall – Historical landfill
- PSC C3 – Former RAF Raydon
- PSC C5 – Highways Depot
- PSC D1 – Former RAF Boxted
- PSC H11 – Tilbury Power Station – Current and historical landfill
- PSC H13 – Former Tilbury Power Station

9.8.16 There are also standard measures within Appendix 4.1: Draft Outline CoCP in Volume III that relate to the use of appropriate PPE (GH03), appropriate training for construction workers (GH04) and a protocol for dealing with unexpected contamination (GH08). In addition, a FWRA (GH02) would be undertaken at areas where piled foundations are proposed to ensure that new pathways for any contamination present are not created.

9.8.17 Therefore, it is considered that for groundwater receptors and human health receptors significant effects would be unlikely.

### Introduction of New Contamination

9.8.18 Pollution releases and the introduction of new sources of contamination into the environment (for example uncontrolled leaks and spills from machinery) during construction have the potential to affect sensitive receptors. To mitigate this risk, standard mitigation and control measures are included within Appendix 4.1: Draft Outline CoCP (such as GG24, GG25, GG26, GG32 and GG36) and implemented for the Project during the construction phase. GH02 secures the requirement for a FWRA, including (where appropriate) the risk of breakout of drilling fluids during trenchless crossings.

- 9.8.19 Therefore, based on the mitigation measures described above for groundwater receptors (assigned as a high to negligible sensitivity) and human health receptors (assigned a high to very high sensitivity) significant effects would be unlikely.

### Waveney Valley Alternative

- 9.8.20 No additional sites of potential contamination have been identified within the Waveney Valley Alternative compared to the OHL design. Therefore, the Waveney Valley Alternative would not result in any new or additional significant effects to those predicted for other areas of proposed undergrounding within the Project.

## Preliminary Operation (and maintenance) Effects

### Geology

#### Minerals

- 9.8.21 The MRA presented in Appendix 9.2: Preliminary Minerals Resource Assessment in Volume III identified that only small extents of mineral would be sterilised by the Project. In addition, any potential mineral sterilisation can be considered to be temporary, as although during the operational lifetime of the Project some area of the mineral could not be feasibly extracted (beneath the built elements). Should the development be decommissioned the infrastructure could be removed and access to the underlying mineral restored.
- 9.8.22 The MRA explores the potential for prior extraction of the minerals but concludes that this is not environmentally or economically viable, and that the potential environmental effects associated with extracting the mineral could be disproportionate to the value gained from extracting the mineral prior to construction of the Project.
- 9.8.23 Based on the national significance of the Project, that the affected authorities have greater than the minimum 7-year landbank of sand and gravels required by National Planning Policy, and sufficient additional safeguarded areas, it is considered that the potential effect on the small volume of mineral associated with the Project is acceptable without consideration of further mitigation.
- 9.8.24 Therefore, based on the assessment presented within the MRA, significant effects to safeguarded minerals is considered unlikely.

### Waveney Valley Alternative

- 9.8.25 The Waveney Valley Alternative does not affect any additional MSAs compared to the overhead line design. Therefore, the Waveney Valley Alternative would not result in any new or additional significant effects to those predicted for other areas of proposed undergrounding within the Project.

### Hydrogeology

- 9.8.26 There are no groundwater abstractions or discharges proposed during the operation (and maintenance) of the Project and therefore effects on hydrogeological receptors are not anticipated during this phase, which is not significant.

## Waveney Valley Alternative

- 9.8.27 The Waveney Valley Alternative would not result in any groundwater abstractions or discharges during operation (and maintenance), therefore there are not anticipated to be any new or additional significant effects to those predicted for other areas of proposed undergrounding within the Project.

## Contaminated Land

- 9.8.28 Potential effects in relation to existing contamination are not anticipated during the operation (and maintenance) phase of the Project because any existing contamination would be appropriately dealt with (mitigated or remediated) during the construction phase of the Project.
- 9.8.29 Therefore, potential effects in relation to contamination during operation (and maintenance) of the Project would only occur by accidental release/spill during routine maintenance activities. However, routine maintenance activities would be undertaken in accordance with National Grid's best practice protocols and therefore effects on sensitive receptors are not anticipated, and this is not significant.

## Waveney Valley Alternative

- 9.8.30 The Waveney Valley Alternative would not result in any new or additional significant effects to those predicted for other areas of proposed undergrounding within the Project as any existing contamination would be dealt with (mitigated or remediated) during the construction phase of the Project.

# 9.9 Sensitivity Testing

## Flexibility in Construction Programme

- 9.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has shown that there would be no new or different significant effects to those identified in the baseline scenario assessed in Section 9.6.

## Flexibility in Design

- 9.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design. Sensitivity testing considering alternative pylon and underground cable route within the proposed LoD, has shown that there would be no new or different likely significant effects as a result of the pylons being placed in a different location assuming they remain outside of areas assessed as having a moderate or above risk of contamination. If design changes subsequently require pylon locations or underground cable route through areas assessed as having a moderate or above risk of significant contamination, then further risk assessment would need to be undertaken in accordance with the mitigation measures within Appendix 4.1: Draft Outline CoCP in Volume III.

## Flexibility Due to Design elements not fixed at Statutory Consultation

- 9.9.3 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that as all of these options are within the draft Order Limits, they have been assessed within the baseline assessment and therefore it is considered that there would be no new or additional significant effects than those discussed within Section 9.8.
- 9.9.4 Where there is flexibility included to explore an alternative single crossing within a SPZ1 (high sensitivity groundwater area) at the River Stour, this may lead to the potential for a greater magnitude of effect if this option is taken forwards. However, the design would be subject to further engagement with the Environment Agency and appropriate mitigation designed to minimise residual effects (if required).
- 9.9.5 The current adopted Essex Minerals Local Plan is currently under review, and following a call for sites and public consultation, preferred sites for allocation will be selected, and these could be located within the draft Order Limits. A review of the allocated sites or candidate sites will be included within the ES depending on the progress of the minerals local plan review at the time of writing.

# 10. Health and Wellbeing

# 10. Health and Wellbeing

## 10.1 Introduction

- 10.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Health and Wellbeing. The chapter covers potential effects on the following:
- Health-related environmental change (for example, air quality, noise, traffic, and transport related effects) during construction and operation (and maintenance) relating to:
    - Both physical and mental health and wellbeing
    - Both the general population, and vulnerable groups/communities (defined by characteristics such as age, ethnic diversity, economic status, disability, sex/gender) who may be disproportionately affected by such changes
- 10.1.2 There are interrelationships related to the potential effects on Health and Wellbeing and other environmental topics. Therefore, please also refer to the following chapters:
- Chapter 7: Air Quality
  - Chapter 9: Contaminated Land, Geology and Hydrogeology
  - Chapter 12: Hydrology and Land Drainage
  - Chapter 13: Landscape and Visual
  - Chapter 14: Noise and Vibration
  - Chapter 15: Socio-economics, Recreation and Tourism
  - Chapter 16: Traffic and Transport
- 10.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:
- Figure 10.1: Health and Wellbeing Study Area
  - Figure 10.2: Health and Wellbeing Receptors
  - Appendix 10.1: Health and Wellbeing Baseline Statistics

## 10.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

- 10.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (Department for Energy Security and Net Zero (DESNZ, 2023)). This is supported by NPS EN-5 (DESNZ, 2023).

- 10.2.2 Paragraph 4.4.1 of EN-1 states that *‘Energy infrastructure has the potential to impact on the health and well-being (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the construction of energy infrastructure and...distribution... of energy may have negative impacts on some people’s health.’*
- 10.2.3 Paragraph 4.4.3 of EN-1 states that *‘New energy infrastructure may also affect the composition and size of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity’.*
- 10.2.4 Paragraph 4.4.4 of EN-1 states that *‘where the proposed project has an effect on humans, the ES should assess these effects for each element of the project, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate’.*
- 10.2.5 Paragraph 4.4.5 of EN-1 states *‘The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate’.*
- 10.2.6 Paragraph 2.9.44 of EN-5 states that *‘Power frequency [Electric and Magnetic Fields] EMFs arise from generation, transmission, distribution and use of electricity and will occur around power lines and electric cables and around domestic, office or industrial equipment that uses electricity’.* Paragraph 2.9.46 of EN-5 states that *‘EMFs can have both direct and indirect effects on human health’.*
- 10.2.7 Paragraph 2.9.48 of EN-5 states that *‘To prevent these known effects, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 for both public and occupational exposure. These are expressed in terms of the induced current density in affected tissues of the body, ‘basic restrictions’, and in terms of measurable ‘reference levels’ of electric field strength (for electric fields), and magnetic flux density (for magnetic fields)’.*
- 10.2.8 Paragraph 2.9.51 of EN-5 states *‘The levels of EMFs produced by power lines in normal operation are usually considerably lower than the ICNIRP 1998 reference levels’.*

## Other National Legislation and Policy

- 10.2.9 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
  - National Planning Policy Framework (Department for Levelling Up, Housing and Communities (DLUHC), 2023)

## Regional and Local Policy

- 10.2.10 Chapter 2: Key Legislation and Planning Policy Context lists relevant regional and local policy. Local policy, specific to Health and Wellbeing will be reviewed and assessments undertaken in relation to compliance with this policy in the ES

- 10.2.11 Local authorities and Integrated Care Boards have equal and joint duties to prepare Joint Strategic Needs Assessments (JSNAs) and Health and Wellbeing Strategies for their areas, which set out the current and future health care needs for a local area and strategies for how these needs should be met.

## Guidance

- 10.2.12 Relevant guidance, specific to health and wellbeing, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Government White Paper: Healthy Lives, Healthy People (HM Government, 2011)
  - A Green Future: Our 25 Year Plan to Improve the Environment (HM Government, 2019)
  - Planning Practice Guidance (PPG) – The Role of Health and Wellbeing in Planning (DLUHC, 2014)
  - Putting Health into Place (Public Health England (PHE), 2018)
  - Health Impact Assessment in spatial planning (PHE, 2020)
  - Advice on the content of Environmental Statements accompanying an application under the NSIP Regime (PHE, 2021)
  - Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (Institute of Environmental Management and Assessment (IEMA), 2017)
  - Mental Wellbeing Impact Assessment – a toolkit for wellbeing (National MWIA Collaborative (England), 2011)
  - Effective Scoping of Human Health in Environmental Impact Assessment (IEMA, 2022)
  - Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022)
  - Health Impact Assessment – a practical guide (Welsh Health Impact Assessment Support Unit (WHIASU), 2021)

## 10.3 Scoping Opinion

- 10.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate (2022) on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 10.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Health and Wellbeing is provided in Appendix 5.1: Scoping Opinion Responses in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 10.4.

## 10.4 Project Engagement and Consultation

- 10.4.1 National Grid has held several meetings with relevant consultees including the ten local authorities and three county councils.
- 10.4.2 A summary of discussions and how these have influenced the Project, scope, and the approach to the assessment are provided in Table 10.1.

Table 10.1 - Stakeholder Engagement

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
Suffolk County Council September 2023	Suffolk County Council requested consideration of mental health during operation.	The PEIR includes a summary of health effects relating to both physical and mental health during construction and operation (and maintenance) phases.
Norfolk County Council September 2023	Norfolk County Council requested consideration of mental health during operation. Norfolk also requested that baseline data should be provided to aid further levels of detail where possible.	The PEIR includes a summary of health effects relating to both physical and mental health during construction and operation (and maintenance) phases. Baseline data will be updated for the ES.
South Norfolk Council, September 2023	There is a lack of detail regarding how each environmental topic will be assessed, and the guidance or legislative documentation which will be used in the assessment of each environmental topic.	Information relating to guidance and assessment methodology has been provided within the PEIR.
Mid Suffolk District Council and Babergh District Council September 2023	Mid Suffolk and Babergh District Councils outlined that World Health Organisation (WHO) guidance on health should be considered within the assessment.	The ES chapter will be prepared in line with IEMA and WHIASU guidance. Relevant information from WHO guidance on health impacts will be considered as appropriate.
Essex County Council	No response received at time of writing.	-
Tendring District Council	No response received at time of writing.	-

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
Colchester City Council, September 2023	No issues raised.	-
Braintree District Council	No response received at time of writing.	-
Chelmsford City Council, October 2023	Chelmsford City Council requested that reference to WHIASU guidance and vulnerable groups checklist is included within the assessment.	The ES chapter will use WHIASU guidance to identify vulnerable groups.
Basildon Borough Council, October 2023	Basildon Borough Council made comment in relation to vulnerable groups and the need to address different needs of individual groups (for example older people, children).  The methodology should consider how the Project will impact on various aspects of environmental change, for example disruption to green space, traffic and transport effects, potential contamination of water / land and general community disruption.	The ES chapter will assess effects in relation to the different needs of vulnerable groups.  The PEIR includes a summary of effects on health and wellbeing arising from new environmental change, which covers the various topics proposed.
Brentwood Borough Council	No response received at time of writing.	-
Thurrock Council, September 2023	Thurrock Council signposted to the WHIASU guidance, particularly in relation to consideration of potentially vulnerable groups.  Thurrock Council has provided examples of other baseline metrics which could be used to inform the assessment.  Thurrock requested that consideration of potential	WHIASU guidance will be used to help inform the identification of potentially vulnerable groups.  Additional baseline data sources and metrics provided by Thurrock Council will be incorporated into the ES where relevant.  The PEIR includes a summary of health effects relating to both physical and mental health during construction and operation (and maintenance) phases.

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	health effects to arise during operational stage is given.	
UK Health Security Agency, September 2023	UKHSA outlined that consideration should be given to the document ' <i>Advice on the content of Environmental Statements accompanying an application under the NSIP Regime</i> ' (PHE, 2021) within the assessment.	This document and the advice contained within it will be considered in the preparation of the ES chapter.
Suffolk and North East Essex Integrated Care Board (SNEEICB), September 2023	No issues raised.	-

## 10.5 PEIR Approach and Methods

10.5.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology / approach used to undertake the preliminary assessment on Health and Wellbeing. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

10.5.2 The study area for Health and Wellbeing has been defined using professional judgement and experience of other similar linear projects. The study area is defined by the boundaries of the Local Authorities in which the Project is located and is presented on Figure 10.1: Health and Wellbeing Study Area in Volume II.

10.5.3 The Health and Wellbeing assessment also takes account of the study areas (as defined in the ES Scoping Report (National Grid, 2022) of related topics that may affect environmental change, notably Chapter 7: Air Quality, Chapter 9: Contaminated Land, Geology and Hydrogeology, Chapter 12: Hydrology and Land Drainage, Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Recreation and Tourism, and Chapter 16: Traffic and Transport.

### Existing Baseline

#### Data Collection

10.5.4 The baseline information has drawn on the following key information sources:

- Census 2021 (Office for National Statistics (ONS), 2022)

- Local health data published by the Office for Health Improvement and Disparities (OHID) that provides a wider picture of the health of residents (OHID, 2022)
- Data from the DCLG, for example Indices of Deprivation (2019) (DCLG, 2019)
- Essex Joint Health and Wellbeing Strategy (2022 – 2026) (Essex County Council, 2023)
- JSNA 2019 Essex Countywide Report (Essex City Council, 2019)
- Local Authority Health Profiles (OHID, 2022)
- Babergh and Mid Suffolk Health and Wellbeing Strategy 2021-2027 (Babergh District Council, 2023)
- Norfolk Core20 (Norfolk County Council, 2020)
- Norfolk Insight (Norfolk County Council, 2020)
- Norfolk and Waveney Joint Health and Wellbeing Strategy (2018 – 2022) (Norfolk County Council, 2018)
- Transitional Integrated Care Strategy and Joint Health and Wellbeing Strategy (Norfolk County Council 2023)
- The State of Suffolk (updated for 2022) (Suffolk County Council, 2023)
- Health Suffolk JSNA (Suffolk County Council, 2023)
- Baseline data presented in Chapter 7: Air Quality, Chapter 9: Contaminated Land, Geology and Hydrogeology, Chapter 12: Hydrology and Land Drainage, Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Recreation and Tourism, and Chapter 16: Traffic and Transport

## Further Data to be collected to inform the ES

- 10.5.5 All required baseline data has been obtained; however, ongoing reviews of this data will be undertaken to ensure the assessment in the ES incorporates the latest available information.
- 10.5.6 In addition, the ES will be informed by assessment results from Chapter 7: Air Quality, Chapter 9: Contaminated Land, Geology and Hydrogeology, Chapter 12: Hydrology and Land Drainage, Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Recreation and Tourism, and Chapter 16: Traffic and Transport.

## PEIR Assessment Methodology

- 10.5.7 The preliminary Health and Wellbeing assessment determines if effects arising because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant.
- 10.5.8 The WHO defines health as a '*state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'. The range of personal, social, economic, and environmental factors that influence health status are known as health determinants and include the physical environment, income levels, employment, education, social support, and housing.

- 10.5.9 The Project has the potential to give rise to changes in health status by influencing health determinants. Changes can affect the health of receptors, identified as the 'general population' and 'vulnerable groups'. The latter relates to groups who may have a higher sensitivity to these changes in health status, by virtue of factors such as age (for example older people or children), ethnicity, economic factors, disability, sex, or gender.
- 10.5.10 The assessment in this PEIR is based on published IEMA guidance on Determining Significance for Human Health in EIA (IEMA, 2022) and Effective Scoping of Human Health in EIA (IEMA, 2022). The assessment identifies and assesses the change on environmental conditions, along with physical and mental health, because of the Project.
- 10.5.11 The baseline sets out the wider health context required to inform the assessment, covering both physical and mental health. This information has been used as a basis for determining the sensitivity of receptors to changes in health determinants arising from the Project.
- 10.5.12 The health determinants likely to be influenced by the Project comprise health related environmental change (for example, air quality, noise, visual amenity, and contaminated land health related effects) and mental health (control, resilience and community assets, and participation and inclusion).
- 10.5.13 The potential for likely significant effects on health and wellbeing resulting from related environmental change, as set out in Chapter 7: Air Quality, Chapter 9: Contaminated Land, Geology and Hydrogeology, Chapter 12: Hydrology and Land Drainage, Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Recreation and Tourism and Chapter 16: Traffic and Transport, is summarised in this Chapter, for both general population and vulnerable group receptors.
- 10.5.14 The qualitative assessment presented in this PEIR is informed by the MWIA guidance (National MWIA Collaborative (2011)). This guidance considers the potential mental health effects because of the Project, specifically in relation to control, resilience and community assets, and participation and inclusion.
- 10.5.15 In addition, although EMFs during operation have been scoped out, a qualitative assessment is presented.

## Preliminary Assessment Key Parameters and Assumptions

- 10.5.16 The assessment has been undertaken based on the preliminary Project design information and the consideration of preliminary conclusions from other related environmental topic assessments. This information is iterative and will be updated in the ES as the design evolves and any changes are made.
- 10.5.17 All conclusions and assessments are, by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.

- 10.5.18 Health effects are considered at a population, rather than an individual, level. Effects may therefore be presented in relation to the general population or in relation to vulnerable groups.
- 10.5.19 Ascertaining the level of exposure of a population to effects on certain health determinants is based on professional judgement, considering inherent uncertainties in identifying how and where people may spend their time (for example in a location exposed to effects) as opposed to other locations where other factors may be responsible for health changes. The assessment draws from and builds upon the outputs of the supporting technical disciplines and is therefore subject to the same limitations and assumptions affecting those assessments.
- 10.5.20 The scale and significance of effects cannot always be quantified. It is common for health assessments to address this through descriptive analysis of effects and identification of the potential direction of effects.
- 10.5.21 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, drawing attention to any areas that may have changed from that which is presented in this preliminary assessment.

#### **Further Assessment within the ES**

- 10.5.22 The ES will present a detailed assessment in accordance with IEMA guidance with the significance of the effect on a receptor presented during construction and operation (and maintenance) (where relevant), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.
- 10.5.23 The ES will include the results of relevant site surveys undertaken to inform the assessments of other environmental topics, for example usage surveys for Public Rights of Way (PRoW) (reported in Chapter 16: Traffic and Transport).
- 10.5.24 The ES will include a qualitative assessment determining the magnitude of potential change and sensitivity of receptors to change (both general population and vulnerable groups). The assessment will include:
- How the health determinant might change because of the Project and whether this would be beneficial or adverse
  - Duration of change – temporary or permanent
  - Exposure to change (including identification of vulnerable groups)
  - Intensity (magnitude or severity of the change in the health determinant)
- 10.5.25 A conclusion on significance and associated reasoning will be provided where possible in relation to identified receptors (general population and vulnerable groups) and effects on physical and mental health arising from environmental change.
- 10.5.26 An EMF compliance report will be produced to support the application for development consent and sits outside the EIA process. However, a summary of this report will be included in the ES.

## 10.6 Baseline Conditions

- 10.6.1 Baseline conditions have been gathered from desk-based information and presented with reference to the section of the Project that they are located.
- 10.6.2 The baseline for Health and Wellbeing comprises information about the health characteristics of the local area, covering both physical and mental health, as well as information that can be used to identify potential vulnerable populations (age, ethnicity, economic status, disability, sex/gender). When combined with environmental information, this provides the context necessary to assess the potential effects of the Project on Health and Wellbeing.

### Physical and Mental Health Context

#### Population

- 10.6.3 Information on population size and age profile can be found in Chapter 15: Socio-economics, Recreation and Tourism.

#### Ethnicity

- 10.6.4 The study area is less ethnically diverse than England as a whole, with Thurrock (Section H) showing the greatest diversity. Thurrock is the only Local Authority within the study area that is more ethnically diverse than the overall proportion for England. Colchester and Brentwood (Section C and D, and G respectively), whilst not as diverse as Thurrock, have greater ethnic diversity than the rest of the study area (OHID, 2022).
- 10.6.5 Further detail regarding ethnicity is provided in Appendix 10.1: Health and Wellbeing Baseline Statistics in Volume III.

#### Deprivation, Housing and Employment

- 10.6.6 Generally, the study area shows a lower level of deprivation in terms of income and child poverty. Tendring (Section C) has the highest level of income deprivation and child poverty within the study area (Essex County Council, 2023).
- 10.6.7 Except for Brentwood (Section G), all the Local Authorities within the study area have a higher-than-average rate of fuel poverty. In Tendring (Section C), 16.5% of houses are classified as in fuel poverty, which is the highest of the study area (OHID, 2022).
- 10.6.8 All the Local Authorities in the study area have a lower rate of unemployment than England as a whole, except for Tendring (which is equal) and Thurrock (which is higher). In Basildon (Section G), however, 'long-term unemployment'<sup>54</sup> is higher compared to England as a whole. This indicates that those out of work in Basildon are unemployed for an extended period and may find it harder to return to employment, whereas there may be a greater turnover of people out of work for a limited period in Thurrock.
- 10.6.9 Deprivation, housing, and employment health indicators are summarised further in Appendix 10.1: Health and Wellbeing Baseline Statistics in Volume III.

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<sup>54</sup> Long-term unemployment is most generally defined as being out of work for 12 months or more.

## Local Health

- 10.6.10 Health indicators across the study area show a varied composition in comparison to the national context. South Norfolk (Section A) has the highest incidence of limiting long-term illnesses or disabilities, with a proportion higher than the national average. This could be reflective of the ageing population in this area when compared to other local authorities in the study area. South Norfolk additionally has one of the highest life expectancies in the study area, with Tendring (Section C) having the lowest for both males and females (Norfolk County Council, 2022). Tendring has the greatest gap in male life expectancy between the most and least deprived areas in England. Tendring has the overall highest proportion of the population with a limiting long-term illness or disability of the Local Authorities within the study area, with limiting illnesses affecting a quarter of the population.
- 10.6.11 Across the study area, there is generally a similar or lower rate of childhood obesity when compared to England as a whole, except for Tendring (Section C), which has around a third of Reception-aged children recorded as overweight or obese. By Year 6, all the Local Authorities record childhood obesity rates in line with or lower than the average for England (OHID, 2022; Essex County Council, 2019). Childhood obesity indicates that opportunities for exercise, active travel, outdoor recreation and accessing healthy food is a challenge during childhood. The percentage of physically inactive adults within the study area is generally in line with the England average. Tendring (Section C) and Braintree (Section E) have the highest proportions of inactive adults. Working to reduce excess weight and obesity across all age groups is highlighted as a key priority within the Essex JSNA. Childhood obesity and adult activity levels are identified as areas of focus within the Suffolk Health and Wellbeing Strategy (Suffolk County Council, 2023).
- 10.6.12 There is a higher proportion of teenage pregnancies in Tendring (Section C) than in any of the other Local Authorities in the study area, with approximately twice the average rate for England. However, general fertility rates across the study area are not significantly different when compared to the rates across England as a whole.
- 10.6.13 Across the study area, the Lower Super Output Areas (LSOAs)<sup>55</sup> ranked as the most deprived according to the health deprivation and disability domain are primarily focused in urban areas, with the highest number of LSOAs in the top 10% in Tendring (Section C). Variations by ward within the study area are also prominent. Prior to the COVID-19 pandemic, life expectancy, healthy life expectancy, and disability-free life expectancy for both men and women were higher in Essex than the England average. Below the county level however, the picture of life expectancy is much more varied. For example, in Essex there is a gap of around 12 years in life expectancy between those living in the most and least deprived neighbourhoods. Essex County Council has identified this as a potential focus area (Essex County Council, 2019). Similarly, this is a priority for Suffolk County Council (Suffolk County Council, 2023).

## Mental Health

- 10.6.14 The Government published Health Matters: Reducing Health Inequalities in Mental Illness in 2018 (Public Health England, 2018), which highlighted that people with severe

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<sup>55</sup> LSOAs are made up of groups of Output Areas (which are smaller areas the census uses and are based on postcodes - they are used for statistical purposes), usually four or five. They comprise between 400 and 1,200 households and have a usually resident population between 1,000 and 3,000 person (Census 2021).

and enduring mental illness are at greater risk of poor physical health and reduced life expectancy compared to the general population. The report notes that mental health problems can affect anyone and have significant effects on wider society. There are a wide range of mental health conditions and disorders, with common mental health conditions such as depression and anxiety affecting one in five of the population. Issues of mental wellbeing, mental illness and mental distress are all interlinked, and there is a clear link between loneliness and poor mental and physical health.

- 10.6.15 The health inequalities identified within wards and across the study area likely indicate associated inequalities in mental health.
- 10.6.16 Local health indicators suggest that personal wellbeing in the study area is either better or not different to England as a whole, however, Tendring (Section C) is an outlier with a significantly higher rate of hospital stays for self-harm. This may be reflective of pressures on mental health from overall deprivation.
- 10.6.17 Mental health and wellbeing are a priority identified in the majority of the JSNAs and Health and Wellbeing Strategies of Local Authorities within the study area. For example, the Essex JSNA identifies mental health and wellbeing as a priority for the county, with a primary focus to be on Basildon (Section G), Colchester (Sections C and D) and Tendring (Section C).

### **Vulnerable Groups**

- 10.6.18 The local authorities within the study area present differences in terms of vulnerable groups and associated sensitivities in human health and wellbeing, for example:
- Several local authorities exhibit ageing populations, for example South Norfolk (Section A), Mid Suffolk (Section B), Babergh (Section C) and Tendring (Section H)
  - A greater proportion of residents within South Norfolk are living with long-term illness than is the case nationally
  - Colchester City Council (Sections C and D) has a younger population than the England average. The local authority also has a high proportion of the population that cannot understand English and a high proportion of residents living in overcrowded housing
  - Tendring District Council (Section C) experiences high levels of unemployment / long-term unemployment, has a high proportion of people living with long-term illness, and several wards / local areas suffer from income deprivation
  - Thurrock Council (Section H) also has a younger population than the England average. The local authority has the most diverse population of those within the study area

### **Environmental Context**

- 10.6.19 As previously noted, the health and wellbeing assessment focuses on health-related environmental change. Accordingly, this Chapter draws on information from other environmental topic chapters, including Chapter 7: Air Quality, Chapter 9: Contaminated Land, Geology and Hydrogeology, Chapter 12: Hydrology and Land Drainage, Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Recreation and Tourism and Chapter 16: Traffic and Transport. A summary

of key baseline information drawn from these chapters and their associated study areas are included on Figure 10.2: Health and Wellbeing Receptors in Volume II.

## Future Baseline

- 10.6.20 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project within the ES. The ONS produces 25-year subnational projections for population, which represent an indication of future trends in population. The projections are based on trends of the previous five years with regards to changes in age and sex. The latest projections are based on data from 2021.
- 10.6.21 Table 10.2 shows that there is a variety of patterns in the population within the study area, with some local authorities and sections showing greater and lower proportions of each age group when compared to the national average for England. All the local authorities' populations are expected to increase through to 2043.

Table 10.2 – 2043 Population Forecast by Local Authority Area

	Population aged under 5 years (%)	Population aged 5 to 15 years (%)	Population aged 16 to 24 years (%)	Population aged 25 to 64 years (%)	Population aged 65 years and over (%)	Total Population (2043)
South Norfolk (Section A)	5	11	8	47	29	177,110
Mid Suffolk (Section B)	4	9	8	46	32	115,846
Babergh (Section C)	4	10	8	44	34	101,923
Colchester (Section C and D)	6	11	14	49	20	228,062
Tendring (Section C)	5	10	9	42	35	175,427
Braintree (Section E)	6	12	11	51	20	162,144
Chelmsford (Section F)	5	11	10	50	23	204,078
Brentwood (Section G)	6	11	10	50	24	78,573
Basildon (Section G)	6	12	11	51	20	206,509

	Population aged under 5 years (%)	Population aged 5 to 15 years (%)	Population aged 16 to 24 years (%)	Population aged 25 to 64 years (%)	Population aged 65 years and over (%)	Total Population (2043)
<b>Thurrock (Section H)</b>	7	13	11	52	17	205,470
<b>England</b>	5	11	11	49	24	61,744,000

Source: ONS, 2021

- 10.6.22 Life expectancy across the UK is expected to fall over time, with the average life expectancy projected to be 82.6 and 85.5 for males and females respectively for those born in 2043. While this data is not available at local authority level, it does allow for a general interpretation that living standards in the UK may fall, with an associated potential increase in poor health, particularly with an ageing population for much of the study area. These estimates were based on data from 2018 and therefore predate the COVID-19 pandemic, which itself may lead to adverse effects on health and wellbeing.
- 10.6.23 Local planning policy across the study area aims to improve the health of the population while improving quality of life. The JSNAs prepared for individual local authorities emphasise improving mental and physical health, addressing the need to reduce childhood and adulthood obesity rates and increase physical activity rates.
- 10.6.24 A widening of inequality between the most and least deprived areas in recent years, prior to the COVID-19 pandemic, suggests that health inequalities may continue to widen. This in turn may result in adverse effects on the wellbeing of the population and increased pressure on health services.

## 10.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 10.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 10.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 10.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Embedded measures relevant to Health and Wellbeing are summarised below:
- Sensitive routing and siting to avoid and reduce as far as practicable effects on identified environmental and socio-economics receptors. The Project has avoided sensitive features such as centres of population and community, healthcare, and education facilities, through the corridor and routing studies. Where practical, construction compounds would be located to avoid or minimise environmental and community effects, provide the best access for personnel and deliveries in relation to major structures and worksites, and meet other construction requirements for the Project

- The Project would be designed in accordance with National Grid design standards and will be compliant with the guidelines and policies relating to EMF stated in NPS EN-5 (DESNZ, 2023), including the ICNIRP guidelines. Compliance with these guidelines and policies mean that the Project will already have designed out potential effects from EMF to a level to meet health and safety standards
- The Project will be designed to comply with design safety standards including NETS SQSS and the suite of National Grid policies and processes which contain details on design standards required to be met when designing, constructing, and operating its projects. Existing National Grid processes are designed to identify potential safety risks during construction and operation and to design these out at each stage of Project development

## Standard Mitigation

10.7.4 Standard mitigation measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.

10.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures which are of relevance to health and wellbeing. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):

- GG05: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include agreed traffic routes, access points, pollution prevention and pollution incident response, etc
- GG35: Members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will typically include the notification of 'noisy activities,' heavy traffic periods and start and end dates of key phasing. A contact number will be provided which members of the public can use to raise any concerns or complaints about the Project. All construction-related complaints will be logged by the Main Works Contractor in a complaints register, together with a record of the responses given and actions taken
- GG20: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration, and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable
- NV01: Contractors will be required to follow good construction practices (referred to as best practicable means (BPM)) as outlined in BS 5228-1 and BS 5228-2 to control noise and vibration respectively
- S02: PRowS crossing the working areas will be managed in discussion with the relevant local authorities and potentially temporary closures applied, where required, for with the relevant local authority. Access disruption would be reduced while construction activities occur. Any required temporary diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns

- Interactions with PRoW would be managed in line with measures outlined in the Draft PRoW Management Strategy at Annex B of Appendix 4.1: Draft Outline CoCP in Volume III to manage potential effects on PRoW and users of PRoW

10.7.6 The mechanisms by which mitigation measures would be secured and delivered will be set out in the ES.

## Additional Mitigation

10.7.7 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

10.7.8 The assessment undertaken within this PEIR has not identified any requirements for additional mitigation for Health and Wellbeing at this stage.

## Waveney Valley Alternative

10.7.9 No additional embedded, standard or additional mitigation measures, beyond those outlined above, and set out in Chapters 7: Air Quality, 9: Contaminated Land, Geology and Hydrogeology, 13: Landscape and Visual, 14: Noise and Vibration and 16: Traffic and Transport (including for the Waveney Valley Alternative mitigation sections), would be needed if the Waveney Valley Alternative was taken forward.

## 10.8 Potential Residual Effects and Preliminary Likely Significant Effects

10.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation – embedded (design measures), standard practice, and any additional mitigation measures – are in place before assessing the effects, which is in accordance with IEMA guidance (IEMA, 2022).

10.8.2 It should be noted that the assessment is ongoing and subject to change as the Project develops. A full detailed assessment will be presented within the ES submitted with the Development Consent Order application.

### Preliminary Construction Effects

10.8.3 During the construction phase, there is the potential for health and wellbeing to be affected by construction activities. A summary of the preliminary residual effects, as identified within other environmental topics, is presented in Table 10.3, alongside the assessment of the effect on Health and Wellbeing.

Table 10.3 – Environmental Topic Effects on Health and Wellbeing during Construction

<b>Preliminary Construction Effects</b>			
<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
Chapter 7: Air Quality	Construction Dust	<p>Prior to the implementation of mitigation, IAQM methodology assessed the potential significant effects of dust risk, determining that the construction activities (demolition, earthworks, construction and trackout) could have medium or high risk to dust soiling and human health.</p> <p>A range of mitigation measures for high-risk sites are set out in Appendix 4.1: Draft Outline CoCP in Volume III. These measures are standard good practices and following the implementation of this appropriate mitigation, the effects of construction on dust soiling and human health are anticipated to be not significant.</p> <p>Further assessment of air quality will be undertaken and presented in the ES.</p>	<p>The risk of construction dust may negatively affect human health associated with respiratory and cardiovascular diseases. Mental health and wellbeing may also be impacted by residents experiencing anxiety in relation to air quality effects. However, with the mitigation identified, the residual preliminary effects of the Project in relation to Health and Wellbeing for both the general population and for vulnerable groups would be neutral and not significant.</p>
Chapter 9: Contaminated Land, Geology and Hydrogeology	Disturbance and mobilisation of contamination; introduction of new sources of contamination	<p>A baseline assessment and Preliminary Contaminated Land Risk Assessment has been undertaken in accordance with the process of contamination risk assessment defined within Land Contamination Risk Management (Environment Agency, 2023) and is presented within Appendix 9.1: Baseline Information and Preliminary Contamination Risk Assessment (PRA) in Volume III. The PRA has identified a generally 'very low/low risk' of significant existing contamination to be present within most of the draft Order Limits. A worst case 'very high' risk has been identified within small discrete</p>	<p>Land contamination can pose risks to human health and the environment. Risk assessments aim to establish possible pollutant pathways and identify all necessary mitigation measures, as appropriate, to eliminate or reduce the risk to an acceptable level. With the mitigation identified, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general</p>

<b>Preliminary Construction Effects</b>			
<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		<p>sections of the draft Order Limits.</p> <p>If the Project identified significant sources of potential contamination within the draft Order Limits, there is potential for exposure of sensitive receptors to the contamination, where the potentially contaminated ground is disturbed (e.g., excavations), or mobilisation of existing contamination through creation of new pathways (e.g., piling).</p> <p>Pollution releases and the introduction of new sources of contamination into the environment (for example uncontrolled leaks and spills from machinery) during construction also have the potential to affect sensitive receptors.</p> <p>Further assessment of sites assessed as presenting a moderate or above risk will be undertaken and presented in the ES to determine the likelihood of the Project interacting with these sites and causing ground disturbance. Where further assessment of these sites identifies the risk of ground disturbance during construction of the Project, the policy requirements of GH10, within Appendix 4.1: Draft Outline CoCP in Volume III, would apply, requiring that prior to construction, each site is individually investigated and assessed in accordance with Land Contamination Risk Management (Environment Agency, 2023)) to determine any additional mitigation measures or remediation requirements.</p>	<p>population and for vulnerable groups would be neutral and not significant.</p>
Chapter 12: Hydrology and Land Drainage	Potential effects on water quality	During construction, new crossings of watercourses would be required for temporary access. There is a risk of pollution from construction traffic using these temporary	Water contamination can pose risks to human health and the environment. With appropriate

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		<p>access routes, for example linked to mud from tyres and other debris entering the watercourses. Other construction activities with a risk of opening pollution pathways to water environment receptors include for example, dewatering of excavations and drilling for trenchless crossings.</p> <p>The design of crossing methods would follow standard measures set out in Appendix 4.1: Draft Outline CoCP in Volume III and, in the case of trenchless crossings, would be informed by the Project’s ground investigation data to reduce the risks of breakout of drilling muds. In addition, the haul road would be put in place in accordance with conditions set out within the consents and permits from the relevant authorities (Environment Agency for main rivers, the Lead Local Flood Authority (LLFA) for ordinary watercourses and the Internal Drainage Board as required).</p> <p>The majority of CSE compounds, construction compounds and substation works are not located near watercourses. Therefore, there would be limited pathways for potential pollutants arising from construction activities at these locations, for example silted runoff, to reach watercourse receptors. However, the Tilbury Substation works (although within the existing security fence) would be near several ordinary watercourses and drainage ditches. The magnitude of the potential effects on these watercourses would be reduced through the implementation of the good practice pollution prevention and water quality safeguarding measures.</p>	<p>design and standard mitigation identified, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general population and for vulnerable groups would be neutral and not significant.</p>

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		Further assessment of hydrology and land drainage will be undertaken and presented in the ES.	
Chapter 13: Landscape and Visual	Landscape - Visual Receptors	<p>Most of the effects which would occur during the construction phase would be short-term and largely reversible, limited to the draft Order Limits and the immediate surroundings from which construction activity may be perceptible. The main exceptions to this are the permanent changes relating to the introduction of the overhead line, underground cable, new EACN Substation, substation extensions at Norwich Main and Bramford and substation works within the existing footprint at Tilbury. The landscape and visual effects arising from the presence of partially constructed pylons, and the cranes used to do this, would be comparable to the operation (and maintenance) effects.</p> <p>Significant negative effects on the landscape during construction would be largely limited to the 'host' landscape character area or landscape character type, where direct effects would occur. Effects beyond the extents of the draft Order Limits would be indirect and largely related to construction of the partially erected pylons.</p> <p>Significant negative effects on views and visual amenity would largely be contained within approximately 0.5 km to 1 km of the draft Order Limits, where close views of low-level construction activity would be apparent in certain views. From the wider study area visibility of construction activity would largely relate to views of partially constructed pylons (potentially with lights at night).</p>	Mental health and wellbeing may be impacted by residents experiencing anxiety in relation to effects on visual amenity during construction. Effects are temporary, and the location of impacted populations would change throughout the construction period due to the linear nature of the Project. Relevant mitigation includes appropriate community liaison measures described in Appendix 4.1: Draft Outline CoCP in Volume III, to inform residents of construction activities. Taking these factors into consideration, the preliminary residual effects of the Project in relation to Health and Wellbeing would be neutral for both the general population and vulnerable groups and not significant.

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		<p>A full list of significantly affected receptors is presented in Chapter 13: Landscape and Visual.</p> <p>Further assessment of landscape and visual effects will be undertaken and presented in the ES.</p>	
<p>Chapter 14: Noise and Vibration</p>	<p>Construction noise</p>	<p>The assessment set out in Chapter 14: Noise and Vibration has identified 100 construction locations where there is potential for significant adverse effects from construction noise at Noise Sensitive Receptors (NSRs). BPM may take the form of alternative plant or methods, plant silencers, and screening, as appropriate to the task. Specific mitigation measures would be determined by the Main Works Contractor(s) prior to conducting works. With these BPM mitigation measures in place (detailed in Appendix 4.1: Draft Outline CoCP in Volume III), all significant effects would be expected to be avoided or mitigated and the effects of construction noise is therefore not likely to be significant.</p> <p>Further assessment of construction noise will be undertaken and presented in the ES.</p>	<p>There is strong evidence setting out the links between changes in noise levels and human health outcomes, with changes in noise levels likely to relate primarily to anxiety/stress because of changes in the local environment. The level of effect arising from noise pollution can depend on the type of noise and time of day it occurs, nature of tasks being undertaken, and personal characteristics.</p> <p>Standard mitigation set out in Appendix 4.1: Draft Outline CoCP in Volume III includes measure NV01 which requires contractors to follow good construction practices as outlined in BS 5228-1 and BS 5228-2 to control noise and vibration respectively.</p> <p>Further mitigation includes appropriate community liaison measures described in Appendix 4.1: Draft Outline CoCP in Volume</p>

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
			<p>III, to inform residents of construction activities.</p> <p>With mitigation identified, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general population and vulnerable groups would be neutral and not significant.</p>
	<p>Construction Vibration</p>	<p>The assessment has identified 19 instances where there are potential significant adverse (negative) effects from construction vibration at NSRs, without specific BPM mitigation measures.</p> <p>Appendix 4:1: Draft Outline CoCP in Volume III outlines specific mitigation measures. These will be refined by the Main Works Contractor(s) prior to conducting works (which would be documented in the CoCP submitted to discharge the DCO Requirement). In all instances, significant adverse effects from construction vibration would be expected to be avoided and mitigated to a minimum with the use of BPM.</p> <p>Further assessment of construction vibration will be undertaken in the ES.</p>	<p>With mitigation identified, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general population and vulnerable groups would be neutral and not significant.</p>
	<p>Construction traffic noise</p>	<p>The assessment indicates that construction traffic would lead to a negligible (neutral) or small magnitude (negative) effect on most Primary Access Routes, with a potential medium or large magnitude (negative) effect on two proposed construction traffic routes. Potential significant</p>	<p>Noise effects resulting from construction traffic would be temporary (during the construction phase). Relevant mitigation includes appropriate community</p>

<b>Preliminary Construction Effects</b>			
<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		<p>adverse effects from construction traffic are likely at one NSR, Jasmine Cottage (Section C). There are no small magnitude (negative) effects on routes which include a noise important area, which are more sensitive to increases in traffic noise. As such the effect of construction traffic noise is likely to be not significant.</p> <p>Further assessment of construction traffic noise will be undertaken and presented in the ES.</p>	<p>liaison measures described in Appendix 4.1: Draft Outline CoCP in Volume III, to inform residents of construction activities. Taking these factors into consideration, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general population and vulnerable groups would be neutral and not significant.</p>
Chapter 15: Socio-economics, Recreation and Tourism	Employment and the local economy	<p>The Project is expected to generate approximately 800 Full Time Equivalent (FTE) gross direct employees across the (184 km) Project throughout the approximate four year construction duration. The direct construction employment generated by the Project is likely to have a potential positive effect on the wider study area economy which is likely to be not significant.</p> <p>Further assessment will be undertaken and presented in the ES.</p>	<p>Work and training are one of the wider social determinants of health, with strong links between employment and both physical and mental wellbeing. The Project provides an opportunity for job creation, which also aligns with tackling health inequality. The preliminary residual effects of the Project in relation to Health and Wellbeing would therefore be positive for both the general population and vulnerable groups although is not anticipated to be significant.</p>
	Effects on community facilities, business,	Tables 15.15, 15.16 and 15.17 in Chapter 15: Socio-economics, Recreation and Tourism list several recreational receptors which may experience significant	Recreational and community facilities are important for people's physical and mental wellbeing

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
	<p>recreation, and tourism facilities</p>	<p>effects during the construction phase. These include facilities such as Potters Farm: The Piggery, Middle Farm Lakes, Langham Hall Estate, Ardleigh Carvan and Camping Park, Prettyfields Vineyard, JackRabbit Brewing Co, White Notley Football Club and The Hare which would experience some temporary disruption during construction; other facilities such as several fishing lakes in Section C of the Project (e.g., Paxman’s Angling Club, fishing lake north-west of Ardleigh), Porters Farm, Dunton Hills Family Golf Centre, Eden Garden, Orsett Golf Course and St Cleres Golf Club may be temporarily affected during the construction phase.</p> <p>Several PRowS are identified in Table 15.18 of Chapter 15: Socio-economics, Recreation and Tourism as being significantly affected during construction. A PRow management strategy is provided in Appendix 4.1: Draft Outline CoCP in Volume III which has been developed to manage potential temporary closures or diversions required.</p> <p>There are not anticipated to be any significant effects on community facilities during construction. The Project requires temporary acquisition of land from Equine centre - Writtle University College, St Mary’s Church Buttsbury, and Woodland Schools - Hutton Manor and Little Acorns. However, the residual effect is not anticipated to be significant once measures outlined in Appendix 4.1: Draft CoCP in Volume III and Draft Outline CTMP are implemented.</p>	<p>providing opportunities for health-promoting activity, physical exercise, and meeting-places. Effects on several facilities have been noted, however these are temporary. It is understood that there is the potential for effects on mental wellbeing including stress and anxiety from the temporary effects on some businesses during construction. However, this is subjective and therefore a conclusion cannot be drawn to determine significance. The PRow management strategy provided in Appendix 4.1: Draft Outline CoCP in Volume III has been developed to manage potential temporary closures or diversions required.</p> <p>Taking these factors into account, the preliminary residual effects of the Project in relation to Health and Wellbeing for both the general population and vulnerable groups is likely to be neutral and not significant.</p>

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		Further assessment will be undertaken and presented in the ES.	
Chapter 16: Traffic and Transport	Effects on receptors including pedestrians, cyclists, horse-riders, bus passengers, car drivers and passengers	<p>The predicted increase for 12-hour HGV flows (07:00-19:00 hrs) exceeds the 10% threshold (for sensitive roads) and 30% threshold (for non-sensitive roads) on the majority of the assessed local road link forming the Primary Access Routes and will be subject to further assessment within the ES.</p> <p>The primary traffic and transportation effects associated with the Project would be as a direct result of an increase in traffic flows on the surrounding roads used by construction vehicles. This may lead to a range of potentially significant effects in relation to a diverse range of receptors, including pedestrians, cyclists, horse-riders, bus passengers and road users. Potentially significant effects identified in Chapter 16: Traffic and Transport relate to:</p> <ul style="list-style-type: none"> <li>• Reduced ability to cross the road, changed journey times and distances, loss of amenity and a reduction in road safety (for pedestrians, cyclists, and horse-riders)</li> <li>• Changed journey times and distances plus potential effects in terms of road safety (for bus passengers and car drivers / passengers)</li> </ul> <p>Chapter 16: Traffic and Transport identifies that the potential for significant effects is dependent upon individual road characteristics and the surrounding environment and further detail will be provided and assessed within the ES. Appendix 4.1: Draft Outline CoCP</p>	<p>Changes in traffic flows can potentially create a ‘barrier effect’ which can be linked to people’s health and wellbeing, for example by discouraging trip-making, which can in turn have effects on people’s mental wellbeing (particularly for older populations). Changes in journey times and distances can similarly affect people’s trip choices. Levels of construction traffic using the local road network can also have more direct potential implications for road safety for people living in the immediate vicinity of construction routes.</p> <p>The preliminary residual effects of the Project in relation to Health and Wellbeing is potentially negative during construction due to changes in travel choice and potential effects on journey times and distances (in particular for those accessing healthcare facilities). However, with mitigation identified, this is not likely to be</p>

**Preliminary Construction Effects**

<b>Topic</b>	<b>Nature of Effects</b>	<b>Topic Summary and Mitigation</b>	<b>Health and Wellbeing Preliminary Residual Effect</b>
		<p>in Volume III and the Draft Outline CTMP contain a list of relevant standard measures relating to traffic and transport.</p> <p>Further assessment will be undertaken and presented in the ES.</p>	<p>significant from a Health and Wellbeing perspective. Further assessment, including further detail relating to mitigation measures, will be provided in the ES.</p>

## Waveney Valley Alternative

- 10.8.4 The Waveney Valley Alternative may result in a greater magnitude of impact in relation to hydrogeology when compared to the overhead line design, as it has the potential for a greater interaction with groundwater and groundwater receptor. However, it is considered that with mitigation in place and the proposed additional assessment planned for the ES, the potential for significant effects could be reduced to an extent that they are unlikely to be significant, as set out in Chapter 9: Contaminated Land, Geology and Hydrogeology.
- 10.8.5 Whilst the underground cable alternative has greater potential for temporary negative effects on flood risk from the River Waveney during construction, the implementation of the mitigation measures would reduce any temporary effects to a level not anticipated to be significant, as set out in Chapter 12: Hydrology and Land Drainage.
- 10.8.6 The visual effects of the construction of the underground cable and CSE compounds would be more notable than the construction of an overhead line due to the wider swathe of land affected and longer duration of construction works. However, there would be no change to the assessment conclusions presented for the overhead line design, as set out in Chapter 13: Landscape and Visual.
- 10.8.7 The construction noise assessment has identified two additional NSR where there are potential significant adverse (negative) effects from the construction of underground cables associated with the Waveney Valley Alternative during daytime periods. However, significant adverse (negative) effects would be expected to be avoided or mitigated to a minimum with the use of BPM and therefore would not result in additional significant effects above those reported above. There are no identified NSR where there are potential significant adverse (negative) effects associated with the overhead line option in this area, as set out in Chapter 14: Noise and Vibration.
- 10.8.8 The construction noise assessment has identified one additional NSR where there are potential significant adverse (negative) effects from the construction of trenchless crossings associated with the Waveney Valley Alternative during night-time periods (assuming works are conducted at night). However, significant adverse (negative) effects would be expected to be avoided or mitigated to a minimum with the use of BPM and therefore would not result in additional significant effects above those reported above. There are no additional significant effects associated with the overhead line design and Waveney Valley Alternative in this area, as set out in Chapter 14: Noise and Vibration.
- 10.8.9 There is the potential for the Waveney Valley Alternative to result in an increase in construction vehicles, which would exceed the traffic flow threshold for further detailed assessment, as per the overhead line design. In addition, the Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 Thetford, which would be used to bring in cable drums to avoid highway constraints through Diss, as set out in Chapter 16: Traffic and Transport. It is anticipated that this would result in six additional AIL movements across a four-month period and is therefore not significant. The potential effects on health and wellbeing would be determined in the ES, should the Waveney Valley Alternative be taken forward.

## Preliminary Operational (and Maintenance) Effects

- 10.8.10 During the operation (and maintenance) phase, there is the potential for both physical and mental health and wellbeing to be affected by operation and maintenance activities. A summary of the effects, as identified within other environmental topics, is presented in Table 10.4, together with a summary of the potential effect on Health and Wellbeing.
- 10.8.11 EMFs arise from the generation, transmission, distribution, and use of electricity. The Project would be designed in accordance with National Grid design standards and would be compliant with the guidelines and policies relating to EMF stated in NPS EN-5 (DESNZ, 2023), including the ICNIRP guidelines. Compliance with these guidelines and policies mean that the Project would already have designed out potential effects from EMFs to a level to meet health and safety standards. It is acknowledged that residents may be concerned about the potential health effects associated with EMFs and that this could affect mental health and wellbeing. Messaging and awareness raising about the Project and potential effects (including in relation to EMFs) will continue through the Project development phase. The effects on health and wellbeing are therefore considered to be neutral and not significant. An EMF compliance report will be produced to support the application for development consent and sits outside the EIA process. However, a summary of this report will be included in the ES.

Table 10.4 – Environmental Topic Effects on Health and Wellbeing during Operation

<b>Preliminary Operational Effects</b>			
<b>Topic</b>	<b>Effect</b>	<b>Topic Effect and Mitigation</b>	<b>Health and Wellbeing Effect</b>
Chapter 7: Air Quality	N/A	No operational effects have been identified.	N/A
Chapter 9: Contaminated Land, Geology and Hydrogeology	Disturbance and mobilisation of contamination	<p>Potential effects in relation to existing contamination are not anticipated during the operational phase of the Project because any existing contamination would be appropriately dealt with (mitigated or remediated) during the construction phase of the Project. Therefore, potential effects in relation to contamination during operation of the Project would only occur by accidental release/spill during routine maintenance activities. However, routine maintenance activities would be undertaken in accordance with National Grid’s best practice protocols and therefore effects on sensitive receptors are not anticipated, and this is not significant.</p> <p>Further assessment will be undertaken and presented in the ES.</p>	With best practice measures identified, the preliminary residual effects during operation (and maintenance) in relation to Health and Wellbeing would be neutral and not significant.
Chapter 12: Hydrology and Land Drainage	Flood Risk and Land Drainage	Surface water runoff from the CSE compounds, substation extensions and any permanent access roads would be drained using appropriate SuDS techniques to meet with LLFA discharge requirements. The CSE compounds would not be permanently staffed and the extensions to the substations are not anticipated to result in an increase in volumes of foul water drainage or change the existing discharge arrangements.	<p>Changes in flood regime could affect mental health and wellbeing due to the changes in the environment and a sense of loss of control of the surroundings.</p> <p>The change to the land drainage regime is assessed to be neutral</p>

**Preliminary Operational Effects**

<b>Topic</b>	<b>Effect</b>	<b>Topic Effect and Mitigation</b>	<b>Health and Wellbeing Effect</b>
			and preliminary residual effects would be not significant. The resultant effect on health and wellbeing is therefore assessed to be neutral and not significant.
Chapter 13: Landscape and Visual	Landscape Character Visual Receptors	<p>Significant negative effects on landscape character during operation (and maintenance) are predicted to extend across the draft Order Limits and the surrounding landscapes within approximately 0.5 km to 1 km of the Project.</p> <p>Significant negative effects on views and visual amenity during operation (and maintenance) are predicted to be experienced within approximately 1 km to 2 km of the Project. Significant negative effects are likely to be experienced by a range of visual receptors including residents, road users and recreational receptors.</p> <p>A full list of significantly affected receptors are presented in Chapter 13: Landscape and Visual.</p> <p>Further assessment will be undertaken and presented in the ES.</p>	The response of local communities to the landscape and visual aspects of the Project are subjective. Negative health and wellbeing effects are likely to be experienced by a proportion of the local population as a result of how the Project may affect the setting of homes, businesses and / or culturally or ecologically important community assets. A further proportion of the local population are likely to have either neutral or positive

**Preliminary Operational Effects**

<b>Topic</b>	<b>Effect</b>	<b>Topic Effect and Mitigation</b>	<b>Health and Wellbeing Effect</b>
			<p>perceptions of the Project. Therefore, it is difficult to conclude an overall significance on health and wellbeing of landscape and visual effects during the operation (and maintenance) of the Project.</p>
<p>Chapter 14: Noise and Vibration</p>	<p>Noise and Vibration</p>	<p>Operational noise at the proposed EACN Substation would not lead to a significant effect for nearby NSRs.</p> <p>Further assessment of operational noise from the proposed EACN Substation will be undertaken in the ES if further design information is available. Alternatively, further assessment will be conducted as standard practice by National Grid, including any mitigation measures.</p>	<p>The preliminary residual effects on health and wellbeing because of changes in noise level during the operation (and maintenance) of the Project would be neutral and not significant owing to the assets being designed to meet specific requirements.</p>
<p>Chapter 15: Socio-economics, Recreation and Tourism</p>	<p>Community Facility, Business, Recreation and Tourism</p>	<p>Tables 15.15, 15.16 and 15.17 in Chapter 15: Socio-economics, Recreation and Tourism list several receptors where there may be potential residual effects because of restrictions during the operational phase (in relation to the creation of exclusion zones or maintenance areas). This is</p>	<p>Although preliminary residual effects have been identified in relation to a small number of private</p>

**Preliminary Operational Effects**

<b>Topic</b>	<b>Effect</b>	<b>Topic Effect and Mitigation</b>	<b>Health and Wellbeing Effect</b>
		<p>particularly the case for Middle Farm Lakes and the fishing lake north-west of Ardleigh (as shown on Figure 10.2: Health and Wellbeing Receptors in Volume II), where the lake may close due to the need to maintain a 30 m angling exclusion zone.</p>	<p>recreational businesses, facilities would primarily remain open to users, and alternative recreation sites are available for use to replace the loss of certain sites. It is considered this would be neutral and not lead to significant effects in relation to Health and Wellbeing.</p>
Chapter 16: Traffic and Transport	N/A	No operational effects have been identified.	N/A

## Waveney Valley Alternative

- 10.8.12 There would be no change to significance of effects identified above as set out in Chapters 9: Contaminated Land, Geology and Hydrogeology, 12: Hydrology and Land Drainage, 13: Landscape and Visual, 14: Noise and Vibration and 15: Socio-economics, Recreation and Tourism, with the exception of a likely reduction in some landscape and visual effects. There are therefore no new or different effects arising from health-related environmental change that would lead to new or different health effects.

## 10.9 Sensitivity Testing

### Flexibility in Construction Programme

- 10.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Section 10.7.

### Flexibility in Design

- 10.9.2 This chapter has assumed the pylon locations and underground cable alignments provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing has considered alternative pylon locations and underground cable route within the proposed LoD. There would be no new or different likely significant effects as a result of the assumptions and mitigation set out in Chapters 7: Air Quality, 12: Hydrology and Land Drainage, 13: Landscape and Visual, 14: Noise and Vibration, 15: Socio-economics, Recreation and Tourism and 16: Traffic and Transport, although the specific receptors experiencing visual effects may change, as set out in Chapter 13: Landscape and Visual.
- 10.9.3 If design changes subsequently require pylon locations or underground cable route through areas assessed as having a moderate or above risk of significant contamination, then further risk assessment would need to be undertaken in accordance with the mitigation measures within Appendix 4.1: Draft Outline CoCP in Volume III, as set out in Chapter 9: Contaminated Land, Geology and Hydrogeology.

### Flexibility due to Design elements not fixed at Statutory Consultation

- 10.9.4 The alternative offline EACN Substation access route would change the receptors experiencing effects from construction traffic, such as noise levels and traffic flows, as set out in Chapters 14: Noise and Vibration and 16: Traffic and Transport. The assessment of these effects will be updated in the ES once construction phasing information is available.
- 10.9.5 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, there would likely be no new or different likely significant effects to Health and Wellbeing, as a result of the assumptions and mitigation set out in Chapters 7: Air Quality, 9: Contaminated Land, Geology and Hydrogeology, 12: Hydrology and Land Drainage, 13: Landscape and Visual, 14: Noise and Vibration, 15: Socio-economics, Recreation and Tourism and 16: Traffic and Transport.

# 11. Historic Environment

# 11. Historic Environment

## 11.1 Introduction

11.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on the Historic Environment. The chapter covers effects on the following during construction and operation (and maintenance):

- Archaeological remains - designated and non-designated
- Historic buildings - designated and non-designated
- Historic landscapes - non-designated

11.1.2 There are interrelationships related to the potential effects on the Historic Environment and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 7: Air Quality
- Chapter 9: Geology, Hydrogeology and Contaminated Land
- Chapter 12: Hydrology and Land Drainage
- Chapter 13: Landscape and Visual
- Chapter 14: Noise and Vibration
- Chapter 16: Traffic and Transport

11.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 11.1: Historic Environment Study Area
- Figure 11.2: Designated Heritage Assets Within Study Area
- Figure 11.3: Non-Designated Heritage Assets
- Appendix 11.1: Historic Environment Baseline Report
- Appendix 11.2: Historic Environment Assessment Tables
- Appendix 11.3: EACN Substation Geophysical Survey Report

## 11.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

11.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024). EN-1 states that energy projects have the potential to have negative effects on the Historic Environment which has been considered within this chapter.

- 11.2.2 The NPS EN-1 contains the following paragraphs relating to the historic environment which have been considered within this chapter:
- Paragraph 5.9.11 states *‘Where a site on which development is proposed includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact’.*
  - Paragraph 5.9.24 states *‘In considering the impact of a proposed development on any heritage assets, the Secretary of State should consider the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspects of the proposal’.*
  - Paragraph 5.9.30 states *‘Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II\* listed buildings; grade I and II\* registered parks and gardens; and World Heritage Sites, should be wholly exceptional’.*
- 11.2.3 NPS EN-5 provides limited guidance in relation to heritage. The references to cultural heritage or the historic environment are firstly in Paragraph 2.9.19 in summary of the Horlock Rules, which states *‘... applicants should: ... seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections’.* This is defined in footnote 13 as *‘Internationally and nationally designated areas of highest amenity, cultural or scientific value are: National Parks; Areas of Outstanding Natural Beauty; Heritage Coasts; World Heritage Sites; Ramsar Sites; Sites of Special Scientific Interest; National Nature Reserves; Special Protection Areas; Special Areas of Conservation. Care should be taken in relation to all historic sites with statutory protection e.g. Ancient Monuments, Battlefields and Listed Buildings’.*
- 11.2.4 Secondly, at Paragraph 2.9.25 in relation to underground options which states *‘the Secretary of State should only grant development consent for underground or subsea sections of a proposed line over an overhead alternative if they are satisfied that the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environments impacts that it presents, and that any technical obstacles associated with it are surmountable. In this context is should consider: ...designated heritage assets and Heritage Coasts (including, where relevant, impacts on the setting of designated features and areas)... the potentially very disruptive effects of undergrounding on local communities, habitats, archaeological and heritage sites...’.*
- 11.2.5 The Infrastructure Planning (Decisions) Regulation (2010) Regulation 3 (listed buildings, conservation areas and scheduled monuments) requires that:
- *‘(1) When deciding an application which affects a listed building or its setting, the decision-maker must have regard to the desirability of preserving the listed building or its setting or any features of special architectural or historic interest which it possesses’*

- *‘(2) When deciding an application relating to a conservation area, the decision-maker must have regard to the desirability of preserving or enhancing the character or appearance of that area*
- *‘(3) When deciding an application for development consent which affects or is likely to affect a scheduled monument or its setting, the decision-maker must have regard to the desirability of preserving the scheduled monument or its setting’*

## Other National Legislation and Policy

11.2.6 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- Ancient Monuments and Archaeological Areas Act 1979
- Planning (Listed Buildings and Conservation Areas) Act 1990

## Regional and Local Policy

11.2.7 Chapter 2: Key Legislation and Planning Policy Context lists relevant regional and local policy for the draft Order Limits (South Norfolk, Mid Suffolk, Babergh, Colchester, Tendring, Braintree, Chelmsford, Brentwood, Basildon, and Thurrock). There are a further five Local Authorities within the 2 km study area (Breckland, Ipswich, Maldon, Medway, and Gravesham). There are a further three Local Authorities within the 3 km study area (Epping Forest, Uttlesford and Norwich). Local policy, specific to the Historic Environment, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Breckland Local Plan: Policy ENV 07 Designated Heritage Assets and ENV 08 Non-Designated Heritage Assets (adopted September 2023)
- Ipswich Local Plan 2018 – 2036: Policy DM13 Built Heritage and Conservation and DM14 Archaeology
- Maldon Local Development Plan 2014-2029: Policy D3 Conservation and Heritage Assets
- Medway Local Plan, adopted May 2003: Policy BNE12 Conservation Areas, BNE18 Setting of Listed Buildings, BNE20 Scheduled Ancient Monuments, BNE21 Archaeological Sites
- Gravesham Local Plan, adopted September 2014: Policy CS20 Heritage and the Historic Environment
- Epping Forest Local Plan 2011 – 2033, adopted March 2023: Policy DM7 Historic Environment
- Uttlesford Local Plan: Policy ENV2 Development affecting Listed Buildings, ENV4 Ancient Monuments and Sites of Archaeological Importance and ENV9 Historic Landscapes (adopted January 2005)
- Norwich Local Plan: Policy DM9 The Historic Environment and Heritage Assets (adopted December 2014)

## Guidance

- 11.2.8 Relevant guidance, specific to the Historic Environment, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Standard and guidance for historic environment desk-based assessment (Chartered Institute for Archaeologists (CifA), 2014, updated 2020)
  - DMRB LA 106 Cultural Heritage Assessment (National Highways *et al.*, 2020)
  - Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment (Historic England, 2008)
  - Managing Significance in Decision-Taking in the Historic Environment. Historic Environment Good Practice Advice in Planning: 2 (Historic England, 2015)
  - The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (Historic England, 2017)
  - Statements of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12 (Historic England, 2019)
  - Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS, 2011)
  - Principles of Cultural Heritage Impact Assessment in the UK (IEMA, IHBC, CifA, 2021)

## 11.3 Scoping Opinion

- 11.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 11.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Historic Environment is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 11.4.

## 11.4 Project Engagement and Consultation

- 11.4.1 National Grid has held several meetings with relevant consultees including Historic England and the heritage advisors to the local authorities along the Project.
- 11.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 11.1.

Table 11.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Norfolk Historic Environment Record (HER), May 2022	Norfolk HER provided HER data for the Scoping Report Corridor <sup>56</sup> , plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Suffolk HER, May 2022	Suffolk HER provided HER data for the Scoping Report Corridor, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Essex HER, May, 22 June 2022	Essex HER provided HER data and aerial imagery for the Scoping Report Corridor, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Colchester HER, June 2022	Colchester HER provided HER data for the Scoping Report Corridor, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Babergh District Council, Mid Suffolk District Council, Thurrock Council, Norfolk County Council, Suffolk County Council, Essex County Council, Braintree District Council, Chelmsford City Council, Basildon Borough, Colchester City Council, Historic England, July 2022	The Project presented the proposed approach to scoping and methodology for Historic Environment assessment and baseline. Most aspects of the approach were agreed but the outstanding areas are study area and specific aspects of the proposed approach to scoping walkover survey and historic building assessment.	Further consideration was given to the specific aspects not agreed and further engagement was undertaken in September 2022 to present updated approach (see item below).
Norfolk County Council, Suffolk County Council, Essex County Council, Braintree	The Project presented the updated approach to study areas, scoping of walkover and scoping of historic buildings, in response to feedback received at and following the previous	The EIA Scoping Report reflected the updated information presented in the meeting; this was agreed with the Planning

<sup>56</sup> The preferred corridor in the CPRSS, was consulted on at non-statutory consultation in 2022 and referred to within the EIA Scoping Report as the 'Scoping Report Corridor'.

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
District Council, Chelmsford City Council, Colchester City Council, Historic England, September 2022	meeting on 13 July 2022. This was largely agreed with some caveats regarding the 250 m study area in specific geographic locations along the major river valleys crossed by the Project and some concerns regarding designated assets of the highest significance beyond the 3 km study area, this will be dealt with on a case-by-case basis once Zone of Theoretical Visibility (ZTV) is available. A brief update regarding archaeological fieldwork was provided. The Landscape and Visual Impact Assessment (LVIA) methodology, including viewpoints, was presented.	Inspectorate except for certain aspects of the scoping of historic buildings. Further information is presented in Appendix 11.1: Historic Environment Baseline Report in Volume III regarding the justification for scoping out of individual historic buildings. The Historic Environment Baseline Report will be updated to take account of the ZTV for the design presented in the DCO application.
Norfolk County Council, South Norfolk Council, Suffolk County Council, Babergh District Council, Mid Suffolk District Council, Essex County Council, Colchester City Council, Braintree District Council, Chelmsford City Council, Brentwood Borough Council, Basildon Borough Council, Thurrock Council, February 2023	The proposed methodology and location for landscape and heritage viewpoints was presented to stakeholders. The primary focus was landscape viewpoints, with some landscape viewpoints identified as also relevant for heritage.  Heritage stakeholders requested a methodology for selection of heritage viewpoints and heritage specific viewpoints.	A methodology for the selection of heritage viewpoints was issued to stakeholders in June 2023, with comments received and addressed in subsequent meetings. Heritage specific viewpoints were issued to stakeholders for a consultation in November 2023. Heritage specific viewpoints are not assessed within this PEIR but will be included in the ES based on the design presented in the DCO application.
Historic England, March 2023	Meeting held to discuss the proposed methodology and location for landscape and heritage viewpoints. Some landscape viewpoints were also identified as relevant for heritage. Historic England raised an issue of non-designated heritage assets that may be of equivalent value with designated heritage assets and would need to be appropriately considered in assessment	A methodology was issued in June 2023 and heritage specific viewpoints were issued to stakeholders for a consultation in November 2023. Ongoing desk-based research and walkover and setting survey are informing assessment of the value of heritage assets and ongoing

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
	including the selection of viewpoints. Historic England also raised several heritage assets that may require viewpoints to be considered.	engagement with Historic England will be undertaken to agree whether any non-designated heritage assets that may be of equivalent value with designated heritage assets. The final assessment of value will be presented in the ES.
Norfolk HER, July 2023	Norfolk HER provided HER data for the draft Order Limits, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Suffolk HER, July 2023	Suffolk HER provided HER data for the draft Order Limits, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Essex HER, August 2023	Essex HER provided HER data for the draft Order Limits, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Colchester HER, September 2023	Colchester HER provided HER data for the draft Order Limits, plus a 500 m buffer (a 500 m buffer was created to allow for future design development).	Information obtained to inform baseline within the PEIR.
Norfolk County Council, South Norfolk Council, Suffolk County Council, Babergh District Council, Mid Suffolk District Council, Essex County Council, Tendring District Council, Colchester City Council, Braintree District Council, Chelmsford City Council, Thurrock Council, Historic England September 2023	This Historic Environment Thematic Group meeting was held to update stakeholders on progress with the Baseline Report (Appendix 11.1 in Volume III), approach to fieldwork (including geophysical survey, ground investigation (GI) works and trial trenching) and heritage viewpoints.	Actions regarding providing updated information to stakeholders on proposed GI works have been completed and further engagement on these topics held since this date, as described in this PEIR chapter. Appendix 11.3: EACN Substation Geophysical Survey Report also presents the results of the geophysics surveys undertaken at the proposed location of the EACN Substation.

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
Historic England, September, and October 2023	Informal meetings were held to discuss the proposed approach to assessment of specific high value designated heritage assets.	The feedback received has informed the assessment in the PEIR and will be carried forward into the ES.
Norfolk County Council, Suffolk County Council, Essex County Council, Thurrock Council, Colchester City Council, Historic England November 2023	A meeting was held with archaeological advisors to discuss approach to geophysical survey and trial trenching. Included agreement of approach to Written Schemes of Investigation (WSIs) to produce one document for the Project for geophysical survey and one overarching document for trial trenching to cover all methodology with area specific documents subsequently produced to provide specific detail of trench layout and methodology. This approach was agreed with stakeholders.	The approach to WSIs is as agreed in the meeting. Results of fieldwork will inform the baseline and assessment in the ES.
Norfolk County Council, South Norfolk Council, Suffolk County Council, Babergh District Council, Mid Suffolk District Council, Essex County Council, Colchester City Council, Tendring District Council, Braintree District Council, Chelmsford City Council, Brentwood Borough Council, Basildon Borough Council, Historic England November 2023	Meetings held to discuss heritage specific viewpoints. The methodology for selection of viewpoints was briefly outlined (as stakeholders had already seen and commented) and the heritage specific viewpoints were presented. Feedback was received from stakeholders regarding proposed viewpoints and additional viewpoints were proposed for some heritage assets. Some viewpoints were agreed to be scoped out but written explanation for this was requested. Importance of ZTV was emphasised by stakeholders and commitment to share as soon as possible was made.	An agreed list of heritage viewpoints will be presented in the ES.

## 11.5 PEIR Approach and Methods

- 11.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology / approach used to undertake the preliminary assessment on the Historic Environment. The overarching approach is also described in

Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

- 11.5.2 The assessment is based on guidance set out by IEMA, IHBC and ClfA on how Historic Environment should be assessed in EIA (IEMA, IHBC, ClfA 2021).

## Study Area

- 11.5.3 As defined in the EIA Scoping Report (National Grid, 2022) the study areas for the historic environment comprises the draft Order Limits plus a 250 m buffer for non-designated heritage assets. In addition, two wider study areas have been defined: the first, extends 2 km around the draft Order Limits and is used for all designated heritage assets; the second, comprises up to 3 km from the draft Order Limits for designated assets of the highest significance (scheduled monuments, grade I and II\* listed buildings and grade I and II\* registered parks and gardens).
- 11.5.4 In certain locations, and in accordance with the approach for the LVIA, including ZTV, the study area may be increased, for example where topography allows for more distant views. This is to ensure that heritage assets, where their setting could be affected, are included in assessment.
- 11.5.5 The study areas are considered appropriate based on the potential effects of this Project on heritage assets, including consideration of physical impact and impacts arising through change to setting from tall infrastructure, the study areas and approach to ZTV for landscape and visual, professional judgement and previous experience of similar projects.
- 11.5.6 The study area for the Historic Environment is presented on Figure 11.1: Historic Environment Study Area in Volume II.

## Existing Baseline

### Data Collection

- 11.5.7 The baseline assessment has been informed by a desk study which has drawn on the following key information sources:
- HER data for known archaeological sites, monuments, find spots and events
  - Local authority websites have been viewed for information on locally listed buildings
  - Data sets of designations from Historic England's National Heritage List for England
  - Conservation areas have recently become available as a data download from Historic England. Data for conservation areas were cross referenced with the local authority websites to ensure accurate data was used
  - Archaeological reports (grey literature) on archaeological interventions within the draft Order Limits as the key consideration area for archaeological potential
  - Published archaeological journals and monographs, local history books and pamphlets, including local history websites as appropriate

### Site Visit and Surveys

- 11.5.8 The baseline within the PEIR has been supported by a site walkover, where land access has been available, and a setting survey.

## Site Walkover

- 11.5.9 A large proportion of the site walkover survey has been undertaken in spring/summer of 2023. Surveys are ongoing and complete survey results, access permitting, will be detailed within the ES.
- 11.5.10 A targeted approach was used for the walkover survey, with areas scoped in or out for site visits to aid a proportionate approach to assessment. Scoping of the targeted walkover focused on areas of perceived limited modern disturbance and areas not so densely vegetated as to obscure the ground surface and local topography. The survey scoping was data led, because of a desk-based information, and where ground truthing of the conditions of heritage assets was possible.
- 11.5.11 The site walkover was informed by utilising aerial imagery data from the Project commissioned aerial survey. The aerial imagery is useful as it represents the most up to date (2022) ground conditions within the draft Order Limits. This was analysed and areas identified that provide value to the baseline understanding of the Project.
- 11.5.12 The scoping of the survey area was conducted in early 2023. This was conducted using a holistic understanding of the current site conditions, informed by what is visible on the aerial imagery, and recorded heritage assets, along with professional judgement. The purpose of the walkover is to add to the understanding of the historic environment conditions for the baseline and not to catalogue current ground or farming conditions i.e., if the field contains crops or livestock etc.
- 11.5.13 The following outlines the rationale that was applied to the process of scoping areas in or out of the walkover survey.
- Areas scoped out of survey:
    - Areas of existing infrastructure, water (such as reservoirs), disused or in use quarries, areas previously impacted by construction i.e., compounds or landscaping around existing infrastructure, industrial complexes, private gardens, or areas of hardstanding where only observations of modern disturbance was available on site and the character of the area has been altered. It is unlikely that areas such as these would be physically affected by the Project but even if they were, a walkover would not provide suitable information to inform impact assessment due to the previous changes to the land
    - Areas of dense woodland or thick scrubland that would be avoided by the Project and therefore not physically affected and where identification of any potential earthworks would be difficult
    - Fields which have been subject to previous archaeological investigations, such as geophysics, trial trenches or excavation – a walkover survey would not be able to supplement information on heritage assets supplied by intrusive fieldwork
    - Fields in very close proximity to residential properties or surrounded by woodland for a similar proportionate approach that the Project would need to provide a suitable buffer for safety. The ES will set out the approach taken on a case-by-case basis
    - Areas removed from the Project, following consultation led changes and/or refinement of design, which were not yet surveyed

- Areas scoped in for survey:
  - Fields with monument records to ground truth the condition of the asset
  - Fields within the draft Order Limits near a designated heritage asset for the purpose of supporting setting assessment
  - Fields where potential assets or activity of interest have been identified through LiDAR or the aerial imagery
  - Grassland, identified through the aerial survey, where there is a greater potential to identify any earthworks through probable limited disturbance from agricultural activity

11.5.14 Where a land parcel did not meet one or more of the survey scoping criteria above, the parcel was scoped out for walkover.

11.5.15 The final data set of assets identified and ground truthed through walkover will be incorporated in the baseline and gazetteer submitted as part of the ES.

### **Setting Survey**

11.5.16 To provide a proportionate assessment and due to the large number of listed buildings and non-designated historic buildings within the study areas previously defined, a scoping method to determine which buildings would be taken forward for assessment was implemented. At this stage of the Project, it is anticipated that there would be no direct physical impacts on any listed buildings and non-designated historic buildings because of the Project. Therefore, this scoping exercise is based on which buildings are likely to experience any change to their settings resulting from the Project, during either construction or operation (and maintenance).

11.5.17 If the vibration assessment for the design presented in the DCO application identifies any likely significant effects to listed buildings or non-designated historic buildings these will be scoped into assessment (in the ES following completion of the vibration assessment) regardless of the methodology presented below. As the study area for vibration assessment is 100 m from the closest construction activity with the potential to generate vibration effects at Noise and Vibration sensitive receptors, it is unlikely that any historic buildings that fall within this criteria will have been scoped out due to the proximity to the Project.

11.5.18 The following principles have been applied to scope listed buildings and non-designated historic buildings into or out of assessment. Any of these buildings identified as having relevant historic interest within the draft Order Limits have been automatically scoped into assessment.

11.5.19 Listed buildings and non-designated historic buildings have been scoped out if:

- The buildings are beyond the 250 m study area and are outside the ZTV. At this distance from the Project the only change to setting is likely to be visual and therefore a lack of visibility of the Project would mean that it can be reasonably concluded that no change to setting would occur
- Buildings that are of a type that have a restricted setting due to their inherent characteristics. This group includes, but may not be limited to milestones, signposts, or way makers, drinking fountains, pump heads, dove cots, icehouses, and gravestones /markers/ tombs within churchyards

- Buildings that are located within settlements and do not have settings that extend beyond the urban area and where the Project does not introduce new infrastructure into this setting. This requires a rapid assessment to check that any buildings in this category with settings that extend to the Project are included in assessment. This has been undertaken based on a building's location (supported by review of current mapping and aerial imagery). It was assumed that domestic buildings, shops, public houses have settings that are informed by their settlement location and do not extend beyond this, except were demonstrated otherwise by location information. This also includes buildings located within conservation areas
- Buildings that are separated from the Project by other major infrastructure (e.g., motorways, major dual carriageways, active mainline railways) where it can be reasonably concluded that the infrastructure was a pre-existing barrier that the setting of a building would not extend beyond
- Buildings within Tilbury Docks whose function and significance is derived from the activities of the docks and do not extend beyond the geographical limits of the dockyard as the Project does not introduce new infrastructure into this setting
- Buildings that are separated from the Project by the Bramford, Norwich Main and Tilbury Substations as these structures already have a notable influence on the setting of assets that the addition of overhead lines beyond does not create appreciable change. Cumulative likely significant environmental effects will be assessed as part of the ES
- Any other listed buildings and non-designated buildings (not already scoped out for one of the above reasons) where it has been identified that their settings do not extend to the Project and therefore there would be no potential for impact. This is identified through the assessment of setting and value in Appendix 11.1: Historic Environment Baseline Report in Volume III, and where identified, these buildings are not to be taken forward for impact assessment in the PEIR

11.5.20 The above assumptions will be kept under review to establish whether there is a need to alter the scoping out thresholds and approach taken.

11.5.21 The listed buildings within the 2 km and 3 km study areas that were scoped out are listed in the Appendix 11.1: Historic Environment Baseline Report in Volume III. Any buildings not scoped out for the above reasons have their settings and value assessed and described in Appendix 11.1: Historic Environment Baseline Report in Volume III and are included in this PEIR.

11.5.22 There may also be situations in which listed buildings and non-designated buildings outside the study areas are scoped in, including where they have a historical and/or functional relationship with a scoped in building within the study areas or where LVIA indicates the Project would be a prominent visual feature. Listed buildings located immediately adjacent to Primary Access Routes are included in assessment, Figure 16.1: Primary Access Routes in Volume II presents the locations of these routes.

11.5.23 The setting survey was conducted between autumn 2022 and summer 2023. It is due to be completed in 2024 and results will be detailed within the ES.

## Desk-Based Assessment

- 11.5.24 Appendix 11.1: Historic Environment Baseline Report in Volume III has been prepared in accordance with the specification directed in the Standard and guidance for historic environment desk-based assessment (ClfA 2014, updated 2020), except for the assessment of the impact of the Project and any proposed mitigation, which will be included in the ES chapter. The Baseline Report focuses on:
- Detailing the desk-based baseline for the historic environment
  - Providing a robust assessment of the value of all heritage assets included within the baseline at this time
  - Assessing the setting of heritage assets scoped into the assessment as per the approach detailed in the EIA Scoping Report (National Grid, 2022) and identifies as to what degree the setting contributes to the value of the heritage asset
  - Presenting the heritage baseline in the form of an appended cultural heritage gazetteer supported by figures and photographs where appropriate
- 11.5.25 As described above a targeted walkover survey has been undertaken where a need for supporting information is identified. The walkover is reported in Appendix 11.1: Historic Environment Baseline Report in Volume III.

## Further Data to be collected to inform the ES

- 11.5.26 In addition to the data collected for this PEIR, the ES will be informed by the following additional third-party data and data obtained through surveys:
- Historic maps, including OS, estate maps, enclosure maps, tithe maps and military plans, all available scales of OS maps will be utilised
  - Recent aerial photography, including imagery taken for the Project in 2022
  - Historic aerial photography
  - LiDAR data
  - Protected lanes data from relevant Local Authorities
  - Walkover and setting survey results for areas surveyed beyond the end of September 2023
  - Non-intrusive archaeological evaluation
  - Intrusive archaeological evaluation
  - Desk-based information for any areas of the draft Order Limits and associated Study Areas not currently included in assessment

## PEIR Assessment Methodology

- 11.5.27 The preliminary Historic Environment assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral, together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is

available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.

- 11.5.28 The preliminary assessment within this PEIR, is based on guidance set out in Principles of Cultural Heritage Impact Assessment in the UK (IEMA, IHBC, ClfA 2021), DMRB LA 104 Environmental Assessment and Monitoring (National Highways *et al.*, 2020a) and DMRB LA 106 Cultural Heritage Assessment (National Highways *et al.*, 2020b), and guided by Conservation Principles (Historic England, 2008), Statements of Heritage Significance (Historic England, 2019), Standard and guidance for historic environment desk-based assessment (Chartered Institute for Archaeology, 2014, updated 2020) and professional judgement.
- 11.5.29 The contribution of the setting to the value of heritage assets has been assessed in accordance with the guidance provided in the Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (Historic England, 2017). The baseline setting was informed through a combination of desk-based assessment of online mapping and aerial imagery, the LVIA, and the walkover and setting survey. The value of the heritage asset, assigned in the Baseline Report (Appendix 11.1: Historic Environment Baseline Report in Volume III), has been carried into the PEIR for discussion of impact and proportionate mitigation measures.
- 11.5.30 The Dedham Vale National Landscape (an AONB) is recognised as a nationally significant landscape with cultural heritage associations. The Stour Valley Project Area, although not designated (see Chapter 13: Landscape and Visual), also has important cultural heritage associations that exist with artists such as Constable, Gainsborough, Nash, and the East Anglian School of Painting and Drawing under the direction of Sir Cedric Morris. Historic environment associations have been considered within the historic landscape assessment or, where relevant, the designated asset assessment in the PEIR.

### **Preliminary Assessment Key Parameters and Assumptions**

- 11.5.31 The assessment has been undertaken based on preliminary Project design information and survey data gathered to the end of September 2023. This information is iterative and will be updated in the ES as the design evolves and any changes are made.
- 11.5.32 The walkover survey area is principally made up of arable fields. It is acknowledged that there are limitations in identifying features of archaeological interest within ploughed fields due to modern agricultural practices, which are likely to have truncated or removed above ground earthworks or other evidence of heritage assets. While it is acknowledged that artefacts brought to the surface from ploughing have the potential to provide evidence for the location of archaeological sites, the purpose of the walkover survey is to ground truth site conditions and not to conduct a systematic fieldwalking exercise.
- 11.5.33 At this stage of the Project, it is anticipated that there would be no direct physical impacts on any listed buildings and non-designated historic buildings because of the Project.
- 11.5.34 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

## Further Assessment within the ES

- 11.5.35 The ES will present a detailed assessment in accordance with IEMA guidance with the significance of the effect on a receptor presented, where relevant, during construction and operation (and maintenance), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect. Where there is any potential for an impact to a heritage asset resulting from the Project, these assets would be assessed in full in the ES. The assessment will utilise the assessment of value assigned to heritage assets in Appendix 11.1: Historic Environment Baseline Report in Volume III and an assigned magnitude of impact, following the methodology presented in the Scoping Report, in line with the most up to date design information for the Project.
- 11.5.36 The ES will include the full results of the site surveys and will also consider any effects on the Historic Environment associated with mitigation proposals for other environmental receptors.
- 11.5.37 The assessment of impact due to a change in the setting of an asset that affects its value would be informed by the most up to date LVIA, including ZTVs, wireframes and photomontages.

## 11.6 Baseline Conditions

- 11.6.1 Baseline conditions have been gathered from desk-based information and site surveys (complete up to the end of September 2023) and presented with reference to the section of the Project in which they are located.

### Archaeological Remains

- 11.6.2 Archaeological remains include material remains of human activity from the earliest periods of human evolution to the present. These may be buried traces of human activities, sites visible above ground, or moveable artefacts. These included both designated (scheduled monuments) and non-designated remains.

### Designated Archaeological Remains

- 11.6.3 Overall, there are 69 scheduled monuments located within the study area, these are presented on Figure 11.2: Designated Heritage Assets Within Study Area in Volume II. Table 11.2 contains the number of scheduled monuments within the study area. Some of the assets are in one or more study areas.

Table 11.2 - Scheduled Monuments within the draft Order Limits and its study areas

Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area	Between 250 m and 2 km study area	Between 2 km and 3 km study area
Scheduled Monuments	<b>Total</b>	<b>0</b>	<b>7</b>	<b>45</b>	<b>17</b>
	A	0	1	4	1

Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area	Between 250 m and 2 km study area	Between 2 km and 3 km study area
	B	0	1	6	3
	C	0	1	5	3
	D	0	0	5	3
	E	0	1	6	3
	F	0	1	5	0
	G	0	0	6	0
	H	0	2	8	4

## Non-Designated Archaeological Remains

11.6.4 Descriptions of non-designated archaeological remains and assessment of their value are included in Appendix 11.1: Historic Environment Baseline Report in Volume III and presented on Figure 11.3: Non-Designated Heritage Assets in Volume II. Table 11.3 presents a summary of the non-designated archaeological remains by Project section. This approach has been taken to provide an overview of the nature of the archaeological evidence.

11.6.5 Most of the assets are firstly categorised in terms of the nature of the evidence for them, such as through cropmarks, findspots or archaeological excavation, and secondly based on the type of activity represented by this evidence, such as settlement or agricultural activity. Some of the assets only have a single level of categorisation, such as 20th Century Military remains.

Table 11.3 - Non-designated Archaeological Remains

Non- Designated Heritage Asset Type	Type Sub-Division	Section	Within Draft Order Limits	Between draft Order Limits and 250 m study area
Cropmarks (CM)	CM - Settlement/ Enclosure	<b>Total</b>	<b>127</b>	<b>113</b>
		A	3	12
		B	3	3
		C	18	14
		D	6	5
		E	7	11
		F	5	4
		G	1	0
		H	6	4
	CM - Industrial	A	0	2
		B	0	3
		C	0	0
		D	1	0
		E	1	1

<b>Non- Designated Heritage Asset Type</b>	<b>Type Sub-Division</b>	<b>Section</b>	<b>Within Draft Order Limits</b>	<b>Between draft Order Limits and 250 m study area</b>
		F	0	0
		G	0	0
		H	0	0
	<b>CM - Agricultural</b>	A	8	15
		B	3	3
		C	19	2
		D	10	7
		E	8	11
		F	6	8
		G	9	2
		H	3	4
	<b>CM - Funerary</b>	A	2	4
		B	0	0
		C	6	4
		D	2	1
		E	2	2
		F	0	3
		G	0	0
		H	0	2
<b>Find Spots (FS)</b>	<b>FS - Settlement/ Building</b>	<b>Total</b>	<b>350</b>	<b>2721</b>
		A	1	10
		B	0	0
		C	2	4
		D	0	5
		E	1	2
		F	1	6
		G	0	0
		H	0	0
	<b>FS - Burnt Mound</b>	A	2	2
		B	1	9
		C	0	0
		D	0	0
		E	0	0
		F	0	0
		G	0	0
		H	0	0
	<b>FS - Miscellaneous</b>	A	70	88
		B	229	2470
		C	28	61
		D	2	17
E		3	9	
F		2	24	

Non- Designated Heritage Asset Type	Type Sub-Division	Section	Within Draft Order Limits	Between draft Order Limits and 250 m study area
		G	0	3
		H	9	14
Earthworks (EW)	EW - Settlement	<b>Total</b>	<b>6</b>	<b>14</b>
		A	1	2
		B	0	5
		C	0	0
		D	0	0
		E	0	0
		F	0	0
		G	1	1
		H	0	0
	EW - Agricultural	A	0	1
		B	2	2
		C	1	2
		D	0	0
		E	0	0
		F	0	1
		G	0	0
		H	0	0
	EW - Sea Defence	A	0	0
		B	0	0
		C	0	0
		D	0	0
E		0	0	
F		0	0	
G		0	0	
H		1	0	
Documentary/ Cartographic Sources (DCS)	DCS - Placename	<b>Total</b>	<b>7</b>	<b>19</b>
		A	1	1
		B	0	0
		C	1	0
		D	2	0
		E	0	1
		F	0	0
		G	0	0
	H	0	0	
	DCS - Settlement	A	0	1
		B	0	0
		C	0	0
		D	0	2
		E	0	0
F		0	0	

Non- Designated Heritage Asset Type	Type Sub-Division	Section	Within Draft Order Limits	Between draft Order Limits and 250 m study area	
		G	0	2	
		H	0	0	
	<b>DCS - Former Building</b>	A	1	1	
		B	0	1	
		C	0	0	
		D	0	4	
		E	0	2	
		F	0	3	
		G	0	0	
		H	1	0	
		<b>DCS - Agricultural</b>	A	1	1
	B		0	0	
	C		0	0	
	D		0	0	
	E		0	0	
	F		0	0	
	G		0	0	
	H		0	0	
	<b>DCS - Funerary</b>		<b>Total</b>	<b>1</b>	<b>0</b>
		A	0	0	
		B	0	0	
		C	0	0	
		D	1	0	
		E	0	0	
		F	0	0	
		G	0	0	
		H	0	0	
	<b>Excavated archaeological features (EXC)</b>	<b>EXC - Settlement</b>	<b>Total</b>	<b>43</b>	<b>75</b>
			A	1	2
			B	0	3
C			2	0	
D			3	2	
E			1	11	
F			0	6	
G			0	0	
H			9	7	
<b>EXC - Funerary</b>		A	0	1	
		B	0	1	
		C	0	1	
		D	2	1	
		E	0	0	
		F	0	1	

<b>Non- Designated Heritage Asset Type</b>	<b>Type Sub-Division</b>	<b>Section</b>	<b>Within Draft Order Limits</b>	<b>Between draft Order Limits and 250 m study area</b>	
		G	0	0	
		H	2	2	
	<b>EXC - Peripheral/ Agricultural</b>	A	4	4	
		B	0	0	
		C	0	0	
		D	0	4	
		E	3	4	
		F	0	3	
		G	0	0	
		H	5	8	
	<b>EXC - Misc</b>	A	0	1	
		B	1	6	
		C	0	1	
		D	1	1	
		E	0	1	
		F	0	0	
		G	0	0	
		H	10	4	
	<b>Geophysical Survey Anomalies (GA)</b>	<b>GA - Settlement</b>	<b>Total</b>	<b>2</b>	<b>0</b>
			A	0	0
B			0	0	
C			0	0	
D			0	0	
E			0	0	
F			0	0	
G			0	0	
H			1	0	
<b>GA - Funerary</b>		A	0	0	
		B	0	0	
		C	0	0	
		D	0	0	
		E	0	0	
		F	0	0	
		G	0	0	
		H	0	0	
<b>GA - Industrial</b>		A	1	0	
		B	0	0	
		C	0	0	
		D	0	0	
		E	0	0	
		F	0	0	
	G	0	0		

Non- Designated Heritage Asset Type	Type Sub-Division	Section	Within Draft Order Limits	Between draft Order Limits and 250 m study area
	GA - Agricultural	H	0	0
		A	3	0
		B	0	0
		C	0	0
		D	0	0
		E	0	0
		F	0	0
		G	0	0
		H	0	0
Moated Sites		<b>Total</b>	<b>16</b>	<b>36</b>
		A	2	8
		B	7	14
		C	1	4
		D	2	3
		E	1	2
		F	3	3
		G	0	1
		H	0	1
Roman Road		<b>Total</b>	<b>11</b>	<b>4</b>
		A	0	0
		B	2	0
		C	2	3
		D	3	1
		E	2	0
		F	1	0
		G	1	0
		H	0	1
20th Century Military		<b>Total</b>	<b>37</b>	<b>47</b>
		A	3	0
		B	1	1
		C	3	8
		D	5	22
		E	2	3
		F	20	5
		G	0	3
		H	3	8
Railway/canal		<b>Total</b>	<b>12</b>	<b>3</b>
		A	0	0
		B	8	0
		C	4	0
		D	0	0

Non- Designated Heritage Asset Type	Type Sub-Division	Section	Within Draft Order Limits	Between draft Order Limits and 250 m study area
		E	0	0
		F	0	0
		G	0	3
		H	0	0
Standing Stone		<b>Total</b>	<b>0</b>	<b>1</b>
		A	0	0
		B	0	0
		C	0	0
		D	0	0
		E	0	1
		F	0	0
		G	0	0
		H	0	0

## Historic Buildings

11.6.6 This includes architectural, designed, or structures with a significant historical value as well as conservation areas or structures not usually considered as buildings such as milestones or bridges. Registered parks and gardens are included in this section as these assets contain built heritage elements and are designed landscaped features. These included both designated and non-designated structures.

### Designated Historic Buildings

11.6.7 Designated historic buildings are presented on Figure 11.2: Designated Heritage Assets Within Study Area in Volume II. Overall, there are:

- 1,987 scoped in listed buildings (117 grade I, 146 grade II\* and 1,724 grade II), scoped out listed buildings are located within Appendix 11.1: Historic Environment Baseline Report at Volume III
- Seven registered parks and gardens (three grade II\* and four grade II)
- 54 conservation areas

11.6.8 Table 11.4 contains the number of these heritage assets within the Study Area. Some of the assets are in one or more study areas.

Table 11.4 - Scoped in Listed Buildings, Registered Parks and Gardens and Conservation Areas within the draft Order Limits and its study areas

Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area	Between 250 m and 2 km study area	Between 2 km and 3 km study area
Scoped in Grade I Listed Buildings	<b>Total</b>	<b>0</b>	<b>6</b>	<b>83</b>	<b>28</b>
	A	0	1	18	6
	B	0	2	21	6
	C	0	1	10	6
	D	0	1	6	5
	E	0	0	15	4
	F	0	0	4	0
	G	0	1	3	1
	H	0	0	6	0
Scoped in Grade II* Listed Buildings	<b>Total</b>	<b>0</b>	<b>29</b>	<b>76</b>	<b>41</b>
	A	0	1	2	9
	B	0	4	13	9
	C	0	8	14	8
	D	0	6	16	4
	E	0	4	4	6
	F	0	3	10	3
	G	0	2	8	2
	H	0	1	9	0
Scoped in Grade II Listed Buildings	<b>Total</b>	<b>1</b>	<b>362</b>	<b>1361</b>	<b>0</b>
	A	0	33	304	0
	B	0	71	276	0
	C	0	64	208	0
	D	0	73	170	0
	E	0	37	130	0
	F	1	48	172	0
	G	0	14	60	0
	H	0	22	41	0
Registered Parks and Gardens Grade I	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Registered Parks and Gardens Grade II*	<b>Total</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
	A	0	0	0	1
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0
	F	0	0	1	0

Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area	Between 250 m and 2 km study area	Between 2 km and 3 km study area
	G	0	0	1	0
	H	0	0	0	0
Registered Parks and Gardens Grade II	<b>Total</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>
	A	0	0	1	0
	B	0	0	0	0
	C	0	0	1	0
	D	0	0	0	0
	E	0	0	1	0
	F	1	0	0	0
	G	0	0	0	0
Conservation Areas	<b>Total</b>	<b>4</b>	<b>3</b>	<b>47</b>	<b>0</b>
	A	0	0	9	0
	B	0	0	7	0
	C	1	1	4	0
	D	0	1	2	0
	E	0	0	6	0
	F	1	1	4	0
	G	1	0	7	0
H	1	0	8	0	

### Non-designated Historic Buildings

11.6.9 Descriptions of non-designated historic buildings and assessment of their value are included in Appendix 11.1: Historic Environment Baseline Report in Volume III and shown on Figure 11.3: Non-Designated Heritage Assets in Volume II. Table 11.5 presents a summary of the non-designated historic buildings by Project section. This approach has been taken to provide an overview of the nature of the evidence.

Table 11.5 - Non-designated Historic Buildings<sup>57</sup>

Non-Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area
Buildings/Ruins	<b>Total</b>	<b>41</b>	<b>134</b>
	A	2	9
	B	20	77
	C	11	23
	D	3	22

<sup>57</sup> Also includes other assets such as milestones and grave markers

Non-Designated Heritage Asset	Section	Within draft Order Limits	Between draft Order Limits and 250 m study area
	E	0	1
	F	5	0
	G	0	1
	H	0	1
Milestones/Way Markers	<b>Total</b>	<b>1</b>	<b>8</b>
	A	0	1
	B	0	1
	C	1	1
	D	0	2
	E	0	3
	F	0	1
	G	0	0
Grave Markers	<b>Total</b>	<b>0</b>	<b>1</b>
	A	0	1
	B	0	0
	C	0	0
	D	0	0
	E	0	0
	F	0	0
	G	0	0
H	0	0	

## Historic Landscapes

- 11.6.10 Historic landscapes comprise the historic landscape character of the present landscape. The historic and present landscape were formed by the results of the actions and interactions of natural and/or human factors. Historic landscapes include elements such as protected lanes and hedgerows.
- 11.6.11 An initial baseline for non-designated historic landscape, based on the historic landscape characterisation data provided by the HERs, was presented in the EIA Scoping Report (National Grid, 2022). There has been no change to this data since the Scoping Report was produced and as the detailed assessment of the historic landscape is still in progress this information has not been reproduced in the PEIR. A small number of non-designated features that have been identified through desk-based assessment and are not included in the historic landscape characterisation data are presented below.
- 11.6.12 In England there are no categories of designation that cover historic landscapes. Registered parks and gardens include landscape features, but these are assessed in the historic buildings section.

## Non-Designated Historic Landscapes

11.6.13 Descriptions of non-designated historic landscapes and assessment of their value are included in Appendix 11.1: Historic Environment Baseline Report in Volume III. Table 11.6 presents a summary of the non-designated historic landscape features by Project section. This approach has been taken to provide an overview of the nature of the evidence.

Table 11.6 - Non-designated Historic Landscape Features

<b>Non- Designated Heritage Asset Type</b>	<b>Section</b>	<b>Within Draft Order Limits</b>	<b>Between draft Order Limits and 250 m study area</b>
Settlement	<b>Total</b>	<b>8</b>	<b>6</b>
	A	0	0
	B	5	4
	C	0	0
	D	3	1
	E	0	0
	F	0	0
	G	0	1
	H	0	0
Common land	<b>Total</b>	<b>4</b>	<b>1</b>
	A	0	0
	B	0	0
	C	0	0
	D	4	1
	E	0	0
	F	0	0
	G	0	0
	H	0	0
Parkland	<b>Total</b>	<b>6</b>	<b>5</b>
	A	1	0
	B	2	5
	C	0	0
	D	0	0
	E	3	0
	F	0	0
	G	0	0
	H	0	0
Woodland	<b>Total</b>	<b>4</b>	<b>12</b>
	A	0	0
	B	4	6
	C	0	3
	D	0	0

<b>Non- Designated Heritage Asset Type</b>	<b>Section</b>	<b>Within Draft Order Limits</b>	<b>Between draft Order Limits and 250 m study area</b>
	E	0	0
	F	0	3
	G	0	0
	H	0	0
Fishponds	<b>Total</b>	<b>1</b>	<b>0</b>
	A	0	0
	B	0	0
	C	0	0
	D	0	0
	E	0	0
	F	0	0
	G	1	0
	H	0	0

## Future Baseline

- 11.6.14 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 11.6.15 The future baseline of heritage assets in the draft Order Limits and study areas would be expected to remain in the same condition as at present without the implementation of the Project at the time of the Project opening year (2031). Assuming there are no changes in land use, then the condition of any buried archaeological remains would stay as they are currently for an indefinite period within areas of pasture. Within arable fields, it is possible that they may suffer a slow deterioration, given the effects of periodic deep-ploughing regimes. Equally, features of the historic landscape would remain in their current condition if there were no changes in land use or management regime. In the case of historic building assets, they would be more susceptible to slow deterioration in their condition, without regular maintenance. However, if they were maintained then they too would be expected to remain in their current condition for an indefinite period.
- 11.6.16 Climate change or unusual weather events could change the condition of heritage assets. For example, a change in water table could change the conditions of buried archaeological remains. If this were a change from wet to dry, then any preserved organic material would deteriorate very quickly. If the change were from dry to wet this could also cause a deterioration in condition.
- 11.6.17 However, the assessment has been undertaken on a precautionary basis, and there are no anticipated changes to the baseline data that would materially alter the assessment.

## 11.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 11.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 11.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 11.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Embedded measures relevant to Historic Environment include:
- Sensitive routing and siting - Avoid and reduce as far as practicable effects on identified environmental and socio-economics receptors
  - Underground cable - Undergrounding is proposed in up to five locations, including through the Dedham Vale National Landscape (an AONB). The Dedham Vale National Landscape (an AONB) is a nationally important and designated landscape. With the proposed underground cable, the effects on views and setting would be reduced. This would also reduce permanent effects to the setting of heritage assets located within the National Landscape (an AONB)

### Standard Mitigation

- 11.7.4 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 11.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures relating to Historic Environment. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- H01: The location of known archaeological remains or areas where archaeological investigations will be undertaken (i.e., excavations) will be signposted/ fenced off to avoid unintentional damage.
  - H02: Where a previously unknown heritage asset has been discovered, or a known heritage asset has proven to be more significant than foreseen at the time of application, the Project will inform the Local Planning Authority and discuss a solution that protects the significance of the new discovery, so far as is practicable within the Project construction requirements
  - H03: Where practicable, maintain elements within the landscape such as vegetation and hedgerows. Where vegetation cannot be retained, replacement will be used as appropriate (including re-instating hedgerows, fences, and walls). The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES

## Additional Mitigation

- 11.7.6 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.
- 11.7.7 As a result of the assessment within this PEIR, as defined in Section 11.8, the following additional mitigation is required:
- Archaeological mitigation in the form of excavation and recording. This will be specified through a draft Heritage Mitigation Strategy and Outline WSI to be submitted with the DCO application
- 11.7.8 Further embedded, standard and additional mitigation measures would be developed as part of the ES where required and included within the Outline CoCP submitted with the DCO application.

## Waveney Valley Alternative

- 11.7.9 Additional mitigation measures, as outlined above, may need to be secured within the draft Heritage Mitigation Strategy and Outline WSI dependent on the results of geophysical survey and trial trenching for the Waveney Valley Alternative. As the underground cable would cause a larger area of physical effect than the overhead line it is likely that the mitigation requirements would be more extensive. However, these would be of the same type as outlined in the standard and additional mitigation above.

## 11.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 11.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation - embedded (design measures), standard practice, and any additional mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).
- 11.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals. The mitigation currently proposed is based on available validated data and professional judgement.
- 11.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

## Preliminary Construction Effects

### Designated Heritage Assets

- 11.8.4 The preliminary assessment for all heritage assets included in the PEIR is presented in Appendix 11.2: Historic Environment Assessment Tables in Volume III. The tables identify assets by their National Heritage List entry/Project ID number and name, which

can be cross referenced with Appendix 11.1: Historic Environment Baseline Report in Volume III. The tables also include information regarding the Project section in which the asset is located, its value as assessed in Appendix 11.1 in Volume III, the construction or operation (and maintenance) effect, suitable mitigation, and whether the effect is likely significant or not significant. The designated heritage assets are shown on Figure 11.2 and non-designated assets on Figure 11.3 in Volume II. For the PEIR, setting assessment for non-designated assets has not been undertaken and so assessment for non-designated assets is only presented for construction effects, as physical impacts to heritage assets have been scoped out for operation (and maintenance).

- 11.8.5 In total the preliminary assessment identified 227 significant temporary negative effects to designated heritage assets (Table 11.7). Effects to listed buildings account for 215 of these effects, and five scheduled monuments, six conservation areas and one registered park and garden would experience this type of effect. The scheduled monuments are in sections B (*Offton Castle* 1006049), C (*Crop mark site S of Ardleigh* 1002146), F (*Settlement Site at Ash Tree Corner*, 1002140) and H (*Bulphan World War II bombing decoy, 850m and 890m south-west of Doesgate Farm*, 1020998; *Earthworks near church, West Tilbury*, 1002199). The conservation areas are in sections B (Badley Church Green), C (Ardleigh), D (Fordstreet), F (Great Waltham, Little Waltham) and H (West Tilbury). The registered park and garden is in section F (Langleys).
- 11.8.6 These significant temporary negative effects would be caused by construction activity, including movement of plant, presence of tall plant such as cranes, associated noise and dust and change to the land use during construction. This would result in changes to elements of the assets' settings that make a notable contribution to their value. They are temporary in nature as the construction activity would occur for a defined period and in most areas land use and most landscape features would be reinstated. There is no suitable additional mitigation for these effects.
- 11.8.7 There would be 223 'not significant' temporary negative effects to designated heritage assets during construction. Again, most of these effects, 211, would occur to listed buildings, and five scheduled monuments and seven conservation areas would also experience this type of effect. The 'not significant' effects result when the contribution the setting makes to the value of the asset is less or the change to the setting is smaller.
- 11.8.8 There are two neutral effects assessed for construction for designated heritage assets, both for listed buildings.

**Table 11.7 Summary of Preliminary Construction Effects**

<b>Construction</b>	<b>Significance of Effect</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>Total for Asset Type</b>
<b>Designated Assets</b>	<b>Neutral (Total)</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>
	Listed Buildings	0	0	1	0	0	0	1	0	2
	Scheduled Monuments	0	0	0	0	0	0	0	0	0

<b>Construction</b>	<b>Significance of Effect</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>Total for Asset Type</b>
	Conservation Areas	0	0	0	0	0	0	0	0	0
	Registered Parks and Gardens	0	0	0	0	0	0	0	0	0
	<b>Not Significant Temporary Negative (Total)</b>	<b>27</b>	<b>29</b>	<b>20</b>	<b>50</b>	<b>20</b>	<b>42</b>	<b>21</b>	<b>14</b>	<b>223</b>
	Listed Buildings	24	28	19	50	17	42	17	14	211
	Scheduled Monuments	1	0	0	0	2	0	2	0	5
	Conservation Areas	2	1	1	0	1	0	2	0	7
	Registered Parks and Gardens	0	0	0	0	0	0	0	0	0
	<b>Significant Temporary Negative (Total)</b>	<b>17</b>	<b>50</b>	<b>42</b>	<b>27</b>	<b>38</b>	<b>35</b>	<b>9</b>	<b>9</b>	<b>227</b>
	Listed Buildings	17	48	40	26	38	31	9	6	215
	Scheduled Monuments	0	1	1	0	0	1	0	2	5
	Conservation Areas	0	1	1	1	0	2	0	1	6
	Registered Parks and Gardens	0	0	0	0	0	1	0	0	1

### Waveney Valley Alternative

11.8.9 There are two design alternatives for the Waveney Valley: an overhead line and an underground cable alternative, as described in Table 4.3. The same designated heritage assets would be affected by both of the design alternatives, and therefore no additional effects would be experienced by the Waveney Valley Alternative during construction.

### **Non-designated Heritage Assets**

- 11.8.10 The preliminary assessment has identified a total of 94 significant permanent negative effects on non-designated heritage assets. These effects would result in archaeological remains from physical effects caused by removal of the whole or a large proportion of the recorded asset for construction working areas. They are permanent as once the asset is removed it cannot be replaced and the archaeological evidence would be lost. Mitigation in the form of archaeological excavation and recording is proposed for these assets.
- 11.8.11 An additional 351 non-designated assets are assessed to experience 'not significant' permanent negative effects. These effects would result from physical effects to a smaller proportion of the recorded asset. Mitigation in the form of archaeological excavation and recording is proposed for some of these assets, as defined within Section 11.5.
- 11.8.12 There are 922 non-designated assets that are assessed to experience neutral effects as they are located within the study area, although fall outside the draft Order Limits. Therefore, they would not experience any physical effect.

### **Waveney Valley Alternative**

- 11.8.13 The same non-designated assets would be affected by both of the design alternatives, and no additional significant effects would be experienced by the Waveney Valley Alternative. However, the area of the archaeological assets affected by the underground cable alternative would be greater than for the overhead line. Although, based on current baseline it is not expected that this would alter the preliminary assessment of significance of effect reported above.

### **Preliminary Operation (and Maintenance) Effects**

- 11.8.14 The preliminary operation (and maintenance) effects assessment is presented for all heritage assets included in the PEIR in Appendix 11.2: Historic Environment Assessment Tables in Volume III. The information presented is the same as for construction. Operation (and maintenance) effects are treated as permanent.

### **Designated Heritage Assets**

- 11.8.15 For operation (and maintenance) the preliminary assessment has identified 123 significant permanent negative effects to designated heritage assets (Table 11.8): 119 listed buildings, one scheduled monument (in section H, *Bulphan World War II bombing decoy, 850m and 890m south-west of Doesgate Farm 1020998*), two conservation areas (in section F, Great Waltham, and Little Waltham) and one registered park and garden (in section F, Langleys). These permanent effects would be caused by the presence of the overhead line alignment, CSE compounds and/or new or expanded substations within the setting, and in some cases views, of these assets. For these assets this change would affect an element of their setting that makes a notable contribution to their value. At this time no suitable additional mitigation for these effects has been identified. The height of the proposed pylons means that visual screening is not always effective and may in itself cause negative effects to the settings of heritage assets.

- 11.8.16 An additional 178 designated assets are assessed as experiencing ‘not significant’ permanent negative effects. Listed buildings account for 167 of these and there are four scheduled monuments and seven conservation areas that would experience this type of effect. The not significant effects result when the contribution the setting makes to the value of the asset is less or the change to the setting is smaller.
- 11.8.17 The preliminary assessment identified 142 neutral effects to designated assets: 134 for listed buildings, four for scheduled monuments and four for conservation areas.
- 11.8.18 The preliminary assessment identified 14 ‘not significant’ permanent positive effects to listed buildings (in sections B, C, E and G) and one to a scheduled monument (in section B, *Offton Castle* 1006049). This is the result of removal of an existing overhead lines and replacement either with underground cable or the placement of the 2024 proposed draft alignment further away from the asset than the existing overhead line.

**Table 11.8 - Summary of Preliminary Operation (and Maintenance) Effects**

<b>Operation</b>	<b>Significance of Effect</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>Total for Asset Type</b>
<b>Designated Assets</b>	<b>Neutral</b>	<b>0</b>	<b>18</b>	<b>36</b>	<b>43</b>	<b>9</b>	<b>7</b>	<b>18</b>	<b>11</b>	<b>142</b>
	Listed Buildings	0	17	35	43	7	7	16	9	134
	Scheduled Monuments	0	0	0	0	1	0	2	1	4
	Conservation Areas	0	1	1	0	1	0	0	1	4
	Registered Parks and Gardens	0	0	0	0	0	0	0	0	0
	<b>Not Significant Permanent Negative</b>	<b>27</b>	<b>30</b>	<b>19</b>	<b>15</b>	<b>22</b>	<b>54</b>	<b>6</b>	<b>5</b>	<b>178</b>
	Listed Buildings	24	29	17	14	21	53	4	5	167
	Scheduled Monuments	1	0	1	0	1	1	0	0	4
	Conservation Areas	2	1	1	1	0	0	2	0	7
	Registered Parks and Gardens	0	0	0	0	0	0	0	0	0
	<b>Significant Permanent Negative</b>	<b>17</b>	<b>22</b>	<b>8</b>	<b>19</b>	<b>25</b>	<b>16</b>	<b>9</b>	<b>7</b>	<b>123</b>
	Listed Buildings	17	22	8	19	25	13	9	6	119
	Scheduled Monuments	0	0	0	0	0	0	0	1	1
	Conservation Areas	0	0	0	0	0	2	0	0	2
	Registered Parks and Gardens	0	0	0	0	0	1	0	0	1
	<b>Not Significant Permanent Positive</b>	<b>0</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>15</b>
	Listed Buildings	0	8	1	0	1	0	4	0	14

Operation	Significance of Effect	A	B	C	D	E	F	G	H	Total for Asset Type
	Scheduled Monuments	0	1	0	0	0	0	0	0	1
	Conservation Areas	0	0	0	0	0	0	0	0	0
	Registered Parks and Gardens	0	0	0	0	0	0	0	0	0

### Waveney Valley Alternative

- 11.8.19 The overhead line option at the Waveney Valley would cause a significant negative effect to the high value Church of St Remigius (1050237) and medium value Grove Farmhouse (1050236), due to the change it would cause to the setting of the assets and views to and from the church from the Waveney Valley. The Waveney Valley Alternative, following reinstatement including historic field boundaries, would cause no change to the settings of these assets and therefore the effect on the value of the assets would reduce from significant to neutral (not significant).

## 11.9 Sensitivity Testing

### Flexibility in Construction Programme

- 11.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Section 11.7.

### Flexibility in Design

- 11.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing has considered alternative pylon locations and underground cable route, within the proposed LoD.
- 11.9.3 Alternative locations could change the preliminary assessment for this chapter in relation to physical effects and effects through change to setting that affect the value of a heritage asset. All elements of construction working areas have implications for physical effects to heritage assets and pylon positions would have implications for the settings of heritage assets. In all cases this could result in an increased or decreased level of effect on some heritage assets. This will continue to be reviewed and assessed in the ES.

## Flexibility due to Design elements not fixed at Statutory Consultation

- 11.9.4 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that none of the alternatives would result in any new or different effects than reported in this chapter, with the exception of the River Stour and south of Rivenhall options as discussed below. The flexibility presented for the majority of the overhead line sections is not expected to cause any significant change in the effects presented in the PEIR, such that the effect would alter from its current assessment of significant or not significant.
- 11.9.5 Should an alternative south of Rivenhall be possible this would likely reduce historic environment effects to a small degree, although significant effects would potentially remain. A small reduction in effects would be likely because the alternative would move the overhead line slightly further away from the entrance to Rivenhall Place which sits within parkland designed by Humphry Repton (landscape designer of the eighteenth century).
- 11.9.6 With regard to the River Stour, the alternative, involving reducing the number of crossings to one, would potentially reduce the negative effects to buried archaeology, by reducing the total area of effect.

# 12. Hydrology and Land Drainage

# 12. Hydrology and Land Drainage

## 12.1 Introduction

12.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Hydrology and Land Drainage. The chapter covers effects on the following:

- Hydromorphology, surface water quality and existing water interests (abstractions and discharges) during construction
- Land drainage and flood risk from all relevant sources, including consideration of effects on the Tilbury Flood Storage Area during construction and operation (and maintenance)

12.1.2 There are interrelationships related to the potential effects on Hydrology and Land Drainage and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 6: Agriculture and Soils
- Chapter 8: Ecology and Biodiversity
- Chapter 9: Contaminated Land, Geology and Hydrogeology
- Chapter 10: Health and Wellbeing
- Chapter 11: Historic Environment

12.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 12.1: Study Area and Water Environment Features
- Figure 12.2: Flood Risk Areas
- Figure 12.3: Water Framework Surface Waterbody Status
- Appendix 12.1: Hydrology and Land Drainage Baseline
- Appendix 12.2: Flood Risk Assessment Screening

## 12.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

12.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project. NPS EN-1 (DESNZ, 2024) is the key overarching policy relevant to the Project. This is supported by NPS EN-5 (DESNZ, 2024).

- 12.2.2 Paragraph 5.8.13 of EN-1 states ‘A site-specific flood risk assessment should be provided for all energy projects in Flood Zones 2 and 3 in England...In Flood Zone 1 in England..., an assessment should accompany all proposals involving:
- Sites of 1 hectare or more
  - Land which has been identified by the EA or NRW as having critical drainage problems
  - Land identified (for example in a local authority strategic flood risk assessment) as being at increased flood risk in future
  - Land that may be subject to other sources of flooding (for example surface water)
  - Where the EA or NRW, Lead Local Flood Authority, Internal Drainage Board or other body have indicated that there may be drainage problems.’
- 12.2.3 Paragraph 5.8.14 states that FRAs ‘should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account’.
- 12.2.4 The minimum requirements for flood risk assessments (FRA) are set out in Paragraph 5.8.15 and include that an FRA should ‘be proportionate to the risk and appropriate to the scale, nature and location of the project and consider the risk of flooding arising from the project in addition to the risk of flooding to the project’.
- 12.2.5 NPS EN-5 covers resilience to climate change and the need to look to design for flood resilience. Paragraph 2.3.2 of EN-5 states ‘Applicants should in particular set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to flooding, particularly for substations that are vital for the electricity transmission and distribution network’.
- 12.2.6 Paragraph 2.3.3 of EN-5 advises that ‘the resilience of the project to the effects of climate change must be assessed in the Environmental Statement (ES) accompanying an application’, also stating that ‘future increased risk of flooding would be covered in any flood risk assessment’.

## Other National Legislation and Policy

- 12.2.7 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- The Floods and Water (Amendment etc.) (EU Exit) Regulations 2017
  - The Environment Act 2021
  - The Land Drainage Act 1991
  - Environmental Permitting (England and Wales) Regulations 2016
  - Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017
  - NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompany Flood Risk and Coastal Change planning practice guidance
  - Water Quality and Supply planning practice guidance

## Regional and Local Policy

- 12.2.8 Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy. Key local strategies relevant to Hydrology and Land Drainage, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Essex Flood Risk Management Strategy (Essex County Council, 2018)
  - Suffolk Flood Risk Management Strategy (Suffolk County Council, 2016)
  - Norfolk Flood Risk Management Strategy (Norfolk County Council, 2015 and 2021 review)
- 12.2.9 These set out policies to reduce the effects of flooding to local communities with the counties and outline the requirements of new development in terms of managing surface water runoff and drainage.

## Guidance

- 12.2.10 Relevant guidance, specific to Hydrology and Land Drainage, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Advice Note 18: Water Framework Directive Assessments (Planning Inspectorate, 2017)
  - Various Construction Industry Research and Information Association publications that provide construction good practice for preventing pollution of the water environment, for example, C532: Control of water pollution from construction sites
  - DMRB LA 113: Road drainage and the water environment (National Highways, 2020)
  - The Sustainable Drainage Systems Design Guide for Essex (Essex County Council, 2020)
  - Essex Green Infrastructure Strategy (Essex County Council, 2020)
  - Essex Green Infrastructure Standards (Essex County Council, 2022)

## 12.3 Scoping Opinion

- 12.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 12.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Hydrology and Land Drainage is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 12.4.

## 12.4 Project Engagement and Consultation

- 12.4.1 National Grid has held several meetings with relevant consultees including the Environment Agency and local authorities in their role as Lead Local Flood Authorities (LLFA) along the Project.
- 12.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 12.1.

Table 12.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<p>Thematic Meeting, Environment Agency and host planning authorities, July 2022</p>	<p>It was noted the Project should consider flood risk and a site-specific FRA should be undertaken, with particular focus on management of surface water drainage.</p> <p>It was raised there is a need to consider effects on groundwater and aquifers and that groundwater as a source of flood risk should be scoped into the FRA.</p> <p>It was raised more current policy guidance and good practice should be applied as the published EN-1 is out of date.</p> <p>It was raised the Project design and assessments should accommodate the most recent Environment Agency climate change guidelines.</p>	<p>An FRA will be prepared to support and inform the ES and Appendix 12.2: Flood Risk Assessment Screening in Volume III has been prepared to support the PEIR.</p> <p>Chapter 9: Contaminated Land, Geology and Hydrogeology provides further details of the proposed scope of assessment on groundwater and aquifers. Groundwater flooding is included within the proposed scope of the FRA in Appendix 12.2: Flood Risk Assessment Screening in Volume III.</p> <p>The requirements of the recently designated EN-1 will be considered, alongside the NPPF and guidance from the Planning Inspectorate about WFD assessments.</p> <p>The most recent Environment Agency climate change guidelines (currently dating to May 2022) will be applied.</p>
<p>Environment Agency, June 2023</p>	<p>Confirmation was received that the Environment Agency has no comments or concerns to raise regarding the key aspects of the proposed methodology and Zone of Influence for the Water Framework Regulations Assessment (as detailed in a</p>	<p>The Project notes the feedback and will continue to engage with the Environment Agency as the assessment progresses.</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	technical note shared in May 2023).	
Environment Agency and LLFAs, and the Water Management Alliance Internal Drainage Boards (IDBs), June 2023	<p>Confirmation received that the Environment Agency agrees with the proposed scope and methodology for the FRA.</p> <p>Essex County Council, in their role as LLFA, requested that information be included within the FRA about the Projects approach to Section 23 consent<sup>58</sup> and includes reference to key local flood risk strategies and standards.</p> <p>Norfolk County Council requires that due to the duration of the Project and the multiple phasing of the construction programme, a Construction Surface Water Management Plan be provided. They expect all sources of flood risk to be evaluated in the FRA and requested comment on the proposed approach to defining Flood Zone 3b.</p> <p>No comments have been received from Thurrock Council or the IDBs.</p>	<p>The Project notes the feedback and will continue to engage with the Environment Agency as the FRA progresses.</p> <p>It is confirmed that the FRA will include details of the Project's intended approach to securing consent for works to ordinary watercourses and that the FRA will be prepared in line with relevant local flood risk strategies and standards.</p> <p>The FRA will include information on the intended approach to surface water management during construction. Key principles and initial proposals will be described within a preliminary surface water drainage strategy and the Project will secure a commitment for the appointed contractor to further develop the preliminary strategy and prepare a Construction Surface Water Management Plan. A commitment to prepare these documents is included within Appendix 4.1: Draft Outline CoCP in Volume III.</p> <p>Appendix 12.2: Flood Risk Assessment Screening in Volume III reviews all sources of flood risk to the Project/arising from the Project. The document outlines that sources identified as posing a low risk will be scoped out and justification is provided. This is to ensure that the site-specific FRA submitted in support of the ES is more concise and focused on assessing key sources of flood risk.</p>

<sup>58</sup> Section 23 of the Land Drainage Act, with reference to ordinary watercourse consent

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
		The Project will engage with the Environment Agency with regard to defining Flood Zone 3b, and a precautionary approach will be adopted whereby, if published data is lacking that defines it, Flood Zone 3b will be treated as the extent of Flood Zone 3 for assessment purposes.

## 12.5 PEIR Approach and Methods

12.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology / approach used to undertake the preliminary assessment on Hydrology and Land Drainage. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

12.5.2 As defined in the EIA Scoping Report (National Grid, 2022), the study area for the hydrology and land drainage assessment includes the area within the draft Order Limits and extends to a 500 m buffer around the draft Order Limits. This is considered an appropriate study area based on the nature of Project construction and operation (and maintenance) activities and technical knowledge of similar schemes. The study area for the water environment is presented in Figure 12.1: Study Area and Water Environment Features in Volume II.

### Existing Baseline

#### Data Collection

12.5.3 The baseline assessment has been informed by a desk study which has drawn on the following key information sources:

- OS mapping, aerial mapping, and Magic Maps (Defra, 2023a)
- Hydrology Data Explorer (Defra, 2023b)
- Statutory Main River map for England (Environment Agency, 2023a)
- Catchment data explorer database of Cycle 2 and Cycle 3 WFD information (Environment Agency, 2023b)
- Thames and Anglian River Basin Management Plans (Environment Agency, 2022a)
- Water quality data archive (Environment Agency, 2023c)

- Records of licenced surface water abstractions and consented discharges to surface water sources (Environment Agency, 2022b)
- Flood Map for Planning (Environment Agency, 2023d)
- Long term flood risk map for England (Environment Agency, 2023e)
- Spatial flood defences database (Environment Agency, 2023f)
- The Historic Flood Map and Recorded Flood Outlines datasets (Environment Agency, 2022c)
- Flood Estimation Handbook webservice (CEH, 2021) defining surface water catchment areas and hydrological properties (e.g., rainfall, slopes, soil permeability)
- High-resolution aerial imagery available to the Project

## Further Data to be collected to inform the ES

- 12.5.4 In addition to the data collected in this PEIR, the ES will be informed by the following additional third-party data and data obtained through survey. This will include:
- Environment Agency flood model outputs (including flood extent and flood depth data) for the floodplains that are proposed to be crossed by Project infrastructure
  - Field notes and photographs collected during, for example, ecology surveys, to characterise attributes such as the hydromorphology of watercourses to be crossed
- 12.5.5 All the further information received from stakeholders will be incorporated into future stages of the assessment.

## PEIR Assessment Methodology

- 12.5.6 The preliminary Hydrology and Land Drainage assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral, together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 12.5.7 Preliminary assessment methodology draws from Part 10 of Volume 11 of the DMRB LA113 (National Highways, 2020). Whilst primarily intended for use in assessing the effects of highways projects on the water environment, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure projects on water environment receptors. The method promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change – although sensitivity is not provided within this PEIR it will be provided within the ES.

## Preliminary Assessment Key Parameters and Assumptions

- 12.5.8 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are accounted for in the assessment.
- 12.5.9 It is currently assumed that no discharges (other than treated surface water runoff) to surface waters are required for the Project during its operation (and maintenance). It is also assumed that there would be no new temporary or permanent abstractions and that the water supply needs of the Project during construction would be sourced either from mains water supply or in remote locations, where this option may not be available, water would be tankered in. With regards to grey water generated from welfare facilities, it is assumed that this would be discharged to the public sewer, or where this is not practicable, be collected and tankered off site to a licenced disposal facility.
- 12.5.10 The choice of watercourse crossing technique is dependent on several factors, for example, watercourse size, flood risk sensitivity, ecological sensitivity, and location. Where underground cables cross watercourses, it is assumed that most ordinary watercourses would be open cut crossings. Some watercourses would be crossed using a trenchless technique. The proposed trenchless crossings of watercourses to date are illustrated in Figure 4.1: Proposed Project Design in Volume II. Where there is uncertainty on crossing technique due to the design still evolving, open cut would be assessed as it is the worst-case. Crossings techniques proposed at each watercourse will be confirmed and described in the ES once the design has evolved, and ground conditions are better understood following ground investigation works.
- 12.5.11 It has been assumed that temporary discharges generated from dewatering activities, for example, around pylon bases and in underground cable sections, would be made to ground, rather than to watercourses. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents.
- 12.5.12 A preliminary assessment is presented based on the development of the Project to date and data gathered at this point.
- 12.5.13 The key parameters and assumptions will be reviewed based on the design presented in the DCO application and, where required, updated or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

## Further Assessment within the ES

- 12.5.14 The ES will present a detailed assessment in accordance with guidance with the significance of the effect on a receptor presented during construction and operation (and maintenance) (where relevant), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.
- 12.5.15 The ES will be informed by the FRA and WFD assessment which will be prepared in parallel to the impact assessment.
- 12.5.16 Full details of the assessment methodology will be presented within the ES, together with further assessment detail, assigning value (sensitivity) to receptors (for example, watercourses and floodplains) as well as criteria for assigning magnitude of effects

(change in the baseline conditions). The criteria will consider the scale/extent of the predicted change and the nature and duration of the effect. The factors are combined to give an overall significance of effect, using a matrix.

## 12.6 Baseline Conditions

- 12.6.1 Baseline conditions have been gathered from desk-based information and presented with reference to the section of the Project that they are located.
- 12.6.2 No canals have been identified in the study area and these are not considered further.

### Sites Designated for Nature Conservation Interest

- 12.6.3 There are numerous ponds and lakes within the study area, some of which are part of sites designated for nature conservation. Sites designated for nature conservation interest within the study area include Sites of Special Scientific Interest (SSSIs), Special Areas for Conservation (SACs), Local Nature Reserves (LNRs), Ramsar Sites, National Nature Reserves (NNRs) and Special Protection Areas (SPAs). Details of sites designated for nature conservation are provided in Chapter 8: Ecology and Biodiversity. Where surface waters play a key role in sustaining the designated interest features, these sites will be included as Hydrology and Land Drainage receptors in the ES. Groundwater Dependent Terrestrial Ecosystems (GWDTEs) will be addressed separately in Chapter 8: Ecology and Biodiversity.

### Existing Water Interests (Surface Water Abstractions and Discharges)

- 12.6.4 Data to characterise existing water interests has been collected from the Environment Agency together with district, borough and city councils. Watercourses in the study area receive, transport and dilute consented and informal discharges. Details of consented discharges and their locations are shown in Appendix 12.1: Hydrology and Land Drainage Baseline in Volume III and Figure 12.1: Study Area and Water Environment Features in Volume II.
- 12.6.5 Information on private water supplies and groundwater abstractions is provided in Chapter 9: Contaminated Land, Geology and Hydrogeology.

### Watercourses, their Water Quality and Hydromorphology

- 12.6.6 Watercourses in the study area are shown in Figure 12.1: Study Area and Water Environment Features in Volume II.

#### Section A – South Norfolk

- 12.6.7 Within Section A there are two main rivers (Frenze Beck and the River Waveney) that would be crossed by the draft Order Limits and one main river (River Tas<sup>59</sup>) that is not crossed by the draft Order Limits but flows through the study area. There are also

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<sup>59</sup> There is also a reach of the River Tas crossed by the draft Order Limits that is not designated as main river.

numerous tributaries of these rivers, classified as ordinary watercourses. The watercourses in Section A generally flow in an easterly or north-easterly direction towards The Broads. Their catchments can be categorised as generally rural in their land use, with relatively flat topography.

12.6.8 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of several other WFD waterbodies. These are listed in Table 12.2, which summarises baseline WFD status data (Environment Agency, 2023b) for the study area<sup>60</sup>, and illustrated in Figure 12.3: Water Framework Surface Waterbody Status in Volume III. The River Waveney is included within the Anglian River Basin Management Plan (RBMP).

Table 12.2 - Summary of WFD Status Data (Cycle 3) 2019/2022

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Intwood Stream (GB105034051240)	Moderate	Fail	Heavily modified
Tas (Tasburgh to River Yare) (GB105034051230)	Moderate	Fail	Heavily modified
Tributary of Tas (GB105034050950)	Moderate	Fail	Heavily modified
Tas (Head to Tasburgh) (GB105034045730)	Moderate	Fail	Not designated artificial or heavily modified
Dickleburgh Stream (GB105034045850)	Moderate	Fail	Not designated artificial or heavily modified
Frenze Beck (GB105034045840)	Moderate	Fail	Not designated artificial or heavily modified
Waveney (upstream (u/s) Frenze Beck) (GB105034045820)	Moderate	Fail	Not designated artificial or heavily modified

12.6.9 The WFD classifications for the waterbodies are informed by monitoring a range of parameters that are indicators of water quality from Environment Agency monitoring sites. As Table 12.2 shows, the waterbodies share similar quality characteristics: they all share a moderate ecological status and a failing chemical status. Multiple reasons for not achieving good (RNAG) status are reported for these waterbodies, with

<sup>60</sup> WFD status data from 2022 is available for ecological status but for chemical status ('does not require assessment' in 2022) the most recent available data is 2019. This is applicable to WFD data presented for the whole study area.

polybrominated diphenyl ethers (PBDE) being common to all. Phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources are RNAGs common to all the waterbodies in Table 12.2 except the Tas (Head to Tasburgh) and Waveney. A RNAG common to the Tas (Head to Tasburgh) and Waveney is dissolved oxygen, and this is attributed to drought.

- 12.6.10 The Section A study area is not located within a surface water Drinking Water Protected Area but the southern part of the draft Order Limits and study area, from Tibenham to Diss, are located within the Anglian Waveney (SWSGZ1020) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section A is partially located within Nitrate Vulnerable Zones (NVZs).
- 12.6.11 In terms of their physical form, some of the watercourses within the study area are designated as 'heavily modified', as indicated in Table 12.2. 'Heavily modified' refers to a watercourse being modified from its natural state for human use. In terms of both their hydrological regime and morphology, the WFD waterbodies in Table 12.2 are all designated as 'supports good' status. Several of the watercourses within the study area have been subject to modifications for the purposes of land drainage. Watercourses that serve a land drainage function tend to have relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

### Section B – Mid Suffolk

- 12.6.12 Within Section B there are three main rivers (River Waveney, River Gipping and The Channel) that would be crossed by the draft Order Limits and one main river (a tributary of the Gipping) that is not crossed by the draft Order Limits but flows through the study area. There are also numerous tributaries of these rivers, classified as ordinary watercourses. Some reaches of the River Gipping within the study area are classified as main river and other reaches are classified as ordinary watercourse. In the northern portion of Section B, most watercourses tend to flow in a north-easterly direction, whereas in the southern portion of Section B, watercourses tend to flow in a south-easterly direction. Most of the catchments can be categorised as generally rural in their land use. However, some watercourses, such as the River Gipping, have urban areas within their catchments including towns such as Stowmarket and Ipswich. The catchments have a relatively flat topography.
- 12.6.13 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.3 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the Waveney (u/s Frenze Beck) waterbody is shown in the previous Section. The River Waveney and River Gipping are included in the Anglian RBMP.

Table 12.3 - Summary of WFD Status Data (Cycle 3) 2019/2022

WFD Waterbody Name (ID)	Ecological Status	Chemical Status	Hydromorphological Designation
Tributary of Upper Waveney (GB105034045750)	Moderate	Fail	Not designated artificial or heavily modified

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Dove trib – Eye (GB105034045670)	Moderate	Fail	Not designated artificial or heavily modified
Dove trib – Finningham (GB105034045660)	Moderate	Fail	Not designated artificial or heavily modified
Mendlesham Stream (GB105034045650)	Moderate	Fail	Not designated artificial or heavily modified
Gipping (u/s Stowmarket) (GB105035046180)	Moderate	Fail	Not designated artificial or heavily modified
Jordan (East Suffolk) (GB105035046170)	Good	Fail	Not designated artificial or heavily modified
Gipping (downstream (d/s) Stowmarket) (GB105035046280)	Poor	Fail	Heavily modified
Wattisham Watercourse (GB105035040350)	Moderate	Fail	Not designated artificial or heavily modified
Somersham Watercourse (GB105035040310)	Moderate	Fail	Heavily modified
Belstead Brook (GB105035040440)	Poor	Fail	Not designated artificial or heavily modified

12.6.14 Most of the waterbodies in Table 12.3 share similar quality characteristics as they are all failing about chemical status, and most have moderate ecological status. The Jordan has good ecological status whereas the Belstead Brook and Gipping (d/s Stowmarket) have poor ecological status due to fish for the Belstead Brook and macrophytes (aquatic plants) and phytobenthos (autotrophic organisms) for the Gipping. Multiple RNAGs are reported for these waterbodies with PBDEs being common to all. Other common RNAGs are phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources.

12.6.15 Section B is partially located within a surface water Drinking Water Protected Area in the vicinity of Stowmarket and Flowton (Gipping (d/s of Stowmarket)). The majority of Section B is located within either the Anglian Waveney (SWSGZ1020) or Anglian Gipping and Alton Water (SWSGZ1022) surface water Drinking Water Safeguard

Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section B is entirely located within NVZs.

12.6.16 In terms of their physical form, two of the WFD waterbodies in Table 12.3 are designated as ‘heavily modified’. The hydromorphological status for all these waterbodies is ‘supports good’, although the hydrological regime for the Dove tributary – Eye, Gipping (d/s Stowmarket) and Somersham Watercourse waterbodies ‘does not support good’. These three waterbodies have RNAGs attributed to groundwater abstraction.

### Section C – Babergh Colchester and Tendring

12.6.17 Within Section C there are three main rivers (Belstead Brook, Spring Brook and the River Stour) that would be crossed by the draft Order Limits and three main rivers (River Brett, a tributary of the Belstead Brook and Salary Brook) that are not crossed by the draft Order Limits but flow through the study area. There are also numerous tributaries of these rivers, classified as ordinary watercourses. The watercourses in Section C tend to flow in an easterly or south-easterly direction, generally towards the Orwell and Stour estuaries. Their catchments can be predominantly categorised as generally rural in their land use, with some watercourses such as the Belstead Brook and River Stour flowing through towns such as Ipswich and Manningtree respectively. The catchments have relatively flat topography.

12.6.18 Ardleigh Reservoir is partially located within Section C and its main outflow is the Salary Brook.

12.6.19 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.4 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the Belstead Brook and Gipping (d/s Stowmarket) waterbodies is shown in the previous Section. Section C is partially located within the Orwell transitional WFD waterbody which is part of the Essex TraC (transitional and coastal) operational catchment. The watercourse in Section C within this transitional waterbody is an unnamed ordinary watercourse which discharges to Alton Water reservoir (the main outlet of which is Holbrook Creek which discharges to the Stour estuary). The Orwell, River Brett and River Stour are included in the Anglian RBMP.

Table 12.4 - Summary of WFD Status Data (Cycle 3) 2019/2022

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Orwell (GB520503613601)	Moderate	Fail	Heavily modified
Stutton Brook (GB105036040890)	Poor	Fail	Not designated artificial or heavily modified
Brett (GB105036040930)	Moderate	Fail	Heavily modified

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Stour (d/s River Brett) (GB105036041000)	Moderate	Fail	Heavily modified
Stour (Lamarsh - River Brett) (GB105036040942)	Moderate	Fail	Heavily modified
Salary Brook (GB105037041320)	Moderate	Fail	Heavily modified
Tenpenny Brook (GB105037041310)	Moderate	Fail	Heavily modified

- 12.6.20 The waterbodies in Table 12.4 share similar quality characteristics as they are all failing about chemical status, and all have moderate ecological status, except for the Stutton Brook which has poor ecological status due to fish and phosphate. Multiple RNAGs are reported for these waterbodies with PBDEs and mercury and its compounds being common to all. A RNAG common to all the waterbodies except the Orwell is phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources. Fish is another common RNAG, and several waterbodies also have RNAGs relating to physical modification.
- 12.6.21 Section C is partially located within two surface water Drinking Water Protected Areas (Gipping (d/s of Stowmarket) and Stour (d/s River Brett)). Areas of Section C are partially located within the Anglian Gipping and Alton Water (SWSGZ1022), Anglian Gipping and Alton Water (SWSGZ1021) and Anglian Stour and Abberton (SWSGZ1024) surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section C is entirely located within NVZs.
- 12.6.22 In terms of their physical form, most of the WFD waterbodies in Table 12.4 are designated as ‘heavily modified’, with many having been physically modified for land drainage or land management functions. Watercourses modified for these purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms. The hydromorphological supporting elements status for some of the WFD waterbodies in Table 12.4 is ‘supports good’ but the hydrological regime for some of the waterbodies is stated as ‘does not support good’. The RNAGs for the River Brett, attribute this to surface water and groundwater abstraction.

### **Section D – Colchester**

- 12.6.23 Within Section D there are three main rivers (the Roman River, the River Colne and St Botolph’s Brook) that would be crossed by the draft Order Limits. The watercourses within Section D tend to flow in an easterly or south-easterly direction, ultimately discharging to the Colne estuary. Most of the catchments of the watercourses in Section D are predominantly rural, however there are several urban areas in the catchment of

the River Colne, including Colchester which is downstream of the study area. The catchments have relatively flat topography.

12.6.24 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.5 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the Salary Brook, Stour (d/s River Brett) and Stour (Lamarsh - River Brett) waterbodies is shown in the previous Section. The River Stour and River Colne are included in the Anglian RBMP.

**Table 12.5 - Summary of WFD Status Data (Cycle 3) 2019/2022**

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Colne (d/s Doe's Corner) (GB105037041330)	Moderate	Fail	Heavily modified
Roman River (GB105037034150)	Moderate	Fail	Heavily modified
Domsey Brook (GB105037033870)	Good	Fail	Heavily modified

12.6.25 The waterbodies in Table 12.5 are all failing about their chemical status. The Colne and Roman River have moderate ecological status whereas the Domsey Brook has good ecological status. Two RNAGs are reported for the Domsey Brook, PBDEs and mercury and its compounds, which are common to all the waterbodies in Table 12.5. RNAGs common to the Colne and Roman River waterbodies are macrophytes and phytobenthos, perfluorooctane sulphonate (PFOS)<sup>61</sup>, physical modifications and phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources.

12.6.26 The central part of Section D is located within three surface water Drinking Water Protected Areas (Stour (d/s River Brett), Stour (Lamarsh – River Brett) and Colne (d/s Doe's Corner). Section D is almost entirely within surface water Drinking Water Safeguard Zones including the following: Anglian Stour and Abberton (SWSGZ1024), Anglian Colne and Arleigh (SWSGZ1026, SWSGZ1027) and Anglian Chelmer and Blackwater (SWSGZ1028). Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section D is entirely located within NVZs.

12.6.27 In terms of their physical form, all the WFD waterbodies within Table 12.5 are designated as 'heavily modified'. The Roman River waterbody has a hydrological regime that 'does not support good' (attributed to surface water abstraction) whereas the hydrological regime for the Domsey Brook is 'high'. Despite its hydrological regime status, the Domsey Brook is only classified as 'supports good' (rather than 'high') for its hydromorphological supporting elements overall because it is designated as 'heavily

<sup>61</sup> PFOS is a man-made substance belonging to a group of chemicals known for their water, grease, and stain repellent properties. It is extremely persistent, toxic and bioaccumulative.

modified<sup>62</sup>. The Colne and Roman River WFD waterbodies, along with several other watercourses within the study area, serve a land drainage or land management function. Watercourses modified for these purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

## Section E – Braintree

- 12.6.28 Within Section E there are three main rivers (the River Blackwater, one of its tributaries and the River Brain) that would be crossed by the draft Order Limits. Watercourses in Section E tend to flow in a south-easterly direction, ultimately discharging to the Blackwater estuary. Some of the smaller catchments of the watercourses in Section E are predominantly rural but the catchments of the River Blackwater and the River Brain cover urban areas such as Braintree. The catchments have relatively flat topography.
- 12.6.29 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.6 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the Roman River and Domsey Brook waterbodies is shown in the previous Section. The River Blackwater is included in the Anglian RBMP.

Table 12.6 - Summary of WFD Status Data (Cycle 3) 2019/2022

WFD Waterbody Name (ID)	Ecological Status	Chemical Status	Hydromorphological Designation
Blackwater (Combined Essex) (GB105037041160)	Moderate	Fail	Heavily modified
Brain (GB105037041140)	Moderate	Fail	Heavily modified
Ter (GB105037033940)	Moderate	Fail	Not designated artificial or heavily modified

- 12.6.30 The waterbodies in Table 12.6 share similar quality characteristics as they are all failing about chemical status, and all have moderate ecological status. Multiple RNAGs are reported for these waterbodies with the following being common to all: PBDEs, mercury and its compounds and phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources. RNAGs related to physical modification are also common to the Brain and Blackwater waterbodies.
- 12.6.31 Section E is partially located within the Blackwater (Combined Essex) surface water Drinking Water Protected Area and is almost entirely located within the Anglian Chelmer and Blackwater (SWSGZ1028 and SWSGZ1029) surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter

<sup>62</sup> Under the WFD, a 'heavily modified' waterbody cannot be classified as 'high' for its hydromorphological compliance.

9: Contaminated Land, Geology and Hydrogeology. Section E is entirely located within NVZs.

12.6.32 With the exception of the River Ter, the WFD waterbodies within Table 12.6 are designated as 'heavily modified'. The hydromorphological supporting elements for the Brain and Ter WFD waterbodies are classified as 'supports good'. Many of the watercourses within Section E have been modified for land drainage, land management, water industry and flood protection purposes. Watercourses modified for land drainage or management purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

### Section F – Chelmsford

12.6.33 Within Section F there are seven main rivers (River Ter, Straw Brook, River Chelmer, Chignall Brook, River Can, Roxwell Brook and Stock Brook) that would be crossed by the draft Order Limits and one main river (a tributary of the River Wid) that is not crossed by the draft Order Limits but flows through the study area. Watercourses in Section F tend to flow in an easterly or south-easterly direction, ultimately discharging to the Blackwater estuary. Upstream of the study area, most of the catchments of the watercourses in this Section are predominantly rural, although the River Chelmer and River Can flow through Chelmsford downstream of the study area. The catchments have relatively flat topography.

12.6.34 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.7 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the River Ter waterbody is shown in the previous Section. The River Chelmer and River Can are included in the Anglian RBMP.

Table 12.7 - Summary of WFD Status Data (Cycle 3) 2019/2022

WFD Waterbody Name (ID)	Ecological Status	Chemical Status	Hydromorphological Designation
Chelmer (Gt. Easton - River Can) (GB105037033950)	Moderate	Fail	Heavily modified
Chignall Brook (GB105037033650)	Moderate	Fail	Heavily modified
Can (GB105037033840)	Poor	Fail	Not designated artificial or heavily modified
Roxwell Brook (GB105037033540)	Poor	Fail	Not designated artificial or heavily modified
Wid (Margaretting Hall - River Can) (GB105037033900)	Poor	Fail	Not designated artificial or heavily modified

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Wid (Ingatestone Hall - Margaretting Hall) (GB105037028690)	Moderate	Fail	Not designated artificial or heavily modified

- 12.6.35 The waterbodies in Table 12.7 share similar quality characteristics as they are all failing for chemical status and are designated either moderate or poor for their ecological status. The poor ecological status of the Can and Wid (Margaretting Hall - River Can) waterbodies is due to macrophytes and phytobenthos, and due to phosphate for the Wid. The poor ecological status of the Roxwell Brook is due to fish. Multiple RNAGs are reported for the waterbodies in Table 12.7 with the following being common to all: PBDEs, mercury and its compounds and phosphate from diffuse (poor agricultural and soil management) sources. Other common RNAGs include phosphate from point sources (sewage discharge), physical modification, fish, invertebrates and PFOS.
- 12.6.36 Section F is not located within any surface water Drinking Water Protected Areas but is located entirely within the Anglian Chelmer and Blackwater (SWSGZ1029) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section F is entirely located within NVZs.
- 12.6.37 The Chelmer and Chignall Brook waterbodies are designated as ‘heavily modified’ whereas the rest of the waterbodies are not designated as artificial or heavily modified. The Chelmer and Chignall Brook waterbodies have both been physically modified for land drainage purposes. The hydromorphological supporting elements for all the waterbodies in Table 12.7 are designated as ‘high’ or ‘supports good’.

### **Section G – Brentwood/Basildon**

- 12.6.38 Within Section G there are three main rivers (River Wid, Stock Brook and Haverings Grove Brook) that would be crossed by the draft Order Limits and two main rivers (River Crouch and River Wid tributary) that is not crossed by the draft Order Limits but flows through the study area. Most of the watercourses in Section G tend to flow in an easterly or north-easterly direction, ultimately discharging to the Blackwater or Crouch estuaries. The nature of their catchments is varied, with some watercourses in Section G having predominantly rural catchments and other catchments covering urban areas such as Brentwood. The catchments have relatively flat topography.
- 12.6.39 In addition to the catchments associated with the main rivers noted above, the study area also covers the catchments of other WFD waterbodies. These are listed in Table 12.8 which summarises baseline WFD status data (Environment Agency, 2023b) for the study area. Data for the Wid (Margaretting Hall - River Can) and Wid (Ingatestone Hall - Margaretting Hall) waterbodies is shown in the previous Section. The River Crouch is included in the Anglian RBMP and the Mardyke is included in the Thames RBMP.

Table 12.8 - Summary of WFD Status Data (Cycle 3) 2019/2022

WFD Waterbody Name (ID)	Ecological Status	Chemical Status	Hydromorphological Designation
Wid (Shenfield STW - Ingatestone Hall) (GB105037028670)	Moderate	Fail	Heavily modified
Wid (Doddinghurst Brook - Shenfield STW) (GB105037028680)	Poor	Fail	Not designated artificial or heavily modified
Haverings Grove Brook (GB105037028650)	Moderate	Fail	Heavily modified
Crouch (Upper) - u/s A129 (GB105037028500)	Moderate	Fail	Not designated artificial or heavily modified
Mardyke (East Tributary) (GB106037028070)	Moderate	Fail	Heavily modified

- 12.6.40 The waterbodies in Table 12.8 share similar quality characteristics as they are all failing for chemical status and are designated either moderate or poor for their ecological status. The poor ecological status of the Wid (Doddinghurst Brook - Shenfield Sewage Treatment Works) waterbody is due to macrophytes and phytobenthos and phosphate. Multiple RNAGs are reported for the waterbodies in Table 12.8 with the following being common to all: PBDEs, mercury and its compounds and phosphate from diffuse (poor agricultural and soil management) sources. Other common RNAGs include phosphate from point sources (sewage discharge), physical modification, invertebrates, and fish.
- 12.6.41 Section G is not located within any surface water Drinking Water Protected Areas. Most of the Section, except for the southern end, is located within the Anglian Chelmer and Blackwater (SWSGZ1029) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. Section G is entirely located within NVZs.
- 12.6.42 In terms of their physical form, some of the waterbodies in Table 12.8 are designated as 'heavily modified' whilst others are not designated artificial or heavily modified. Those designated as 'heavily modified' have been modified for land drainage and flood protection purposes. The hydromorphological supporting elements for all the waterbodies in Table 12.8 are designated as 'high' or 'supports good'.

## Section H – Thurrock

- 12.6.43 Within Section H there are two main rivers (tributary of Tilbury Main Sewer and an unnamed watercourse between West Tilbury Marshes and East Tilbury Marshes) crossed by the draft Order Limits and there are six main rivers (Mardyke tributaries and

unnamed ditch tributaries of the Thames) not crossed by the draft Order Limits but within the study area. These watercourses discharge to the Thames downstream of the study area via tidal flats and mostly have flapped outfalls. In the northern portion of Section H there are two tributaries of the Mardyke, which are ordinary watercourses at the point they are crossed by the draft Order Limits but are designated main rivers downstream of this, within the study area. The Mardyke tributaries within Section H are small ditches that tend to flow in a south-westerly direction before discharging to the Mardyke west of the study area. The Mardyke at Purfleet flows in a south-westerly direction and discharges to the Thames at Purfleet via a flapped outfall. Tilbury Main Sewer is another main river that is not crossed by the draft Order Limits but flows through the study area, in the southern portion of Section H. It discharges to the Gravesend Reach of the Thames via a flapped outfall.

- 12.6.44 Although land within the study area is predominantly rural, some of the catchments of the watercourses in Section H cover urban areas such as Basildon and East Tilbury.
- 12.6.45 WFD waterbodies within Section H are listed in Table 12.9 which summarises baseline WFD status data (Environment Agency, 2023b). Data for the Mardyke (East Tributary) waterbody is shown in the previous Section. The southern half of Section H is located within the Thames Middle transitional WFD waterbody catchment which is part of the tidal Thames and the Thames TraC (transitional and coastal) operational catchment. There are multiple ordinary watercourses, ditches, and ponds within this waterbody catchment in Section H. The Thames Middle waterbody incorporates a 40 km reach of the Thames from the Thames Barrier to Lower Hope Reach. The Mardyke and the Thames are included in the Thames RBMP.

**Table 12.9 - Summary of WFD Status Data (Cycle 3) 2019/2022**

<b>WFD Waterbody Name (ID)</b>	<b>Ecological Status</b>	<b>Chemical Status</b>	<b>Hydromorphological Designation</b>
Mardyke (GB106037028200)	Moderate	Fail	Heavily modified
Thames Middle (GB530603911402)	Moderate	Fail	Heavily modified

- 12.6.46 Although the waterbodies in Table 12.9 have similar overall ecological and chemical status, there are differences in their status for the supporting elements. For example, the Thames Middle waterbody is designated good, moderate, or high for all the ecological supporting elements whereas the Mardyke has a poor classification for macrophytes and phosphate and bad status for dissolved oxygen. Regarding their chemical status, the Mardyke is failing due to PBDEs, PFOS and mercury and its compounds whilst the Thames Middle waterbody is also failing due to benzo(a)pyrene, benzo(b)fluoranthene, benzo(g-h-i) perylene and tributyltin compounds. Multiple RNAGs are reported for the waterbodies in Table 12.9, with the following being common to both: PBDEs, PFOS, mercury and its compounds and physical modification. The Thames Middle waterbody also has several RNAGs relating to tributyltin compounds which are attributed to urbanisation, contaminated land and bed sediments, landfill leaching and sewage discharges.

- 12.6.47 Section H is not located within any surface water Drinking Water Protected Areas or any surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology. The northern half of Section H is located within an NVZ.
- 12.6.48 Both waterbodies in Table 12.9 are designated as 'heavily modified', modified for purposes such as flood protection, land drainage and transport. The hydromorphological supporting elements for the Mardyke waterbody are classified as 'supports good'. The Mardyke is slow flowing and has a shallow gradient and its tributaries within the study area have multiple straightened reaches. These characteristics are also typical of the watercourses within the Thames Middle WFD waterbody catchment in Section H.

## Flood Risk and Land Drainage

- 12.6.49 A summary of the baseline information for flood risk and land drainage is provided below by Project sections. Further detail is included in the Appendix 12.2: FRA Screening Report in Volume II.
- 12.6.50 Figure 12.2: Flood Risk Areas, in Volume II of the PEIR, shows the extents of Flood Zones 2 and 3 within the study area and the areas at risk of surface water flooding.

### Section A – South Norfolk

- 12.6.51 In this Section, according to the Environment Agency Flood Map for Planning (Environment Agency, 2023d), the draft Order Limits are located almost entirely in Flood Zone 1 (low risk), equivalent to an annual chance of flooding from rivers and the sea of less than 1 in 1,000 (0.1%). Parts of the draft Order Limits are in Flood Zone 3 (high risk), equivalent to an annual chance of flooding from rivers of 1 in 100 (1%) or greater, associated with the River Tas, several of its tributaries, the Frenze Beck and the River Waveney.
- 12.6.52 According to the Environment Agency Asset Information and Maintenance (AIMS) database (Environment Agency, 2023f), the only flood defences within Section A are natural high ground along the banks of the Frenze Beck and River Waveney.
- 12.6.53 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section A that have previously been flooded.
- 12.6.54 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land at the locations proposed for the substation and for construction compounds within Section A is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%).

### Section B – Mid Suffolk

- 12.6.55 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section B is located almost entirely in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within this Section are associated with the River Waveney, one of its unnamed tributaries, River Dove tributaries, the River Gipping and two of its tributaries, and The Channel.

- 12.6.56 According to the Environment Agency AIMS database (Environment Agency, 2023f), the only flood defences within Section B are natural high ground along the banks of The Channel and engineered high ground along the banks of the River Gipping.
- 12.6.57 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section B that have previously been flooded.
- 12.6.58 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land proposed to accommodate construction compounds and other above ground infrastructure within Section B is at very low risk of surface water flooding.
- 12.6.59 Groundwater flood risk varies throughout the study area. In most of Mid Suffolk this risk is negligible according to the SFRAs.

### **Section C – Babergh Colchester and Tendring**

- 12.6.60 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section C is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within Section C are associated with the Belstead Brook and one of its unnamed tributaries, Spring Brook, Stutton Brook, River Brett/River Stour, Black Brook, Salary Brook, and Ardleigh Reservoir.
- 12.6.61 According to the Environment Agency AIMS database (Environment Agency, 2023f), flood defences within Section C are in the form of natural high ground associated with the Belstead Brook, Stutton Brook, River Stour, River Brett, and Salary Brook.
- 12.6.62 There is one Recorded Flood Outline (Environment Agency, 2022c) in Section C, associated with a fluvial flood event on the River Stour in 1968.
- 12.6.63 The Risk of Flooding from the Surface Water map (Environment Agency, 2023e) shows that the majority of land at the locations proposed for substation works, construction compounds and CSE compounds within Section C is at very low risk of surface water flooding. A very small area of the proposed substation at high (3.3% annual chance of flooding), medium (1% annual chance of flooding) and low (0.1% annual chance of flooding) risk.
- 12.6.64 In south-east Babergh there is a risk of groundwater flooding associated with certain geologies and ground conditions such as locations where chalk bedrock is not overlain by impermeable superficial drifts.

### **Section D – Colchester**

- 12.6.65 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section D is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within Section D are associated with St Botolph's Brook, the River Colne, Hillhouse Wood Brook and the Roman River.
- 12.6.66 According to the Environment Agency AIMS database (Environment Agency, 2023f), the flood defences in Section D are natural high ground along the banks of St Botolph's Brook, the River Colne, Hillhouse Wood Brook, the Roman River, and its tributaries.
- 12.6.67 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section D that have previously been flooded.

- 12.6.68 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land at the proposed compounds and CSE compounds within Section D is at very low risk of surface water flooding. However, the south-eastern corner of the proposed compound to the west of the A134 is shown to be at high risk of surface water flooding.

### **Section E – Braintree**

- 12.6.69 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section E is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within Section E are associated with the River Blackwater and one of its tributaries, the River Brain and tributaries of the River Ter and Straw Brook.
- 12.6.70 According to the Environment Agency AIMS database (Environment Agency, 2023f), the flood defences in Section E are natural high ground along the banks of the River Blackwater, one of its tributaries and the River Brain.
- 12.6.71 There is one Recorded Flood Outline (Environment Agency, 2022c) in Section E, associated with a fluvial flood event on the River Blackwater in 1947.
- 12.6.72 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land at the proposed compound and CSE compound locations within Section E is at very low risk of surface water flooding. The map indicates that there is a surface water flow path through one of the proposed CSE compounds, with this land shown to be at low risk of surface water flooding.

### **Section F – Chelmsford**

- 12.6.73 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section F is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within Section F are associated with the Straw Brook, River Ter, River Chelmer, Walthambury Brook, Chignall Brook, River Can, Roxwell Brook, Sandy Brook and River Wid tributary.
- 12.6.74 According to the Environment Agency AIMS database (Environment Agency, 2023f), the flood defences in Section F are natural high ground along the banks of the River Ter, Straw Brook, River Chelmer, Chignall Brook, River Can, Roxwell Brook and River Wid tributary.
- 12.6.75 There are two Recorded Flood Outlines (Environment Agency, 2022c) in Section F, associated with fluvial flood events on the River Chelmer in 1947 and 2001.
- 12.6.76 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land at the proposed compound locations within Section F is at very low risk of surface water flooding.

### **Section G – Brentwood/Basildon**

- 12.6.77 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section G is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 3 (high risk) within Section G are associated with the River Wid and a tributary, Stock Brook, Haverings Grove Brook, a tributary of the Mardyke and the River Crouch.

- 12.6.78 According to the Environment Agency AIMS database (Environment Agency, 2023f), the flood defences in Section G are natural high ground along the banks of the River Wid, its tributary, Stock Brook, Haverings Grove Brook, the River Crouch, and tributaries of the Mardyke.
- 12.6.79 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section G that have previously been flooded.
- 12.6.80 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land proposed for above ground infrastructure within Section G is at very low risk of surface water flooding.

## Section H – Thurrock

- 12.6.81 The Environment Agency Flood Map for Planning (Environment Agency, 2023d) shows that Section H is mostly located in Flood Zone 1 (low risk). For the northern and central parts of Section H, areas of Flood Zone 3 (high risk) are limited in extent and are associated with the Mardyke tributaries. Flood Zone 3 is more extensive in the southern part of Section H in the vicinity of Linford, East Tilbury and between West Tilbury and the Thames.
- 12.6.82 According to the Environment Agency AIMS database (Environment Agency, 2023f), the flood defences in Section H include natural high ground along the banks of the Mardyke tributaries, the Tilbury Main Sewer and its tributaries. The dataset shows the Tilbury Power Station concrete wall defence, along the bank of the River Thames, is located at the southern end of the study area. The Tilbury Flood Storage Area (FSA) is partially located within the draft Order Limits. It is located to the north and north-east of Tilbury and is designed to reduce flood risk by storing water from the marshland and upstream areas, as presented on Figure 12.2: Flood Risk Areas in Volume II.
- 12.6.83 There are three Recorded Flood Outlines (Environment Agency, 2022c) in Section H, all associated with a tidal flood event on the River Thames in 1953.
- 12.6.84 The Risk of Flooding from Surface Water map (Environment Agency, 2023e) shows that most of the land at Tilbury Substation, the CSE compounds and construction compound locations within Section H is at very low risk of surface water flooding. However, some of the land within three of the proposed compounds is shown to be at high and medium risk of surface water flooding, associated with ponding of surface water and surface water flow paths. Parts of Tilbury Substation are also shown to be at high and medium risk of surface water flooding, again associated with both ponding of surface water and surface water flow paths.

## Future Baseline

- 12.6.85 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 12.6.86 With regard to flood risk and drainage, future baseline conditions within the ES will be forecast, drawing on current best practice guidelines from the Environment Agency about the predicted effects of climate change on rainfall intensities and peak river flows. These future conditions will be considered to factor in climate change resilience into the Project drainage design.

12.6.87 When assigning value to water environment resources and receptors, the implementation of future cycles of Water Framework Regulations management plans, driving future improvements in the ecological and chemical quality of water bodies, will be considered; and the potential effects of other planned development on the quality of the water environment within the study area will also be considered.

## 12.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

12.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.

12.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.

12.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 of Chapter 4: Project Description. Embedded measures relevant to Hydrology and Land Drainage are summarised below.

12.7.4 The Project has avoided sensitive features, such as the floodplains of watercourses, through the corridor and routing studies where possible. In addition, the Project has assumed the following embedded measures relevant to Hydrology and Land Drainage:

- For access roads and haul roads, the Project requires the crossing of multiple ditches, drains and watercourses. Large or sensitive watercourses, for example those designated as main river, and those with WFD status, will be crossed using clear span bridges
- Pylons would not be located within 16 m of a main river based on Environment Agency guidance or within 2 m of an ordinary watercourse

### Standard Mitigation

12.7.5 Standard mitigation measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.

12.7.6 Appendix 4.1: The Draft Outline CoCP in Volume III contains a list of relevant standard practice measures relating to Hydrology and Land Drainage. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):

- W03: Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Natural substrate will be provided through box culverts at temporary watercourse crossings
- W07: Where construction activities take place in Flood Zone 3, construction compounds and other working areas will be laid out in accordance with the Sequential Test and incorporate flood resilience measures where necessary, for

example incorporating raised bunds to prevent floodwater ingress into, HDD pits. Storage of construction equipment and materials will be done in such a way as to avoid forming barriers to floodplain flows. Material storage areas will be located outside of the fluvial floodplain where practicable

- W09: Where construction activities take place within surface water flood zones, prior to works commencing appropriate site drainage will be put in place to reduce the risk of standing water and avoid substantial delays to the construction programme
- W10: Where construction haul roads pass within or cross floodplains, the haul road design will include for flood mitigation/drainage to allow for the flow of water within the floodplain. The design of the haul roads themselves will include for some resilience to flooding, for example, incorporating suitable geo-textiles to stabilise the road surfacing, as well as allowing water to flow within the floodplain. Suitable materials will be used to surface the haul roads. In some cases, bespoke construction methodologies may be used based on site constraints and ground conditions
- W13: Surface water drainage features, based on Sustainable Drainage (SuDS) techniques, will be installed at the CSE compound sites during construction. Access roads and haul roads will also have suitable drainage provisions. Drainage features would provide attenuation and treatment of runoff
- W14: Once the Project has been constructed, the working areas will be removed, and the sites reinstated. Temporary construction haul roads (including temporary bridges and culverts) are likely to be removed unless identified as offering a long-term improvement to the environment and land usage during the design (and agreed with the land owner). Any stripped topsoil will be reinstated, and the site will be returned to its former use, subject to any planting restrictions or agreements with landowners. Replacement drainage schemes will be installed where appropriate. A specialised drainage contractor will review the drainage designs and provide advice to National Grid and the main works contractor during all relevant construction and reinstatement activities. Permanent records of the land drainage locations will be made and passed to the landowners/occupiers
- GG26: Fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. Where practicable, they will be stored >15m from watercourses, ponds, and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15m distance, additional measures will be identified. All refuelling, oiling, and greasing of construction plant and equipment will take place above drip trays and away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling

12.7.7 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

12.7.8 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

- 12.7.9 Crossing methodologies for all individual ditches, drains and watercourses have not yet been confirmed. The development of methodologies and strategies for watercourse crossings is currently ongoing for the Project, including for environmentally sensitive areas, informed by stakeholder consultation and feedback. Any works with the potential to affect the floodplain or flow regime of a main river would be subject to consent under the Environmental Permitting (England and Wales) Regulations 2017. Similarly, works with potential to impede land drainage or the flow regime of any ordinary watercourse would be subject to consent under the Land Drainage Act 1991. Alternatively, powers to undertake such works will be included within the Development Consent Order, following agreement of protective provisions with the Environment Agency and other land drainage authorities.
- 12.7.10 The non-statutory consultation response from the Environment Agency refers to potential Project infrastructure within Flood Zone 3. Further discussions will be held with the Environment Agency on this matter and regarding the definition of the functional floodplain (Flood Zone 3b). The FRA will outline the proposed mitigation measures/commitments to ensure no detrimental effects on flood risk from rivers and the sea or the functioning of flood defences.

## Waveney Valley Alternative

- 12.7.11 The footprint of temporary works within the floodplain would increase as a result of the Waveney Valley Alternative. The mitigation measures outlined above would reduce effects on flood risk to the construction work site. However, additional measures may be required in the form of flood protection to prevent inundation of the cable installation pits. To manage the potential for temporary increases in flood risk to third party lands, the measures described above in W07 would be adopted.

## 12.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 12.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation - embedded (design measures), standard practice, and any additional mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).
- 12.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 12.8.3 A full detailed assessment will be presented within the ES submitted with the Development Consent Order application.
- 12.8.4 Effects on watercourses, their water quality and hydromorphology are scoped out for operation (and maintenance), and effects on existing surface water interests (abstractions and discharges) have been scoped out for both construction and operation (and maintenance). With reference to the EIA Scoping Opinion (see Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III), the Planning

Inspectorate agrees that these matters can be scoped out subject to further information and justification being included in the ES in some aspects of the matters.

- 12.8.5 Effects on flooding from sewers, water mains, reservoirs, canals, and other artificial sources have been scoped out for construction and operation (and maintenance). Justification for this is provided within Appendix 12.2: Flood Risk Assessment Screening in Volume III.

## Preliminary Construction Effects

### Sites Designated for Nature Conservation

- 12.8.6 At this stage, the key sites designated for nature conservation identified with a hydrological link and potential associated effect are Wortham Ling Nature Reserve and SSSI (national importance) and Roydon Fen Nature Reserve (local importance).
- 12.8.7 The following sites have also been identified with a hydrological link to the Project: Norfolk Valley Fens and Flordon Common, Aslacton Parish Land SSSI, Stour and Orwell Estuaries SPA and Ramsar; Stour Estuary SSSI, Orwell Estuary SSSI, Catterwade Marshes SSSI, Hamford Water, Colne Estuary, Blackwater Estuary, Chelmer Valley Riverside LNR, Hutton Country Park LNR, Crouch, and Roach Estuaries.
- 12.8.8 There are also several sites that have been identified with a potential hydrological link to the Project, pending further investigation and awaited information: Fen Alder Carr LNR, Hanningfield Reservoir SSSI, Langdon Ridge SSSI, Thames Estuary and Marshes SPA and Ramsar, Mucking Flats and Marshes SSSI.
- 12.8.9 An assessment of effects will be presented in the ES, informed by further data and ecology surveys.

### Waveney Valley Alternative

- 12.8.10 There are two design alternatives for the Waveney Valley: an overhead line and an underground cable alternative, as described in Table 4.3. The same receptors, e.g. the River Waveney and associated designated sites, would be affected by both of the design alternatives, and therefore no additional effects would be experienced by the Waveney Valley Alternative.

### Watercourses, their Water Quality and Hydromorphology

- 12.8.11 During construction, new crossings of watercourses would be required for temporary access and could result in channel bed/bank modifications causing disruption to flow regimes and effects on hydromorphology. There is also an associated risk of pollution from construction traffic using these temporary access routes, for example linked to mud from tyres and other debris entering the watercourses. Other construction activities with a risk of opening pollution pathways to water environment receptors include the

dewatering of excavations and drilling for trenchless crossings (with potential for outbreaks of drilling muds, including bentonite<sup>63</sup>).

- 12.8.12 There are multiple main rivers within the draft Order Limits, as detailed in Section 12.6. There are also numerous ordinary watercourses within the draft Order Limits which will be quantified following a design team walkover survey that will be undertaken to develop a watercourse crossing schedule. The method of crossing a watercourse would depend upon several factors and details of proposed watercourse crossings will be presented in the ES.
- 12.8.13 However, all watercourse crossing designs would follow the standard practice measures set out in Appendix 4.1: Draft Outline CoCP in Volume III. In addition, the haul road would be put in place in accordance with conditions set out within the consents and permits from the relevant authorities (Environment Agency for main rivers, the LLFA for ordinary watercourses and the IDB as required).
- 12.8.14 The standard practice measures within Appendix 4.1: Draft Outline CoCP in Volume III would reduce pollution risks and the potential negative effects of the temporary watercourse crossings such that effects on watercourses are anticipated to be not significant.
- 12.8.15 Whilst temporary negative effects on the hydromorphology of the watercourses that are crossed by culverts cannot be avoided, the design of temporary crossings would reduce temporary effects on the watercourses' flow regimes and channel forms. Effects on these watercourses are hence anticipated to be not significant. For the larger watercourses to be crossed by clear span bridges (for example those with WFD status) effects are expected to be not significant.
- 12.8.16 There would be limited physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses in the overhead line sections or from third party infrastructure works. Very localised disturbances at watercourse haul road crossings are assessed above. In the cable sections, the degree of physical disturbance would depend on the crossing methodology. For example, physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses crossed using a trenchless methodology would be avoided. Table 4.6 in Chapter 4: Project Description provides information on which watercourses would be crossed using a trenchless technique. All crossing designs would adhere to standard practice. A full assessment of the effects due to cable crossings will be included in the ES with the worst case assessment carried out in each case.
- 12.8.17 Soil stripping and the subsequent stockpiling and storage of soil could cause deterioration of surface water quality through generation of silted or polluted runoff. In the cable sections of the Project, the width of soil stripping would be more extensive than in overhead line sections. However, the protocols described in Appendix 4.1: Draft Outline CoCP in Volume III would manage worksite runoff and reduce the potential for pollution via this pathway. Material storage areas would be located outside of the fluvial floodplain where practicable.
- 12.8.18 In the overhead line sections, the amount of topsoil strip would be less than in cable sections, so the potential for surface water quality to deteriorate from receiving silted

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<sup>63</sup> Bentonite is a swelling clay that has the ability to absorb large quantities of water, with this property used to advantage in drilling mud and groundwater sealants.

runoff is comparatively lower. The standard practice measures within Appendix 4.1: Draft Outline CoCP in Volume III would reduce negative effects associated with pollution risks such that no significant effects are anticipated.

- 12.8.19 While trenchless crossings would avoid physical disturbance to the flow regime and form of channel and riparian corridors, the technique is not without risk of pollution, associated with inadvertent releases of drilling fluids/muds. Open cut crossings of watercourses could also cause disturbance of bed sediments. The design of the crossing methods would follow standard practice measures set out within Appendix 4.1: Draft Outline CoCP in Volume III and trenchless crossings, would be informed by the Project's ground investigation data to reduce the risks of breakout of drilling muds. The designs would also accord with any conditions set out within secondary consents and permits for the works from the relevant authorities.
- 12.8.20 The majority of CSE compounds, construction compounds and substation works are not located near watercourses. Therefore, there are no pathways for potential pollutants arising from construction activities at most locations, for example silted runoff, to reach watercourse receptors. However, the Tilbury Substation works (although within the existing security fence) would be near several ordinary watercourses and drainage ditches. The magnitude of the potential effects on these watercourses would be reduced through the implementation of the good practice pollution prevention and water quality safeguarding measures.
- 12.8.21 Consequently, any potential negative effects on water quality would be temporary and localised and are hence expected to be not significant.
- 12.8.22 Interactions with groundwater in the cable sections and where pylon excavations or topsoil stripping is required is assessed in Chapter 9: Contaminated Land, Geology and Hydrogeology.

### Waveney Valley Alternative

- 12.8.23 Both design alternatives at the Waveney Valley are considered to have potential effects on the same receptors albeit effects may be different in nature. The underground cable alternative has greater potential for temporary negative effects on the River Waveney during construction, as this option would involve a wider construction swathe and temporary works within the riparian zone, with associated pollution risks and potential effects on hydromorphology. As part of the underground cable alternative, the current design is that the River Waveney and its tributary would be crossed using trenchless techniques (two trenchless crossings), with a haul road to the north and south of each drive and exit pit and a single crossing of the river. A clear span crossing for this access route would reduce any effects on the flow regime of the river and implementation of the good practice measures described previously during construction would reduce any temporary effects. Although greater negative effects are anticipated for the Waveney Valley Alternative, with appropriate mitigation these are anticipated to be not significant.

### Flood Risk and Land Drainage

- 12.8.24 There is the potential for the Project to increase flood risk during construction through the creation of soil stockpiles and temporary works areas, which could result in the temporary loss of floodplain storage or could impede flood flows. Most of the substations works would be in Flood Zone 1, except for the Tilbury Substation works

which would be within Flood Zone 3, albeit a floodplain area that is defended from routine inundation from the River Thames.

- 12.8.25 Temporary construction works are currently proposed within the Tilbury FSA, including a primary cable construction compound and its associated drainage provisions. The duration the temporary work areas would be in place is currently unknown, as the phasing of the construction programme is yet to be confirmed. Further information and assessment will be included within the ES and the Flood Risk Assessment.
- 12.8.26 There are existing flood defences along numerous watercourses within the draft Order Limits. National Grid will continue to engage with the Environment Agency to understand the structural form, condition and standard of these defences and measures to reduce the effects of any temporary works on the integrity of these assets will be secured within the DCO.
- 12.8.27 The River Stour and, in the Waveney Valley Alternative option only, the River Waveney, are the only main rivers that would be crossed by the cable sections of the Project. The effects of the underground cable construction on flood risk and the land drainage regime in the catchment of these rivers would be reduced by avoiding any large-scale stockpiling or storage of cable trench arisings in the floodplain, by operating an Emergency Action Plan for the worksite, as described in commitment GG32 of Appendix 4.1: Draft Outline CoCP in Volume III, and by adopting a trenchless technique for cabling beneath the river channels.
- 12.8.28 The FRA will outline the proposed mitigation measures/commitments to ensure no detrimental effects on flood risk from rivers and the sea or the functioning of flood defences. Implementation of these would reduce potential negative effects on the flood storage and floodplain flow attributes of watercourses in the study area. Considering the nature and footprint of the Project and using professional judgement, the effect is anticipated to be not significant.
- 12.8.29 There would also be changes to land surface permeabilities at the substations, CSE compounds and at permanent access tracks which could disrupt the current land drainage regime. The Project would introduce new areas of temporary impermeable land cover, such as construction compounds and haul routes, along the cable section and roads providing access to pylons, along with topsoil stripping and earthworks. This could locally reduce rainfall infiltration rates, increase runoff rates, and induce overland flow during construction. This could contribute to localised changes to the land drainage regime, resulting in ponding of water or waterlogging of soils. Areas with a sloping topography where topsoil has been stripped would be particularly vulnerable to these changes. The works may also disrupt or sever existing field drainage systems. Temporary measures would be put in place to maintain such drainage routes during construction, then the systems would be reinstated post-construction.
- 12.8.30 Access roads, haul roads and compound areas would have suitable drainage provisions, providing for attenuation of runoff and encouraging infiltration of surface water runoff to ground (for example French drains).
- 12.8.31 Consequently, negative effects on the land drainage regime and rainfall infiltration and runoff patterns would be limited on receptors which include local land uses and the Project itself. Therefore, effects are anticipated to be not significant. In addition, works affecting the land drainage regime would be temporary and localised, with land, any existing field drainage systems reinstated on completion of construction works.

Considering the nature and footprint of the Project, and using professional judgement, effects would generally be neutral, with any potential negative localised effects expected to be not significant.

12.8.32 Whilst piled foundations may be required to construct proposed pylon foundations and CSE compounds, most of the construction activities would take place above the groundwater table, and piling, if required, would be undertaken in accordance with the recommendations of a programme of site-specific ground investigations which would in turn inform the foundation designs. As a result, potential negative effects on existing groundwater flows and levels, and effects on baseline groundwater flood risk would be not significant. Further details on groundwater levels and flows are provided in Chapter 9: Contaminated Land, Geology and Hydrogeology.

12.8.33 No further effects on flood risk and drainage from the third-party infrastructure works are expected, with these effects anticipated to be limited to those detailed above regarding construction compounds and haul roads used to facilitate the works.

### River Waveney Alternative

12.8.34 The underground cable alternative has greater potential for temporary negative effects on flood risk from the River Waveney during construction, as this option would involve a wider construction swathe and temporary works within the floodplain of the watercourse. Implementation of the mitigation measures described previously during construction would reduce any temporary effects. Although greater negative effects are anticipated for the Waveney Valley Alternative, with appropriate mitigation these are anticipated to be not significant.

## Preliminary Operation (and Maintenance) Effects

### Flood Risk and Land Drainage

12.8.35 During operation (and maintenance), interactions with Flood Zone 3 are limited to a small number of pylons and permanent access roads and existing Tilbury Substation. The FRA will outline the proposed mitigation measures/commitments to ensure the Project is safe from flooding over its lifetime and that there are no detrimental effects on flood risk from rivers and the sea because of these interactions. The exact requirements for any potential mitigation measures have not been fully developed at this stage but may include flood compensation proposals if necessary. Subject to the implementation of such measures, if required, potential negative effects on flood risk from rivers and the sea are expected to be not significant. The FRA will also consider the resilience of Project infrastructure located within Flood Zone 3 that would need to remain operational in the event of a flood.

12.8.36 Due to the nature of the third-party infrastructure works no operational or maintenance effects on flood risk are anticipated.

12.8.37 Once the overhead line construction is complete and underground cables have been installed, land and any associated land drainage would be reinstated, and all temporary watercourse crossings would be removed where there would be no benefits to retaining them.

- 12.8.38 Surface water runoff from the CSE compounds, substation extensions and any permanent access roads would be drained using appropriate SuDS techniques to meet with LLFA discharge requirements. The CSE compounds would not be permanently staffed and the extensions to the substations are not anticipated to result in an increase in volumes of foul water drainage or change the existing discharge arrangements. The change to the land drainage regime is assessed to be neutral and effects would be not significant.
- 12.8.39 Potential effects on groundwater flows and levels from the underground cable are addressed in Chapter 9: Contaminated, Geology and Hydrogeology. Potential effects on baseline groundwater flood risk are anticipated to be neutral and not significant.
- 12.8.40 The potential for likely significant effects on all other attributes of receptors in the water environment during operation (and maintenance) of the Project have been scoped out as outlined in the EIA Scoping Report (National Grid, 2022).

### Waveney Valley Alternative

- 12.8.41 During operation (and maintenance), the Waveney Valley alternative design would have very limited effects on surface water receptors. Following reinstatement of the cabling working corridor, there would be no interactions between project infrastructure and the floodplain or channel of the River Waveney, or its tributaries and the rainfall runoff regime would revert to baseline. As described above, land and any associated land drainage would be reinstated, and all temporary watercourse crossings would be removed. The change to flood risk and land drainage regime is therefore assessed to be neutral and effects would be not significant.

## 12.9 Sensitivity Testing

### Flexibility in Construction Programme

- 12.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative Project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Section 12.8.

### Flexibility in Design

- 12.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design. Sensitivity testing has considered alternative pylon locations, underground cable route, within the proposed LoD. It is assumed that pylons would not be located within 16 m of a main river based on Environment Agency guidance or within 2 m of an ordinary watercourse. This sensitivity testing has shown that there would be no new or different likely significant effects because of the pylons being placed in a different location. The magnitude of effects on flood risk could be increased if pylons were relocated in Flood Zone 3 without suitable additional mitigation. The sensitivity testing has also shown, assuming trenchless crossing of the River Stour, that there

would be no new or different likely significant effects if the underground cables were placed in a different location within the LoD.

## Flexibility due to Design elements not fixed at Statutory Consultation

- 12.9.3 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that, with the exception of the River Stour crossing, as discussed below, none of the alternatives would result in any new or different effects than reported in this chapter.
- 12.9.4 With regard to the River Stour, the alternative, involving reducing the number of crossings to one, would likely have beneficial (positive) effects on this receptor in terms of the Project, during its construction, having less impact on the hydromorphology of the watercourse and a lower potential for pollution of the river.

# 13. Landscape and Visual

# 13. Landscape and Visual

## 13.1 Introduction

13.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on the Landscape and on Visual amenity. The chapter covers effects on the following during construction and operation (and maintenance):

- Landscape character and resources, including effects upon the physical elements, character and/or qualities of the landscape
- Visual amenity, including effects upon potential receptors (people) and viewing groups caused by changes in the appearance of the landscape

13.1.2 There are interrelationships related to the potential effects on Landscape and Visual amenity and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 8: Ecology and Biodiversity
- Chapter 10: Health and Wellbeing
- Chapter 11: Historic Environment
- Chapter 15: Socio-economics, Recreation and Tourism
- Chapter 16: Traffic and Transport

13.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 13.1: LVIA Study Area and Landscape Designations
- Figure 13.2: Landform and Drainage
- Figure 13.3: Trees and Woodland
- Figure 13.4: Settlements and Infrastructure
- Figure 13.5: National Character Areas and East of England Typology
- Figure 13.6: Landscape Character Types and Landscape Character Areas
- Figure 13.7: Visual Receptors
- Figure 13.8.1 to 13.8.11: Zone of Theoretical Visibility (ZTV) of Project by Section / Cable Sealing End Compounds / Substations
- Figures 13.9.1 to 13.9.89: Wireline Visualisations
- Appendix 13.1: Landscape Baseline and Assessment
- Appendix 13.2: Visual Baseline and Assessment

## 13.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

- 13.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy context relevant to the Project including the NPS EN-1 (Department for Energy Security and Net Zero (DESNZ, 2024). This is supported by NPS EN-5 (Department of Energy and Climate (Department for Energy Security and Net Zero (DESNZ, 2024).
- 13.2.2 EN-1 sets out broad guidance in relation to landscape and visual effects at section 5.10. The following paragraphs from EN-1 summarise what should be included in the Applicant's assessment (paragraphs 5.10.16 to 5.10.25) and are considered in this chapter:
- Paragraph 5.10.17 states *'The landscape and visual impact assessment should include reference to any landscape character assessment and associated studies...'* and *'should also take account of any relevant policies based on these assessments...'*
  - Paragraph 5.10.19 states *'The applicant should consider landscape and visual matters in the early stages of siting and design, where site choices and design principles are being established...'*
  - Paragraph 5.10.20 states *'The assessment should include the effects on landscape components and character during construction and operation. For projects which may affect a National Park, The Broads or an AONBs the assessment should include effects on the natural beauty and special qualities of these areas.'*
  - Paragraph 5.10.21 states *'The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity...'*
- 13.2.3 EN-5 contains more specific guidance. The following paragraphs from EN-5 relate to the assessment of landscape and visual effects and are considered within this chapter:
- Paragraph 2.9.7 states *'While the government does not believe that the development of overhead lines is incompatible in principle with developers' statutory duty under section 9 of the Electricity Act, to have regard to visual and landscape amenity and to mitigate possible impacts thereon, in practice new overhead lines can give rise to adverse landscape and visual impacts.'*
  - Paragraph 2.9.11 states *'Landscape and visual benefits may arise through the reconfiguration, rationalisation, or undergrounding of existing electricity network infrastructure.'*
  - Paragraph 2.11.5 states *'The Secretary of State should also have special regard to nationally designated landscapes, where the general presumption in favour of overhead lines should be inverted to favour undergrounding'*. Paragraph 2.11.6 goes on to state that *'Away from these protected landscapes, and in locations where there is a high potential for widespread and significant adverse landscape and/or visual impacts, the Secretary of State should be satisfied that the applicant has provided evidence to support a decision on whether undergrounding is or is not appropriate,*

*having considered this on a case-by-case basis, weighing the considerations...’ which include:*

- *The adverse implications of the overhead line proposal;*
- *The costs and feasibility of re-routing overhead lines or mitigation proposals for the relevant line section; and*
- *The cost and feasibility of the reconfiguration, rationalisation, and/or use of underground or subsea cabling of proximate existing or proposed electricity networks infrastructure.’*

## Other National Legislation and Policy

13.2.4 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance

## Regional and Local Policy

13.2.5 Chapter 2: Key Legislation and Planning Policy Context lists relevant regional and local policy. Key local policy relevant to Landscape and Visual, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Joint Core Strategy for Broadland, Norwich, and South Norfolk (Broadland District Council / South Norfolk Council, adopted March 2011, amendments January 2014)
- Babergh and Mid Suffolk Joint Local Plan – Part 1 (Babergh District Council / Mid Suffolk District Council, November 2023)
- Tendring District Local Plan 2013-2033 and Beyond, Section 2 (Tendring District Council, adopted January 2022)
- Colchester City Local Plan 2017-2033 Section 2 (Colchester City Council, adopted July 2022)
- The Braintree District Local Plan 2013 – 2033 Section 2 (Braintree District Council, adopted July 2022)
- Chelmsford Local Plan, Our Planning Strategy 2013 to 2036 (Chelmsford City Council, adopted May 2020)
- Basildon District Local Plan Saved Policies (Basildon Council, September 2007, updated October 2018)
- Brentwood Local Plan 2016 – 2033 (Brentwood Borough Council, adopted March 2022)
- Thurrock Local Development Framework, Core Strategy and Policies for Management of Development (Thurrock Council, adopted January 2015)

## Guidance

- 13.2.6 Relevant guidance, specific to Landscape and Visual, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Guidelines for Landscape and Visual Impact Assessment – 3rd Edition (GLVIA3) (Landscape Institute and Institute for Environmental Management and Assessment (IEMA), 2013)
  - Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2019)
  - Technical Information Note (TIN): Landscape Character Assessment (Technical Information Note 08/15) (Landscape Institute, 2016)
  - Technical Guidance Note (TGN) 02/21 Assessing landscape value outside national designations (Landscape Institute, 2021)
  - TGN 06/19 Visual Representation of Development Proposals (Landscape Institute, 2019)

## 13.3 Scoping Opinion

- 13.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 13.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point of relevance to the Landscape and Visual chapter is provided in Appendix 5.1: National Grid’s response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 13.4.

## 13.4 Project Engagement and Consultation

- 13.4.1 National Grid has held several meetings with relevant consultees including Natural England, Suffolk Coast and Heaths and Dedham Vale National Landscape (AONB) Authorities and relevant local planning authorities.
- 13.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 13.1.

Table 13.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Thematic Group Meeting, July 2022: <ul style="list-style-type: none"> <li>• Natural England</li> </ul>	The purpose of the meeting was to discuss and agree the scope of the EIA and share baseline information. The participants provided feedback in relation to:	<ul style="list-style-type: none"> <li>• The study area to be used for the assessment was agreed with stakeholders and is presented in Section 13.5 and shown on Figures</li> </ul>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<ul style="list-style-type: none"> <li>• Suffolk Coast and Heaths and Dedham Vale National Landscape (AONB) Authorities</li> <li>• Norfolk County Council</li> <li>• South Norfolk District Council</li> <li>• Colchester City Council</li> <li>• Braintree District Council</li> <li>• Essex County Council</li> <li>• Suffolk County Council</li> <li>• Thurrock Council</li> <li>• Basildon Council</li> <li>• Chelmsford City Council</li> </ul>	<ul style="list-style-type: none"> <li>• Study area – stakeholders asked for further clarification regarding the study area extents. National Grid agreed to provide further clarification.</li> <li>• Baseline data - stakeholders requested that the East of England Typology was referenced, to provide a baseline which is standardised across the study area. National Grid agreed to consider this dataset in the landscape baseline.</li> <li>• Baseline data - stakeholders suggested reviewing relevant Neighbouring Plans to identify key or valued viewpoints. National Grid agreed to review Neighbourhood Plans.</li> <li>• Baseline data - stakeholders suggested reviewing the Lands of the Fanns study to inform baseline landscape character. National Grid agreed to review the study.</li> <li>• Baseline data – stakeholders suggested reviewing the National Landscape (an AONB) special qualities report. National Grid agreed to review.</li> <li>• ZTV methodology – stakeholders requested clarification on the use of ZTVs and requested graded ZTVs which show the proportion of pylons that would be visible. National Grid agreed to provide further clarification.</li> <li>• Effects on residential visual amenity – stakeholders requested that effects on residential visual amenity be considered. National Grid</li> </ul>	<p>13.1 through to 13.8 in Volume II.</p> <ul style="list-style-type: none"> <li>• Baseline information used to inform the landscape assessment was agreed with stakeholders and is described in Section 13.6 and Appendix 13.1: Landscape Baseline and Assessment in Volume III (which includes the East of England Typology and Lands of the Fanns study). A summary of effects across the East of England Typology is provided in Appendix 13.1 in Volume III.</li> <li>• Baseline information used to inform the visual assessment was agreed with stakeholders and is described in Section 13.6 and Appendix 13.2: Visual Baseline and Assessment in Volume III (which includes representative viewpoints, selected after a review of baseline information including Neighbourhood Plans).</li> <li>• The ZTV methodology was agreed with stakeholders and is described in Section 13.5 (which includes graded ZTVs sought by stakeholders).</li> <li>• Effects on residential visual amenity will be considered in the ES as the PEIR does not go into that level of detail.</li> <li>• The potential for ‘wirescape’ effects with existing overhead lines is considered in Appendix 13.1: Landscape Baseline and</li> </ul>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	<p>agreed to provide further clarification.</p> <ul style="list-style-type: none"> <li>• Cumulative effects – stakeholders requested that cumulative ‘wirescape’ effects be considered, noting Bramford Substation and the Bramford to Twinstead Project.</li> <li>• Pylon design – stakeholders requested further information on the use of T-pylons as an alternative to the standard lattice towers.</li> </ul>	<p>Assessment and Appendix 13.2: Visual Baseline and Assessment in Volume III. Potential cumulative effects with other developments including Bramford to Twinstead will be given further consideration in the ES.</p> <ul style="list-style-type: none"> <li>• The PEIR assumes the pylon design will comprise steel lattice pylons. Pylon design will be confirmed within the ES following further assessment work.</li> <li>• Further information on the use of T-pylons is included in Appendix B of the 2024 Design Development Report.</li> </ul>
<p>EIA Viewpoints Meeting, Norfolk, February 2023:</p> <ul style="list-style-type: none"> <li>• Norfolk County Council</li> <li>• South Norfolk District Council</li> </ul>	<p>The purpose of the meeting was to seek agreement on viewpoint locations in the county of Norfolk. The local planning authorities provided feedback on viewpoint locations at the meeting and in subsequent correspondence.</p>	<p>The viewpoints requested by the local planning authorities were considered in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>EIA Viewpoints Meeting, Essex, February 2023:</p> <ul style="list-style-type: none"> <li>• Essex County Council</li> <li>• Essex Place Services</li> <li>• Braintree District Council</li> <li>• Brentwood Borough Council</li> <li>• Chelmsford City Council</li> </ul>	<p>The purpose of the meeting was to seek agreement on viewpoint locations in the county of Essex. The local planning authorities and Essex Place Services provided feedback on viewpoint locations at the meeting and in subsequent correspondence.</p>	<p>The viewpoints requested by the local planning authorities were considered in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
<ul style="list-style-type: none"> <li>Colchester Borough Council</li> </ul>		
<p>EIA Viewpoints Meeting, Thurrock, February 2023:</p> <ul style="list-style-type: none"> <li>Thurrock Council</li> <li>Essex Place Services</li> </ul>	<p>The purpose of the meeting was to seek agreement on viewpoint locations in Thurrock. Thurrock and Essex Place Services provided feedback on viewpoint locations at the meeting and in subsequent correspondence.</p>	<p>The viewpoints requested by Thurrock Council were considered in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>EIA Viewpoints, Suffolk, February 2023:</p> <ul style="list-style-type: none"> <li>Suffolk County Council</li> </ul>	<p>The purpose of the meeting was to seek agreement on viewpoint locations in the county of Suffolk. Suffolk County Council provided feedback on viewpoint locations at the meeting and in subsequent correspondence.</p>	<p>The viewpoints requested by Suffolk County Council were considered in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>EIA Viewpoints Meeting, Norfolk, May 2023:</p> <ul style="list-style-type: none"> <li>Norfolk County Council</li> <li>South Norfolk Council</li> </ul>	<p>The purpose of the meeting was to present and discuss National Grid's response to viewpoint location feedback from the February meeting. Details of revised and additional viewpoints were presented, based on the feedback. The local planning authorities provided feedback on updated and additional viewpoint locations at the meeting and in subsequent correspondence.</p> <p>The proposed approaches to the production of the ZTV and visualisations for the PEIR and ES were also presented and discussed.</p>	<p>Additional viewpoint location feedback was considered further in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed assessment in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>EIA Viewpoints Meeting, Essex, May 2023:</p> <ul style="list-style-type: none"> <li>Essex County Council</li> </ul>	<p>The purpose of the meeting was to present and discuss National Grid's response to viewpoint location feedback from the February meeting. Details of</p>	<p>Additional viewpoint location feedback was considered further in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed</p>

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
<ul style="list-style-type: none"> <li>• Basildon Council</li> <li>• Braintree District Council</li> <li>• Brentwood Borough Council</li> <li>• Chelmsford City Council</li> <li>• Colchester Borough Council</li> </ul>	<p>revised and additional viewpoints were presented, based on the feedback. The local planning authorities provided feedback on updated and additional viewpoint locations at the meeting and in subsequent correspondence.</p> <p>The proposed approaches to the production of the ZTV and visualisations for the PEIR and ES were also presented and discussed.</p>	<p>assessment in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>EIA Viewpoints Meeting, Thurrock, May 2023:</p> <ul style="list-style-type: none"> <li>• Thurrock Council</li> </ul>	<p>The purpose of the meeting was to present and discuss National Grid's response to viewpoint location feedback from the February meeting. Details of revised and additional viewpoints were presented, based on the feedback. Thurrock Council provided feedback on updated and additional viewpoint locations at the meeting and in subsequent correspondence.</p> <p>The proposed approaches to the production of the ZTV and visualisations for the PEIR and ES were also presented and discussed.</p>	<p>Additional viewpoint location feedback was considered further in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed assessment in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<p>EIA Viewpoints Meeting, Suffolk, May 2023:</p> <ul style="list-style-type: none"> <li>• Suffolk County Council</li> <li>• Babergh District Council and Mid Suffolk District Council</li> </ul>	<p>The purpose of the meeting was to present and discuss National Grid's response to viewpoint location feedback from the February meeting. Details of revised and additional viewpoints were presented, based on the feedback. The local planning authorities provided feedback on updated and additional viewpoint locations at the meeting and in subsequent correspondence.</p> <p>The proposed approaches to the production of the ZTV and visualisations for the PEIR and ES were also presented and discussed.</p>	<p>The additional viewpoint location feedback was considered further in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed assessment in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>
<p>Correspondence undertaken by email between May 2023 and March 2024:</p> <ul style="list-style-type: none"> <li>• Norfolk County Council</li> <li>• South Norfolk Council</li> <li>• Suffolk County Council</li> <li>• Babergh District Council and Mid Suffolk District Council</li> <li>• Essex County Council</li> <li>• Tendring District Council</li> <li>• Basildon Council</li> <li>• Braintree District Council</li> <li>• Brentwood Borough Council</li> <li>• Chelmsford City Council</li> </ul>	<p>The purpose of the ongoing correspondence was to share information, respond to viewpoint location feedback received after May 2023 meetings, and to review subsequent ongoing feedback up until March 2024 with the aim to agree VP locations for PEIR and ES and also take into account potential additional locations for ES.</p>	<p>The ongoing additional viewpoint location feedback was considered further in the selection of viewpoints for PEIR and ES. The PEIR viewpoints are listed assessment in Appendix 13.2: Visual Baseline and Assessment in Volume III. Additional viewpoints will be considered for inclusion within the ES.</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<ul style="list-style-type: none"> <li>• Colchester Borough Council</li> <li>• Thurrock Council</li> <li>• Suffolk Coast and Heaths and Dedham Vale National Landscape (AONB) Authorities</li> </ul>		

13.4.3 In addition to stakeholder engagement, meetings have been held with the North Falls and Five Estuaries wind farm project teams. These wind farms are proposed to be located off the coast of East Anglia and connect into the proposed EACN Substation. Both projects involve the construction of new substations, which are proposed to be located adjacent to the EACN Substation. Project teams have worked collaboratively to reduce potential cumulative effects. Engagement with a third customer, an interconnector being progressed by Tarchon, has to date been more limited due to the earlier stage of their project development. Collaborative engagement will continue to inform the assessments in the ES.

## 13.5 PEIR Approach and Methods

13.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology / approach used to undertake the preliminary assessment of Landscape and Visual effects. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

13.5.2 The assessment is based on the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013), which promotes landscape and visual impact assessment that is proportional to the scale and nature of the proposals and the likely landscape and visual effects.

### Study Area

13.5.3 The Scoping Report (National Grid, Nov 2022) proposed that the study area for the ES would comprise 3 km and 1 km distance from the proposed Order Limits for the overhead lines and CSE compounds / EACN Substation and underground cable route(s), respectively. The Planning Inspectorate stated in the Scoping Opinion (Dec 2022), ‘...that the study area and ZTV should represent the extent of the likely impacts from all phases of the Proposed Development (including construction, maintenance and decommissioning) and should encompass long views from within the Dedham Vale AONB’.

- 13.5.4 The proposed landscape and visual study area has been reviewed in light of further assessment work undertaken in preparation of the PEIR. The emphasis of this preliminary assessment is based on landscape and visual receptors lying within 3 km of the operational overground elements of the Project and 1 km of the operational underground cable route where it is considered that significant landscape and visual effects are most likely to occur. The operational overground elements of the Project include the 400 kV overhead lines, the CSE compounds, extended Norwich Main Substation, extended Bramford Substation and the proposed EACN Substation. With regard to Tilbury Substation the operational changes would be within the existing substation footprint and therefore the preliminary assessment related to this element is focussed within 1 km. In addition to this a 1 km buffer has also been applied to proposed improvements to the existing carriageway along Bentley Road (Section C), required to provide access to the EACN Substation as this extends approximately 4.6 km to the south-east of the proposed EACN Substation.
- 13.5.5 More distant viewpoints up to 5 km from the Project are considered where there is the potential for significant visual effects to arise beyond the 3 km study area, for example where there are particularly sensitive visual receptors and where topography allows more far-reaching views.
- 13.5.6 The overall landscape and visual study area considered in the PEIR is shown on Figure 13.1: LVIA Study Area and Landscape Designations in Volume II.
- 13.5.7 The study area will continue to be reviewed, in the light of feedback received during statutory consultation, ongoing site surveys, and following the production of updated ZTVs as the Project develops. This is to assist in capturing all potentially significant effects in the assessment.

## Existing Baseline

### Data Collection

- 13.5.8 The baseline assessment has been informed by a desk study which has drawn on the following key information sources:
- Mapping and data
    - Ordnance Survey (OS) Maps at 1:50,000 and 1:25,000 scales
    - Aerial photography, Google Earth, and Google Maps Street View
    - Open-source GIS data
    - Aerial imagery (2022) - Digital surface model (DSM) tiles, Digital terrain model (DTM) tiles, Ortho-mosaic tiles and tree crown mapping were provided for the Scoping Report Corridor. Imagery at a resolution of 3 cm Ground Sampling Distance were captured using fixed-wing aircraft
  - Landscape Character Assessment (LCA)
    - Natural England's National Character Area profiles (Natural England, 2014)
    - Natural England's National Historic Landscape Characterisation (NHLC) Project

- East of England Landscape Typology (Landscape East, 2010)
- South Norfolk District LCA (LUC, 2001)
- Suffolk LCA (Suffolk County Council, 2010)
- Tendring District LCA (LUC, 2001)
- Colchester Borough LCA (CBA, 2005)
- Braintree, Brentwood, Chelmsford, Maldon and Uttlesford LCAs (CBA, 2006)
- Essex LCA (CBA, 2003)
- LCA of Basildon Borough (The Landscape Partnership, 2014)
- Thurrock Landscape Capacity Study (CBA, 2005)
- Land of the Fanns, LCA (Alison Farmer Associates, 2016)
- Designated landscape publications
  - The Dedham Vale Landscape (LDA for the Countryside Commission, 1997)
  - Dedham Vale AONB Natural Beauty and Special Qualities and Perceived and Anticipated Risks (Alison Farmer Associates, 2016)
  - Dedham Vale AONB and Stour Valley Project Area<sup>64</sup> Management Plan (Dedham Vale National Landscape and Stour Valley Project Area Partnership, 2021-26)
  - Dedham Vale AONB and Stour Valley Project Area State of the AONB Report 2018 (LUC, 2019)

## Site Visit and Surveys

- 13.5.9 Field survey work was carried out during several visits under differing weather conditions between winter 2022 and winter 2023/2024, and records were made in the form of field notes and photographs. Field survey work included visits to the draft Order Limits, viewpoints and designated landscapes, and extensive travel around the study area to consider likely effects on landscape character and on experiences of views seen from designated landscapes, settlements / communities, and routes. Field work has been undertaken during summer and winter months to fully understand the maximum level of visibility as part of the landscape and visual baseline.

## Further Data to be collected to inform the ES

- 13.5.10 The Landscape and Visual ES chapter will include baseline data gathered from other ES chapters where relevant. This will include data from Chapter 8: Ecology and Biodiversity, Chapter 11: Historic Environment, Chapter 15: Socio-economics, Recreation and Tourism and Chapter 16: Traffic and Transport.

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<sup>64</sup> The Stour Valley Project Area does not form part of the Dedham Vale National Landscape but has been identified as an important landscape by local residents and statutory and non-statutory organisations and is therefore considered in the Management Plan for the National Landscape.

13.5.11 Additional baseline photography was also captured in winter 2023/2024 for additional viewpoints to be considered in the ES. These viewpoints will be agreed with Essex, Thurrock, Suffolk, and Norfolk.

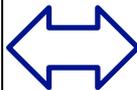
## PEIR Assessment Methodology

- 13.5.12 The preliminary LVIA determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 13.5.13 The identification of landscape and visual effects is the result of applying professional judgement within an evidence-based assessment process.
- 13.5.14 The assessment of landscape and visual effects first considers potential sources of effects, during both construction and operation (and maintenance).

### Approach to LVIA

- 13.5.15 The basis of identifying and describing effects is a consideration of the nature of receptors, and the nature of the effect. The factors considered in describing landscape and visual effects include susceptibility of receptors to the specific effects of the Project and the value of the receptor affected (which combine to form a judgement on sensitivity) and the scale, geographical extent, duration, and reversibility of effect (which combine to form a judgement on magnitude of change). These factors will be fully described in the ES.
- 13.5.16 The diagram below is intended to assist the decision-maker in understanding the key principles in identifying the significance of landscape and visual effects.

Diagram 13.1 - Key Principles in Identifying Significance of Landscape and Visual Effects

	<b>Less likely to be Significant</b>		<b>More likely to be Significant</b>
Landscape	The Project is reasonably well accommodated within the landscape and does not contrast with key characteristics. It does not substantially undermine the special qualities or valued characteristics of the landscape. The effect is small in scale, short-lived and easily reversible.		The Project contrasts with the character of the landscape, forming a clear feature which substantially alters the valued characteristics or special qualities. The effect is large in scale, long-lasting and difficult to reverse.
Visual Amenity	The Project is seen at locations where attention is less focussed on surroundings, affects relatively few receptors and is limited in value.		The Project is seen at locations where attention is focussed on surroundings, affects many receptors and views are of high

	<b>Less likely to be Significant</b>		<b>More likely to be Significant</b>
	The Project is generally well accommodated in views and the effect is typically small in scale, short-lived and easily reversible.		value. The Project is a contrasting or clear element in the view and the effect is large in scale, long-lasting and difficult to reverse.

- 13.5.17 Significant effects are those which should be given greatest weight in decision making. They typically concern substantial, long-lasting, and irreversible changes to receptors of the greatest sensitivity. However, there may be cases where, for example, a receptor is of such sensitivity that even a small change might constitute a significant effect.
- 13.5.18 The direction of landscape and visual effects (positive, negative, or neutral – the terms used in this PEIR) are determined in relation to the degree to which the Project fits with the existing character of the landscape or view and the contribution that the Project makes, even if it contrasts with the existing character of the landscape or view. About transmission infrastructure, potential landscape and visual effects have been assumed to be negative and were determined as such within the assessment unless otherwise stated.

### **General Methodology**

- 13.5.19 The methodology is based on guidance set out in GLVIA3 and draws on the TIN 08/15 and TGN 02-21.
- 13.5.20 The key steps in the methodology for assessing both landscape and visual effects include:
- The area from which the Project may theoretically be visible was established through creation of a ZTV covering up to 5 km from the Project (see Figures 13.8.1 to 13.8.11: Zone of Theoretical Visibility of Project by Section / CSE compounds / substations in Volume II)
  - The landscape of the study area was analysed, and landscape receptors identified
  - The visual baseline was recorded in terms of the places where people would be affected by views of the Project, and the nature of views and visual amenity, seen by different groups of people
  - Viewpoints were selected (including representative viewpoints, specific viewpoints, and illustrative viewpoints), in consultation with local planning authorities, National Landscape (an AONB) authorities and Natural England
  - Likely effects on landscape and visual resources were identified
  - The significance of landscape and visual effects, for the PEIR, has been judged with reference to guidance and professional judgement

### **Zone of Theoretical Visibility Mapping**

- 13.5.21 An appraisal of the theoretical extent to which the Project would be visible has been informed by establishing a ZTV, using specific computer software designed to calculate

the theoretical visibility of the above ground elements of the Project including pylons, CSE compounds and substations.

- 13.5.22 The ZTV has been used as a starting point in the assessment to provide an indication of theoretical visibility. The ZTV outputs have been ground truthed in the field so that the assessment conclusions better represent the potential visibility of the Project. The ZTVs produced for the PEIR will be refined and updated for the ES to capture any changes in the design of the Project following submission of the PEIR and feedback from the statutory consultation. Updated ZTVs will be presented within the ES.
- 13.5.23 DTM used for the ZTV analysis is LiDAR 2 m DTM data which has been obtained from Defra<sup>65</sup>.
- 13.5.24 Woodland blocks are modelled into the ZTVs, using the National Forest Inventory mapping dataset which has been assigned a height of 15 m. This is considered a conservative approach to represent the likely screening/filtering effects of mature woodland. However, the ZTVs do not consider the additional screening and filtering effects of hedgerow and field trees, small copses or more recently planted trees, woodland and hedgerows which are found in many places throughout the study area. The ZTVs also do not account for any proposed planting within Environmental Areas around CSE compounds, substations and substation extensions. This is considered sufficient for a preliminary assessment of the type required at this stage.
- 13.5.25 The ZTV maps in Figures 13.8.1 to 13.8.11 in Volume II show theoretical visibility of different elements of the Project up to a distance of 5 km, and illustrate the following:
- Figure 13.8.1 - ZTV of Proposed 400 kV Overhead Line (Numbers of Pylons) – heat mapping to show numbers of structures theoretically visible (within 10 km in each direction). The ZTV has been prepared based on proposed pylon positions. The theoretical visibility of individual pylons has been limited to a maximum distance of 10 km. This is considered to be a reasonable and proportionate and worst case approach for ZTV modelling. In most instances pylons are likely to be barely perceptible beyond 5 km and therefore unlikely to give rise to significant effects. This is because at 5 km distance, when viewed at arm's length, a 50 m tall pylon would appear to be approximately 6 mm high in the landscape. This is known as the apparent height of the pylon
  - Figure 13.8.2 - ZTV of Proposed 400 kV Overhead Line (Proportions of Pylons) – mapping to illustrate proportions of structures theoretically visible, based on full pylon (100%), top half of pylon (50%) and top of pylon (10%)
  - Figure 13.8.3 – ZTV of Norwich Main Substation Extension - mapping to illustrate visibility of substation extension at maximum proposed height
  - Figure 13.8.4 – ZTV of CSE Compounds in the Waveney Valley - mapping to illustrate proportions of gantries theoretically visible (being tallest elements of the CSE compound), based on full height of gantry (100% visibility of full CSE compound to the ground) top half of gantry (50%) and top part of the gantry (10%)
  - Figure 13.8.5 – ZTV of Bramford Substation Extension - mapping to illustrate visibility of substation extension at maximum proposed height

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<sup>65</sup> Available at: <https://environment.data.gov.uk/DefraDataDownload/>

- Figure 13.8.6 – ZTV of CSE Compound north of Dedham Vale National Landscape (an AONB) - mapping to illustrate proportions of gantries theoretically visible (being tallest elements of the CSE compound), based on full height of gantry (100% visibility of full CSE compound to the ground) top half of gantry (50%) and top part of the gantry (10%)
- Figure 13.8.7 – ZTV of the EACN Substation – mapping to illustrate visibility of substation at maximum proposed height
- Figure 13.8.8 – ZTV of CSE Compounds south of Dedham Vale National Landscape (an AONB) - mapping to illustrate proportions of gantries theoretically visible (being tallest elements of the CSE compound), based on full height of gantry (100% visibility of full CSE compound to the ground) top half of gantry (50%) and top part of the gantry (10%)
- Figure 13.8.9 – ZTV of CSE Compound north of Fairstead - mapping to illustrate proportions of gantries theoretically visible (being tallest elements of the CSE compound), based on full height of gantry (100% visibility of full CSE compound to the ground) top half of gantry (50%) and top part of the gantry (10%)
- Figure 13.8.10 – ZTV of CSE Compound near Southfields - mapping to illustrate proportions of gantries theoretically visible (being tallest elements of the CSE compound), based on full height of gantry (100% visibility of full CSE compound to the ground) top half of gantry (50%) and top part of the gantry (10%)
- Figure 13.8.11 – ZTV of Tilbury Substation Works - mapping to illustrate visibility of new elements within the existing compound at Tilbury Substation, at maximum proposed height

## Methodology for Baseline Photography and the Production of Wirelines

### Viewpoint Photography

- 13.5.26 Viewpoint photography has been undertaken in accordance with guidance from the Landscape Institute (Landscape Institute, 2019). The focal lengths used are in accordance with recommendations contained in guidance and are stated on Figures 13.9.1 to 13.9.89: Wireline Visualisations in Volume II. Photography was undertaken between winter 2022 and winter 2024. A Nikon D750 full frame sensor digital single lens reflex (SLR) camera with a fixed 50 mm focal length lens was used to undertake photography from all viewpoint locations.
- 13.5.27 A tripod with vertical and horizontal spirit levels was used to provide stability and to ensure a level set of adjoining images. The cameras were orientated to take photographs in landscape format. A panoramic head was used in each instance to ensure the camera rotated about the no-parallax point of the lens to eliminate parallax errors between the successive images and enable accurate stitching of the images. The camera was moved through increments of 24° (degrees) and rotated through a full 360° at each viewpoint. Fifteen photographs were taken for each 360° view.
- 13.5.28 The location of each viewpoint and information about the conditions at the time of the photographs being taken was recorded in the field in accordance with LI guidance (LI, 2019).

- 13.5.29 Weather conditions and visibility were considered an important aspect of the field visits for the photography. Where possible, visits were planned around clear days with good visibility. Viewpoint locations were visited at appropriate times of day to ensure, as far as possible, that the sun lit the scene from behind, or to one side of the photographer. South facing viewpoints can present problems particularly in winter when the sun is low in the sky. Photography opportunities facing into the sun were avoided where possible to prevent the overhead transmission infrastructure appearing in silhouette.

### Photography Stitching

- 13.5.30 Photographic stitching software PTGui© was used to stitch together the adjoining frames to create panoramic baseline photography using cylindrical projection.

### Wireline Production

- 13.5.31 The software packages Autodesk 3DSMax and Blender were used to create a 3D Environment model. A Digital Terrain Model (DTM) was created within the 3D model from OS Terrain® 5; Environment Agency LiDAR data was also used. The DTM includes the Project extents, viewpoint locations and all landform visible within the baseline photography. Overhead transmission line infrastructure, CSE compounds, substations and viewpoint location co-ordinates were added. The 3D model views were aligned using the DTM and control points visible within the baseline photography. The wirelines were exported from the 3D model and overlaid on the photography to create photowirelines. It is important to note that the photowirelines do not account for screening or filtering of views towards the Project by existing buildings and / or vegetation in baseline views nor do they reflect instances where existing electricity infrastructure would be removed such as existing 132 kV pylons and lower voltage wood poles.

### Figure Layout

- 13.5.32 Adobe InDesign© software was used to present the figures. The dimensions for each image (printed height and field of view) are detailed below and each viewpoint visualisation has been presented as follows:
- 90° Baseline photograph (cylindrical projection) on page 1 and 90° Wireline image (cylindrical projection) on page 2. Wireline image shows the overhead line, cable sealing end compound and / or substation extension, where visible:
    - Page size: 841 x 297 mm
    - Up to four x 90° sections presented in this format

## Preliminary Assessment Key Parameters and Assumptions

- 13.5.33 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are accounted for in the assessment.
- 13.5.34 Several assumptions and limitations are made in relation to the information presented in this chapter. These reflect the evolving nature and preliminary stage of the Project:

- The survey and assessment work is ongoing. The preliminary assessment focuses on landscape and visual receptors which would potentially experience significant effects
- The preliminary assessment assumes that vegetation removed during construction would be reinstated, except where there are planting restrictions associated with requirements to maintain an overhead line safety clearance and over underground cables. Vegetation clearance for the overhead line and underground cabling is set out in Chapter 4: Project Description

13.5.35 The key parameters and assumptions will be reviewed based on the design presented in the DCO application and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

## Further Assessment within the ES

13.5.36 The ES will present a full detailed assessment based on guidance in GLVIA3 and drawing on the TIN 08/15 and TGN 02-21. The ES will be accompanied by a detailed methodology setting out the factors which will be considered in forming a judgement on the significance of landscape and visual effects.

13.5.37 Judging the significance of landscape and visual effects requires consideration of the nature of the receptor and the nature of the effect on the receptor. GLVIA3 states that the nature of receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the receptor. Sensitivity judgements will be recorded as high, medium, or low. The nature of the effect on each receptor, commonly referred to as its magnitude, should be assessed in terms of size and scale; geographical extent; duration and reversibility. Magnitude of change will be recorded as high, medium, low, or negligible. Intermediate judgements (e.g., medium-high, low-medium) will be used where necessary.

13.5.38 Judgements of sensitivity and magnitude will then be combined to form a judgement regarding the overall significance of effect. Levels of landscape or visual effect will be categorised as major, moderate, minor or negligible / no effect. 'Moderate' and 'major' effects are considered significant in the context of the EIA Regulations. The nature of effects will be described as positive (beneficial), neutral or negative (adverse).

13.5.39 The ES will provide final details of embedded, standard, and additional mitigation measures which will be informed by the findings of the PEIR and statutory consultation.

## 13.6 Baseline Conditions

13.6.1 Baseline conditions have been gathered from desk-based information and site surveys and are presented with reference to the section of the Project that they are located within.

13.6.2 Detailed baseline information is also presented in Appendix 13.1: Landscape Baseline and Assessment and Appendix 13.2: Visual Baseline and Assessment in Volume III with a summary presented in the paragraphs that follow.

## Section A – South Norfolk

### Landscape Character

- 13.6.3 Section A is located mainly within the South Norfolk and High Suffolk Claylands National Character Area (NCA) (83), between Norwich in the north and Diss in the south (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape comprises a flat to gently undulating plateau, dissected by river valleys including the valleys of the River Tas and River Waveney (see Figure 13.2: Landform and Drainage in Volume II). The River Waveney is characterised by its relatively large-scale open valley landscape. The valley is flat and low-lying, with regular pastoral fields and dense tree and scrub cover. The settlement of Diss / Roydon occupies part of the valley. In terms of the East of England Typology, the plateau is characterised as part of the Settled Plateau Claylands Landscape Character Type (LCT) and Wooded Plateau Claylands LCT, the latter containing a higher proportion of woodland (see Figure 13.3: Trees and Woodland in Volume II). The tributary valleys are classified as Valley Meadowlands LCT along the valley floors, with Valley Settled Farmlands LCT on the valley sides.

### Designated Landscapes

- 13.6.4 There are no designated landscapes within Section A (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

### Visual Receptors and Views

- 13.6.5 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Mulbarton, Fornsett End and Diss / Roydon (see Figure 13.4: Settlements and Infrastructure in Volume II). The A47, A140 and A1066 pass through the study area, in proximity to Norwich, and there is an extensive network of B-roads and minor roads. There is a network of public rights of way (PRoW) and long-distance routes including the Boudicca Way and Angles Way. Although a well-wooded landscape, from the elevated plateau there are frequent longer views. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. Baseline photographs for representative viewpoints in Section A are provided in Figures 13.9.1 to 13.9.14: Wireline Visualisations in Volume II.

## Section B – Mid Suffolk

### Landscape Character

- 13.6.6 Section B is located within the South Norfolk and High Suffolk Claylands NCA (83) and South Suffolk and North Essex Clayland NCA (86), between Diss in the north and Bramford in the south (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape comprises a flat to gently undulating plateau, dissected by tributary streams including the River Waveney and River Gipping (see Figure 13.2: Landform and Drainage in Volume II). In terms of the East of England Typology, the plateau is characterised as part of the Settled Plateau Claylands LCT and Wooded Plateau Claylands LCT, the latter containing a higher proportion of woodland (see Figure 13.3: Trees and Woodland in Volume II). The tributary valleys which dissect

the plateau are classified as Valley Meadowlands LCT along the valley floors, with Valley Settled Farmlands LCT on the valley sides.

### **Designated Landscapes**

- 13.6.7 There are no designated landscapes within Section B (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

### **Visual Receptors and Views**

- 13.6.8 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Palgrave, Mellis, Gislingham, Mendlesham, Stowupland, Stowmarket, Needham Market and Bramford (see Figure 13.4: Settlements and Infrastructure in Volume II). The A143 and A14 pass through the study area, the latter passing through Stowmarket and Needham market, and there is an extensive network of B-roads and minor roads. There is a network of PRoW and long-distance routes including the Angles Way, Mid Suffolk Footpath and Gipping Valley River Path. Although a well-wooded landscape, from the elevated plateau there are frequent longer views. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. Baseline photographs for representative viewpoints in Section B are provided in Figures 13.9.15 to 13.9.34: Wireline Visualisations in Volume II.

## **Section C – Babergh, Colchester and Tendring**

### **Landscape Character**

- 13.6.9 Section C is located within the South Suffolk and North Essex Clayland NCA (86) and Northern Thames Basin NCA (111), between Bramford in the north and Ardleigh in the south (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape comprises a wide plateau crossed by numerous valleys including the broad valley of the River Stour (see Figure 13.2: Landform and Drainage in Volume II). In terms of the East of England Typology, the northern end of Section C is part of the Wooded Plateau Claylands LCT, crossed by the Valley Settled Farmlands LCT along the course of the Wash Brook. Along the Stour Valley, the floor is part of the Valley Meadowlands LCT, with Valley Settled Farmlands LCT on the upper sides and Plateau Estate Farmlands LCT on the wooded plateau above the valley. To the south, around Ardleigh, the Plateau Estate Farmlands LCT predominates.

### **Designated Landscapes**

- 13.6.10 The River Stour and its enclosing valley sides and plateau edge form part of the Dedham Vale National Landscape (an AONB). The National Landscape is a lowland river valley landscape, located on the Essex/Suffolk border. It covers the lower reaches of the River Stour and is very low-lying, with the valley floor typically lying at between 0 m and 20 m Above Ordnance Datum (AOD), rising to gentle ridges to the north and south, lying at between 30 m and 60 m AOD.
- 13.6.11 The 'special qualities' of the National Landscape are summarised in the former Countryside Commission's publication 'The Dedham Vale Landscape' (1997) and a

later study by Allison Farmer Associates (2016)<sup>66</sup>. The Allison Farmer study summarises the ‘special qualities’ as follows:

- *‘Iconic lowland river valley associated with the artist John Constable RA, the views he painted are still recognisable today*
- *Historic villages with timber framed housing and prominent churches*
- *Valley bottoms grazing marshes with associated drainage ditches and wildlife*
- *Naturally functioning River Stour with associated tributaries, meres, and historic river management features*
- *Semi natural ancient woodlands on valley sides with associated wildlife*
- *Traditional field boundaries intact and well managed*
- *Apparent and buried archaeology indicating millennia of human activity*
- *A sense of relative tranquillity*
- *Surprisingly long-distance views from higher ground along the valley in an area associated with large skies’ (Page 83)*

## Visual Receptors and Views

13.6.12 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Capel St Mary, Stratford St Mary, Dedham and Ardleigh (see Figure 13.4: Settlements and Infrastructure in Volume II). The A1071, A12, A137 and A120 pass through the Study Area, and there is an extensive network of B-roads and minor roads. There is a network of PRoW and long-distance routes including the Gipping Valley River Path, Essex Way, St Edmund Way, Stour Valley Path, and National Cycle Network (NCN) Routes 1 and 51. Although a relatively well-wooded landscape, from the sometimes more open and elevated plateaus there are frequent longer views. Within valleys, views are often contained by the enclosing landform and/or trees and hedgerows. Within Dedham Vale National Landscape (an AONB), views within the Stour Valley tend to be contained by landform and vegetation. Woodland on the plateau edges filters outward views. Baseline photographs for representative viewpoints in Section C are provided in Figures 13.9.35 to 13.9.50: Wireline Visualisations in Volume II.

## Section D – Colchester

### Landscape Character

13.6.13 Section D is located mainly within the Northern Thames Basin NCA (111), with its western extents in the South Suffolk and North Essex Clayland NCA (86). It runs between Ardleigh in the east and Coggeshall in the west (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape comprises a flat to gently undulating plateau, dissected by the broad valley of the River Colne which runs west to east (see Figure 13.2: Landform and Drainage in Volume II). In

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<sup>66</sup> Available at: <https://dedhamvale-nl.org.uk/wp-content/uploads/2021/04/Natural-Beauty-and-Special-Qualities-and-Perceived-and-Anticipated-Risks-Final-Report-July-2016-1.pdf>

terms of the East of England Typology, the plateau is part of the Plateau Estate Farmlands LCT and Wooded Plateau Farmlands LCT. The Colne Valley is identified as Valley Meadowlands LCT along the valley floor, rising to Valley Settled Farmlands LCT on the valley sides. The northern and western extents of Colchester are identified as being of urban character.

### **Designated Landscapes**

- 13.6.14 Section D lies to the south of Dedham Vale National Landscape (an AONB) (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II), with part of the Landscape and Visual study area for this section lying within the National Landscape (and AONB).

### **Visual Receptors and Views**

- 13.6.15 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Colchester, Great Horkeley, West Bergholt and Marks Tey (see Figure 13.4: Settlements and Infrastructure in Volume II). The A134, A1124, A120 and A12 pass through the study area, and there is an extensive network of B-roads and minor roads. There is a network of PRow and long-distance routes including the Essex Way, St Edmund Way, Stour Valley Path and NCN Routes 1 and 13. Although a well-wooded landscape, from the elevated plateau there are frequent longer views. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. There are some elevated views from within Dedham Vale National Landscape (an AONB) although these are typically focused to the north, across the Stour Valley. Baseline photographs for representative viewpoints in Section D are provided in Figures 13.9.51 to 13.9.61: Wireline Visualisations in Volume II.

## **Section E – Braintree**

### **Landscape Character**

- 13.6.16 Section E is located within the South Suffolk and North Essex Clayland NCA (86), between Coggeshall in the east and Great Leighs in the west (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape is an undulating plateau dissected by numerous river valleys, including of the River Blackwater and River Brain (see Figure 13.2: Landform and Drainage in Volume II). In terms of the East of England Typology, the plateau is part of the Wooded Plateau Farmlands LCT, dissected by the Valley Settled Farmlands LCT along the river valleys. The settlement of Witham is identified as an area of urban character.

### **Designated Landscapes**

- 13.6.17 There are no designated landscapes within Section E (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

### **Visual Receptors and Views**

- 13.6.18 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Coggeshall, Feering, Kelvedon, Silver End, Witham and

Black Notley (see Figure 13.4: Settlements and Infrastructure in Volume II). The A12 and A120 pass through the study area, and there is an extensive network of B-roads and minor roads. There is a network of PRoW and long-distance routes including the Essex Way and NCN Routes 16 and 50. Although a well-wooded landscape, from the elevated plateau there are frequent longer views. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. Baseline photographs for representative viewpoints in Section E are provided in Figures 13.9.62 to 13.9.67: Wireline Visualisations in Volume II.

## Section F – Chelmsford

### Landscape Character

- 13.6.19 Section F is located mainly within the South Suffolk and North Essex Clayland NCA (86), with its southern end in the Northern Thames Basin NCA (111). Section F runs between Great Leighs in the north-east and Ingatestone in the south-west, around the northern and western sides of Chelmsford (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape is an undulating plateau dissected by numerous river valleys, including of the River Ter, River Chelmer, and River Can (see Figure 13.2: Landform and Drainage in Volume II). In terms of the East of England Typology, the plateau is part of the Wooded Plateau Farmlands LCT, dissected by the Valley Settled Farmlands LCT along the river valleys. At the southern end of the route, it passes through the Wooded Hills and Ridges LCT, south-west of Chelmsford. Chelmsford is identified as being of urban character.

### Designated Landscapes

- 13.6.20 There are no designated landscapes within Section F (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

### Visual Receptors and Views

- 13.6.21 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Great Leighs, Great and Little Waltham, Roxwell, Writtle and Chelmsford (see Figure 13.4: Settlements and Infrastructure in Volume II). There are several A-roads connecting the larger settlements in the study area including the A131, A1060, A414 and A12, and there is an extensive network of B-roads and minor roads. There is a network of PRoW and long-distance routes including the Essex Way, Saffron Trail, Centenary Circle, St Peters Way and NCN Routes 13 and 50. The landscape is well-wooded (see Figure 13.3: Trees and Woodland in Volume II), and views are often contained by woodland and field boundary trees and hedgerows. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. Baseline photographs for representative viewpoints in Section F are provided in Figures 13.9.68 to 13.9.79: Wireline Visualisations in Volume II.

## Section G – Brentwood/Basildon

### Landscape Character

- 13.6.22 Section G is located within the Northern Thames Basin NCA (111), between Ingatestone in the north and West Horndon in the south (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape comprises a wide plateau divided by river valleys (see Figure 13.2: Landform and Drainage in Volume II). Section G is mostly within the Wooded Hills and Ridges LCT, in terms of the East of England Typology. At the southern end of Section G, a small area is within the Lowland Settled Claylands LCT. There are areas of urban character at Brentwood and Basildon.

### Designated Landscapes

- 13.6.23 There are no designated landscapes within Section G (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

### Visual Receptors and Views

- 13.6.24 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Ingatestone, Stock, Billericay, Brentwood, and Basildon (see Figure 13.4: Settlements and Infrastructure in Volume II). There are several A-roads connecting the larger settlements in the study area including the A12, A129 and A127, and there is an extensive network of B-roads and minor roads. There is a network of PRow and long-distance routes including NCN Route 13. A well-wooded landscape (see Figure 13.3: Trees and Woodland in Volume II), where views are often contained by woodland and field boundary trees and hedgerows. Within valleys views are often contained by the enclosing landform and/or trees and hedgerows. Baseline photographs for representative viewpoints in Section G are provided in Figures 13.9.80 to 13.9.84: Wireline Visualisations in Volume II.

## Section H – Thurrock

### Landscape Character

- 13.6.25 Section H is located mainly within the Northern Thames Basin NCA (111), with its southern end forming part of the Greater Thames Estuary NCA (81). Section H runs between West Horndon in the north and Tilbury in the south (see Figure 13.5: National Character Areas and East of England Typology in Volume II). The landscape is characterised by its extensive tracts of flat land, and forms part of a low-lying coastal landscape in its southern extents (see Figure 13.2: Landform and Drainage in Volume II). In terms of the East of England Typology, the landscape is part of the Lowland Settled Claylands LCT in the north and Lowland Settled Farmlands LCT in the south. Coastal areas are part of the Coastal Levels LCT which encompasses the north side of the Thames Estuary. There are areas of urban character at Basildon, Chadwell St Mary and Stanford-le-Hope. The Wooded Hills and Ridges LCT extends around the western and southern sides of Basildon.

## Designated Landscapes

- 13.6.26 There are no designated landscapes within Section H (see Figure 13.1: LVIA Study Area and Landscape Designations in Volume II).

## Visual Receptors and Views

- 13.6.27 Visual receptors are shown on Figure 13.7: Visual Receptors in Volume II. The larger settlements / communities are Basildon, Bulphan, Horndon on the Hill, Orsett, Stanford-le-Hope, Chadwell St Mary and East Tilbury (see Figure 13.4: Settlements and Infrastructure in Volume II). There are several A-roads connecting the larger settlements in the study area including the A128, A13, A1089 and A1013, and there is an extensive network of B-roads and minor roads. There is a network of PRoW and long-distance routes including the England Coast Path Route and NCN Link Route 13. There are some long and open views, including south towards the Thames Estuary. Baseline photographs for representative viewpoints in Section H are provided in Figures 13.9.85 to 13.9.89: Wireline Visualisations in Volume II.

## Future Baseline

- 13.6.28 The future baseline relates to known or anticipated changes to the current baseline in the future will be assessed as part of the Project in the ES.
- 13.6.29 Ash (*Fraxinus excelsior*) trees within the study area may be affected by ash dieback. This is a disease of ash trees caused by a fungus of Asian origin called *Hymenoscyphus fraxineus* (*H. fraxineus*; formerly called *Chalara fraxinea*). The disease causes leaf loss and crown dieback in affected trees. Mapping by Defra and the Forestry Commission confirms the presence of ash dieback in the study area. The future baseline therefore assumes that there would be loss of ash trees in the long term across the study area, but that other tree species would occupy gaps created in the short term, and overall levels of vegetation would remain like existing.
- 13.6.30 In contrast, some positive landscape changes are also anticipated. These relate to agri-environment and woodland planting schemes which would continue to enhance the landscape. For example, over the last decade there have been new areas of woodland and hedgerows planted in parts of the study area, for example new woodland planting at Fordham Hall Estate. Furthermore, it is anticipated the landscape being managed in accordance with the Dedham Vale AONB and Stour Valley Management Plan (Dedham Vale AONB, 2021) will continue to be enhanced by management practices and conservation and enhancement projects undertaken by the National Landscape (an AONB) and partners.
- 13.6.31 The future baseline includes consented proposals which are not yet present in the landscape but are expected to be constructed, and therefore should be assessed as part of the Project in the ES. There are applications for development within the study area, which may affect the landscape character or result in changes to visual amenity and people's views. Anticipated and committed developments that have considerable overlap with the draft Order Limits and therefore the potential to significantly affect the current baseline are detailed below. These, and other committed developments, are identified in Chapter 17: Cumulative Effects.

## **Bramford to Twinstead Reinforcement**

- 13.6.32 Bramford to Twinstead is a proposed network reinforcement between Bramford Substation in Suffolk and Twinstead Tee in Essex and is also part of the Great Grid Upgrade. The proposals include up to 18 km of overhead line and approximately 11 km of underground cable, the latter through the Dedham Vale National Landscape (an AONB) and in the Stour Valley. The proposals would include overhead line and underground cable entry into Bramford Substation from the south-west.
- 13.6.33 If approval is granted, Bramford to Twinstead is proposed to become operational in 2028. Bramford to Twinstead would therefore form part of the future baseline against which the cumulative effects of the Project would be assessed in the ES.

## **Five Estuaries Offshore Wind Farm and North Falls Offshore Wind Farm**

- 13.6.34 Five Estuaries Offshore Wind Farm is the proposed extension to the operational Galloper Wind Farm. It covers approximately 128 km<sup>2</sup> across two seabed areas and would be located approximately 37 km offshore at its closest point to Suffolk. Five Estuaries would make landfall in Tendring, Essex, before connecting to the Project near the EACN Substation.
- 13.6.35 North Falls Offshore Wind Farm is the proposed extension to the operational Greater Gabbard Offshore Wind Farm, located to the west of Galloper Offshore Wind Farm. It covers approximately 95 km<sup>2</sup> and would be approximately 42 km offshore at its closest point. North Falls would make landfall in Tendring, Essex, before connecting to the Project near the EACN Substation.
- 13.6.36 If approval is granted, Five Estuaries and North Falls are both proposed to become operational in 2030. The substations for both developments would be in proximity to (and connected to via underground cables) the EACN Substation, and would therefore form part of the future baseline against which the cumulative effects of the Project would be assessed in the ES. The design teams for the Project, Five Estuaries and North Falls are liaising closely to ensure compatibility with proposals including proposals for landscape mitigation.

## **Dunton Hills Garden Village**

- 13.6.37 The proposed Dunton Hills Garden Village covers approximately 225.75 ha of agricultural land and golf course to the west of Basildon, Essex. Approximately 19.5 ha of Dunton Hills Garden Village intersects with the draft Order Limits and much of this area forms landscaping within Dunton Hills Garden Village.
- 13.6.38 The construction period is currently unknown but if approved and commenced before Project construction, Dunton Hills Garden Village would form part of the future baseline against which the cumulative effects of the Project would be assessed. Residents in the Garden Village would be future visual receptors with potential views of the Project.

## **Lower Thames Crossing (LTC)**

- 13.6.39 LTC is a proposed new road crossing connecting Kent, Thurrock, and Essex. Approximately 23 km in length, it would connect to the existing road network from the A2/M2 to the M25 with two tunnels (one southbound and one northbound) beneath the River Thames.

- 13.6.40 If approval is granted, the LTC is proposed to become operational in 2029/2030. The LTC would therefore form part of the future baseline against which the cumulative effects of the Project would be assessed in the ES. Road users on the LTC would become future visual receptors with potential views of the Project. The design teams for the Project and LTC are liaising closely to ensure compatibility with proposals including ecological mitigation, as currently plans include mitigation within the Norwich to Tilbury draft Order Limits.

### **Thurrock Flexible Generation Plant**

- 13.6.41 Development for a flexible generation plant at Thurrock has been granted approval with works taking place during 2023 and 2024. Approximately 48 ha of the site intersects with the draft Order Limits.
- 13.6.42 Thurrock Flexible Generation Plant would form part of the future baseline against which the cumulative effects of the Project would be assessed in the ES.

### **Chelmsford North East Bypass (CNEB)**

- 13.6.43 The CNEB is a consented 4.6 km single carriageway bypass between Beaulieu Parkway in Chelmsford and a new roundabout on the A131 at Chatham Green. The CNEB intersects with the draft Order Limits to the east of Chatham Green.
- 13.6.44 Advanced enabling works for the CNEB are underway, although the construction period is currently unknown. Should the CNEB become operational before Project construction, road users would become future visual receptors with potential views of the Project.
- 13.6.45 As previously stated, it is recognised that no landscape is static and that the landscape across the study area is under different pressures and continually changing, albeit over relatively long timeframes. Further to a review of the above it is considered that there is the potential for changes to landscape character and views in some parts of the study area in the future, in the absence of the Project.

## **13.7 Embedded, Standard and Additional Mitigation Measures**

### **Embedded Mitigation**

- 13.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 13.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 13.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in Chapter 4: Project Description. Measures of relevance to the Landscape and Visual chapter include:
- Sensitive routeing and siting - as far as practicable effects on identified environmental and socio-economics receptors have been avoided and reduced

- Underground cables are proposed through Dedham Vale National Landscape (an AONB) and its immediate setting
- Prior to the commencement of construction works for the Project, several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected. The Project would follow the route of existing 132 kV overhead lines north of Flowton and north of Mellis, where the existing 132 kV overhead lines would be undergrounded
- The Project allows for the use of full line tension gantries at CSE compounds (where design allows). The use of full tension gantries may remove the need for a bulkier terminal pylon adjacent to the CSE compound which would reduce visual clutter and therefore help to reduce landscape and visual effects. The draft Order Limits include adequate room for planting and potentially mounding for additional screening. These are presented as 'Environmental Areas' on Figure 4.1: Proposed Project Design in Volume II
- Replacement planting would be undertaken at the earliest opportunity given the right planting season
- National Grid will consider the proposed materials and colour palette for the CSE compounds and substations / substation extensions, including buildings, security fencing, equipment, and surfacing; this will include options for surfacing of permanent access roads. National Grid will seek, as far as practicable, to choose materials and colours which help the Project to blend into the surrounding landscape. Proposed details will be provided in the ES

## Standard Mitigation

- 13.7.4 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 13.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures relating to Landscape and Visual effects. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- GG08: Where sensitive features are to be retained (i.e., veteran, and mature trees, and Ancient Woodland), an appropriate protective area or protection mechanisms will be established using appropriate equipment or fencing and signage and will be inspected, repaired, and replaced as necessary. The protective areas will be shown on the 'Retention and Reinstatement Plans' contained within the LEMP
  - LV01: An Environmental Manager(s)/ Environmental Clerk of Works will be appointed for the duration of the construction phase
  - LV02: A pre-condition survey will be undertaken to ensure appropriate reinstatement is undertaken
  - LV03: Sensitive areas, to be defined in the ES, will be protected during construction
  - LV04: Construction lighting will be directional and minimised where possible

- LV05: Where practicable, maintain elements within the landscape such as vegetation and hedgerows. Where vegetation cannot be retained, replacement will be used as appropriate (including re-instating hedgerows, fences, and walls)
- LV06: The Main Works Contractor(s) will apply the relevant protective principles set out in British Standard (BS) 5837:2012: Trees in relation to design, demolition, and construction. This will be applied to trees within the Order Limits which will be preserved through the construction phase, and to trees outside of the Order Limits where such measures do not hinder or prevent the use of the relevant working width for construction. All works to high grade trees, including trees under Tree Preservation Orders and veteran trees, will be undertaken by a suitably qualified and experienced arborist, and supervised by an AcoW

13.7.6 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

13.7.7 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, to further reduce significant environmental effects.

13.7.8 As a result of the preliminary assessment within this PEIR, as defined in section 13.9 below, the following additional mitigation measures are required:

- The construction methods and working widths required for installation of the underground cables will continue to be developed to seek to reduce loss of existing characteristic vegetation within Dedham Vale National Landscape (an AONB) and its setting. Where practicable, commitments will be made to reduce the working area through sensitive locations and the design developed to seek to avoid vegetation loss. Trenchless crossings are proposed at four locations within the National Landscape to cross the River Stour and areas of woodland

## Waveney Valley Alternative

13.7.9 Additional mitigation measures in the form of woodland, tree, scrub and hedgerow planting as part of 'Environmental Areas' would be required to filter and screen views of the two additional CSE compounds associated with the Waveney Valley Alternative.

## 13.8 Potential Residual Effects and Preliminary Likely Significant Effects

13.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation - embedded (design measures), standard practice, and any additional mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).

- 13.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals. The mitigation currently proposed is based on available validated data and professional judgement.
- 13.8.3 A full detailed assessment will be presented within the ES submitted with the Development Consent Order application.

## Preliminary Construction Effects

### Sources of Effects during Construction

- 13.8.4 The presence of partially constructed infrastructure and the undertaking of construction activities within the draft Order Limits would result in landscape and visual effects during the construction phase. As set out in Chapter 4: Project Description, it is estimated that the construction phase would take approximately four years in total (2027 to 2031). This assessment assumes that construction work would be undertaken in phases, and therefore that potential landscape and visual effects would be short to medium-term. Effects occurring during the construction phase would be reversible unless otherwise stated, as construction works would cease on completion. Some effects may be longer lasting e.g., felling of trees or removal of hedgerows.
- 13.8.5 The changes arising from the construction of the Project would be primarily associated with:
- Vegetation clearance
    - For overhead lines, including removal of a 40 m wide swathe (20 m either side of the overhead line) and potential additional removal or management of vegetation within 100 m (50 m either side of the overhead line). Vegetation would be removed to ground level or sufficient height to meet electrical clearances plus an allowance for growth
    - For underground cabling, including removal of a 120 m wide swathe of vegetation. Following construction, hedgerows would be replanted, however, trees would not be replanted above the cable sections and vegetation would be managed to ensure it does not affect the buried cables
    - For haul roads, typically within a 12 m wide swathe and potential additional removal of vegetation within a 20 m wide swathe
  - The installation of approximately 25 km of 400 kV underground cables using a combination of open cut and trenchless crossing techniques (some of which is located through Dedham Vale National Landscape (an AONB))
  - Construction of temporary construction compounds as shown on Figure 4.1: Proposed Project Design in Volume II and detailed in Table 4.4 in Chapter 4: Project Description
  - Construction of a largely continuous haul road for the length of the Project, typically 8 m in width with a working corridor 21 m in width
  - Preparation of accesses along existing roads and the temporary haul road, including site access points

- Movement of associated construction vehicles and personnel on existing roads and the temporary haul road and other tracks
- Provision of watercourse crossings
- Diversion, removal, undergrounding or protection of existing third-party services.
- Excavation and construction of pylon foundations
- Delivery, assembly, and erection of pylons
- Pylon conductor ‘stringing’ and commissioning of the overhead line
- Removal of temporary infrastructure and reinstatement, including landscape works
- The potential need for lighting during construction if work extends into hours of darkness
- Works and modifications to third-party assets to facilitate the construction of the Project

### Waveney Valley Alternative

- 13.8.6 For the Waveney Valley Alternative, there would be approximately 2 km less of overhead line constructed and the construction of approximately 2 km of additional underground cable. There would be two additional CSE compounds adjacent to terminal pylon RG084 and north of pylon RG091. The underground cable would cross the channels of the River Waveney via trenchless crossings. All other works listed in the above bullet points would remain consistent with the Waveney Valley Alternative.

### Landscape Effects during Construction

- 13.8.7 The Project crosses several LCAs and LCTs, as illustrated on Figure 13.6: Landscape Character Types and Landscape Character Areas in Volume II. The assessment in Tables A13.1.3 to A13.1.9 in Appendix 13.1: Landscape Baseline and Assessment in Volume III describes the likely effects on landscape character and landscape resources within the study area during construction in more detail. The assessment takes into account the mitigation measures set out in Section 13.8.
- 13.8.8 Most of the effects which would occur during the construction phase would be short to medium-term and largely reversible, limited to the draft Order Limits and the immediate surroundings from which construction activity may be perceptible. The main exceptions to this are the permanent changes relating to the introduction of the overhead line, underground cable, new EACN Substation, substation extensions at Norwich Main and Bramford and to a much lesser extent the substation works within the existing footprint at Tilbury. The landscape and visual effects arising from the presence of partially constructed pylons, and the cranes used to do this, would be comparable to the operation (and maintenance) effects.
- 13.8.9 Significant negative effects on the landscape during construction would be largely limited to the ‘host’ LCA or LCT, where direct effects would occur. Effects beyond the extents of the draft Order Limits would be indirect and largely related to construction of the partially erected pylons, CSE compounds, extended substations and EACN Substation. Significant negative effects are likely to be experienced from the following LCAs/LCTs because of direct or indirect effects during construction:

- Wymondham Settled Plateau Farmland LCA D1 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south and east of Mulbarton and south of Toprow
- Ashwellthorpe Plateau Farmland LCA E1 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Tacolneston and Forncett End
- Great Moulton Plateau Farmland LCA E2 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south and west of Pristow Green and Long Row
- Tas Tributary Farmland LCA B1 – direct and indirect effects would occur because of construction of the substation extension at Norwich Main and construction of the overhead line and associated vegetation loss north-west of Swainsthorpe, between Flordon, Hapton and Toprow, west of Forncett St Mary and east of Hargate
- Waveney Tributary Farmland LCA B4 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Winfarthing and Shelfanger and north of Bressingham
- Waveney Rural River Valley LCA A5 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Roydon and east of Bressingham Steam and Gardens
- Rolling Valley Farmlands and Furze LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Wortham Ling, west of Thrandeston and east of Stowmarket
- Wooded Valley Meadowlands and Fens LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south of Roydon
- Rolling Valley Claylands LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Finningham, north-west of Needham Market and south-west of Needham Market
- Ancient Plateau Claylands LCT – direct and indirect effects would occur because of construction of the extension at Bramford Substation and overhead line and associated vegetation loss south-west of Palgrave, west of Mellis, east of Stowmarket, south-west of Needham Market, west of Barking Tye and Willisham Tye, west of Somersham and south-west of Little Blakenham
- Plateau Claylands LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Thornham Magna and west of Mendlesham and Mendlesham Green
- Ancient Estate Claylands LCT – direct and indirect effects would occur because of construction of the overhead line south and east of Chattisham, north of Raydon and west of the A12, and construction of the underground cable and associated vegetation loss between JC34 and Raydon
- Valley Meadowlands LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss north-west and west of Needham Market

- Rolling Valley Farmland LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south-west of Willisham Tye, west of Offton and west of Somersham
- Plateau Farmland LCT – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Ipswich and construction of the underground cable between Bacon’s Green and Bobitts Hall, to the west of Holton St Mary
- Bromley Heaths LCA 7A - direct and indirect effects would occur because of construction of the overhead line and underground cable north-east of Colchester and between Little Bromley and Lamb Corner, and construction of the EACN Substation near Badley Hall together with associated vegetation loss
- Ardleigh Valley System LCA 6B - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss north-east of Colchester
- Langham Farmland Plateau LCA B7 - direct effects and indirect would occur because of construction of the overhead line and underground cable and associated vegetation loss, east of Langham and east of the A12
- Stour River Valley Floor LCA A8 - direct effects and indirect would occur because of construction of the underground cable and associated vegetation loss west of Stratford St Mary
- Stour River Valley Slopes LCA A7 indirect direct effects would occur because of construction of the underground cable and associated vegetation loss south-west of Stratford St Mary
- Stour River Valley Slopes LCA sub area A7a - direct and indirect effects would occur because of construction of the underground cable and associated vegetation loss just outside the southern boundary of the LCA
- Stour River Valley Slopes LCA sub area A7b - direct and indirect effects would occur because of construction of the underground cable and associated vegetation loss including a relatively notable amount of tree cover and fragmentation of vegetation cover along Black Brook
- Rochfords Farmland Plateau LCA B5 - direct and indirect effects would occur because of construction of the overhead line, CSE compound and underground cable and associated vegetation loss south-east of Wormingford and west of Great Horkesley
- Great Horkesley Farmland Plateau LCA B6 - direct and indirect effects would occur because of construction of the overhead line, CSE compound and underground cable and associated vegetation loss north of Great Horkesley
- Colne River Valley Slopes LCA A5 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Fordham and Fordstreet, including riparian vegetation along the River Colne
- Colne River Valley Floor LCA A4 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss including riparian vegetation along the River Colne Great Tey Farmland Plateau LCA B4 - direct and

indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Aldham

- Easthorpe Farmland Plateau LCA B2 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss north of Copford and Little Tey
- Gosfield Wooded Farmland LCA B4 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Coggeshall
- Central Essex Farmland LCA B1 – direct and indirect effects would occur because of construction of the overhead line, underground cable and CSE compounds and associated vegetation loss south of Silver End / north of Rivenhall, south of Great Leighs / north of Gamble’s Green and east of Boyton Cross / west of Chelmsford
- Blackwater and Brain Valley LCA C6 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south of Coggeshall and north of Kelvedon crossing the River Blackwater, and crossing the River Brain at White Notley
- Chelmer Valley LCA C5 – direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss south of Great Waltham and north of Little Waltham, crossing the River Chelmer
- Chelmsford and Environs LCA G2 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Great Oxney Green
- Brentwood Hills LCA D2 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss from Little Oxney Green, through Havering’s Grove to the railway line east of West Horndon
- West Billericay Wooded Farmlands LCA 11 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Gooseberry Green and north-west of Little Burstead
- Burstead Sloping Farmland LCA 12 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Herongate and east of Little Burstead
- Dunton Settled Claylands LCA 13 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss west of Southfields and Great Berry (Basildon)
- Langdon Hills Rolling Farmland / Wooded Hills LCA B2 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss between Basildon and Stanford-le-Hope
- Sticking Hill Rolling Farmland / Wooded Hills LCA B1 - direct and indirect effects would occur because of construction of the overhead line and associated vegetation loss east of Bulphan and north-east of Orsett
- Bulphan Fenland LCA A1 – indirect and indirect effects would occur because of construction activity in the adjacent LCA and associated vegetation loss

- White Crofts/ Orsett Heath Urban Fringe LCA D4 - direct and indirect effects would occur because of construction of the overhead line, underground cable, and associated vegetation loss north-east of Tilbury
- Linford/ Buckingham Hill Urban Fringe LCA D5 - direct and indirect effects would occur because of construction of the overhead line and CSE compound and associated vegetation loss near Southfields and Linford
- West Tilbury Urban Fringe LCA D7 - direct and indirect effects would occur because of construction of the underground cable and associated vegetation loss between Linford and West Tilbury
- Chadwell Escarpment Urban Fringe LCA D6 - direct and indirect effects would occur because of construction of the underground cable and associated vegetation loss east of Hall Hill
- Tilbury Marshes LCA C5 - direct and indirect effects would occur because of construction of the underground cable and substation extension at Tilbury and associated vegetation loss east of Tilbury

### Waveney Valley Alternative

- 13.8.10 The Waveney Valley Alternative would result in direct and significant (negative) effects on the Waveney Rural River Valley LCA, Wooded Valley Meadowlands and Fens LCT and Rolling Valley Farmlands and Furze LCT, through the construction of the underground cable, CSE compounds, overhead lines and associated vegetation loss. The underground cable would cross the channels of the River Waveney via trenchless crossings, which would minimise effects on existing vegetation along the watercourse. As set out above, there would also be significant (negative) effects on the same LCAs/LCTs as a result of the construction of the overhead line option, therefore this alternative would not change the significance of effects during construction. However, the construction of the underground cable, including cable compounds, additional drainage works, drive pits and exit pits for the trenchless crossings, together with the construction of two CSE compounds and adjacent terminal pylons would overall affect a greater area and introduce a concentration of construction activity in the valley. As a result, the Waveney Valley Alternative would have a greater direct effect on the fabric of the landscape and on tranquillity during construction; albeit much would be temporary and reversible.

### Visual Effects during Construction

- 13.8.11 Visual receptors within the study area are illustrated on Figure 13.7: Visual Receptors in Volume II. An assessment of effects on views and visual amenity during construction and operation (and maintenance) is provided in Tables A13.2.1 to A13.2.8 in Appendix 13.2: Visual Baseline and Assessment in Volume III. This considers views from settlements, roads, recreational routes, and recreational areas, grouped into 'Visual Receptor Areas'. The assessment takes into account the mitigation measures set out in Section 13.8.
- 13.8.12 Significant negative effects on views and visual amenity would largely be contained within approximately 0.5 km to 1 km of the draft Order Limits, where close views of low-level construction activity would be apparent in certain views. From the wider study area visibility of construction activity would largely relate to views of partially constructed

pylons (potentially with lights if present at night). Significant negative effects on views would extend up to 2 km of the draft Order Limits in some locations, for example where longer distance, open and wide views are likely to be available towards construction activity. Effects would be transient and change throughout the construction period as the Project would be constructed in sections.

- 13.8.13 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section A during construction: Area A1 Swardeston; Area A2 Stoke Holy Cross; Area A3 Mulbarton and Wreningham; Area A4 Newton Flotman; Area A5 Tacolnaston; Area A6 Forncett St Peter; Area A7 Carleton Rode; Area A8 Tibenham; Area A9 Shelfanger; Area A10 Burston; Area A11 Fen Street; and Area A12 Roydon and Diss.
- 13.8.14 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section B during construction: Area B1 Wortham; Area B2 Palgrave; Area B3 Mellis; Area B4 Finningham and Gislingham; Area B5 Wickham Skeith and Mendlesham; Area B6 Stowupland; Area B7 Forward Green and Creeting St Mary; Area B8 Stowmarket; Area B9 Needham Market; Area B10 Great Bricett; Area B11 Barking and Willisham; Area B12 Elmsett; and Area B13 Somersham.
- 13.8.15 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section C during construction: C1 Burstall; C2 Washbrook; C4 Chattisham; C5 Capel St Mary; C6 Raydon; C7 Great Wenham and Holton St Mary; C8 Higham; C9 Stratford St Mary; C10 Dedham Heath; C11 Langham; C12 Ardleigh; and C13 Little Bromley.
- 13.8.16 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section D during construction: Area D1 Tye Green and Boxted; Area D2 Little Horkesley and Wormingford; Area D3 Great Horkesley and West Bergholt; Area D5 North Colchester; Area D6 Fordham; Area D7 Fordham Heath and Eight Ash Green; Area D8 Fordstreet and Aldham; Area D9 Great Tey; Area D10 Marks Tey; and Area D11 Copford.
- 13.8.17 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section E during construction: Area E1 Coggeshall; Area E2 Feering; Area E3 Kelvedon; Area E4 Silver End; Area E5 Black Notley and White Notley; and Area E6 Terling and Chipping Hill.
- 13.8.18 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section F during construction: Area F1 Great Leighs; Area F2 Peverel's Farm; Area F3 Great Waltham; Area F4 Little Waltham; Area F5 Chignall Smealy; Area F6 Chelmsford North-West; Area F7 Roxwell; Area F8 Writtle and Chelmsford West; Area F9 Edney Common; Area F10 Hylands Park; and Area F11 Margaretting and Stock.
- 13.8.19 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section G during construction: Area G1 Ingatestone and Fryerning; Area G2 Billericay West; Area G3 Brentwood East; Area G4 Ingrave and Herongate; and Area G5 Little Burstead.
- 13.8.20 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section H during construction: H1 Bulphan; H2 Horndon on the Hill; H3 Orsett; H4 Stanford-le-Hope and East Tilbury; H5 Chadwell St Mary; and H7 Tilbury Marshes.

## Waveney Valley Alternative

- 13.8.21 There would be no change to the assessment conclusions as set out above for the Waveney Valley Alternative. Significant (negative) visual effects are likely to be experienced from the following Visual Receptor Areas during construction: Area A11 Fen Street; Area A12 Roydon and Diss; Area B1 Wortham; and Area B2 Palgrave. Under both options, there would be close views of construction activity from visual receptors in these areas; albeit the visual effects of the construction of the underground cable and CSE compounds would be more notable than the construction of an overhead line due to the wider swathe of land affected and longer duration of construction works associated with trenchless crossings and open cut installation of cables compared to the construction of an overhead line.

## Preliminary Operational (and Maintenance) Effects

### Sources of Effects during Operation (and Maintenance)

- 13.8.22 The key changes arising from the operation (and maintenance) of the Project are set out fully in Chapter 4: Project Description and would include:
- A new 400 kV electricity transmission reinforcement between the existing Norwich Main, Bramford and Tilbury Substations comprising:
    - Installation of approximately 159 km of 400 kV overhead line
    - Installation of approximately 510 steel lattice pylons (approximately 50 m in height), some of which are gantries (typically up to 15 m in height) within proposed CSE compounds or existing or proposed substations
    - Installation of approximately 25 km of 400 kV underground cables (some of which is located through Dedham Vale National Landscape (an AONB))
  - Six new CSE compounds (including permanent access roads)
  - A new 400 kV AIS (EACN Substation) located on the Tendring Peninsula (including a permanent access road)
  - Substation extension works at the existing Norwich Main and Bramford Substations, and works within the existing Tilbury Substation to connect and support operation of the new transmission connection

## Waveney Valley Alternative

- 13.8.23 For the Waveney Valley Alternative, there would be approximately 2 km less overhead line and approximately 2 km of additional underground cable with two additional CSE compounds one adjacent to terminal pylon RG084 and one north of pylon RG091.

## Landscape Effects during Operation (and Maintenance)

- 13.8.24 As set out in Tables A13.1.3 to A13.1.9 in Appendix 13.1: Landscape Baseline and Assessment in Volume III, significant negative effects on landscape character during operation (and maintenance) are predicted to extend across the draft Order Limits and the surrounding landscapes within approximately 0.5 km to 1 km of the Project. All

effects during operation (and maintenance) are long-term and negative unless stated otherwise. In the longer term, mitigation measures including replacement planting and embedded mitigation within the 'Environmental Areas' around the CSE compounds and substations / substation extensions would reduce effects in some areas. Significant effects are likely to be experienced from the following LCAs/LCTs because of direct or indirect effects:

- Wymondham Settled Plateau Farmland LCA D1 – direct and indirect effects would occur because of introduction of the overhead line south and east of Mulbarton and south of Toprow
- Ashwellthorpe Plateau Farmland LCA E1 – direct and indirect effects would occur because of the introduction of the overhead line east of Tacolneston and Forncett End
- Great Moulton Plateau Farmland LCA E2 – direct and indirect effects would occur because of the introduction of the overhead line south and west of Pristow Green and Long Row
- Tas Tributary Farmland LCA B1– direct and indirect effects would occur because of the introduction of the substation extension at Norwich Main and overhead line north-west of Swainsthorpe, between Flordon, Hapton and Toprow, west of Forncett St Mary and east of Hargate
- Waveney Tributary Farmland LCA B4 – direct and indirect effects would occur because of the introduction of the overhead line east of Winfarthing and Shelfanger and north of Bressingham
- Waveney Rural River Valley LCA A5 – direct and indirect effects would occur because of the introduction of the overhead line west of Roydon and east of Bressingham Steam and Gardens
- Rolling Valley Farmlands and Furze LCT – direct and indirect effects would occur because of the introduction of the overhead line east of Wortham Ling, west of Thrandeston and east of Stowmarket
- Wooded Valley Meadowlands and Fens LCT – direct and indirect effects would occur because of the introduction of the overhead line south of Roydon
- Rolling Valley Claylands LCT – direct and indirect effects would occur because of the introduction of the overhead line east of Finningham, north-west of Needham Market and south-west of Needham Market
- Ancient Plateau Claylands LCT – direct and indirect effects would occur because of the introduction of the substation extension at Bramford and overhead line south-west of Palgrave, west of Mellis, east of Stowmarket, south-west of Needham Market, west of Barking Tye and Willisham Tye, west of Somersham and south-west of Little Blakenham
- Plateau Claylands LCT – direct and indirect effects would occur because of the introduction of the overhead line west of Thornham Magna and west of Mendlesham and Mendlesham Green

- Ancient Estate Claylands LCT – direct and indirect effects would occur because of the introduction of the overhead line south and east of Chattisham, north of Raydon and west of the A12
- Valley Meadowlands LCT – direct and indirect effects would occur because of the introduction of the overhead line north-west and west of Needham Market
- Rolling Valley Farmland LCT – direct and indirect effects would occur because of the introduction of the overhead line south-west of Willisham Tye, west of Offton and west of Somersham
- Plateau Farmland LCT – direct and indirect effects would occur because of the introduction of the overhead line west of Ipswich
- Bromley Heaths LCA 7A - direct and indirect effects would occur because of the introduction of the overhead line north-east of Colchester and introduction of the EACN Substation near Badley Hall
- Ardleigh Valley System LCA 6B - direct and indirect effects would occur because of the introduction of the overhead line north-east of Colchester
- Langham Farmland Plateau LCA B7 - direct and indirect effects would occur because of the introduction of the overhead line within the former airfield
- Stour River Valley Slopes LCA sub area A7b - direct and indirect effects would occur because of permanent vegetation loss associated with the underground cables including a relatively notable amount of tree cover and fragmentation of vegetation cover along Black Brook
- Rochfords Farmland Plateau LCA B5 – direct and indirect effects would occur because of the introduction of the overhead line and CSE compound south-east of Wormingford and west of Great Horkesley
- Great Horkesley Farmland Plateau LCA B6 - direct and indirect effects would occur because of the introduction of the overhead line and CSE compound north of Great Horkesley
- Colne River Valley Slopes LCA A5 - direct and indirect effects would occur because of the introduction of the overhead line east of Fordham and Fordstreet and crossing the River Colne to the north-west of Colchester
- Colne River Valley Floor LCA A4 - direct and indirect effects would occur because of the introduction of the overhead line in the Colne Valley north-west of Colchester
- Great Tey Farmland Plateau LCA B4 - direct and indirect effects would occur because of the introduction of the overhead line north and east of Aldham
- Easthorpe Farmland Plateau LCA B2 - direct and indirect effects would occur because of the introduction of the overhead line north of Copford and Little Tey
- Gosfield Wooded Farmland LCA B4 - direct effects would occur because of the introduction of the overhead line east of Coggeshall
- Central Essex Farmland LCA B1 - direct and indirect effects would occur because of the introduction of the overhead line, underground cable and CSE compounds south of Silver End / north of Rivenhall, south of Great Leighs / north of Gamble's Green and east of Boyton Cross / west of Chelmsford

- Blackwater and Brain Valley LCA C6 - direct and indirect effects would occur because of the introduction of the overhead line south of Coggeshall and north of Kelvedon crossing the River Blackwater, and crossing the River Brain at White Notley
- Chelmer Valley LCA C5 - direct and indirect effects would occur because of the introduction of the overhead line south of Great Waltham and north of Little Waltham, crossing the River Chelmer
- Chelmsford and Environs LCA G2 - direct and indirect effects would occur because of the introduction of the overhead line west of Great Oxney Green
- Brentwood Hills LCA - direct and indirect effects would occur because of the introduction of the overhead line from Little Oxney Green, through Havering's Grove to the railway line east of West Horndon
- West Billericay Wooded Farmlands LCA 11 - direct and indirect effects would occur because of the introduction of the overhead line east of Gooseberry Green and north-west of Little Burstead
- Burstead Sloping Farmland LCA 12 - direct and indirect effects would occur because of the introduction of the overhead line west of Herongate and east of Little Burstead
- Dunton Settled Claylands LCA 13 - direct and indirect effects would occur because of the introduction of the overhead line west of Southfields and Great Berry (Basildon)
- Langdon Hills Rolling Farmland / Wooded Hills LCA B2 - direct and indirect effects would occur because of the introduction of the overhead line between Basildon and Stanford-le-Hope
- Sticking Hill Rolling Farmland / Wooded Hills LCA B1 - direct and indirect effects would occur because of the introduction of the overhead line east of Bulphan and north-east of Orsett
- Bulphan Fenland LCA A1 – indirect effects would occur because of the introduction of the overhead line in the adjacent LCA
- White Crofts/ Orsett Heath Urban Fringe LCA D4 - direct and indirect effects would occur because of the introduction of the overhead line north-east of Tilbury
- Linford/ Buckingham Hill Urban Fringe LCA D5 - direct and indirect effects would occur because of the introduction of the overhead line and CSE compound near Southfields and Linford

### Waveney Valley Alternative

- 13.8.25 There would be some changes to the assessment conclusions set out above when taking into consideration the Waveney Valley Alternative. Although the Waveney Valley Alternative would result in a significant (negative) landscape effect on the Waveney Rural River Valley LCA, this would be reduced due to much of the Project being underground in this LCA. Direct effects would arise through the introduction of a CSE compound and terminal pylon south of the A1066. Indirect effects would likely arise due to the perception of overhead lines connecting into the CSE compound from the north in addition to the perception of a second CSE compound and associated overhead line to

the south outside this LCA. The re-establishment of hedgerows over the cable route and embedded mitigation within the 'Environmental Areas' around the CSE compounds would notably reduce effects on the more tranquil and sensitive part of this LCA in the longer term.

- 13.8.26 Although a short section of underground cable would reduce the landscape effect on the Rolling Valley Farmlands and Furze LCT, significant (negative) landscape effects would remain. These effects would be due to the introduction of a CSE compound and associated overhead line within the Rolling Valley Farmlands and Furze LCT to the south east of Wortham Ling. The effect on the Wooded Valley Meadowlands and Fens LCT would be reduced to not significant in the longer term, when mitigation around the CSE compounds is taken into account.
- 13.8.27 Overall, the operation (and maintenance) landscape effects of the Waveney Valley Alternative are likely to be locally reduced in comparison to an overhead line but would still remain significant for the Waveney Rural River Valley LCA and Rolling Valley Farmlands and Furze LCT.

## Visual Effects during Operation (and Maintenance)

- 13.8.28 As set out in Tables A13.2.1 to A13.2.8 in Appendix 13.2: Visual Baseline and Assessment in Volume III, significant effects on views and visual amenity during operation (and maintenance) are predicted to be experienced within approximately 1 km to 2 km of the Project. Significant negative effects are likely to be experienced by a range of visual receptors including residents, road users and recreational receptors. Wireline visualisations for representative viewpoints are provided in Figures 13.9.1 to 13.9.89: Wireline Visualisations in Volume II.
- 13.8.29 In the longer term, mitigation measures including replacement planting and embedded mitigation within the 'Environmental Areas' around the CSE compounds and substations / substation extensions would reduce effects in some areas. There is the potential to further reduce visual effects in some locations through additional mitigation measures, for example strategic planting, making commitments to avoid siting towers in certain locations (where practicable) or the use of low height towers. This may result in a change in effect from significant to not significant within localised areas, or from specific visual receptors. However, it is likely that significant effects would remain for the majority of receptors, particularly where close views of the Project are available.
- 13.8.30 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section A during operation: Area A1 Swardeston; Area A2 Stoke Holy Cross; Area A3 Mulbarton and Wreningham; Area A4 Newton Flotman; Area A5 Tacolneston; Area A6 Fornsett St Peter; Area A7 Carleton Rode; Area A8 Tibenham; Area A9 Shelfanger; Area A10 Burston; Area A11 Fen Street; and Area A12 Roydon and Diss.
- 13.8.31 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section B during operation: Area B1 Wortham; Area B2 Palgrave; Area B3 Mellis; Area B4 Finningham and Gislingham; Area B5 Wickham Skeith and Mendlesham; Area B6 Stowupland; Area B7 Forward Green and Creting St Mary; Area B8 Stowmarket; Area B9 Needham Market; Area B10 Great Bricett; Area B11 Barking and Willisham; Area B12 Elmsett; and Area B13 Somersham.
- 13.8.32 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section C during operation: Area C1 Burstall; Area C2 Washbrook; Area C4

Chattisham; Area C5 Capel St Mary; Area C6 Raydon; Area C7 Great Wenham and Holtton St Mary; Area C9 Stratford St Mary; Area C10 Dedham Heath; Area C11 Langham; Area C12 Ardleigh; and Area C13 Little Bromley.

- 13.8.33 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section D during operation: Area D1 Tye Green and Boxted; Area D2 Little Horkesley and Wormingford; Area D3 Great Horkesley and West Bergholt; Area D5 North Colchester; Area D6 Fordham; Area D7 Fordham Heath and Eight Ash Green; Area D8 Fordstreet and Aldham; Area D9 Great Tey; Area D10 Marks Tey; and Area D11 Copford.
- 13.8.34 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section E during operation: Area E1 Coggeshall; Area E2 Feering; Area E3 Kelvedon; Area E4 Silver End; Area E5 Black Notley and White Notley; and Area E6 Terling and Chipping Hill.
- 13.8.35 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section F during operation: Area F1 Great Leighs; Area F2 Peverel's Farm; Area F3 Great Waltham; Area F4 Little Waltham; Area F5 Chignall Smealy; Area F6 Chelmsford North-West; Area F7 Roxwell; Area F8 Writtle and Chelmsford West; Area F9 Edney Common; Area F10 Hylands Park; and Area F11 Margaretting and Stock.
- 13.8.36 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section G during operation: Area G1 Ingatestone and Fryerning; Area G2 Billericay West; Area G3 Brentwood East; Area G4 Ingrave and Herongate; and Area G5 Little Burstead.
- 13.8.37 Significant effects are likely to be experienced from the following Visual Receptor Areas within Section H during operation: H1 Bulphan; H2 Horndon on the Hill; H3 Orsett; H4 Stanford-le-Hope and East Tilbury; and H5 Chadwell St Mary.

### Waveney Valley Alternative

- 13.8.38 There would be some changes to the visual assessment conclusions set out above when taking into consideration the Waveney Valley Alternative. In the longer term, the re-establishment of hedgerows over the cable route and the proposed planting within the Environmental Areas around the CSE compounds would likely reduce effects on views within Visual Receptor Area A11 Fen Street and Area A12 Roydon and Diss. Some significant visual effects would reduce to not significant in parts of the valley though some would likely remain significant (negative) due to the visibility of the terminal pylon adjacent to the A1066. Although the re-establishment of hedgerows over the cable route and the proposed planting within the Environmental Areas around the CSE compounds would reduce effects on views from northern parts of Visual Receptor Area B2 Palgrave, significant effects are still likely to be experienced from other parts of this area due to the introduction of the overhead lines connecting into the CSE compound east of Wortham Ling and continuing south towards Mellis. There would be no changes to the visual assessment conclusion for Visual Receptor Area B1 Wortham.
- 13.8.39 Overall, the operation (and maintenance) visual effects of the Waveney Valley Alternative are likely to be reduced in comparison to an overhead line, although there would be some significant effects some would be removed.

## Effects on Designated Landscapes during Operation (and Maintenance)

- 13.8.40 An assessment of effects on the special qualities of the Dedham Vale National Landscape (an AONB) is provided in Appendix 13.1: Landscape Baseline and Assessment in Volume III.
- 13.8.41 There are a number of interrelated special qualities which contribute to the landscape and scenic beauty of Dedham Vale National Landscape, which are described as an ‘*assemblage of features*’ in the Dedham Vale AONB and Stour Valley Project Area Management Plan (2021 – 2026).
- 13.8.42 Undergrounding of the Project through the National Landscape and its setting is anticipated to have a short to medium-term, negative effect on some of the identified special qualities. These include the ‘*valley bottom grazing marshes*’, and ‘*traditional field boundaries*’ within the National Landscape, and the ‘*naturally functioning River Stour*’ and ‘*semi natural ancient woodlands*’ within the setting of the National Landscape. In the longer term, vegetation removed to accommodate the Project would be reinstated, and effects on most of the special qualities would not be significant. The exception to this is the ‘*apparent and buried archaeology indicating millennia of human activity*’ which is identified as a special quality; the preliminary findings of Chapter 11: Historic Environment conclude that construction of the Project would remove some/all of the recorded assets within the cable swathe, and therefore the effect on this special quality would be negative and potentially significant.
- 13.8.43 The overhead line component of the Project has the potential to affect the ‘*surprisingly long-distance views*’ from the National Landscape which are identified as a special quality. However, given the distance to the Project and layers of intervening vegetation, no significant effects have been identified for this special quality.
- 13.8.44 Although there would be some short to medium-term disruption during undergrounding of the Project, in the longer-term it is considered that most of the special qualities would not be undermined to such an extent that the landscape and scenic beauty of the National Landscape would be affected. The exception to this is the potential for significant negative effects on buried archaeology. A high standard of construction management (such as vegetation protection and soil handling), as well as close attention to quality and detail of landscape restoration, post construction, would be required. This mitigation will be assured by measures set out in Appendix 4.1: Draft Outline CoCP in Volume III and summarised in this chapter. The ES will provide final details of embedded, standard, and additional mitigation measures which will be informed by the findings of the PEIR and statutory consultation.

### Waveney Valley Alternative

- 13.8.45 There would be no change to the assessment of effects on special qualities as set out above, as a result of the Waveney Valley Alternative. The Waveney Valley section of the Project is approximately 40 km to the north of Dedham Vale National Landscape (an AONB) and would not be perceptible at this distance for either the overhead line option or the Waveney Valley Alternative.

## 13.9 Sensitivity Testing

### Flexibility in Construction Programme

- 13.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Appendix 13.1: Landscape Baseline and Assessment and Appendix 13.2: Visual Baseline and Assessment in Volume III, as changes in dates would make no difference to the appearance of construction works.

### Flexibility in Design

- 13.9.2 This chapter has assumed the pylon locations, CSE compounds, new and extended substation locations and extents, and underground cable alignments provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design. Sensitivity testing has been carried out to determine the potential for likely significant effects should alternative pylon locations, CSE compounds and/ or underground cable route change within the proposed LoD.
- 13.9.3 Alternative locations for pylon positions, CSE compounds and new and extended substation locations and extents could change the preliminary assessment for this chapter in relation to visual effects. Changes to pylon positions and extent and location of CSE compound and substation infrastructure would likely have implications on views and may result in either an increased or decreased level of effect on some visual receptors (and identified significance of effect). At this preliminary stage, it is anticipated that alternative locations for pylon position would have no new or different significant landscape effects in terms of the assessment of effects on landscape character or landscape designations than the base assessment, which has already concluded several potential significant effects. This will continue to be reviewed and assessed in the LVIA.
- 13.9.4 Changes to the underground cable alignments could change the preliminary assessment for this chapter in relation to landscape and visual effects in some locations; particularly where a change in alignment within the LoD would cause an increase in vegetation loss within Dedham Vale National Landscape (an AONB) and its setting or in areas where a change might bring construction works closer to more highly sensitive visual receptors such as local communities.

### Flexibility due to Design elements not fixed at Statutory Consultation

- 13.9.5 There are also elements of the Project which have not been fixed at statutory consultation, as detailed in Table 4.3 of Chapter 4: Project Description.

### Trenchless crossings of the River Stour

- 13.9.6 The assessment has assumed the worst-case scenario of two trenchless crossings for the River Stour which would affect a larger proportion of the land either side of the river.

The alternative, involving reducing the number of crossings to one, would likely have beneficial (positive) effects on landscape character and the landscape and special qualities of Dedham Vale National Landscape (an AONB) both during construction and operation (and maintenance). It is assumed that should only one trenchless crossing be required then the cable swathe would not need to split and consequentially there would be fewer direct effects in terms of overall areas of the landscape affected. However, some significant effects would likely remain during construction.

### **Overhead line alignment south of Norwich Main Substation**

- 13.9.7 The assessment assumes the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, should the battery storage facility not be consented, and an alternative alignment progressed in closer parallel to the existing 400 kV overhead line this would likely reduce visual effects to a small degree. This is because a closer parallel alignment would keep the infrastructure together and there would likely be less need for heavier angle pylons. However, some significant effects would likely remain during construction and operation (and maintenance).

### **Overhead line alignment south of Rivenhall**

- 13.9.8 The assessment assumes the alignment presented on Figure 4.1: Proposed Project Design in Volume II. Should an alternative alignment be possible if a solar farm development is not granted planning approval, this would likely reduce landscape and visual effects to a small degree; however, significant effects would likely remain during construction and operation (and maintenance). A small reduction in effects would be likely because the alternative would move the overhead line slightly further away from the entrance to Rivenhall Place which sits within parkland designed by Humphry Repton (landscape designer of the eighteenth century).

### **Overhead line alignment in the Buckingham Hill Landfill area**

- 13.9.9 The assessment assumes the alignment presented on Figure 4.1: Proposed Project Design in Volume II. However, should an alternative alignment be possible if Southfields housing development does not go ahead, this would likely reduce landscape and visual effects to some degree. This is because the alternative would avoid crossing a local road twice and also avoid direct effects on a publicly accessible green space during construction. It would also move the overhead line further away from public rights of way and newly created parkland during operation (and maintenance). However, some significant effects would likely remain during construction and operation (and maintenance).

### **Other aspects of flexibility**

- 13.9.10 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that, with the exception of those discussed above, none of the other alternatives would result in any new or different effects than reported in this chapter.

# 14. Noise and Vibration

# 14. Noise and Vibration

## 14.1 Introduction

14.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Noise and Vibration sensitive receptors (NSRs). The chapter covers effects from the following:

- Construction noise
- Construction vibration
- Construction traffic noise
- Operational noise from the proposed new EACN Substation
- Operational vibration

14.1.2 There are interrelationships between the potential Noise and Vibration effects and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 8: Ecology and Biodiversity
- Chapter 10: Health and Wellbeing
- Chapter 11: Historic Environment
- Chapter 15: Socio-economics, Recreation and Tourism
- Chapter 16: Traffic and Transport

14.1.3 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 14.1: Baseline Noise Data
- Figure 14.2: Initial Construction Noise and Vibration Assessment Outputs
- Appendix 14.1: Construction Noise and Vibration Data
- Appendix 14.2: Construction Traffic Noise Assessment
- Appendix 14.3: EACN Substation Operational Noise Assessment

## 14.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

14.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024). EN-1 states that energy projects have the potential to have adverse effects on NSRs which has been considered within this chapter.

- 14.2.2 EN-1 contains the following paragraphs relating to Noise and Vibration which have been considered within this chapter. Paragraphs 5.12.1 to 5.12.5 state:
- 14.2.3 *'Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance, sleep disturbance cardiovascular disease and mental ill-health). It can also have an impact on the environment and the use and enjoyment of areas of value such as quiet places and areas with high landscape quality. The Government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to "noise" below apply equally to assessment of impacts of vibration.*
- 14.2.4 *Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the Secretary of State in accordance with the Biodiversity and Geological Conservation section of this NPS.*
- 14.2.5 *Factors that will determine the likely noise impact include:*
- *The inherent operational noise from the proposed development, and its characteristics.*
  - *The proximity of the proposed development to noise sensitive premises (including residential properties, schools, and hospitals) and noise sensitive areas (including certain parks and open spaces).*
  - *The proximity of the proposed development to quiet places and other areas that are particularly valued for their soundscape or landscape quality the proximity of the proposed development to sites where noise may have an adverse impact on protected species or other wildlife, including migratory species.*
  - *Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment....a prediction of how the noise environment will change with the proposed development:*
  - *In the shorter term such as during the construction period.*
  - *In the longer term during the operating life of the infrastructure.*
  - *At particular times of the day, evening and night (and weekends) as appropriate, and at different times of year;*
  - *An assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and quality of life/ well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas;*
  - *If likely to cause disturbance, an assessment of the effect of underwater or subterranean noise*
  - *All reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life*
  - *The nature and extent of the noise assessment should be proportionate to the likely noise impact.*

- *Paragraph 5.12.8 states that ‘Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation’.*

14.2.6 Paragraph 5.12.16 of EN-1 (DESNZ, 2024) states ‘Development must be undertaken in accordance with statutory requirements for noise. Due regard must be given to the relevant sections of the Noise Policy Statement for England, the NPPF, and the government’s associated planning guidance on noise’.

14.2.7 NPS EN-5 (DESNZ, 2024) includes the following relating to noise and vibration, specifically from overhead lines, which has been considered within this chapter. Paragraphs 2.9.26 to 2.9.38 states:

- *‘All high voltage transmission lines have the potential to generate noise under certain conditions.*
- *Line noise is most commonly caused by corona noise when the conductor surface electric stress exceeds the inception level for corona discharge activity which is released as acoustic energy and radiates into the air as sound. Transmission line conductors are designed to operate below this threshold. Surface contamination on a conductor or accidental damage during transport or installation can cause local enhancement of electric stress and initiate discharge activity leading to the generation of noise.*
- *The highest noise levels generated by a line generally occur during rain.*
- *Water droplets may collect on the surface of the conductor and initiate corona discharges with noise levels being dependent on the level of rainfall. Fog may also give rise to increased noise levels, although these levels are lower than those during rain.*
- *After a prolonged spell of dry weather without rain to wash the conductors, contamination may accumulate at sufficient levels to result in increased noise. After heavy rain, these discharge sources are washed away, and the line will resume normal quieter operating sound.*
- *Surface grease on conductors can also give rise to audible noise effects as grease is able to move slowly under the influence of an electric field, tending to form points which then initiate discharge activity. Surface grease is likely to occur along the entire length of a conductor. Hence there may be many potential discharge sources and, consequently, a high noise level.*
- *This will only occur if substandard grease has been used during manufacture or if the conductor has been overheated by carrying excessive electrical load. This can be mitigated through good design or by replacement.*
- *Transmission line audible noise is generally categorised as “crackle” or “hum”, according to its tonal content.*
- *Crackle may occur alone, but hum will usually occur only in conjunction with crackle. Hum is only likely to occur during rain when rates of rainfall exceed 1mm/hr. Crackle is a sound containing a random mixture of frequencies over a wide range, typically 1kHz to 10kHz. No individual pure tone can be identified for any significant duration. Crackle has a generally similar spectral content to the sound of rainfall. Hum is only*

likely to occur during rain when rates of rainfall exceed 1mm/hr. Hum is a sound consisting of a single pure tone or tones.

- Noise may also arise from discharges on overhead line fittings such as spacers, insulators, and clamps. Such noise should be mitigated through good design.
- Audible noise effects can also arise from substation equipment such as transformers, quadrature boosters and mechanically switched capacitors.
- Transformers are installed at many substations and generate low frequency hum. Whether the noise can be heard outside a substation depends on several factors, including transformer type and the level of noise attenuation present (either engineered intentionally or provided by other structures).'

14.2.8 Paragraph 2.9.39 to 2.9.43 states:

- 'For the assessment of noise from substations, standard methods of assessment and interpretation using the principles of the relevant British Standards are satisfactory.
- For the assessment of noise from overhead lines, the applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors.
- The Secretary of State is likely to regard it as acceptable for the applicant to use a methodology that demonstrably addresses these criteria'.
- When considering mitigation measures, Paragraph 2.10.9 states 'Applications must consider the following measures (including) ... Selection of quieter cost-effective plants'.

## Other National Legislation and Policy

14.2.9 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- The Control of Pollution Act 1974
- Environmental Protection Act 1990
- NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance
- Planning Practice Guidance for Noise (PPGN) 2019
- Noise Policy Statement for England 2010

## Regional and Local Policy

14.2.10 Chapter 2: Key Legislation and Planning Policy Context lists relevant regional and local policy. Local policy, specific to noise and vibration will be reviewed and assessments undertaken in relation to compliance with this policy in the ES.

## Guidance

- 14.2.11 Relevant guidance, specific to Noise and Vibration, that has informed this PEIR and will inform the assessment within the ES, comprises:
- BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (British Standards Institute (BSI), 2014) (BS 5228-1)
  - BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (BSI, 2014) (BS 5228-2)
  - BS 7385-2:1993. Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration (BSI, 1993) (BS 7385-2)
  - Calculation of Road Traffic Noise (CRTN) (Department for Transport, 1988)
  - DMRB LA 111: Noise and Vibration (National Highways *et al*, 2020) (DMRB LA 111)
  - BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BSI, 2019) (BS 4142)
  - BS 8233:2014. Guidance on sound insulation and noise insulation for buildings (BSI, 2014) (BS 8233)

## 14.3 Scoping Opinion

- 14.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 14.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Noise and Vibration is provided in Appendix 5.1: National Grid’s response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 14.4.

## 14.4 Project Engagement and Consultation

- 14.4.1 National Grid has held several meetings with relevant consultees including Local Authorities.
- 14.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 14.1.

Table 14.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Babergh District Council, Mid Suffolk District Council,	A letter was issued to Local Planning Authorities setting out the proposed methodology and scope of the ES.	Generally, Local Authorities agreed with the scope and

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
Thurrock Council, Norfolk County Council, Suffolk County Council, Essex County Council, Braintree District Council, Chelmsford City Council, Basildon Borough Council, Colchester City Council, Historic England, September 2022	There was general agreement with the proposed scope of assessment. However, further details were requested regarding potential operational noise effects.	methodology of the assessment – the preliminary assessment is presented in this PEIR.  Potential effects of construction noise and vibration, construction traffic noise, and operational noise from the proposed EACN Substation have been scoped into the assessment.
Tendring District Council and Essex County Council, July 2023.	A technical note was shared with the Environmental Health Officers (EHOs) to agree the approach to undertaking an operational noise impact assessment of the proposed EACN Substation within Tendring District together with using background noise monitoring data gathered for another project in the vicinity. Essex County Council deferred authority to Tendring District Council, who agreed that the proposed approach was acceptable.	Assessment approach agreed with Tendring District Council – the preliminary assessment is presented in this PEIR.

14.4.3 In addition to stakeholder engagement, meetings have been held with the North Falls and Five Estuaries wind farm project teams. These wind farms are proposed to be located off the coast of East Anglia and connect into the proposed EACN Substation. Both projects involve the construction of new substations, which are proposed to be located adjacent to the EACN Substation. Project teams have worked collaboratively to reduce potential cumulative effects. Engagement with a third customer, an interconnector being progressed by Tarchon, has to date been more limited due to the earlier stage of their project development. Collaborative engagement will continue to inform the assessments in the ES.

## 14.5 PEIR Approach and Methods

14.5.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology / approach used to undertake the preliminary assessment on Noise and Vibration. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

## Study Area

- 14.5.2 The study areas used for the noise and vibration assessments are outlined in the EIA Scoping Report (National Grid, 2022). The study areas for the various noise and vibration assessments are also presented on Figure 14.1: Baseline Noise Data in Volume II and summarised in the following paragraphs.

### Construction Noise Study Area

- 14.5.3 The study area for construction noise effects includes NSRs within 300 m of the draft Order Limits / construction works associated with the Project, excluding traffic on the public highway which is considered separately. This is based on guidance in BS 5228-1 (BSI, 2014) and DMRB LA 111 (National Highways, 2020).

### Construction Vibration Study Area

- 14.5.4 The study area for construction vibration effects, based on guidance from BS 5228-2 and DMRB LA 111, comprises 100 m from the closest construction activity with the potential to generate vibration effects at NSRs.

### Construction Traffic Noise Study Area

- 14.5.5 Noise from construction traffic on the existing road network has been assessed for each applicable road understood to be affected. The assessment considers the change in Basic Noise Level (BNL), calculated in line with the methodology described in technical memorandum CRTN (Department for Transport, 1988), with a subsequent assessment of the effects on NSRs within 50 m of routes. Potential significant effects are identified in accordance with the methodology described in DMRB LA 111.

### Operational Noise Study Area

- 14.5.6 The study area for operational noise effects from substations, based on guidance from Internal Standards Organisation (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996) (ISO 9613), is 1 km from the EACN Substation, with a particular focus on the nearest NSR.

## Existing Baseline

### Data Collection

- 14.5.7 The baseline information has drawn on the following key information sources:
- Ordnance Survey AddressBase+ data
  - Defra strategic noise mapping data (2017)
  - Existing noise survey data from the Five Estuaries Offshore Wind Farm PEIR Volume 3, Chapter 9: Airborne Noise and Vibration, and Volume 5, Annex 9.1: Onshore

Airborne Noise Baseline Noise Survey (Five Estuaries Offshore Wind Farm, February 2023)<sup>67</sup>

- Traffic data on existing routes and predicted traffic flows associated with proposed construction
- Proposed plant information for the proposed EACN Substation (operational noise data)

### **Further Data to be collected to inform the ES**

- 14.5.8 In addition to the data collected for this PEIR, the ES will be informed by any baseline data required if there are changes to the study area, for example because of updated draft Order Limits or changes to traffic flows.

## **PEIR Assessment Methodology**

- 14.5.9 The preliminary Noise and Vibration assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 14.5.10 This section sets out the proposed methodology for the Noise and Vibration assessment for the PEIR. This is based on guidance set out in BS 5228-1 (BSI, 2014), BS 5228-2 (BSI, 2014), DMRB LA 111 (National Highways, 2020), and BS 4142 (BSI, 2019).

### **Baseline Noise Survey Methodology**

- 14.5.11 A baseline noise survey was conducted in the locality of the proposed EACN Substation, within Tendring, in autumn 2022 as part of the Five Estuaries offshore wind farm project. It has been agreed with Tendring District Council, that the results of this survey can be used to confirm the existing baseline noise environment for the Project. Therefore, the effects of the Project, the Five Estuaries project and the North Falls project are all assessed against a consistent baseline.
- 14.5.12 Further baseline noise surveys are not proposed as part of the assessment of construction noise unless there is a justifiable reason for a particular NSR. In lieu of baseline noise data, worst-case lower thresholds have and will be used for the assessment of construction noise unless Defra strategic noise mapping data could be utilised to justify a higher threshold, where appropriate.

### **Construction Noise Methodology**

- 14.5.13 Construction noise effects have been assessed in accordance with BS 5228-1 (BSI, 2014) and with guidance within DMRB LA 111 (National Highways, 2020).

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<sup>67</sup> [Document Library - Stage 2 - Five Estuaries](#)

- 14.5.14 Construction noise levels would exceed the magnitude threshold values within certain distances, depending on the activity and the associated plant. These threshold distances have been calculated for each construction activity in accordance with the methodology described in Annex F of BS 5228-1. The thresholds are set relative to the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the ‘ABC’ method). The Category A construction noise thresholds represent the lowest assessment criteria (typically used to assess effects in rural areas) and are proposed to be used throughout the Project as a worst-case unless there is a justification for a higher threshold to be set (e.g., via noise survey or Defra noise mapping data) at specific locations.
- 14.5.15 The Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) have been established in accordance with Table 14.2.

**Table 14.2 - Construction Noise LOAELs and SOAELs**

<b>Time Period</b>	<b>LOAEL</b>	<b>SOAEL</b>
Weekdays 7:00am to 7:00pm, and Saturdays 7:00am to 1:00pm	50dB $L_{Aeq,T}$	65dB $L_{Aeq,T}$
Weekdays 7:00pm to 11:00pm, Saturdays 1:00pm to 11:00pm, and Sundays 7:00am to 11:00pm	50dB $L_{Aeq,T}$	55dB $L_{Aeq,T}$
Night-time 11:00pm to 7:00am	40dB $L_{Aeq,T}$	45dB $L_{Aeq,T}$

- 14.5.16 The assessment highlights NSRs potentially falling within the various threshold distances for each activity. Although in practice BPM will be employed to reduce construction noise levels, for the purposes of this assessment specific mitigation measures, such as screening, are not included in the calculations (except for certain fixed plant items, such as generators). This is so that construction noise ‘hot spots’ can be highlighted, and specific noise mitigation measures can be identified to avoid significant adverse effects.

### **Construction Traffic Noise Methodology**

- 14.5.17 Noise from construction traffic on the public highway has been calculated in accordance with CRTN (Department for Transport, 1988) and assessed against the criteria detailed in DMRB LA 111 (National Highways, 2020). The BNL from roads within the construction traffic study area has been calculated in accordance with CRTN for the ‘Without Development’ and ‘With Development’ scenarios in the during construction. The calculated BNL values have also been compared to determine the magnitude of the effects.

### **Construction Vibration Methodology**

- 14.5.18 This distances within which construction vibration threshold levels would be exceeded have been calculated and accordance with the methodologies described in BS 5228-2 (BSI, 2014) for each applicable activity.

14.5.19 Construction vibration effect threshold levels, including applicable LOAEL and SOAEL are presented in Table 14.3.

**Table 14.3 - Construction Vibration Effect Magnitudes**

<b>Vibration Level mm/s PPV*</b>	<b>Effect</b>
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments (LOAEL).
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if warning and explanation has been given to residents (SOAEL).
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

\* Peak Particle Velocity

14.5.20 The assessment highlights NSRs potentially falling within the various threshold distances for each activity. Although in practice BPM will be employed to reduce construction vibration levels, for the purposes of this assessment specific mitigation measures are not included in the calculations. This is so that construction vibration ‘hot spots’ can be highlighted, and specific vibration mitigation measures can be identified to avoid significant adverse effects.

14.5.21 The assessment therefore considers potential construction vibration effects against threshold values assuming no significant existing vibration sources.

**Operational Noise Methodology**

14.5.22 The assessment of operational noise from the proposed EACN Substation follows the methodology of BS 4142. BS 4142 assessed the potential significant of effects of industrial and commercial sound at NSRs by comparing the ‘rating sound level’ of the source to the typically representative ‘background sound level’.

14.5.23 Operational noise levels (‘specific noise levels’) are predicted at nearby NSRs using a noise propagation model (SoundPlan version 8.2) based on the calculation methodology described in ISO 9613 (ISO, 1996). The model takes account of plant noise data, topography, ground conditions, and screening.

14.5.24 Certain acoustic features can increase the potential for a sound to attract attention, and therefore increase its relative impact than that expected from a simple comparison between the specific sound level and the background sound level. BS 4142 (BSI, 2019) identifies noise that contains audible tonality, impulsivity and/or intermittency and recommends that a correction be added to the specific sound level. The specific sound level along with any applicable correction is referred to as the ‘sound rating level’. It should be noted that the penalties can be additive i.e., if they have a combination of tonal, impulsive, and intermittent acoustic characters.

14.5.25 The greater the difference between the rating level and the background sound level; the greater the likelihood of complaints. The assessment criteria given by BS 4142 are as follows:

- A difference of +10dB or more is likely to be an indication of a significant adverse (negative) impact, depending on the context
  - A difference of +5dB could be an indication of an adverse (negative) impact, depending on the context
- 14.5.26 The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse (negative) impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 14.5.27 The assessment also considers the context of the sound. Where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be considered, including:
- The absolute level of the sound
  - The character and level of the residual sound compared to the character and level of the specific sound
  - The sensitivity of the receptor, including whether dwellings already incorporate design measures that secure good internal and/or outdoor conditions, such as: façade insulation treatment, ventilation and/or cooling that will reduce the need to have windows open to provide rapid or purge ventilation and acoustic screening
- 14.5.28 When considering context, BS 4142 (BSI, 2019) references BS 8233 (BSI, 2014) as providing context where background and rating noise levels are low. BS 8233 recommends internal sound levels in bedroom spaces of  $\leq 30\text{dB } L_{Aeq,8h}$  during night-time periods and states that the attenuation of sound through a particularly open window for ventilation is 10 -15dB. As such, suitable internal sound levels in bedroom spaces ( $\leq 30\text{dB } L_{Aeq,8h}$ ) would be expected to be achieved where the sound rating level is below 40dB externally. The sound rating level includes penalties for acoustic character and as such the absolute sound level would be lower. With closed windows, internal sound levels would be significantly lower.

## Preliminary Assessment Key Parameters and Assumptions

- 14.5.29 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are accounted for in the assessment.
- 14.5.30 All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a conservative representative scenario has been assessed.
- 14.5.31 The assessment comprises assessing the value and sensitivity of the receptor, the magnitude of impact (change in the baseline conditions) the receptor would experience due to the Project and the resulting significance of effect, which is determined by combining the value and impact. Where there is any potential for an impact to a receptor resulting from the Project it has been assessed.
- 14.5.32 Although in practice BPM will be employed to reduce construction noise and vibration levels, for the purposes of this assessment specific mitigation measures are not

included in the construction noise and vibration calculations. This is so that construction noise and vibration 'hot spots' can be highlighted, and specific noise and vibration mitigation measures can be identified to avoid significant adverse effects or mitigate to a minimum.

- 14.5.33 Specific construction noise and vibration mitigation measures will be determined by the contractor following their own detailed assessment prior to the start of construction.
- 14.5.34 The PEIR considers two design alternatives at the Waveney Valley, as detailed in Table 4.3 in Chapter 4: Project Description, an overhead line design and an underground cable alternative. The quantitative preliminary assessment within this chapter uses traffic data, provided by the FEED, for the overhead line solution at the Waveney Valley. However, for the Waveney Valley Alternative, this chapter provides text describing how the traffic numbers would differ from the overhead line solution which are based on recently received data and professional judgement. An assessment of the preferred option will be provided within the ES.
- 14.5.35 Although the majority of works would be expected to occur during normal daytime hours, there may be activities that require night-time working. It is assumed this may include trenchless crossings, as once the works have started, it may not be feasible to stop such works until completed. As such, it is assumed that there is potential for night-time works at all trenchless crossing locations. Additionally, in practice, drilling would occur in one direction, with the plant (and therefore the main noise source) located on one side of the crossing only. However, it is assumed that drilling may occur in either direction as a worst-case.
- 14.5.36 The operational noise assessments for the proposed EACN Substation as part of the Project, and the proposed substations for the proposed Five Estuaries and North Falls offshore wind farm schemes are assessed against a fixed agreed baseline for all projects and considers the potential cumulative effects accordingly.
- 14.5.37 The key parameters and assumptions will be reviewed based on the final design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

## Further Assessment within the ES

- 14.5.38 The ES will present a detailed assessment in accordance with IEMA guidance with the significance of the effect on a receptor presented during construction and operation (and maintenance) (where relevant), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.
- 14.5.39 The construction noise and vibration assessment will be updated based on information available at the time of the ES.
- 14.5.40 At this stage, it is anticipated that further detailed assessment of operational noise from the proposed EACN Substation, based on the design presented in the DCO application, will be required. This will be conducted in line with the methodology outlined within section 14.5 above, and presented within the ES if further design information is available.

## 14.6 Baseline Conditions

14.6.1 Baseline conditions have been gathered from desk-based information and existing site surveys, and presented with reference to the section of the Project that they are located.

### Route-Wide Baseline Noise and Vibration Conditions

14.6.2 The draft Order Limits pass in proximity to a number of larger built-up areas at (north to south) including: Mulbarton, Diss, Gislingham (in Section A), Stowmarket, Needham Market (in Section B), Capel St Mary, Ardleigh (in Section C), Colchester, Aldham (in Section D), Silver End, White Notley (in Section E), Little Waltham, Broomfield, Chelmsford (in Section F), Billericay (in Section G), Horndon on the Hill, Stanford-le-Hope, Orsett, Linford, East Tilbury, and West Tilbury (in Section H).

14.6.3 The draft Order Limits also cross over or are located close to a number of main transport routes, including the following roads (north to south): A140; A1066; A143; A14; A1071; A12; A1124; A120; A131; A1060; A414; A129; A127; A128; and A13, and the following railway lines (north to south): the Great Eastern Main Line, the Shenfield-Southend line, and the London, Tilbury and Southend line. These features are presented on Figure 14.1: Baseline Noise Data in Volume II.

14.6.4 Noise Important Areas (NIAs) are determined via strategic noise maps and highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England. There are 31 NIAs located within the 300 m study area (refer to Table 14.4 and Figure 14.1: Baseline Noise Data in Volume II).

Table 14.4 - NIA Within the Study Area

<b>NIA identification number</b>	<b>Associated Road/Railway</b>	<b>Responsible Authority</b>	<b>Project Section(s)</b>
5020	A140 (Road)	Norfolk	Section A
11345	A1071 (Road)	Suffolk	Section C
4790	A12 (Road)	National Highways	Section C
4791	A12 (Road)	National Highways	Section C
12056	A12 (Road)	National Highways	Section C
4788	A12 (Road)	National Highways	Section C
4787	A12 (Road)	National Highways	Section C
4786	A12 (Road)	National Highways	Section C
6097	A12 (Road)	National Highways	Section C
12065	A12 (Road)	National Highways	Section C
4783	A12 (Road)	National Highways	Section D
12054	A1124 (Road)	Essex	Section D
12053	A1124 (Road)	Essex	Section D

<b>NIA identification number</b>	<b>Associated Road/Railway</b>	<b>Responsible Authority</b>	<b>Project Section(s)</b>
12052	A1124 (Road)	Essex	Section D
12051	A1124 (Road)	Essex	Section D
4760	A12 (Road)	National Highways	Section D
4756	A120 (Road)	National Highways	Section D
14333	A120 (Road)	National Highways	Section D
4755	A120 (Road)	National Highways	Section D
4754	A120 (Road)	National Highways	Section D
12047	A120 (Road)	National Highways	Section D
4752	A120 (Road)	National Highways	Section E
13893	A131 (Road)	Essex	Section E
5357	A12 (Road)	National Highways	Section F
5356	A12 (Road)	National Highways	Section F
6170	A12 (Road)	National Highways	Section G
5664	A127 (Road)	Essex	Section G
5665	A127 (Road)	Essex	Section G
13464	A127 (Road)	Essex	Section G
13478	A13 (Road)	Thurrock	Section H
5562	A1013/A13 (Road)	Thurrock	Section H

- 14.6.5 The noise climate is expected to vary along the draft Order Limits depending on the nature of the area. For example, close to noise sources, such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels would be expected to be lower. Daytime noise level contours from existing road and railway sources are presented in Figure 14.1: Baseline Noise Data in Volume II, showing how existing noise levels vary along the draft Order Limits. Areas outside of the contours are generally considered to have low ambient and background noise levels. Areas where the road and rail contours overlap are considered to experience noise effects from both sources.
- 14.6.6 Ecological and heritage sites that may be affected by noise and vibration will be considered within Chapter 8: Ecology and Biodiversity and Chapter 11: Historic Environment of the ES.
- 14.6.7 It is assumed that existing vibration levels are negligible within the draft Order Limits compared to construction vibration threshold values, which is likely to be the case even close to railways or busy main roads.

## Baseline Noise Conditions in Vicinity of Proposed EACN Substation, Tendring (Section C)

- 14.6.8 The area around the proposed EACN Substation in Tendring District is predominantly rural in nature with several relatively isolated dwellings in the vicinity, as shown in Figure 14.1: Baseline Noise Data in Volume II. The nearest NSRs are residential dwellings off Little Bromley Road and Hungerdown Lane to the west. There are also settlements at Hungerdown Lane to the north, Great Bromley to the south-west, Little Bromley to the south-east, with a built-up area of Lawford to the north-west.
- 14.6.9 There are no major sources of noise in the immediate vicinity of the site, with the main transport routes being the A120 approximately 3 km to the south, the A12 approximately 5 km to the west, and the Great Eastern Main Line Railway approximately 1.5 km to the west. The main source of noise in the area is therefore likely to be road traffic on local roads. Ambient and background noise levels are therefore considered likely to be relatively low.
- 14.6.10 The baseline noise survey was conducted in the locality of the proposed EACN Substation, in autumn 2022 as part of the Five Estuaries offshore wind farm project. Details of the operational noise assessment for the proposed EACN Substation, including baseline noise data, is included in Appendix 14.3: EACN Substation Operational Noise Assessment in Volume III. The background noise levels in the vicinity of the proposed EACN Substation are between 26 and 34 dB LA90 during daytime periods and 21 and 25 dB LA90 during night-time periods. These background levels are typical of a predominantly rural area.

## Future Baseline

- 14.6.11 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.
- 14.6.12 No significant changes to the future Noise and Vibration baseline are anticipated along most of the Project route owing to its largely rural and agricultural nature. There are, however, localised areas where the future baseline may change. This is including the Lower Thames Crossing (in Section H), the Chelmsford northern bypass (in Section F), and the onshore components of the Five Estuaries and North Falls offshore wind farm schemes close to the proposed EACN Substation (in Section C).
- 14.6.13 The Construction Noise and Vibration assessment methodologies assume worst-case assessment criteria and therefore assessment would be unaffected by changes to the baseline.
- 14.6.14 The operational noise assessments for the proposed EACN Substation as part of the Project, and the proposed substations for the proposed Five Estuaries and North Falls offshore wind farm schemes are assessed against a fixed agreed baseline for all projects and considers the potential cumulative effects accordingly.

## 14.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 14.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 14.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 14.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 of Chapter 4: Project Description. Those relevant to Noise and Vibration include:
- The route alignment and siting have been designed as far as practicable to avoid sensitive noise and vibration features as set out in the Corridor and Preliminary Routeing and Siting Study (National Grid, 2022). This included avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby NSRs being isolated dwellings and small settlements
  - The Project will include triple Araucaria conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons). Due to its geometrical configuration, the triple Araucaria design is the least electrically stressed conductor system that National Grid uses. It is the best design for reducing the effects of line crackle (corona discharge) and would reduce the generation of noise from the proposed overhead lines during operation
  - Substations – noise control measures: The proposed new substation would include any required noise mitigation measures by design. This may include, plant selection, siting, screening, and enclosures, as appropriate
  - Substations – vibration control measures: Plant with moving parts, such as cooling equipment and transformers, would be expected to be mounted on suitable anti-vibration mounts to protect the plant from potential vibration effects and to attenuate vibration generated by the plant

### Standard Mitigation

- 14.7.4 Standard mitigation measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 14.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard mitigation measures and BPM relating to Noise and Vibration. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- NV01: Main Works Contractor(s) will be required to follow good construction practices (referred to as best practicable means (BPM)) as outlined in BS 5228-1 and BS 5228-2 to control noise and vibration respectively. BS 5228-1 and BS 5228-2

have Approved Code of Practice status (in England) under the powers conferred by Sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974, as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. Compliance with the good practice noise and vibration requirements stated therein became a statutory obligation under the Act

- NV02: BPM measures will be identified within the CoCP and may include housing continuous noisy plant in acoustic enclosures, siting semi-static equipment as far as reasonably practicable away from occupied buildings and fitting equipment with suitable enclosures or screening
- NV03: In certain instances where construction noise and/ or vibration may cause a significant adverse effect at nearby Noise Sensitive Receptors (NSR), applications for prior consent under Section 61 of the Control of Pollution Act 1974 may be submitted to the relevant local authority to ensure that BPM are applied to control noise and vibration. This would be considered within the mitigation outlined in the Outline CoCP to support the DCO application
- NV04: Where there is potential for works to generate vibration at, or approaching, levels exceeding 12.5 mm PPV at buildings or structures (or lower levels if the building or structure is deemed particularly sensitive to vibration), pre and post work condition surveys will be conducted. Any damage (cosmetic or otherwise) deemed to be caused by the works will be rectified
- NV05: A Noise and Vibration Management Plan to set out the framework for how noise and vibration will be managed during construction will be produced by the Main Works Contractor(s) prior to the commencement of construction
- NV06: Avoid unnecessary revving of engines and switch off equipment when not required
- NV07: Keep internal haul roads well maintained and avoid steep gradients, where possible
- NV08: Use rubber linings in, for example, chutes and dumpers to reduce impact noise
- NV09: Minimize drop height of materials
- NV10: Start-up plant and vehicles sequentially rather than all together
- NV11: Continuous noisy plant should be housed in acoustic enclosures, where practicable
- NV12: Exhaust silencing and plant muffling equipment should be fitted and maintained in good working order
- NV13: Static plant known to generate significant levels of vibration should be fitted with vibration dampening features
- NV14: Each item of plant used should be selected to comply with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/United Kingdom Statutory Instrument (SI) 2001/1701 as transposed into UK legislation by the Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001/1701

- NV15: Consideration will be given to the recommendations set out in Annex B of BS 5228-1, noise sources, remedies, and their effectiveness
- NV16: Equipment should be well maintained and where possible should be used in the mode of operation that minimises noise
- NV17: Plant and equipment will be shut down when not in use
- NV18: Semi-static equipment will be sited and orientated as far as is reasonably practicable away from occupied buildings and, where feasible, will be fitted with suitable enclosures or screened using noise barriers
- NV19: Materials will be handled in a manner that minimises noise
- NV20: All appropriate personnel will be instructed on BPM measures to reduce noise and vibration as part of their induction training and followed up by 'toolbox' talks
- NV23: For the construction of pylon foundations, non-percussive piling methods will be used where feasible
- GG10: The Project will be constructed in compliance with the required ECPs including a CTMP and Construction Staff Travel Plan (an outline CTMP will be submitted as part of the DCO application)

14.7.6 Appendix 4:1: Draft Outline CoCP in Volume III outlines specific mitigation measures to reduce construction noise and vibration. However, specific BPM to reduce construction noise and vibration would be determined by the Main Works Contractor(s) following their detailed assessment but would typically include the use of alternative methods and screening (this will be documented in the CoCP submitted to discharge the DCO Requirement).

14.7.7 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

## Additional Mitigation

14.7.8 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

14.7.9 Assessments conducted within this PEIR, as defined in Section 14.9, have not identified any requirements for additional mitigation at this stage, above those identified above as embedded or standard mitigation.

14.7.10 However, with regards to construction noise and vibration, specific measures would be required at identified 'hot spots' to avoid potential significant adverse effects. These would be standard mitigation measures, as identified above.

14.7.11 With regards to operational noise from the proposed EACN Substation, the assessment indicates that mitigation measures would need to be included in the design to avoid potential significant adverse effects. This would be an embedded mitigation measure, as identified above, through future design and assessment.

## Waveney Valley Alternative

- 14.7.12 The Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 Thetford (as presented on Figure 16.1: Primary Access Routes in Volume II), which would be used to bring in cable drums. Construction noise associated with the Waveney Valley Alternative would be mitigated through BPM as per the overhead line design, no additional mitigation would be required.

## 14.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 14.8.1 The preliminary likely significant effects of the Project have been considered based upon current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential effects are outlined below. For construction noise and vibration, the assessment is presented without mitigation in place – this is so that noise and vibration ‘hot-spots’ can be identified where specific mitigation measures may be required to avoid significant adverse effects. For construction traffic on the public highway and operational effects it assumes that all mitigation - embedded (design measures) and standard practice mitigation measures are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022).
- 14.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 14.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

## Preliminary Construction Effects

### Construction Noise (Daytime)

- 14.8.4 Construction plant data and associated noise data is provided in Appendix 14.1: Construction Noise and Vibration Data in Volume III, and an initial assessment of construction noise without mitigation is presented in Figure 14.2: Initial Construction Noise and Vibration Assessment Outputs in Volume II. The assessment of construction traffic noise on temporary haul roads is provided in Appendix 14.2: Construction Traffic Noise Assessment in Volume III.
- 14.8.5 The construction noise assessment has identified 95 NSRs where there are potential significant adverse (negative) effects from 100 construction locations (five NSRs have potentially significant adverse effects from two separate activities), without specific BPM mitigation measures, during daytime periods. This includes:
- Fifty-six NSRs potentially significantly affected by underground cable construction noise
  - Thirty-seven NSRs potentially significantly affected by overhead line construction noise

- Four NSRs potentially significantly affected by trenchless crossing construction noise
- Three NSRs potentially significantly affected by compound construction and/or operation (and maintenance) noise

14.8.6 As noted above, the assessment assumed that no specific BPM mitigation measures were used and as such the above locations, also shown in Figure 14.2: Initial Construction Noise and Vibration Assessment Outputs in Volume II, can be considered as construction noise 'hot spots' requiring specific BPM mitigation measures.

14.8.7 BPM may take the form of alternative plant or methods, plant silencers, and screening, as appropriate to the task. Specific mitigation measures would be determined by the contractor prior to conducting works. Updated BPM will be set out in the Outline CoCP to be submitted with the ES, however, they would not be finalised until the final CoCP is prepared by the Main Works Contractor(s) to discharge the DCO Requirement. In all instances, significant adverse (negative) effects from construction noise would be expected to be avoided or mitigated to a minimum with the use of BPM. As such, the effects of construction noise are likely to be not significant.

14.8.8 There are also potential exceedances of the construction noise SOAEL at 325 NSRs in relation to temporary access and haul road construction. However, these activities would not be expected to be of a significant duration (less than ten days in any 15 consecutive days) at any one location and as such would not be expected to be significant. This will be considered further in the ES.

14.8.9 There are 432 NSRs located within 30 m of third party works, required due to deliver the Project. In most instances works would be expected to be relatively minor, in terms of noise level and/or duration and would not be considered to be significant. However, there is insufficient data at this stage to determine specific effects from third party activities. This will be considered further in the ES.

14.8.10 Further assessment of construction noise will be undertaken in the ES.

### Waveney Valley Alternative

14.8.11 The construction noise assessment has identified two additional NSRs where there are potential significant adverse (negative) effects (without mitigation) from the construction of underground cables associated with the Waveney Valley Alternative during daytime periods. However, significant adverse (negative) effects from construction noise would be expected to be avoided or mitigated to a minimum with the use of BPM and therefore would not result in additional significant effects above those reported above for the overhead line design. There are no identified NSRs where there are potential significant adverse (negative) effects associated with the overhead line option in this area.

### Construction Noise (Night-time)

14.8.12 The majority of works would be expected to be conducted during daytime periods. However, there are certain activities that may be required to be conducted during night-time periods. For example, this may include trenchless crossings, as once the works have started, it may not be feasible to stop such works until completed. As such, it is assumed that there is potential for night-time works at all trenchless crossing locations. Additionally, in practice, drilling would occur in one direction, with the plant (and

therefore the main noise source) located on one side of the crossing only. However, it is assumed that drilling may occur in either direction as a worst-case. On this basis, there are 51 NSRs potentially significantly affected by trenchless crossing construction noise during night-time periods, without mitigation.

- 14.8.13 As above, these locations can be considered as construction noise 'hot spots' requiring specific BPM mitigation measures and in all instances, significant adverse (negative) effects from construction noise would be expected to be avoided with the use of BPM. As such, the effects of construction noise are likely to be not significant. Further assessment of potential construction noise effects during night-time will be undertaken in the ES.

### Waveney Valley Alternative

- 14.8.14 The construction noise assessment has identified one additional NSR where there are potential significant adverse (negative) effects (without mitigation) from the construction of trenchless crossings associated with the Waveney Valley Alternative during night-time periods (assuming works are conducted at night). However, significant adverse (negative) effects would be expected to be avoided or mitigated to a minimum with the use of BPM and therefore would not result in additional significant effects above those reported above. There are no further differences associated with the overhead line design and Waveney Valley Alternative in this area.

### Construction Vibration

- 14.8.15 Construction plant data and associated noise data is provided in Appendix 14.1: Construction Noise and Vibration Data in Volume III, and an initial assessment of construction vibration is presented in Figure 14.2: Initial Construction Noise and Vibration Assessment Outputs in Volume II. The assessment has identified 19 instances where there are potential significant adverse (negative) effects from construction vibration at NSRs, without specific BPM mitigation measures. These include:
- One NSR potentially significantly affected by overhead line construction (if percussive piling required)
  - Eighteen NSRs potentially significantly affected by underground cable construction vibration (ground compaction)
- 14.8.16 There are also 12 NSRs where the construction vibration SOAEL may be exceeded at NSRs due to the construction of temporary access routes (ground compaction). However, the duration would be relatively short in duration (typically less than a day at any specific location), and as such would not typically be regarded as significant.
- 14.8.17 As noted above, the assessment assumed that no specific BPM mitigation measures were used and as such the above locations, shown in Figure 14.2: Initial construction noise and vibration assessment outputs in Volume II, can be considered as construction vibration 'hot spots'<sup>68</sup> requiring specific BPM mitigation measures.

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<sup>68</sup> Sensitive receptors where there is potential for significant adverse effects from construction noise and/or vibration without mitigation.

- 14.8.18 BPM may take the form of alternative plant or methods as appropriate to the task. For example, with regards to overhead line construction, it is assumed that percussive piling may be required for the construction of pylon foundations, as a worst-case. However, typically, non-percussive methods would be used where feasible. The method would be determined by the contractor following an assessment of ground conditions.
- 14.8.19 Appendix 4:1: Draft Outline CoCP in Volume III outlines specific mitigation measures. These will be refined by the Main Works Contractor(s) prior to conducting works (which would be documented in the CoCP submitted to discharge the DCO Requirement). In all instances, significant adverse effects from construction vibration would be expected to be avoided and mitigated to a minimum with the use of BPM. As such, the effects of construction vibration are likely to be not significant.
- 14.8.20 Further assessment of construction vibration will be undertaken in the ES.

### Waveney Valley Alternative

- 14.8.21 There are no NSRs within the threshold distance for significant adverse effects from potential vibration generating construction activities associated with the Waveney Valley Alternative. Therefore, no additional significant adverse effects from construction vibration have been identified in relation the Waveney Valley Alternative.

### Construction Traffic on the Public Highway

- 14.8.22 The assessment of construction traffic noise on the public highway is provided in Appendix 14.2: Construction Traffic Noise Assessment in Volume III.
- 14.8.23 The assessment indicates that construction traffic would lead to a negligible (neutral) or small magnitude (negative) effect on most Primary Access Routes, with a potential medium or large magnitude (negative) effect on two proposed construction traffic routes; namely:
- Link PAR 30 – Bentley Road (Section C)
  - Link PAR 33 – Wick Lane (Section D)
- 14.8.24 Links PAR 30 and 33 are both low flow routes, with and without construction traffic, and as such consideration is given to the absolute noise level, with reference to the construction noise SOAEL, in deriving potential significance of effect.
- 14.8.25 There are 18 NSRs within 50 m of the Primary Access Routes. However, taking account of absolute noise level of traffic in relation to the construction noise SOAEL, and consideration of existing baseline conditions, potential significant adverse effects are only likely at one NSR, located along Link PAR 30 – Bentley Road:
- Jasmine Cottage, Bentley Road, Little Bentley, CO7 8SS (National Grid Reference (NGR) 611136, 226669) – located in Section C
- 14.8.26 Jasmine Cottage is located immediately adjacent to Bentley Road at a distance of approximately 1 m from the carriageway edge. The predicted noise increase at this specific property is 3.8 dB which is a medium magnitude (negative) effect, with the absolute noise level being above the construction noise SOAEL, principally due to the small distance between the property and the carriageway.

- 14.8.27 Significant effects from are not expected at any other NSR in relation to construction traffic noise.
- 14.8.28 There are no small magnitude (negative) effects on routes which include a NIA, which are more sensitive to increases in traffic noise. As such the effect of construction traffic noise within NIAs is likely to be not significant.

### Waveney Valley Alternative

- 14.8.29 A qualitative assessment of the Waveney Valley Alternative has been undertaken – using 12 hr weekday data recently provided by the FEED. The assessment indicates that construction traffic from the Waveney Valley Alternative would lead to a negligible (neutral) effect, comparable to the overhead line option, with no additional likely significant adverse effects resulting from a 2% worst-case daily increase from the baseline for total traffic on the 12h weekday flows. A quantitative assessment will be presented in the ES if this option is taken forwards.
- 14.8.30 In addition, the Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 Thetford, which would be used to bring in cable drums to avoid highway constraints through Diss. It is anticipated that this would introduce a maximum of six daily AIL movements across a four-month period along this route. This is not likely to result in any additional significant effects when compared to the overhead line design.

### Preliminary Operation (and Maintenance) Effects

- 14.8.31 An assessment of operational (and maintenance) noise from the proposed EACN Substation is presented in Appendix 14.3: EACN Substation Operational Noise Assessment in Volume III.
- 14.8.32 The assessment indicates that noise from the operation of the proposed EACN Substation would lead to a negligible (neutral) to small magnitude (negative) at nearby NSRs where standard noise mitigation measures are incorporated in the design. Noise from the operation (and maintenance) of the proposed EACN Substation is therefore likely to be not significant.
- 14.8.33 Further assessment of operational noise from the proposed EACN Substation will be undertaken in the ES if further design information is available. Alternatively, further assessment will be conducted as standard practice by National Grid, including any mitigation measures. This may be secured as a requirement in the DCO, if granted. Cumulative effects of operational substation noise from the proposed Five Estuaries and North Falls Substations will also be assessed in the ES.

### Waveney Valley Alternative

- 14.8.34 There would be no operational or maintenance effects from the Waveney Valley Alternative as operational noise has been scoped out other than at the EACN Substation.

## 14.9 Sensitivity Testing

### Flexibility in Construction Programme

- 14.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Qualitative sensitivity testing considering alternative Project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in this chapter.

### Flexibility in Design

- 14.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II.
- 14.9.3 Qualitative sensitivity testing considering alternative pylon and underground cable routes within the proposed LoD being closer to NSRs, has shown that this may lead to increases in noise and/or vibration levels at these receptors. This may lead to additional significant effects without mitigation. However, the noise and vibration mitigation measures applied, in the form of BPM for construction effects, and substation design for operational noise effects, would adjust accordingly. Significant adverse (negative) effects would therefore be avoided. Conversely, noise and/or vibration levels would reduce if the pylon locations, underground cable routes are moved further from NSRs. Movement within the LoD is therefore not likely to lead to additional significant adverse effects with regards to noise and vibration.

### Flexibility due to Design elements not fixed at Statutory Consultation

- 14.9.4 There are also elements of the Project which have not been fixed at statutory consultation, as detailed in Table 4.3 of Chapter 4: Project Description.
- 14.9.5 With regards to construction noise and vibration, as above, if construction activities move closer to NSRs, this may lead to increases in noise and/or vibration levels at these receptors. This may lead to additional significant effects without mitigation. However, the noise and vibration mitigation measures applied, in the form of BPM for construction effects, would adjust accordingly. Significant adverse (negative) effects would therefore be avoided. Conversely, noise and/or vibration levels would reduce if construction activities are moved further from NSRs.
- 14.9.6 The alternative offline EACN Substation access would move construction traffic away from approximately eight NSR located on Bentley Road between the proposed primary access route and the alternative offline access. Construction traffic noise levels and therefore the potential magnitude of impact would therefore be reduced at these NSR with the use of the alternative offline access. However, the potential significant effect from construction traffic noise at Jasmine Cottage would not be altered as this NSR is located on Bentley Road between the A120 and the alternative offline access.
- 14.9.7 There are no anticipated significant adverse effects from operational noise in relation to the potential uncertainty in the design.

# 15. Socio- economics, Recreation and Tourism

# 15. Socio-economics, Recreation and Tourism

## 15.1 Introduction

15.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Socio-economics, Recreation and Tourism. The chapter covers potential effects on the following:

- Employment and economic activity during construction
- Businesses during construction and operation (and maintenance). *This excludes potential effects on agricultural businesses, which are considered under Chapter 6: Agriculture and Soils*
- Severance and ‘sterilisation’ of land in the context of its potential for future development during construction and operation (and maintenance)
- Disruption of access to community facilities during construction. *This excludes visual amenity, which is considered under Chapter 13: Landscape and Visual*
- Disruption to tourism and recreational assets during construction and operation (and maintenance)
- Pressures on local visitor accommodation during construction

15.1.2 There are interrelationships related to the potential effects on Socio-economics, Recreation and Tourism and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 7: Air Quality
- Chapter 10: Health and Wellbeing
- Chapter 13: Landscape and Visual
- Chapter 14: Noise and Vibration
- Chapter 16: Traffic and Transport

15.1.3 This chapter is supported by the following figures in Volume II:

- Figure 15.1: Study Area
- Figure 15.2: Community Facilities, Businesses, Recreation and Tourism Assets
- Figure 15.3: Recreational Land and Recreational Routes
- Appendix 15.1: Built Assets within 1 km of the Local Study Area

## 15.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statement (NPS)

- 15.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024). EN-1 states that energy projects may have socio-economics impacts, which have been considered within this chapter.
- 15.2.2 Paragraph 5.13.5 of EN-1 states: *‘Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development’s socio-economic impacts correlate with local planning policies’.*
- 15.2.3 Paragraphs 5.13.9 to 5.13.11 of EN-1 state: *‘The Secretary of State should have regard to the potential socio-economic impacts of new energy infrastructure identified by the applicant and from any other sources that the Secretary of State considers to be both relevant and important to its decision’.*
- ‘The Secretary of State may conclude that limited weight is to be given to assertions of socio-economics impacts that are not supported by evidence (particularly in view of the need for energy infrastructure as set out in this NPS)’.*
- ‘The Secretary of State should consider any relevant positive provisions the applicant has made or is proposing to make to mitigate impacts (for example through planning obligations) and any legacy benefits that may arise as well as any options for phasing development in relation to the socio-economic impacts’.*
- 15.2.4 NPS EN-5 does not contain any paragraphs specific to socio-economics matters.

### Other National Legislation and Policy

- 15.2.5 There are no further specific national legislation or policies related to this topic.

### Regional and Local Policy

- 15.2.6 Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy. Key local policies relevant to Socio-economics, Recreation and Tourism include, that has informed this PEIR and will inform the assessment within the ES, comprises:
- South Norfolk Local Plan Development Management Policies Document (South Norfolk Council, 2015)
  - Babergh Local Plan 2011-2031 (saved policies) (Babergh District Council, 2014 and 2023 as amended)
  - Babergh and Mid Suffolk Joint Local Plan (Part One) (Babergh District Council and Mid Suffolk District Council, 2023)
  - Colchester City Local Plan 2013-2033 (previously known as Colchester Borough Local Plan 2013-2033) (Colchester City Council, 2021)

- Tendring District Local Plan 2013-2033 and Beyond (Tendring District Council, 2021)
- Braintree District Local Plan 2033 (Braintree District Council, 2022)
- Chelmsford Local Plan 2013-2036 (Chelmsford City Council, 2020)
- Brentwood Local Plan 2016-2033 (Brentwood Borough Council, 2022)
- Basildon District Local Plan Saved Policies 2007 (Basildon Council, 2018 as amended)
- Thurrock Local Development Framework Core Strategy and Policies for Management of Development (Thurrock Council, 2015)

## Guidance

- 15.2.7 Relevant guidance, specific to Socio-economics, Recreation and Tourism, that has informed this PEIR and will inform the assessment within the ES, comprises:
- HM Treasury Green Book (HM Treasury, 2022)
  - Additionality Guide (Homes and Communities Agency, 2014)
  - DMRB LA 112 Population and Human Health (National Highways, 2020)

## 15.3 Scoping Opinion

- 15.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 15.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Socio-economics, Recreation and Tourism is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 15.4.

## 15.4 Project Engagement and Consultation

- 15.4.1 National Grid has held several meetings with relevant consultees including Local Authorities and the Dedham Vale and Suffolk Coast and Heaths National Landscapes (Areas of Outstanding Natural Beauty (AONBs)).
- 15.4.2 A summary of details of discussions and how these have influenced the Project, scope and the approach to the assessment is provided in Table 15.1.

Table 15.1 - Stakeholder Engagement

<b>Organisation and Date</b>	<b>Summary of Issues Raised</b>	<b>Project Response and consideration in PEIR</b>
<p>Leisure Projects Officer Chelmsford City Council, July 2022</p>	<p>The Project should consider sports pitches and courts as well as Hylands Estate as recreation and tourism assets. The Project should provide clarity on who will engage with those directly affected.</p>	<p>Sports pitches and courts have been considered under 'Recreational Open Space'. Sports clubs have been considered under 'Business, Tourism and Recreational Assets'. Hylands Estate is considered under 'Business, Tourism and Recreational Assets' as 'Hylands House Country Estate'. Land agents appointed by National Grid have been engaging with those who would be directly affected by the Project.</p>
<p>Thematic Group Meeting for Socio-economics, Recreation and Tourism, July 2022. Participants:</p> <ul style="list-style-type: none"> <li>• Basildon Borough Council</li> <li>• Babergh and Mid Suffolk District Councils</li> <li>• Essex County Council</li> <li>• Colchester City Council</li> <li>• Thurrock Council</li> <li>• South Norfolk Council</li> <li>• Norfolk County Council</li> <li>• Braintree District Council</li> <li>• Suffolk County Council</li> <li>• AONB Manager for Suffolk Coast and Heaths and Dedham Vale AONBs (now National Landscapes)</li> <li>• Chelmsford City Council</li> </ul>	<p>The Project sought feedback on the proposed approach to the Socio-economics, Recreation and Tourism assessment prior to formal submission of the scoping report to the Planning Inspectorate.</p> <p>Discussions included:</p> <ol style="list-style-type: none"> <li>1. Effects on businesses because of construction traffic and activities</li> <li>2. Potential effects to the perception of tourism in the area</li> <li>3. Access to education and employment destinations</li> <li>4. Consideration of the National Landscape (an AONB) as a tourism asset</li> <li>5. Extent and effects of the construction workforce, including local employment and training</li> </ol>	<ol style="list-style-type: none"> <li>1. Effects on businesses where visual effects are a potential economic consideration are discussed in this PEIR chapter. Other effects on businesses because of construction traffic and activities are detailed in Chapter 13: Landscape and Visual, Chapter 14: Noise and Vibration and Chapter 16: Traffic and Transport</li> <li>2. Potential effects to the perception of tourism in the area have been considered under 'Business, tourism, and recreational assets'</li> <li>3. Potential effects to education and employment destinations have been considered under 'Community facilities' and 'Business, tourism, and recreational assets' in line</li> </ol>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
		<p>with Chapter 16: Traffic and Transport</p> <p>4. The Dedham Vale National Landscape (an AONB) has been considered as a recreational asset under 'Business, tourism, and recreational assets'</p> <p>5. The study area for construction workforce effects comprises the wider study area (the spatial extent of the local authority areas through which the draft Order Limits pass). Any local community investment including training opportunities would be captured under the National Grid Community Grant Scheme and dealt with separately to the EIA.</p>
<p>Thematic Group Meeting for Socio-economics, Recreation and Tourism, August 2023.</p> <p>Participants:</p> <ul style="list-style-type: none"> <li>• Norfolk County Council</li> <li>• South Norfolk Council</li> <li>• Suffolk County Council</li> <li>• Babergh and Mid Suffolk District Councils</li> <li>• Essex County Council</li> <li>• Colchester City Council</li> <li>• Chelmsford City Council</li> <li>• Basildon Council</li> <li>• Brentwood Borough Council</li> <li>• Braintree District Council</li> <li>• Tendring District Council</li> </ul>	<p>In response to the Planning Inspectorate's Scoping Opinion, feedback was sought to agree the study area.</p> <p>Basildon Borough Council, Suffolk County Council, Norfolk County Council and South Norfolk Council requested further expansion to the study area proposed to capture potential employment in the wider cities, towns, and settlements as a result of the Project.</p> <p>Other discussions included:</p> <ol style="list-style-type: none"> <li>1. Classification of assessment criteria, including the definition of small and large scale effects.</li> <li>2. Babergh District Council and Mid Suffolk District Council</li> </ol>	<p>National Grid has several grid connection projects nationwide which have informed the assumptions on catchment areas for employment generation.</p> <p>Given the Project office is in Bury St Edmunds, West Suffolk will be included in the wider study area. Although Norwich City Council and Ipswich Borough Council have a lower number of manufacturing, construction and administrative sector employees when compared to the region, the two locations are considered to have a relatively larger population, and the commuting time to the closest point of the Project is likely to be within 45 minutes in one direction. Hence, it was agreed that Norwich City</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	<p>requested effects of above ground and undergrounding works to be differentiated within the assessment.</p> <ol style="list-style-type: none"> <li>3. Basildon Borough Council requested the quantification of employment numbers to be generated on a borough by borough basis or at a local community level within the assessment.</li> <li>4. Colchester City Council questioned whether the attractions being paid or free to visit was factored into the assessment.</li> <li>5. South Norfolk Council requested that the Project should report on significant effects on users of airfields within the ES.</li> </ol>	<p>Council and Ipswich Borough Council will be included in the wider study area.</p> <p>The updated wider study area will therefore include LPA areas which the Project passes through, together with Norwich City Council, West Suffolk Council, and Ipswich Borough Council.</p> <ol style="list-style-type: none"> <li>1. Further definition for large- and small-scale effects will be included within the ES. Significance criteria is not provided within the PEIR.</li> <li>2. The preliminary assessment considers effects arising from above ground and underground works, and this is noted where relevant.</li> <li>3. A borough by borough breakdown of direct and indirect employment generation will not be provided. This is due to job uptake being skills level dependent, as well as suitability. In the absence of official baseline data detailing the skill sets within the borough, the assessment of the number of employment jobs a borough could secure is not considered to be robust. The employment generation assessment will consider the wider study area as a whole.</li> <li>4. All tourist attractions that fall within the study area will be considered, including free and paid tourist attractions.</li> <li>5. Significant effects on users of airfields will be reported in the ES.</li> </ol>

## 15.5 PEIR Approach and Methods

15.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology / approach used to undertake the preliminary assessment on Socio-economics, Recreation and Tourism. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

15.5.2 The Socio-economics, Recreation and Tourism topic considers the potential for effects within three study areas:

- **Local Study Area** – This comprises the draft Order Limits. The draft Order Limits represent the area in which temporary and permanent works have the potential to affect Socio-economics, Recreation and Tourism receptors directly
- **1 km from the Local Study Area** – For the assessment of potential effects on businesses where visual effects are an economic consideration (for example, restaurants and wedding venues), businesses are considered where they fall within 1 km of the local study area (draft Order Limits). Based on professional judgement, effects on businesses situated beyond 1 km of the local study area (draft Order Limits) are deemed to be negligible
- **Wider Study Area** – This comprises the spatial extent of the local authority areas through which the draft Order Limits pass together with Norwich City Council and Ipswich Borough Council (adjacent to the Project) and West Suffolk Council (where the Project office is located). The wider study area therefore comprises the following:
  - Norwich City Council
  - South Norfolk Council
  - Mid Suffolk District Council
  - West Suffolk Council
  - Ipswich Borough Council
  - Babergh District Council
  - Tendring District Council
  - Colchester City Council
  - Braintree District Council
  - Chelmsford City Council
  - Basildon Borough Council
  - Brentwood Borough Council
  - Thurrock Council

15.5.3 The purpose of having three study areas is to capture potential effects on receptors at three different spatial scales including:

- Direct effects on receptors located within the draft Order Limits,
- Direct effects on businesses where visual effects are an economic consideration, and
- Wider effects on the local economy and employment

15.5.4 This approach is based on professional judgement and knowledge of previous similar projects. The local and wider study areas are shown on Figure 15.1: Study Area in Volume II. The relevant study areas for each element covered under the Socio-economics, Recreation and Tourism assessment are as follows:

- Local study area - Community facilities, built assets, recreational land, recreational routes within the draft Order Limits where visual effects are not an economic consideration
- Local study area plus 1 km buffer from the draft Order Limits - Built assets where visual effects are an economic consideration
- Wider study area - Local economy and employment and local visitor accommodation bedspace

## Data Collection

15.5.5 The baseline assessment has drawn on the following key information sources:

- Latest available survey data accessed through the Nomis web-based database of labour market statistics run by the University of Durham on behalf of the Office for National Statistics (ONS) (Nomis, 2023)
- Population and household estimates, England, and Wales: Census 2021 (ONS, 2023)
- Annual Population Survey – January 2022 – December 2022 (Nomis, 2023)
- Business Register and Employment Survey (BRES): Employees in the UK: provisional results 2021 (ONS, 2022)
- Population projections – local authority based by single year of age (Nomis, 2020)
- English Indices of Deprivation 2019: Local Authority District Summaries (Ministry of Housing, Communities and Local Government, 2019)
- Engagement with airfield owners undertaken by National Grid sub-contractor
- VisitBritain Accommodation Stock Audit 2016 (VisitBritain, 2016)
- Tourism accommodation (Booking.com, 2023)

15.5.6 The baseline was also informed by project-wide GIS data as well as Google Maps data and aerial imagery.

## Further Data to be collected to inform the ES

15.5.7 In addition to the data collected in this PEIR, the ES will be informed by further baseline data gathered from other topic chapters where relevant. This will include baseline information from Chapter 7: Air Quality, Chapter 10: Health and Wellbeing, Chapter 13:

Landscape and Visual, Chapter 14: Noise and Vibration and Chapter 16: Traffic and Transport.

- 15.5.8 The ES will also draw on the results of Public Rights of Way (PRoW) usage results, that have been undertaken for the Project.

## PEIR Assessment Methodology

- 15.5.9 The preliminary Socio-economics, Recreation and Tourism assessment determines if effects because of the Project, following the implementation of mitigation, are likely to be positive, negative, or neutral together with predicting if effects are likely to be significant. All conclusions and assessments are, by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
- 15.5.10 The assessment has drawn on professional judgement and experience of previous projects. A high-level economic and employment effect assessment has been undertaken due to the stage of the Project, construction employment numbers are subject to change and will be confirmed in the ES.
- 15.5.11 DMRB LA 112: Population and Human Health (National Highways, 2020), whilst not specific to electricity infrastructure, has also provided useful context for assessing land use and accessibility effects associated with linear infrastructure.
- 15.5.12 The assessment has drawn on the guidance above to determine preliminary residual effects.

## Preliminary Assessment Key Parameters and Assumptions

- 15.5.13 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated in the ES as the design evolves and changes are made.
- 15.5.14 The following limitations and assumptions have been identified for the Socio-economics, Recreation and Tourism assessment:
- The assessment relies on, in part, data provided by third parties (e.g., OS Mapping, Nomis, ONS) which are the most up-to-date data available at the time of the assessment. No significant changes or limitations in these datasets have been identified that would affect the robustness of the assessment for EIA purposes
  - The sensitivity of built assets has been assessed based on publicly available data and professional judgement where there is no information (e.g., webpage of the built assets) in the public domain
  - There is no public data on aircraft movements at identified airfields. The baseline data gathered was based on engagement with the identified airfields and information (e.g. type of airfield, number of employee etc.) provided on the webpage of the airfields
  - No site surveys have been undertaken for the purpose of this chapter. However, this is not considered to affect the robustness of the assessment due to baseline information being publicly available online

- Potential visual effects have been based on the preliminary Zones of Theoretical Visibility (ZTV) produced for the PEIR in Figure 13.8: Zone of Theoretical Visibility (ZTV) in Volume II.
- The planning and development preliminary assessment was based on the latest data, planning application and planning allocation boundary available at the time of writing
- Compensation matters are not addressed within the PEIR and will be dealt with separately as part of the DCO process

15.5.15 The key parameters and assumptions will be reviewed based on the design presented in the DCO application and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from that presented in this preliminary assessment.

## Further Assessment within the ES

15.5.16 The ES will present a detailed assessment of the sensitivity, magnitude of impact and significance of effects on the receptors. In the absence of standard methodology, it will be based on professional judgement and experience of previous projects. The economic and employment impact assessment will also be informed by principles set out in the HM Treasury Green Book, and Homes and Communities Agency (HCA) Additionality Guide 4<sup>th</sup> Edition (HCA, 2014). The DMRB LA 112: Population and Human Health (National Highways, 2020) will be used to determine effects on land use and accessibility.

15.5.17 Any further discussions and/or feedback from stakeholder engagement, where relevant, will be incorporated into the ES. The ES will incorporate and draw on the results of survey data captured after September 2023 (e.g., PRoW usage surveys data) as well as assessment findings from other chapters considered relevant to the Socio-economics, Recreation and Tourism topic.

## 15.6 Baseline Conditions

15.6.1 Baseline conditions have been gathered from desk-based information and presented with reference to the section of the Project that they are located.

## Employment and Economic Activity

### Population, Age Profile and Deprivation

15.6.2 The resident population of each of the 13 local authority areas comprising the wider study area as recorded in the Census 2021 is shown in Table 15.2. The most populous local authority areas were Colchester, Basildon, and Chelmsford (in the south). The least populous were Brentwood (in the south), Babergh and Mid Suffolk (in the north). The total resident population for the wider study area was circa 1.9 million.

15.6.3 The East of England was the region of England which saw the largest population growth between the 2011 and 2021 Census dates. Population growth within the wider study

area was greatest in South Norfolk (14.4%), Thurrock (11.6%) and Colchester (11.3%) and smallest in Ipswich (4.4%), Brentwood (4.6%) and West Suffolk (4.9%). These statistics may be affected by the Covid-19 pandemic, which was underway when the Census 2021 was conducted (for example, by students studying from home rather than living away).

- 15.6.4 The proportions of the population aged 15 years and under, 16-64 and 65+ within each of the local authority areas as recorded in the Census 2021 are shown in Table 15.3. Thurrock had the greatest proportion of the population aged 15 years and under (22.6%) and the smallest proportion aged 65+ (13.6%). Tendring had the smallest proportion of the population aged 15 years and under (15.8%) and the greatest proportion aged 65+ (29.5%).
- 15.6.5 The English Indices of Deprivation 2019, also shown in Table 15.2, show the most deprived local authority area within the wider study area is Tendring, which falls within the 25<sup>th</sup> percentile most deprived of all local authority areas in England, as do Norwich and Ipswich. Basildon and Thurrock fall below the 50<sup>th</sup> percentile most deprived. Chelmsford and Brentwood fall within the 25<sup>th</sup> percentile least deprived.

Table 15.2 - Population Size, Change and Deprivation

<b>Local Authority area (Project Section)</b>	<b>Population (Census 2021)</b>	<b>Percentage change since Census 2011</b>	<b>Average rank in IMD 2019*</b>
Norwich (N/a)	143,900	8.9	61
South Norfolk (Section A)	141,900	14.4	225
Mid Suffolk (Section B)	102,700	6.2	229
West Suffolk (N/a)	179,900	4.9	176
Ipswich (N/a)	139,600	4.4	71
Babergh (Section C)	92,300	5.2	212
Tendring (Section C)	148,100	7.3	32
Colchester (Sections C and D)	192,700	11.3	181
Braintree (Section E)	155,200	5.5	203
Chelmsford (Section F)	181,500	7.8	260
Basildon (Section G)	187,600	7.5	111
Brentwood (Section G)	77,000	4.6	287
Thurrock (Section H)	176,000	11.6	116
<b>Wider Study Area</b>	<b>1,918,400</b>	<b>8.5</b>	<b>-</b>
<b>East of England</b>	<b>6,334,500</b>	<b>8.3</b>	<b>-</b>
<b>England</b>	<b>56,490,048</b>	<b>6.6</b>	<b>-</b>

\* Index of Multiple Deprivation (IMD) rank of average rank. This is the population weighted average of the combined ranks for the Lower layer Super Output Areas (LSOAs) within each local authority area ranked from 1 (most deprived) to 317 (least deprived). The domains of deprivation considered in the

ranking are income (weighting 22.5%), employment (22.5%), education (13.5%), health (13.5%), crime (9.3%), barriers to housing and services (9.3%) and living environment (9.3%).

Table 15.3 - Population Age Profile

<b>Local Authority area (Project Section)</b>	<b>Percentage aged 15 years and under (Census 2021)</b>	<b>Percentage aged 16-64 years (Census 2021)</b>	<b>Percentage aged 65+ years (Census 2021)</b>
Norwich (N/a)	16.1	68.9	15.0
South Norfolk (Section A)	17.4	58.3	24.3
Mid Suffolk (Section B)	16.0	58.8	25.4
West Suffolk (N/a)	17.7	61.7	20.8
Ipswich (N/a)	20.0	63.6	16.5
Babergh (Section C)	16.2	57.2	26.5
Tendring (Section C)	15.8	54.8	29.5
Colchester (Sections C and D)	18.8	63.3	17.8
Braintree (Section E)	18.5	61.2	20.5
Chelmsford (Section F)	18.5	62.0	19.4
Basildon (Section G)	20.8	62.3	17.0
Brentwood (Section G)	18.4	61.4	20.2
Thurrock (Section H)	22.6	63.9	13.6
<b>East of England</b>	<b>18.7</b>	<b>61.6</b>	<b>19.6</b>
<b>England</b>	<b>18.5</b>	<b>63.0</b>	<b>18.3</b>

\* Numbers may not sum exactly due to rounding of figures.

### **Economic Activity Rate, Occupational Group, Skills, and Qualifications**

15.6.6 Economic activity rates are shown in Table 15.4. The economic activity rate for the wider study area is 81.7%. This is similar to, or slightly higher than, the rates for the East of England region (80.7%) and England as a whole (78.7%).

Table 15.4 - Economic Activity Rate

<b>Local Authority area (Project Section)</b>	<b>Economic activity rate* APS Oct-21 to Sept-22</b>
Norwich (N/a)	89.7%
South Norfolk (Section A)	81.6%
Mid Suffolk (Section B)	81.3%
West Suffolk (N/a)	78.8%

<b>Local Authority area (Project Section)</b>	<b>Economic activity rate* APS Oct-21 to Sept-22</b>
Ipswich (N/a)	86.8%
Babergh (Section C)	73.2%
Tendring (Section C)	65.4%
Colchester (Sections C and D)	74.9%
Braintree (Section E)	84.8%
Chelmsford (Section F)	80.0%
Brentwood (Section G)	83.4%
Basildon (Section G)	90.7%
Thurrock (Section H)	86.0%
<b>Wider Study Area</b>	81.7%
<b>East of England</b>	80.7%
<b>England</b>	78.7%

\* Economic activity rate is the proportion of working aged people (i.e., people aged 16-64) who are active or potentially active members of the labour market (i.e., people who are employed or unemployed). Examples of people who may not count as economically active include students, early retirees, carers and people with a long-term sickness or disability. The economic activity rate reported is taken from Annual Population Survey data from October 2021 to September 2022.

15.6.7 People in employment by major occupational group as recorded in Annual Population Survey data from October 2021 to September 2022 are shown in Table 15.5. The modal groups for the wider study area were 'Professional occupations', 'Associate professional and technical occupations', and 'Managers, directors, and senior officials'. The employment profile is consistent with the profiles for the East of England region and England more widely.

Table 15.5 - People in Employment by Major Occupational Group

<b>Major occupational group SOC 2010*</b>	<b>Wider Study Area</b>		<b>East of England</b>	<b>England</b>
	<b>Number</b>	<b>%</b>	<b>%</b>	<b>%</b>
Managers, directors, and senior officials	116,400	11.2%	11.8%	11.5%
Professional occupations	257,600	24.8%	25.0%	25.8%
Associate professional and technical occupations	140,300	13.5%	13.3%	13.9%
Administrative and secretarial occupations	99,200	9.6%	10.7%	9.6%
Skilled trades occupations	104,200	10.0%	9.4%	8.8%
Caring, leisure and other service occupations	86,700	8.4%	8.3%	8.5%
Sales and customer service occupations†	73,000	7.0%	6.5%	6.4%

Major occupational group SOC 2010*	Wider Study Area		East of England	England
	Number	%	%	%
Process, plant, and machine operatives	60,800	5.9%	5.6%	5.9%
Elementary occupations	99,800	9.6%	8.9%	9.2%
<b>Totals</b>	<b>1,038,000</b>			

\* Standard Occupational Classification 2010.

† This excludes the result for Colchester for 'Sales and customer service occupations and Brentwood for 'Process, plant, and machine operatives' due to sample size issues from Nomis data collection.

15.6.8 Skills and qualifications held by working people aged 16-64 as recorded in Annual Population Survey data for January 2021 to December 2021 are shown in Table 15.6. The proportion of the population with NVQ4+ qualifications in the wider study area was 13.3%, slightly lower than the East of England and England averages. The skills and qualifications profile in the wider study area are largely in line with the profiles for East of England and England.

Table 15.6 - Skills and Qualifications Held by Working Aged People (16-64)

Skills and Qualifications	Wider Study Area		East of England	England
	Number	%	%	%
People with NVQ4+	441,900	13.3%	14.4%	15.3%
People with NVQ3+	696,800	20.9%	21.2%	21.7%
People with NVQ2+	936,100	28.1%	28.0%	27.6%
People with NVQ1+	1,105,100	33.2%	32.2%	31.0%
People with other qualifications (NVQ)	80,900	2.4%	2.1%	2.1%
People with no qualifications (NVQ)	72,300	2.2%	2.1%	2.3%

\* This excludes the result for Brentwood for 'People with no qualifications' due to sample size issues from Nomis data collection.

15.6.9 People in employment by broad industrial group, as recorded in the BRES 2021, is shown in Table 15.7. The modal groups for the wider study area were health, retail, business administration and support services, largely in line with the profiles for East of England and England. In the wider study area, there are greater proportions of people working in the construction, motor trade, retail, and health sectors. Smaller proportions of people are working in the professional, scientific, and technical broad industrial group than is the case for the profile for East of England and England as a whole.

Table 15.7 - Employment by Broad Industrial Group

<b>Broad industrial group SIC 2007*</b>		<b>Wider Study Area</b>	<b>East of England</b>	<b>England</b>
	<b>Number</b>	<b>%</b>	<b>%</b>	<b>%</b>
Agriculture, forestry, and fishing	7,280	0.9%	0.9%	0.6%
Mining, quarrying and utilities	9,275	1.1%	1.0%	1.2%
Manufacturing	56,500	6.7%	7.3%	7.5%
Construction	53,250	6.3%	5.9%	4.8%
Motor trades	18,600	2.2%	1.9%	1.7%
Wholesale	31,450	3.7%	4.0%	3.7%
Retail	85,000	10.0%	9.2%	9.0%
Transport and storage (inc. postal)	48,750	5.7%	5.5%	5.2%
Accommodation and food services	58,750	6.9%	6.9%	7.5%
Information and communication	26,250	3.1%	4.1%	4.6%
Financial and insurance	25,050	3.0%	2.1%	3.6%
Property	14,000	1.6%	1.7%	1.8%
Professional, scientific, and technical	59,250	7.0%	9.1%	9.3%
Business administration and support services	85,250	10.0%	11.7%	9.0%
Public administration and defence	39,600	4.7%	3.4%	4.3%
Education	80,500	9.5%	9.5%	8.7%
Health	116,500	13.7%	12.1%	13.3%
Arts, entertainment, recreation, and other services	33,250	3.9%	4.0%	4.2%
<b>Total</b>	<b>848,505</b>			

\* Standard Industrial Classification 2007. 'Employment' includes employees and self-employed workers registered for VAT or PAYE.

15.6.10 In summary, the economic activity rate, and the proportion of employment by broad industrial group in the wider study area are broadly in line with the regional and national averages. The area is therefore considered to have a readily available labour force.

## Community Facilities

- 15.6.11 There are three community facilities within the local study area, identified in Table 15.8. Community facilities are grouped into several ‘asset classes’, including nurseries, schools, libraries, hospitals, surgeries, pharmacies, community centres, sports halls, swimming pools and places of worship. Other assets which may serve community purposes (such as public houses and private sports clubs) are considered elsewhere in this chapter under the business, recreation and tourism assets heading.
- 15.6.12 The location of community facilities within the draft Order Limits is shown on Figure 15.2: Community Facilities, Businesses, Recreation and Tourism Assets<sup>69</sup> in Volume II.

Table 15.8 – Community Facilities

Local Authority Area	Asset Class	Name / Description	Postcode/Project Section
Chelmsford	School	Equine centre - Writtle University College Equestrian site associated with Writtle University College which operates Monday to Friday. The University provides equine related courses such as Equestrian Enterprise Management.	CM1 3SD (Section F)
Chelmsford	Place of worship	St Mary's Church, Buttsbury A place of worship with associated graveyard which is open to users throughout the year. It provides monthly services (first Sunday of every month).	CM4 9PA (Section F)
Brentwood	School	Woodland Schools - Hutton Manor and Little Acorns An independent nursery and primary school which operates during term time between Monday to Friday.	CM13 1SD (Section G)

## Business, Recreation and Tourism

- 15.6.13 Businesses, recreational and tourism assets that falls within the local study area are shown in Table 15.9. Those that are located within 1 km from the local study area are detailed in Appendix 15.1: Built Assets within 1 km of the Local Study Area in Volume III. Locations of all businesses, recreation and tourism assets identified are shown in Figure 15.2: Community Facilities, Businesses, Tourism and Recreational Assets<sup>70</sup> in Volume II.

<sup>69</sup> Note: Symbology of the receptors showing on the figure are based on the location indicated on Google Maps. The field boundaries for some receptors are larger than the point-based symbology.

<sup>70</sup> Note: Symbology of the receptors showing on the figure are based on the location indicated on Google Maps. The field boundaries for some receptors are larger than the point-based symbology.

## Built Assets

15.6.14 Built assets located wholly or partially within the local study area are shown in Table 15.9.

15.6.15 The following asset classes have been considered:

- Museum / historic building or garden
- Public house / restaurant / wedding venue
- Campsite / B and B / holiday home
- Sports / activities
  - Angling club
  - Equestrian centre
  - Golf club
  - Paintball / laser tag
  - Football club
- Tourist attraction
- Other

Table 15.9 – Businesses, Recreational and Tourism assets within the Local Study Area

Local Authority Area	Asset Class	Name / Description	Postcode (Project Section)
Mid Suffolk	Campsite / B and B / holiday home	Doves Barn Tourist accommodation with eight bedrooms and a hot tub, pool table, table tennis and other entertainment facilities which is likely to operate all year round. Alternative holiday barns with a capacity of up to 22 guests with similar facilities are not available within the district or adjacent districts. Note: Employee and visitor numbers are not available in the public domain.	IP6 8RJ (Section B)
Mid Suffolk	Campsite / B and B / holiday home	Potters Farm: The Piggery Tourist accommodation which is likely to operate all year round. Alternative accommodation of this nature is available within the district. Note: Employee and visitor numbers are not available in the public domain.	IP14 5SR (Section B)
Mid Suffolk	Sports – angling club	Middle Farm Lakes An angling club with two fishing lakes which operates all year round on a visitor and membership basis.	IP6 8JD (Section B)

Local Authority Area	Asset Class	Name / Description	Postcode (Project Section)
		Alternative angling clubs that operate on a similar basis are available within the wider district. Note: Employee and visitor numbers are not available in the public domain.	
Babergh	Sports – angling club	Hintlesham Fisheries An angling club which is likely to operate all year round on a visitor basis (not membership). It has four ponds, including one match lake. Alternative angling clubs are not available within the district but in adjacent districts. Note: Employee and visitor numbers are not available in the public domain.	IP8 3EG (Section C)
Babergh and Colchester	Tourist attraction	Dedham Vale National Landscape (an AONB) A nationally designated important landscape, open to the public all year round, with a focus on recreation activities. The volume of day trips in 2021 was approximately 673,100 trips, with tourism related employment in the region of 1,225 jobs (875 FTE) (Dedham Vale National Landscape (an AONB), 2022).	CO7 6DH (Section C)
Babergh	Sports – equestrian centre	Stratford Hills Equestrian Centre An equestrian centre and equestrian school which is likely to operate all year round. Alternative equestrian facilities are available in the wider district. Note: Employee and visitor numbers are not available in the public domain.	CO7 6PA (Section C)
Colchester	Sports – equestrian centre / holiday home	Langham Hall Estate An equestrian and simulated shoot facility with proposed camping service and other businesses that operates all year round. Alternative equestrian and simulated shoot facilities are available in the wider district. Note: Employee and visitor numbers are not available in the public domain.	CO4 5PS (Section C)
Tendring	Campsite / B and B / holiday home	Ardleigh Caravan and Camping Park A caravan park with caravan and boat storage service, operating from March to October. Alternative caravan storage facilities are not available within the district or adjacent district. Note: Employee and visitor numbers are not available in the public domain.	CO7 7RH (Section C)
Tendring	Tourist attraction / campsite	Prettyfields Vineyard A vineyard that provides tours and wine or food related events at the café. The vineyard also has a farm shop which runs all year round and provides camping services (i.e. campervans, motorhomes and caravans)	CO7 7PF (Section C)

<b>Local Authority Area</b>	<b>Asset Class</b>	<b>Name / Description</b>	<b>Postcode (Project Section)</b>
		from May to October. Alternative vineyard with camping services is available within the district. Note: Employee and visitor numbers are not available in the public domain.	
Tendring	Tourist attraction / event venue	JackRabbit Brewing Co. A brewing company which is also an event venue that hosts events and provide private hire services. The events and private hire service are likely to be all year round. The operation of the brewery is likely to be conducted by a minimum of two people. However, the detail number of employee is not available in the public domain. Alternative event venues are available within the district. Note: Employee and visitor numbers are not available in the public domain.	CO7 7PF (Section C)
Tendring	Sports – angling club	Paxman’s Angling Club – Home Farm An angling club which operates on a membership basis all year round. There is a maximum capacity of 15 anglers at one time. The club owns six other angling sites across Tendring. Several alternative angling clubs are available in the local area. Note: Employee and visitor numbers are not available in the public domain.	CO7 7LX (Section C)
Tendring	Sports – angling club	Fishing lake north-west of Ardleigh An angling club where operation status is currently unknown. Several alternative angling clubs are available in the local area. Note: No detailed information of the angling club is available in the public domain.	CO7 7QA (Section C)
Braintree	Sports – angling club	Essex Carp Syndicates – The Rise (note as temporarily closed on Google Maps) An angling club which operates on a membership basis all year round. It owns four other angling sites across Essex. Several alternative angling clubs are available in the local area. Note: Employee and visitor numbers are not available in the public domain.	CO5 9RE (Section E)
Braintree	Sports – football club	White Notley Football Club A football club with youth and senior team which is assumed to operate on a regular basis all year round. Although alternative football pitches are available in the	CM8 1SF (Section E)

<b>Local Authority Area</b>	<b>Asset Class</b>	<b>Name / Description</b>	<b>Postcode (Project Section)</b>
		wider district, they do not serve the White Notley community specifically. Note: Employee and visitor numbers are not available in the public domain.	
Chelmsford	Public house / restaurant / wedding venue	Love Joys at The George, Kelvedon A restaurant and event venue which is open all year round. The restaurant operates between Friday and Sunday, as well as private hire including corporate events between Monday to Sunday. Alternative general catering and private hire catering venues are available within the local community. Note: Employee and visitor numbers are not available in the public domain.	CO5 9PL (Section E)
Braintree	Campsite / B and B / holiday home / Other	Porters Farm A hut for overnight stay with a 10-acre dog walking field and dog training area for private hire which operates all year round. Similar accommodation or dog parks are available within the district. However, alternative similar facility with both accommodation and dog park is not available within the district. Note: The farm is likely to run by three people. Visitor numbers are not available in the public domain.	CO5 9DD (Section E)
Chelmsford	Public house / restaurant	The Hare A public house and restaurant which is open all year round. Alternative similar facilities are available within the district. Note: Employee and visitor numbers are not available in the public domain.	CM1 4LU (Section F)
Brentwood	Tourist Attraction	Remus Memorial Horse Sanctuary An animal rescue service and attraction which operates on selected days of the year with a minimum of 11 members of staff. Visitor activities include open day, workshops, afternoon tea, shows and other fundraising activities. Alternative animal rescue sites are available within the district. Note: Visitor numbers are not available in the public domain.	CM4 9NZ (Section G)
Brentwood	Sports – golf club	Dunton Hills Family Golf Centre A golf course which operates all year round on a visitor rather than membership basis. It has a main course with 18 holes, a driving range and a mini golf course that serve both adults and children. The golf course also	CM13 3LT (Section G)

<b>Local Authority Area</b>	<b>Asset Class</b>	<b>Name / Description</b>	<b>Postcode (Project Section)</b>
		<p>provides coaching services. Alternative golf courses that run on both membership and visitor basis for adults and children are available within the district.</p> <p>Note: Employee and visitor numbers are not available in the public domain.</p>	
Basildon	Wedding venue	<p>Eden Garden</p> <p>An event venue which holds wedding, Christmas, birthdays, prom, and corporate events. It operates all year round. Alternative venues of this nature are available within the district.</p> <p>Note: Employee and visitor numbers are not available in the public domain.</p>	CM13 3SW (Section G)
Thurrock	Sports – golf club	<p>Orsett Golf Course</p> <p>A golf course which operates all year round on both a membership and visitor basis. It has a course with 18 holes and a golf equipment shop. The course is also one of the Regional Qualifying tracks for Amateur Open Golf Competitions. Although alternative golf courses are available within the district, they are not categorised as Regional Qualifying tracks.</p> <p>Note: Employee and visitor numbers are not available in the public domain.</p>	RM16 3DR (Section H)
Thurrock	Sports – golf club	<p>St Cleres Hall Golf Club</p> <p>A golf club which operates all year round on a visitor, not membership, basis. It has a course with nine holes, driving range and a ‘footgolf’ facility. It also provides coaching services for all ages. Alternative golf courses and similar facilities are available within the district.</p> <p>Note: Employee and visitor numbers are not available in the public domain.</p>	SS17 0LX (Section H)
Thurrock	Camping and sports ground	<p>Condovers Scout Activity Centre</p> <p>A campsite and scout activity centre that operates all year round. The centre is used for several activities, including air rifle shooting, archery, bouldering, climbing and cart pedalling. Alternative scout activity centres / sites are available in the adjacent district.</p> <p>Note: Employee and visitor numbers are not available in the public domain.</p>	RM18 8QX (Section H)

15.6.16 Built assets located outside, but within 1 km of, the draft Order Limits for the Project are shown in Appendix 15.1: Built Assets within 1 km of the Local Study Area in Volume III.

In summary, there are a total of seven public houses / event venues / restaurants, 22 tourism businesses, six angling clubs, two golf clubs, one paintball / laser tag site, one equestrian centre, one dog park, one garden and seven airfields identified within 1 km of the draft Order Limits. This list excludes business, recreational and tourism assets within the local study area as these are presented in Table 15.9. The following receptors which were listed in the EIA Scoping Report (National Grid, 2022) are excluded within the PEIR:

- ‘The Old Rectory Wedding Venue’ Brentwood, CM13 3SW (permanently closed)
- ‘Little Tey Barn, Holiday homes’ Colchester, CO6 1JA (permanently closed)
- ‘Weavers House’ Colchester CO7 6JS (permanently closed)

### Recreational Land

15.6.17 Recreational land within the local study area is presented in Table 15.10 and Figure 15.3: Recreational Land and Recreational Routes in Volume II. The asset classes considered include designations such as the National Landscape (an AONB) and nature reserves, open access land under the Countryside and Rights of Way Act 2000 (CRoW) (excluding roadside verges), Registered Common Land, as well as parks and playing fields.

Table 15.10 – Recreational Land

Local Authority area(s)	Asset class	Name / description (Project Section)
South Norfolk	CRoW / Registered Common Land	Flordon Common (Section A) Registered Common Land and Section 16 Dedicated Land. Although there are several areas of common land within the district, Flordon Common is also a Site of Special Scientific Interest (SSSI).
South Norfolk	CRoW / Registered Common Land	Baynards Green (Section A) Registered Common Land and Section 16 Dedicated Land.
South Norfolk	Nature reserve / CRoW / Registered Common Land	Roydon Fen (Section A) Registered Common Land and Section 16 Dedicated Land. Roydon Fen is also a Local Nature Reserve.
Mid Suffolk	CRoW / Registered Common Land	The Ling / Wortham Ling (Section B) Registered Common Land and Section 16 Dedicated Land. Although there are several areas of common land within the district, The Ling / Wortham Ling is also a SSSI.
Mid Suffolk	Nature reserve /	Mellis Common (Section B)

Local Authority area(s)	Asset class	Name / description (Project Section)
	CRoW / Registered Common Land	Registered Common Land and Section 16 Dedicated Land. The Common Land is currently managed by the Suffolk Wildlife Trust, and it is likely to be well-used by the local community.
Mid Suffolk	CRoW	Barking Tye (East Suffolk) (Section B) Registered Common Land, Section 15 Land and Section 16 Dedicated Land which is also a playing field (i.e., Barking Recreation Ground). Alternative common land is available within the district.
Mid Suffolk	Playing field	Barking Recreation Ground (Section B) A playing field which is also a Registered Common Land, Section 15 Land and Section 16 Dedicated Land (i.e., Barking Tye (East Suffolk)).
Babergh and Colchester	National Landscape (an AONB)	Dedham Vale National Landscape (an AONB) (Section C)
Thurrock	CRoW	The Green, Hall Hill, Fort Road, Parsonage, Walton, and Tilbury Fort Commons (Section H) A Registered Common Land, Section 15 Land and Section 16 Dedicated Land. Given that several pylons are erected within half of the Common Land, it is not considered to be well-used by the local community due to safety reasons.

\* This table excludes CRoW and Registered Common Land in a form of road verge as road verges are not considered to have functional recreational purposes.

### Recreational Routes

15.6.18 Recreational routes within the local study area are presented in Table 15.11 and presented on Figure 15.3: Recreational Land and Recreational Routes in Volume II. The asset classes considered include PRowS, cycleways and long-distance paths.

Table 15.11 – PRowS, cycleways, and long-distance paths

Local Authority area(s)/Project Section	Asset class	Description
South Norfolk (Section A)	PRowS	There are 45 footpaths, six bridleways and one byway open to all traffic located within the local study area.
South Norfolk (Section A)	Long distance path	Angles Way is a walking trail of approximately 150 km in length. The trail connects towns within the local district between Great Yarmouth and Thetford.

<b>Local Authority area(s)/Project Section</b>	<b>Asset class</b>	<b>Description</b>
Mid Suffolk (Section B)	Cycleway	National Cycle Network Route 30 (NCN 30) is a cycle route of approximately 180 km in length. The cycle route connects six districts between Ten Mile Bank in King's Lynn and West Norfolk District to Caister-on-Sea in Great Yarmouth District via the east coast. It is a nationally designated cycle route.
Mid Suffolk (Section B)	PRoW	There are 112 footpaths, one restricted byway, 11 bridleways and seven byways open to all traffic located within the local study area.
Mid Suffolk (Section B)	Long distance path	The Mid Suffolk Footpath is a walking trail of approximately 32 km in length. The trail connects settlements within the local district between Hoxne and Stowmarket.
Mid Suffolk (Section B)	Long distance path	Gipping Valley River Path is a walking trail of approximately 27 km in length. The trail connects settlements within two local districts between Stowmarket in Mid Suffolk to Ipswich.
Mid Suffolk (Section B)	Cycleway	National Cycle Network Route 51 (NCN 51) is a cycle route of approximately 305 km in length. The cycle route connects two regions passing from Oxford in the south-east to Felixstowe in the East of England. It is a nationally designated cycle route.
Babergh (Section C)	PRoW	There are 48 footpaths, four bridleways and one restricted byway located within the local study area.
Babergh (Section C) and Chelmsford (Section F)	Cycleway	National Cycle Network Route 1 (NCN 1) is a cycle route of approximately 2,034 km in length. The cycle route connects the Highlands in Scotland to Dover in England. It is a nationally designated cycle route.
Tendring (Section C)	PRoW	There are 13 footpaths and one bridleway located within the local study area.
Colchester (Sections C and D)	PRoW	There are 50 footpaths, one byway and four bridleways located within the local study area.
Colchester (Section C)	Long distance path	The St Edmund Way is a walking trail of approximately 127 km in length. The trail connects settlements within four districts between Manningtree in Tendring District and Brandon in Breckland District.
Colchester (Section C)	Long distance path	The Stour Valley Path is a walking trail of approximately 97 km in length. It passes through the Dedham Vale National Landscape (an AONB) and connects settlements within three districts between Cattawade in Babergh District and Newmarket in West Suffolk District.

<b>Local Authority area(s)/Project Section</b>	<b>Asset class</b>	<b>Description</b>
Colchester to Chelmsford (Section C, D, E and F)	Long distance path	The Essex Way is a walking trail of approximately 130 km in length. The trail connects settlements within five districts between Epping in Epping Forest District and Harwich in Tendring District.
Colchester (Section D)	Cycleway	National Cycle Network Route 13 (NCN 13) is a cycle route of approximately 219 km in length. The cycle route connects Tower Bridge in London with Dereham in the East of England. It is a nationally designated cycle route.
Braintree (Section E)	PRoW	There are 27 footpaths and five bridleways located within the local study area.
Braintree (Section E)	Cycleway	National Cycle Network Route 16 (NCN 16) is a cycle route of approximately 69 km in length. The cycle route is in two sections. One section connects Birchanger to Beacon Hill in the East of England, and the other section connects Canterbury to Dover in the south-east. It is a nationally designated cycle route.
Chelmsford (Section F)	PRoW	There are 48 footpaths, one byway and four bridleways located within the local study area.
Chelmsford (Section F)	Cycleway	National Cycle Network Route 50 (NCN 50) (Ulting to Takeley section) is a cycle route of approximately 44 km in length. The cycle route connects four districts from Ulting in Maldon District to Takeley in Uttlesford District. It is a nationally designated cycle route.
Chelmsford (Section F)	Long distance path	Saffron Trail is a walking trail of approximately 112 km in length. The trail connects settlements across three districts, between Southend-on-Sea in Rochford District and Saffron Walden in Uttlesford District.
Chelmsford (Section F)	Long distance path	Centenary Circle is a circular walking trail of approximately 32 km in length. The trail connects local areas on the outskirts of Chelmsford.
Chelmsford (Section F)	Long distance path	St Peter's Way is a walking trail of approximately 72 km in length. The trail connects settlements across three districts, between Bradwell on Sea in Maldon District and Chipping Ongar in Epping Forest District.
Brentwood (Section G)	PRoW	There are 14 footpaths and four bridleways located within the local study area.
Basildon (Section G)	PRoW	There are 15 footpaths, two byways and three bridleways located within the local study area.
Thurrock (Section H)	PRoW	There are 28 footpaths, six bridleways and two byways located within the local study area.

## Local Visitor Accommodation Bedspaces

- 15.6.19 Bedspaces in serviced and non-serviced accommodation as recorded in the Visit Britain Accommodation Stock Audit 2016 are shown in Table 15.12 (Visit Britain, 2016). The number of bedspaces across serviced and non-serviced accommodation within the wider study area was 56,520. Since the most recent accommodation audit undertaken by Visit Britain in 2016, desk-top reviews have identified additional accommodation across the East of England region (Booking.com, 2023). However, the Accommodation Stock Audit remains the latest official accommodation stock data available at the time of writing.
- 15.6.20 In the last calendar year (2022), the bedspace occupancy rate in the East of England peaked in July 2022 at 61% (VisitBritain, 2022). January 2022 experienced the lowest occupancy rate across the year, at 39%.
- 15.6.21 When applying the 2016 (VisitBritain, 2016) wider study area bedspace number to the 2022 bedspace occupancy rate, these suggest there were likely to be approximately 34,477 and 22,042 bedspaces available during peak and off-peak season respectively in the wider study area throughout the last calendar year. Given that several tourist accommodation bedspaces are readily available in the wider study area, the overall sensitivity of the accommodation market is low.

Table 15.12 – Bedspaces in Serviced and Non-Serviced Accommodation in 2016

Type of accommodation	Wider Study Area	East of England	England
Hotels and similar establishments	25,237	111,884	1,784,272
<b>Total serviced accommodation</b>	<b>25,237</b>	<b>111,884</b>	<b>1,784,272</b>
Holiday dwellings	1,686	17,684	327,915
Caravan and campsites	29,446	52,680	916,258
Other collective accommodation	151	3,232	158,252
<b>Total non-serviced accommodation</b>	<b>31,283</b>	<b>73,596</b>	<b>1,402,425</b>
<b>Total Serviced and Non-serviced establishments</b>	<b>56,520</b>	<b>185,480</b>	<b>3,186,697</b>

\* This table excludes the result for West Suffolk, as bedspaces within West Suffolk have not been reported in the Visit Britain Accommodation Stock Audit 2016.

## Future Baseline

- 15.6.22 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project.

## Population and Age Profile Projections

- 15.6.23 Potential future population change for the wider study area relative to the resident population recorded in the Census 2021 is shown in Table 15.13 (Nomis, 2020). These figures are projections from mid-2014 to mid-2018 data based on assumed levels of future fertility, mortality and migration and published in 2020 (ONS, 2020a). The projections did not consider the findings of the Census 2021.

Table 15.13 – Potential future population change

Wider Study Area	Projected years	
	2027 Construction starts	2031 Fully operational
Wider Study Area	4.1%	6.1%
East of England	2.4%	3.9%
England	3.6%	5.1%

\* The population projection published in 2018 representing the wider study area in 2021 was 1,918,918. This is 0.03% higher than the resident population of 1,918,400 recorded by the Census 2021.

- 15.6.24 These projections suggest the population of the wider study area would increase over the construction and operational phases of the Project and at a higher rate than the projected rates for the East of England and England more widely.
- 15.6.25 There is an 'ageing population' in England. The median age in England and Wales rose from 39 years in 2011 to 40 years in 2021. The East of England region is projected to have a greater proportion of people aged 65 years and over by mid-2028 (ONS, 2020b).

## Business and Tourism Projections

- 15.6.26 Levels of tourism and revenue would fluctuate in connection with external factors such as the economy, foreign exchange rates and the weather. The Visit Britain and Visit England Five Year Strategy 2022-2025 states a growth target for Britain to attract 49 million visits by 2025 and £5 billion in spending (Visit England, 2020). Working Futures 2017-2027 indicates a growing employment trend between 2007 and 2027 in the UK (Department for Education, 2020).

## Planning and Development

- 15.6.27 A review of planning applications and development plans has been undertaken to help determine the likely future Socio-economics, Recreation and Tourism profiles of the study areas.

- 15.6.28 Assessments of planning applications and planned developments listed within relevant local plans where the Project may influence deliverability will be completed as part of the ongoing cumulative effects assessment – refer to Chapter 17: Cumulative Effects.

## Planning Applications

- 15.6.29 There are several other developments, including energy, road, infrastructure, industrial and residential developments proposed within the wider study area which could support local employment and economic activity, refer to Figure 17.1: Cumulative Long List – Other Development in Volume II.
- 15.6.30 There are a further nine other developments with planning applications within the local study area related to this chapter. These include:
- A planning application within Tendring in relation to the lawful use of a motorhome and/or towed caravans storage facility. This application also include the continued use of land for caravan and recreation purposes (ref. 21/01184/LUEX and 22/00006/LUEX)
  - A residential development application within Braintree (ref. 21/03579/OUT) including proposed provision of a primary school, public open space, and a new footpath/cycleway route towards Coggeshall
  - A proposed single carriageway road, Chelmsford Northeast Bypass within Essex (ref. CC/CHL/14/20/SPO and 21/02050/CM) with road improvement and changes to PRow
  - A planning application for Langdon Hills Golf and Country Club within Thurrock (ref. 19/01524/SCR) with proposed provision of golf academy, club house and bowling green
  - A residential development planning application within Thurrock (ref. 10/50235/TTGOUT and 21/00249/DVOB) with proposed provision of cycle and footway network and doctor's surgery

## Local Plans Allocations

- 15.6.31 This section describes relevant Local Plan allocations that fall within the local study area.

### **Colchester Borough Local Plan 2017-2033 (Section D)**

- 15.6.32 There is an employment allocation in Lodge Lane, Langham. This site has been allocated as an extension to the existing Langham Airfield, which is a designated Local Economic Area (Policy SS9: Langham) (Colchester Borough Council, 2022).

### **Dunton Hills Garden Village (Section G)**

- 15.6.33 There is a proposal to develop Dunton Hills Family Golf Centre and the predominantly arable land to the north into Dunton Hills Garden Village. This was identified in the Brentwood Local Plan 2016-2033 (Brentwood Borough Council, 2022). In the outline planning application (ref. 21/01525/OUT, validated September 2021), it is proposed to construct a garden community with 3,700 new dwellings and associated infrastructure

including schools, nurseries, and sports facilities. The supplementary ES dated August 2022 assumed a construction programme of up to 17 years between 2024 and 2041.

## Future Baseline - Overview

- 15.6.34 The population growth and ageing population is anticipated to put an increased strain on the demand for community facilities, housing, and recreational open space. Population growth also has the potential to drive growth in the local economy.
- 15.6.35 Both the tourism target and employment number in the UK are expected to grow in the next few years, which has the potential to drive growth in the local economy. The tourism growth target also suggests the potential for increased tourism services in the area to meet the demand.
- 15.6.36 A review of planning applications and development plans suggests that there would be development in relation to community facilities, tourism, and recreational assets in the area. Therefore, there is the potential for continuing change to Socio-economics, Recreation and Tourism profiles across the study areas.

## 15.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 15.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 15.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
- 15.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 within Chapter 4: Project Description. Embedded measures relevant to Socio-economics, Recreation and Tourism include:
- The proposal of underground cabling at up to five locations instead of overhead line, including (but not limited to) areas through the Dedham Vale National Landscape (an AONB), and areas located immediately north and south of the Dedham Vale National Landscape (an AONB). This aims to minimise permanent visual effects and associated knock-on effects on recreation and tourism assets
  - Avoidance of community facilities, businesses, tourism, and recreational assets as far as practicable through the corridor and routing studies

### Standard Mitigation

- 15.7.4 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 15.7.5 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures relating to Socio-economics, Recreation and Tourism. Measures have been

assigned references (for example GG01); these align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference. Relevant measures include but are not limited to:

- GG10: The Project will be constructed in compliance with the required ECPs. Those anticipated to be required, at this stage include:
  - LEMP (an outline LEMP will be submitted as part of the DCO application)
  - CTMP and Construction Staff Travel Plan (an outline CTMP will be submitted as part of the DCO application)
- Provision of training to construction workers, particularly in relation to working hours and the management of emissions (dust, noise, vibration, etc)
- S02: PRowS crossing the working areas will be managed in discussion with the relevant local authorities and potential temporary closures applied, where required. Access disruption would be reduced while construction activities occur where possible. Any required temporary diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns. *A Draft PRow Management Strategy within Annex B of the Draft Outline CoCP in Volume III has been prepared to support statutory consultation. Note: Mitigation will be determined as part of the assessment presented in the ES*

15.7.6 The mechanisms by which mitigation measures would be secured and delivered will be set out in the ES.

## Additional Mitigation

15.7.7 Additional mitigation comprises measures over and above embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

15.7.8 The assessment undertaken within this PEIR has identified requirements for additional mitigation in relation to landowner / business owner negotiations to ensure access would be maintained or to provide alternative means of access where possible during construction phase.

15.7.9 In addition to the above, mitigation measures from other relevant chapters that would also provide mitigation for Socio-economics, Recreation and Tourism effects are detailed in the following PEIR chapters:

- Chapter 7: Air Quality
- Chapter 10: Health and Wellbeing
- Chapter 13: Landscape and Visual
- Chapter 14: Noise and Vibration
- Chapter 16: Traffic and Transport

## Waveney Valley Alternative

- 15.7.10 There are no additional Embedded, Standard and Additional mitigation measures, beyond those outlined above, would be needed if the Waveney Valley Alternative was taken forward as no additional receptors would be affected.

### **15.8 Potential Residual Effects and Preliminary Likely Significant Effects**

- 15.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation – embedded (design measures), standard practice, and additional mitigation measures are in place before assessing the effects. This is in accordance with guidance from the Institute of Environmental Management and Assessment (IEMA) as part of preparing a proportional assessment (IEMA, 2022).
- 15.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 15.8.3 A full detailed assessment will be undertaken before the submission of a Development Consent Order application. The results of this detailed assessment and the mechanisms by which mitigation measures would be secured and delivered will be set out in the ES.

### **Local Economy and Employment – Preliminary Construction Effects**

- 15.8.4 Detail relating to the number of construction workers is not currently available. However, based on other similar grid connection projects, preliminary construction worker numbers are estimated to be approximately 800 Full Time Equivalent (FTE) gross direct employees throughout the approximate four-year construction duration. In the context of a large labour pool of construction workers in the wider study area as reported in Table 15.7, the direct construction employment generated by the Project is likely to have a potential positive effect on the wider study area economy which is likely to be not significant.
- 15.8.5 A detailed assessment will be undertaken in the ES, when the construction employment numbers have been finalised. The assessment will incorporate leakage, displacement and multiplier effects including indirect and induced effects on the economy of the wider study area.

### **Community Facilities – Preliminary Construction Effects**

- 15.8.6 The potential preliminary residual effects for community facilities located within the local study area are reported in Table 15.14.

Table 15.14 – Potential Preliminary Residual Effect on Community Facilities

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
<p>Equine centre - Writtle University College (Section F)</p>	<p>Temporary acquisition of land to construct the overhead line, including land as temporary access track, temporary drainage and to conduct temporary third party works (i.e. pipelines cathodic protection and UKPN 11kV).</p> <p>The construction works may affect staff and students at the college, as well as the use of two equestrian land plots due to potential visual amenity, noise and air quality effects arising from construction vehicles and construction activities. Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented, effects are likely to be reduced and access to the rest of the university would be maintained during construction. Therefore, the residual effect is not anticipated to be significant.</p> <p>Access to all areas within the university would be restored during operation (and maintenance). Given that routine inspections and maintenance activities are not expected to occur frequently, no effects on business viability are anticipated during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation and (maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>St Mary's Church, Buttsbury (Section F)</p>	<p>Temporary acquisition of the eastern verge of the church to conduct temporary third party works (i.e. pipelines cathodic protection).</p> <p>The construction works may affect access, as well as potential visual</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation and (maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>amenity, noise and air quality effects arising from construction vehicles and construction activities. However, the residual effect is not anticipated to be significant once measures outlined in Appendix 4.1: Draft CoCP in Volume III and Draft Outline CTMP are implemented.</p> <p>No effects are anticipated on the church during operation (and maintenance).</p>		(and maintenance))
Woodland Schools – Hutton Manor and Little Acorns (Section G)	<p>Temporary access disruption to conduct temporary third party works (i.e. pipelines cathodic protection).</p> <p>Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented, access to the school would be maintained during construction. Therefore, residual effect is not anticipated to be significant.</p> <p>No effects are anticipated on the school during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation and maintenance))</p>

## Business, Recreation and Tourism – Preliminary Construction and Operation (and Maintenance) Effects

### Built Assets

- 15.8.7 The potential preliminary residual effects for built assets located within the local study area are reported in Table 15.15.

Table 15.15 – Potential Preliminary Residual Effect on Built Assets within the Local Study Area

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
Doves Barn (Section B)	<p>Potential temporary disruption to conduct temporary third party works (i.e. cathodic protection of pipelines). The construction works may affect users due to potential access disruption, visual amenity, noise and air quality effects arising from construction vehicles and construction activities. There may be a potential effect on business viability during construction, however, the residual effect is not anticipated to be significant once measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented.</p> <p>There would be permanent acquisition of rights of access in relation to an existing access track located at the western edge of the tourist accommodation, however no physical works are proposed. Routine inspections and maintenance activities are not expected to occur frequently during operation, no effects are anticipated to arise from the permanent acquisition of rights of access.</p> <p>Potential for permanent visual amenity effects on the accommodation is anticipated. However, the accommodation would be located approximately 310 m from the closest pylon and overhead line, with existing vegetation and properties which could screen or filter views. Therefore, the accommodation is not anticipated to be significantly</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	affected during operation (and maintenance).		
Potters Farm: The Piggery (Section B)	<p>Temporary acquisition of land (i.e. northern section of the private drive) to construct third party works (i.e. pipelines cathodic protection).</p> <p>Potential for temporary noise, air quality and access disruption on the visitor accommodation is anticipated during construction due to the proximity of the site to the draft Order Limits.</p> <p>Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented, partial access to the accommodation would be maintained, and noise and air quality effects would be reduced. However, given that the third party works would be located approximately 30 m from the accommodation, there is potential for the construction works to adversely affect users. Therefore, the residual effect is anticipated to be significant.</p> <p>There is potential for permanent visual amenity effects on the accommodation. However, the accommodation would be located approximately 200m from the closest pylon and overhead line, with existing vegetation potentially screening or filtering views. Therefore, the accommodation is not anticipated to be significantly affected during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
Middle Farm Lakes (Section B)	<p>Temporary acquisition of land as construction buffer, and to construct temporary drainage, temporary work area and temporary access.</p> <p>The fishery may require temporary closure due to the nature of construction works / for safety reasons. Therefore, a significant effect is anticipated during construction.</p> <p>Access to the angling club itself would be restored during operation (and maintenance). The lake is likely to be able to maintain a 30 m angling exclusion zone between the proposed overhead line and the closest point of the eastern fishing lake. However, a worst-case scenario of potential permanent closure has been concluded at this stage. Further assessment would be undertaken in ES stage to confirm.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Significant</b> (operation (and maintenance))</p>
Hintlesham Fisheries (Section C)	<p>Temporary acquisition of land to construct third party works (i.e. UKPN diversions).</p> <p>Although partial access to some fishing ponds may be maintained during the proposed pylon diversion, the nature of construction may affect users due to potential access disruption, visual amenity, noise and air quality effects arising from construction vehicles and construction activities.</p> <p>Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented, partial access to the angling club</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>would be maintained. Therefore, the residual effect is not anticipated to be significant.</p> <p>Access to all fishing ponds would be restored during the operation (and maintenance) phase. One pylon has been proposed to be erected approximately 90 m south-east of one of the fishing lakes. Given there is existing vegetation around the fishing lakes which could screen or filter views, operational (and maintenance) effects are not likely to be significant.</p>		
<p>Dedham Vale National Landscape (an AONB) (Section C)</p>	<p>Temporary acquisition of land to construct the underground cables.</p> <p>Temporary disruption including in relation to visual amenity, noise and air quality effects is anticipated on the section of the National Landscape (an AONB) around Higham and Stratford St Mary during construction. However, given the potential temporary disruption would affect a relatively small area of the National Landscape (an AONB) (approximately 270 ha out of the 9,000 ha of the National Landscape in total), the effects are not likely to significantly affect users of the National Landscape).</p> <p>There would be no effects during operation (and maintenance) due to this section of the Project being located underground. Access to the National Landscape around Higham and Stratford St Mary would be restored during operation.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
Stratford Hills Equestrian Centre (Section C)	<p>Temporary acquisition of land to construct the underground cables and temporary access at the western side of the equestrian centre, and two temporary drainage ponds at the western section of the equestrian centre.</p> <p>The western-most equestrian fields would be temporarily affected. The nature of construction would affect users due to potential access disruption, visual amenity, noise and air quality effects arising from construction vehicles and construction activities.</p> <p>However, the majority of the equestrian fields would fall beyond the draft Order Limits where access would not be affected. Provided that measures outlined in the Draft Outline CoCP are implemented, visual amenity, noise and air quality effects are likely to be reduced. Therefore, the residual effect is not anticipated to be significant.</p> <p>Although there would be the permanent acquisition of rights of access, no physical works are proposed. Full access to the equestrian centre would be restored during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
Langham Hall Estate (Section C)	<p>Temporary acquisition of land to construct underground cables, and temporary drainage ponds.</p> <p>Temporary disruption is anticipated on this business during construction, where operation of a minimum of six of the 12 equestrian fields, paths of</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>equestrian activities and one proposed glamping field would likely be temporarily ceased to construct the underground cables. Business viability may potentially be affected during construction.</p> <p>There would be no effect during operation (and maintenance) due to this section of the Project being located underground. Access to the business would be restored during operation (and maintenance).</p>		
<p>Ardleigh Caravan and Camping Park (Section C)</p>	<p>There would be temporary acquisition of land to conduct third party works (i.e. pipelines cathodic protection and UKPN wood poles) across the site; and to provide temporary work area and temporary access at the south-eastern corner of the site.</p> <p>The business may require temporary closure due to the nature of construction works / for safety reasons. Therefore, a significant effect is anticipated during construction.</p> <p>Access to the business would be restored during operation (and maintenance). Three pylons are proposed to be erected around the camp site (the closest one being approximately 90 m south) which may affect users due to perceived loss of tranquillity / visual effects at the southern section. However, there is existing vegetation around the caravan park which could screen or filter views. The caravan storage business is not anticipated to be affected by the Project. Therefore, operational (and maintenance)</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	effects are not likely to be significant.		
Prettyfields Vineyard (Section C)	<p>There would be temporary acquisition of land at the eastern and western extent of the vineyard to conduct temporary third party works (i.e. pipeline cathodic protection).</p> <p>The farm shop and café fall beyond the draft Order Limits and no land take is required during construction. Camping business may be affected during construction due to the potential perceived loss of tranquillity as outlined in Chapter 13: Landscape and Visual, with potential significant (negative) visual effects. Vine removal is likely to be required during construction and partial closure of the vineyard might be required during construction.</p> <p>Access to the vineyard would not be affected during operation (and maintenance). Although Chapter 13: Landscape and Visual identified potential significant (negative) visual effects, potential closure of business would not be required.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
JackRabbit Brewing Co. (Section C)	<p>There would be temporary acquisition of land (i.e. outdoor area where venue would be held) to conduct temporary third party works (i.e. pipeline cathodic protection).</p> <p>Given the brewery building would fall beyond the draft Order Limits, no land take of brewery building would be required. However, the private hire services would require</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>temporary closure to facilitate the proposed third party works, with a potential significant effect.</p> <p>Access to the brewery and its outdoor venue area would not be affected during operation (and maintenance). Although Chapter 13: Landscape and Visual identified potential significant (negative) visual effects, potential closure of business would not be required.</p>		
<p>Paxman's Angling Club – Home Farm (Section C)</p>	<p>There would be temporary acquisition of land at the southern section of the club to construct temporary drainage, temporary work area, temporary access and conduct third party works (i.e. UKPN 33 kV overhead line).</p> <p>The angling club might require temporary closure due to the construction work for safety reasons during the construction phase.</p> <p>There would be permanent acquisition of land to construct a pylon and overhead lines. Although access to the angling club would be restored during operation (and maintenance), the nearest pylon to the fishing pond would be approximately 40 m away, with no vegetation to screen or filter views. Therefore, operational (and maintenance) effects are likely to be significant.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Significant</b> (operation (and maintenance))</p>
<p>Fishing lake north-west of Ardleigh (Section C)</p>	<p>There would be permanent acquisition of land to enable construction of two pylons, overhead lines and permanent access. There would also be temporary acquisition of land for</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>creation of a temporary work area, temporary drainage and temporary access.</p> <p>The angling club is likely to require temporary closure due to the construction work for safety reason during construction.</p> <p>There would be permanent acquisition of rights of accessing the existing entrance of the angling club, however no physical works are proposed.</p> <p>Although access to the angling club itself would be restored during operation (and maintenance), the lake is likely to require permanent closure due to the need to maintain a 30 m angling exclusion zone for safety reasons.</p>		
<p>Essex Carp Syndicates – The Rise (Section E)  (noted as temporarily closed on Google Map)</p>	<p>There would be temporary acquisition of land for temporary work area, temporary access and third party works (i.e. BT).</p> <p>The proposed construction works are located beyond the functional area of the angling club (i.e. fishing pond). Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented, access to the angling club/fishing pond would be maintained, and visual amenity, noise and air quality effects are likely to be reduced. Therefore, the residual effect is not anticipated to be significant.</p> <p>Access to the angling club would not be affected during operation (and maintenance). Two pylons are proposed to be erected</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>around the angling club (the closest one being approximately 110 m north west) which may affect users due to perceived loss of tranquillity / visual effects at the southern section. However, there is existing dense vegetation around the fishing lake which could screen or filter views. Therefore, operational (and maintenance) effects are not likely to be significant.</p>		
<p>White Notley Football Club (Section E)</p>	<p>There would be temporary acquisition of land for the creation of a temporary work area, temporary access and third party works (i.e. pipelines cathodic protection).</p> <p>Although the majority of the proposed temporary work areas are situated in one of the two football pitches, the proposed third-party pipeline works would partially affect both football pitches at the football club during construction.</p> <p>There would be permanent acquisition of rights of access to a strip of land at the south-western edge of the football club, however no physical works are proposed.</p> <p>Access to the two football pitches would be restored during operation. Although the closest pylon and overhead lines would be located approximately 80 m from the football pitches, it would not affect its function as a football club. Therefore, the football club is not likely to be affected by the Project during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
<p>Love joys at The George, Kelvedon (Section E)</p>	<p>There would be a temporary acquisition of a strip of land at the south-eastern edge of the site to provide a construction buffer. Access to the venue would be maintained during construction. However, the construction works may affect users due to potential visual amenity, noise, and air quality issues. The likely effects are not considered to be significant once measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP are implemented.</p> <p>Access to the venue would not be affected during operation (and maintenance). The erected pylons around the venue (the closest one being approximately 120 m south) may affect users due to potential visual amenity issues. However, given there are existing pylons located west of the business and vegetation which can act as visual screening, the potential effect is not likely to be significant.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>Porters Farm (Section E)</p>	<p>There would be temporary acquisition of a strip of land at the northern edge of the dog walking area for temporary overhead line work area and third-party work (i.e. BT overhead line mitigation).</p> <p>There would also be temporary acquisition of two strips of land at the non-commercial area as temporary access and third-party work (i.e. UKPN overhead line wood pole diversion).</p> <p>The construction works may affect users due to potential access disruption, visual amenity, noise,</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>and air quality issues. These potential effects could be mitigated via measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP. However, the business may be affected due to the perceived loss of tranquillity, and effect may be significant given the nature of the business as a tourist accommodation and dog park.</p> <p>There are no effects on access to the accommodation and dog park during operation (and maintenance). The proposed overhead line would be above the dog walking park area with the closest pylon located approximately 60 m south, with a potential significant effect during operation (and maintenance).</p>		
The Hare (Section G)	<p>There would be temporary acquisition of land at the southern section (grassland currently not being used as a public house / restaurant) for temporary access.</p> <p>However, access to the functional area of the public house / restaurant would not be affected during construction.</p> <p>Given that there is limited vegetation which could screen or filter views, a potential visual amenity effect is anticipated from the garden during construction, and therefore the residual effect could be significant.</p> <p>No permanent land take has been proposed at this location. The public house / restaurant would be located approximately 140 m to the proposed overhead line. However, there are existing</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>properties, together with the existing road network between the business and the pylons and overhead lines, and as such visual amenity is not anticipated to be significantly different to the current view. Therefore, operational (and maintenance) effects are not likely to be significant.</p>		
<p>Remus Memorial Horse Sanctuary (Section G)</p>	<p>There would be temporary acquisition of land at the western edge of the site as a construction buffer.</p> <p>Temporary disruption is anticipated on this business during construction, where operation of two out of the 22 equestrian fields would likely be temporarily ceased to provide an area for a construction buffer.</p> <p>Provided that measures outlined in Appendix 4.1: Draft Outline CoCP in Volume III are implemented, visual amenity, noise and air quality effects are likely to be reduced. Therefore, the residual effect is not anticipated to be significant.</p> <p>There would be a permanent acquisition of rights of access to a strip of land at the northern edge of the sanctuary however no physical works are proposed.</p> <p>Access to the equestrian site would be restored during operation (and maintenance). Although the closest pylon and overhead lines would be located approximately 80 m from the equestrian fields, it would not affect its function as an animal rescue service. Therefore, the service is not likely to be affected</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	by the Project during operation (and maintenance).		
Dunton Hills Family Golf Centre (Section G)	<p>There would be temporary acquisition of land of approximately a quarter of the 18-hole course in order to create temporary drainage, a temporary work area, temporary access and third party works (i.e. pipelines catholic protection and UKPN tower dismantle).</p> <p>Although access to the mini golf, driving range and approximately three quarters of the 18-hole course would be maintained, the temporary land take is likely to lead to partial closure of a section of the golf course during construction.</p> <p>There would be permanent acquisition of rights of access to a strip of land located at the northern section of the golf course, however no physical works are proposed.</p> <p>Access to the golf course would be restored during operation. Although an existing pylon is proposed to be situated within the 18-hole course, the proposed pylon would be erected in an area avoiding golf holes; viability of the golf course is therefore not likely to be significantly affected during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
Eden Garden (Section G)	<p>There would be temporary acquisition of land of a shared private drive to construct third party works (i.e. UKPN cabling).</p> <p>Provided that measures contained in Appendix 4.1: Draft Outline CoCP in Volume III and Draft</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>Outline CTMP would be in place, with existing vegetations which could screen or filter views, the effects are likely to be reduced.</p> <p>The proposed third party works (i.e. UKPN cabling) would be located at the private drive and therefore weddings might not be viable during that period. However, provided that access would be maintained or to provide alternative means of access during construction with landowner / business owner negotiations (e.g. construction works to avoid peak wedding season), the potential effect is likely to be reduced. A worst case scenario has been concluded at this stage with the venue likely to be significantly affected during construction but may subject to change following landowner / business owner negotiations.</p> <p>There is potential for a permanent visual amenity effect on the venue due to the venue being located approximately 130 m from the closest pylon and overhead line. However, there are existing pylons near the venue, and the change in visual amenity is not anticipated to be significant. As such, the attraction is not anticipated to be significantly affected during operation (and maintenance).</p>		
Orsett Golf Course (Section H)	There would be temporary acquisition of land of approximately a quarter of the golf course in order to create a temporary work area, temporary access and third party works (i.e. pipelines cathodic protection, as	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>well as dismantling and diversion of UKPN infrastructure).</p> <p>Although access to approximately three quarters of the golf course would be maintained, the temporary land take is likely to affect business viability during construction. Viability of the golf course may be affected during construction due to as a result of the reduced number of holes, perceived loss of tranquillity and visual effect which may affect user numbers.</p> <p>There would be permanent acquisition of rights of access to two strips of land located at the eastern section of the golf course, however no physical works are proposed.</p> <p>Access to the golf course would be restored during operation (and maintenance). An overhead line would cross the eastern section of the golf course which may affect users due to perceived loss of tranquillity or visual effect. However, the majority of the golf course would not be affected by the Project and the effect is not anticipated to be significant during operation (and maintenance).</p>		
<p>St Cleres Hall Golf Club (Section H)</p>	<p>There would be temporary acquisition of land at the western edge and central area of the golf course for the creation of temporary drainage, temporary work area, temporary access and third party works (i.e. pipelines cathodic protection).</p> <p>Although access to approximately half of the golf course could be maintained, the temporary land</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>take is likely to affect business viability during construction.</p> <p>There would be permanent acquisition of rights of access to an existing access track for permanent access, however no physical works are proposed.</p> <p>There would be no effect on access to the golf course during operation (and maintenance). An overhead line and a pylon would cross the south-western corner of the golf course and may affect users due to perceived loss of tranquillity or visual effect. However, the majority of the golf courses would not be affected by the Project and as such the effect is not anticipated to be significant during operation (and maintenance).</p>		
<p>Condovers Scout Activity Centre (Section H)</p>	<p>Temporary acquisition of land at the south-eastern corner of the activity centre to act as a construction buffer. Access to the functional area of the activity centre would be maintained during construction. Functionality of the activity centre is not anticipated to be affected during construction.</p> <p>Given this section of the Project would be underground cables, there would be no effect on the activity centre during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

15.8.8 The potential preliminary residual effects for all other built assets located within 1 km of the local study area (i.e. not detailed in Table 15.15) are detailed in Appendix 15.1: Built Assets within 1 km of the Local Study Area in Volume III. For all other assets located within 1 km of the local study area, in summary, negative effects on a number of receptors are anticipated during construction and operation (and maintenance).

However, the negative effects are not anticipated to be significant following the implementation of measures set out in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP, except for Chase Farm Airstrip.

15.8.9 The potential preliminary residual effects for recreational land located within the local study area are detailed in Table 15.16.

**Table 15.16 – Potential Preliminary Residual Effect on Recreational Land within the Local Study Area**

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
Flordon Common (Section A)	<p>Temporary acquisition of land of less than 0.1 ha at the western edge of the site to undertake third party works (i.e. UKPN wood pole work area). Although, Chapter 13: Landscape and Visual identifies potential significant (negative) effects on part of the open access land at Flordon Common, where close views of construction activity along the overhead route would be visible, potential closure of the recreational land would not be required.</p> <p>There is potential for permanent visual amenity effects on users of the site. Although, Chapter 13: Landscape and Visual identifies potential significant (negative) effects on part of the open access land at Flordon Common, where close views of the Project would be visible, access to the recreational land would not be affected and potential closure of the recreational land would not be required.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
Baynards Green (Section A)	<p>Temporary acquisition of land of less than 0.1 ha at the northern edge and western edge of the site to be used as a construction buffer.</p> <p>Potential for temporary visual, noise, air quality and access disruption on the site is anticipated. However, given that measures set out within Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP would be in place, users of the site are not anticipated to be significantly affected during construction.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>There is potential for permanent visual amenity effects on the users of site. However, given the site is already crossed by an overhead line and would be located approximately 50 m from the closest pylon and overhead line, users of the site are not anticipated to be significantly affected during operation (and maintenance).</p>		
<p>Roydon Fen (Section A)</p>	<p>Temporary acquisition of land of less than 0.1 ha at the western edge of the site to undertake third party works (i.e. UKPN wood pole work area).</p> <p>Potential for temporary visual, noise and air quality effects on the western edge of the site is anticipated. However, given that measures set out within Appendix 4.1: Draft Outline CoCP in Volume III would be in place and most of the site would not be crossed by the draft Order Limits, users of the site are not anticipated to be significantly affected during construction. Chapter 13: Landscape and Visual also assessed that woodland would filter / screen views from Roydon Fen.</p> <p>There is potential for permanent visual amenity effects for users of the site. There are existing dense woodland surrounding Roydon Fen. Chapter 13: Landscape and Visual assessed that woodland would screen and filter views. Therefore, users of the site are not anticipated to be significantly affected during operation (and maintenance).</p> <p><b>Waveney Valley Alternative (an underground solution through the Waveney Valley - see Chapter 4: Project Description for details):</b></p> <p>Preliminary construction effects and level of significance of effects for the Waveney Valley Alternative option would be as reported for the overhead line option above. Given the existing dense woodland surrounding Roydon Fen and the</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p> <p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p> <p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	operational footprint being located outside Roydon Fen, users of the site are not anticipated to be significantly affected during operation (and maintenance).		
The Ling / Wortham Ling (Section B)	<p>Temporary acquisition of land of less than 0.1 ha at the eastern edge of the site to be used as temporary access. However, given the area is an existing road network, no recreational space would be affected by the construction.</p> <p>Chapter 13: Landscape and Visual identifies significant (negative) effects on Wortham Ling, where construction activity would be visible in close views from Wortham Ling nature reserve, in areas where scrub and tree cover are less dense. However, given that access to the majority of the recreational land would be maintained, users of the site are not anticipated to be significantly affected during construction.</p> <p>There is potential for permanent visual amenity effects on users of the site. Chapter 13: Landscape and Visual identifies significant (negative) effects on Wortham Ling during operation, where the Project would be visible from Wortham Ling Nature Reserve, in areas where scrub and tree cover is less dense. However, given that access to the recreational land would not be affected during operation (and maintenance), potential residual effect is not anticipated to be significant.</p> <p><b>Waveney Valley Alternative (see Chapter 4: Project Description for details):</b></p> <p>There would be a marginally larger area of temporary acquisition of land of less than 1 ha at the eastern edge (with woodland area) of the site to be used as temporary access, temporary drainage and construction buffer when compared to the overhead line design. However, given the area is an</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p> <p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p> <p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>existing road network, no recreational space would be affected by the construction.</p> <p>Chapter 13: Landscape and Visual identified the same significant (negative) effects on Wortham Ling, where construction activity would be visible in close views from Wortham Ling Nature Reserve, in areas where scrub and tree cover are less dense. However, given that access to the majority of the recreational land would be maintained, users of the site are not anticipated to be significantly affected during construction.</p> <p>Preliminary operation (and maintenance) effects and level of significance of effects for the Waveney Valley Alternative option would be as reported as the overhead line option above.</p>		
Mellis Common (Section B)	<p>Although the site would be crossed by the draft Order Limits along Mellis Road as overhead line work areas and third party works (UKPN cabling) during construction, the affected area constitutes road verges with no recreational purposes.</p> <p>Potential for temporary visual, noise and air quality effect on the site is anticipated. Chapter 13: Landscape and Visual identifies significant (negative) effects on parts of Mellis Common (west of the railway line) during construction, where construction activity would be visible. However, access to the recreational area would not be affected during construction. Therefore, the potential residual effects are not anticipated to be significant during construction.</p> <p>Potential for permanent visual amenity effect on the users of the site is anticipated. Chapter 13: Landscape and Visual identifies significant (negative) effects on parts of Mellis Common (west of the railway line) during operation, where the Project would be visible for parts of Mellis Common.</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	<p>However, access to the recreational land would not be affected during operation (and maintenance). Therefore, the potential residual effects are not anticipated to be significant during operation (and maintenance).</p>		
<p>Barking Tye, Barking Recreation Ground (Section B)</p>	<p>Temporary acquisition of land (at the north-western edge of the site) of less than 0.1 ha as permanent access. However, given the land is part of an existing farm access track with no recreational purpose, the effect is not likely to be significant.</p> <p>Potential for temporary visual, noise and air quality effects on the north-western edge of the site are anticipated. Chapter 13: Landscape and Visual identifies significant (negative) effects on Barking Tye during construction, where medium distance views would be visible. However, access to the majority of the recreational land would not be affected during construction. Therefore, the potential residual effects are not anticipated to be significant during construction.</p> <p>Potential for permanent visual amenity effect on the users of the site is anticipated. Chapter 13: Landscape and Visual identifies significant (negative) effects on Barking Tye during operation, where medium distance views of the would be visible. However, access to the recreational land would not be affected during operation (and maintenance). Therefore, the potential residual effects are not anticipated to be significant during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Negative</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>Dedham Vale National Landscape (an AONB) (Section C)</p>	<p>See Table 15.15 .</p>	<p>See Table 15.15 .</p>	<p>See Table 15.15 .</p>

Receptor	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
The Green, Hall Hill, Fort Road, Parsonage, Walton, and Tilbury Fort Commons (Section H)	<p>Temporary acquisition of land to construct underground cables and temporary drainage ponds.</p> <p>Access to one of the ten plots of the Commons located south of Coopers Shaw Road is likely to be temporarily closed during construction. Access to the remaining sites would be maintained.</p> <p>Potential for temporary visual, noise, air quality effects and access disruption to the rest of the sites are anticipated due to the proximity to the construction works (with the closest being directly adjacent to a further plot). However, given that measures set out in Appendix 4.1: Draft Outline CoCP in Volume III and Draft Outline CTMP would be in place, users are not anticipated to be significantly affected during construction.</p> <p>Whilst there would be permanent acquisition of rights of access, no physical works are proposed. Given that access to the common would be maintained during operation and this section of the Project would be underground, users are not anticipated to be affected during operation (and maintenance).</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

### Recreational Routes

- 15.8.10 Temporary closures and diversions of recreational routes during construction were not defined at the time of writing this chapter. These are expected to be defined at the detailed design stage; however, a Draft PRow Management Strategy is provided in Annex B of Appendix 4.1: Draft Outline CoCP in Volume III, which has been developed to manage potential temporary closures or diversions required.
- 15.8.11 The potential preliminary residual effects for recreational routes located within the local study area are detailed in Table 15.17.

Table 15.17 – Potential Preliminary Effect on Recreational Routes within the Local Study Area

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
Swainsthorpe BR7, Winfarthing FP26 and Swardeston BR12  (in South Norfolk)  (Section A)	Access to the PRowS is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Access to the PRowS would be restored during operation and therefore users of the PRowS would not be affected during this phase.	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
W-121/009/0, W-155/044/0, W-172/036/0, W-203/048/0, W-203/054/0, W-418/031/0, W-499/015/0, W-563/003/0, W-121/002/0, W-418/028/0, W-121/019/0, W-121/006/0, W-155/043/0, and W-155/054/0  (in Mid Suffolk)  (Section B)	Access to the PRowS is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Access to the PRowS would be restored during operation and therefore users of the PRowS would not be affected during this phase.	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
W-129/025/0  (in Mid Suffolk)  (Section B)	Access to the PRowS is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Given that the PRow Management Strategy would be in place, diversion	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Not significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
	<p>is likely to be provided or with the provision of protective scaffold over the PRoW.</p> <p>Access to the PRoWs would be restored during operation and therefore users of the PRoWs would not be affected during this phase.</p>		
<p>W-486/003/0 and W-486/007/0 (in Babergh) (Section C)</p>	<p>Access to the PRoWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRoW Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).</p> <p>Access to the PRoWs would be restored during operation and therefore users of the PRoWs would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>PRoW 158_24 (in Tendring) (Section C)</p>	<p>Access to the PRoWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRoW Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).</p> <p>Access to the PRoW would be restored during operation and therefore users of the PRoW would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>PRoW 134_24 and PRoW 135_29 (in Colchester) (Section D)</p>	<p>Access to the PRoWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRoW Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).</p> <p>Access to the PRoWs would be restored during operation and</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
	therefore users of the PRowWs would not be affected during this phase.		
PRoW 92_2 (in Braintree) (Section E)	Access to the PRowWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Access to the PRow would be restored during operation and therefore users of the PRow would not be affected during this phase.	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
PROW 214_31, PROW 221_44, PROW 222_76 and PROW 238_8  (in Chelmsford) (Section F)	Access to the PRowWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Access to the PRowWs would be restored during operation and therefore users of the PRowWs would not be affected during this phase.	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
PROW 312_62 (in Brentwood) (Section G)	Access to the PRowWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).  Access to the PRow would be restored during operation and therefore users of the PRow would not be affected during this phase.	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
PROW 313_69 (in Basildon)	Access to the PRowWs is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the	<b>Negative</b> (construction)	<b>Significant</b> (construction)

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
(Section G)	<p>ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).</p> <p>Access to the PRow would be restored during operation and therefore users of the PRow would not be affected during this phase.</p>	<b>Neutral</b> (operation (and maintenance))	<b>Not significant</b> (operation (and maintenance))
Footpath 224 (in Thurrock) (Section H)	<p>Access to the PRows is likely to be severed during construction (mitigation will be determined as part of the assessment presented in the ES, a Draft PRow Management Strategy is provided in Annex B of the Draft Outline CoCP in Volume III).</p> <p>Access to the PRow would be restored during operation and therefore users of the PRow would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
49 PRows in South Norfolk, 116 PRows in Mid Suffolk, 51 PRows in Babergh, 13 PRows in Tendring, 53 PRows in Colchester, 31 PRows in Braintree, 49 PRows in Chelmsford, 20 PRows in Brentwood, 17 PRows in Basildon, and 15 PRows in Thurrock (all Sections)	<p>Given that access to the PRows would be maintained or diverted during construction, users of the PRows are not anticipated to be significantly affected during construction.</p> <p>Access to the PRows would be restored during operation and therefore users of the PRows would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

<b>Receptor</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
Angles Way, Mid Suffolk Footpath, Gipping Valley River Path, St Edmund Way, Stour Valley Path, Essex Way, Saffron Trail, Centenary Circle, and St Peter's Way (all Sections)	<p>Given that access to most of the long-distance trails would be maintained with only a short section within the draft Order Limits to be diverted during construction, users of the long-distance trails are not anticipated to be significantly affected during construction.</p> <p>Access to the long-distance trails would be restored during operation and therefore users of the long-distance trails would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
National Cycle Network Routes 30, 51, 1, 13, 16 and 50 (all Sections)	<p>Given that access to the majority of the NCN routes would be maintained with a short section within the draft Order Limits to be diverted during construction, users of the NCN routes are not anticipated to be significantly affected during construction.</p> <p>Access to the NCN routes would be restored during operation and therefore users of the NCN routes would not be affected during this phase.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

## **Bedspace**

- 15.8.12 During construction of the Project, non-local workers would require accommodation in the local area. Accommodation demand is likely to be serviced from hotels, B and Bs, camping, caravan sites and short term let properties.
- 15.8.13 Based on the 2016 Visit Britain accommodation bedspace data, there were 56,520 bedspaces for serviced and non-serviced accommodation. Information from VisitBritain states the peak bedspace occupancy rate in East of England was 61% in 2022 which is comparable to the pre-COVID-19 pandemic rate (which peaked in August 2019 with 60% bedspace occupancy). Therefore, the tourist accommodation within the wider study area is likely to be able to accommodate non-local workers for the Project without displacing bedspace for tourist requirements.

- 15.8.14 The accommodation requirement from non-local workers is likely to benefit tourist accommodation businesses during construction from the increased level of business.
- 15.8.15 Overall, both temporary positive (benefits to tourist accommodation businesses) and negative (reduction in tourist accommodation bed spaces) effects are anticipated in relation to the accommodation market during construction. Given the relatively low number of preliminary construction workers anticipated to be employed on the Project, the number of non-local workers are anticipated to be relatively low. Therefore, the effects are not significant during construction. A detailed accommodation market assessment will be undertaken in the ES when the construction employment numbers have been finalised.

### Planning and Development

- 15.8.16 The Project has been designed to avoid planning applications and local plan allocations, where practicable, to reduce the potential effects on land planned for future development. Table 15.18 describes key planning applications and local plan allocations relevant to the Socio-economics, Recreation and Tourism chapter.

Table 15.18 - Potential Preliminary Effect on Planning and Development within the Local Study Area

<b>Planning Application Reference / Local Plan Allocation</b>	<b>Nature of Effect</b>	<b>Preliminary Effect</b>	<b>Preliminary level of significance of Effect</b>
21/01184/LUEX and 22/00006/LUEX  Continue use of land for caravan and recreation purpose and the use as storage facilities	See assessment for Ardleigh Caravan and Camping Park in Table 15.15.	<b>Negative</b> (construction)  <b>Negative</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
21/03579/OUT  Residential development application within Braintree with proposed provision of community facilities, recreational land and recreational routes	The planning application boundary falls within the draft Order Limits (where construction access of the planning application would be located – area of overlapping is approximately 8 ha) near TB080, along the B1024 Coggeshall Road.  The proposed residential and education facilities within the planning application falls outside the draft Order Limits. Construction is assumed to be completed by 2030 (prior to the commencement of the Project).	<b>Neutral</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Not significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))

Planning Application Reference / Local Plan Allocation	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	Therefore, the Project is not anticipated to affect the planning application and not expected to sterilise any area for future development.		
<p>CC/CHL/14/20/SPO and 21/02050/CM</p> <p>Proposed single carriageway road (Chelmsford Northern Bypass) with road improvement and changes to PRow</p>	<p>The planning application boundary falls within the draft Order Limits (where the proposed bypass would be located – area of overlapping is approximately 100 ha) near TB129 to TB131, east of the A131.</p> <p>Given the construction programme for the planning application is not known at the time of writing this assessment, a worst-case scenario has been applied to assume both projects would be constructed at the same period. Potential effects could be mitigated through early engagement with Essex Highways Authority. Potential effects would be assessed in the ES where construction phasing information of the planning application is likely to be available. A worst-case scenario of significant effects is anticipated at this stage.</p> <p>The design of the Project has been adjusted to reposition the crossing of the A131 and some pylons to the east of Langleys Park and Garden. Therefore, the Project is not anticipated to affect the planning application and not expected to sterilise the area for future development.</p>	<p><b>Negative</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>
<p>19/01524/SCR</p> <p>Redevelopment of Langdon Hills Golf and Country Club</p>	<p>The planning application boundary falls within the draft Order Limits (where the proposed golf redevelopment boundary would be located – area of overlapping is approximately 2 ha) near TB235 to TB240.</p> <p>The potential overlap area would be the north western most corner of the golf</p>	<p><b>Neutral</b> (construction)</p> <p><b>Neutral</b> (operation (and maintenance))</p>	<p><b>Not significant</b> (construction)</p> <p><b>Not significant</b> (operation (and maintenance))</p>

Planning Application Reference / Local Plan Allocation	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
	club, where no golf courses would be located. Given the limited extent of the overlap of the two project boundaries, the Project is not anticipated to affect the planning application and not expected to sterilise the area for future development.		
10/50235/TTGOUT and 21/00249/DVOB  Mixed-use development with proposed provision of community facilities, recreational land and recreational routes	The planning application boundary falls within the draft Order Limits (where the proposed informal open space of the planning application would be located – area of overlapping is approximately 70 ha) near TB234 to TB257.  By reviewing aerial images, construction is likely to be complete in 2024, no further effects are anticipated in relation to the serialisation of land for future development – as the effects on the open space would be limited.	<b>Neutral</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Not significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
Colchester Borough Local Plan 2017-2033, Policy SS9: Langham – employment allocation	The planning allocation boundary falls within the draft Order Limits (where an existing private access is located – area of overlapping is less than 0.1 ha) near TB022 to TB023.  Given the limited extent of the overlap of the two project boundaries, the Project is not anticipated to affect the planning allocation and not expected to sterilise the area for future development – the private access would not be affected by the Project.	<b>Neutral</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Not significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))
Brentwood Local Plan 2016-2033 / 21/01525/OUT  Mixed-use development - Dunton Hills Garden Village with proposed provision of community	The planning allocation boundary falls within the draft Order Limits (area of overlapping is approximately 27 ha) near TB222 to TB228, where informal landscaping is proposed.  Given the construction programme for the planning allocation is not known at this stage, a worst-case scenario has been applied to assume both Projects	<b>Negative</b> (construction)  <b>Neutral</b> (operation (and maintenance))	<b>Significant</b> (construction)  <b>Not significant</b> (operation (and maintenance))

Planning Application Reference / Local Plan Allocation	Nature of Effect	Preliminary Effect	Preliminary level of significance of Effect
facilities, recreational land and recreational routes	<p>would be constructed at the same time. Potential effects could be mitigated through early engagement with Brentwood Borough Council. Potential effects will be assessed in the ES where construction phasing information of the planning application is likely to be available. A worst-case scenario of significant effects are anticipated at this stage during construction.</p> <p>The Project has been designed to follow an existing gas pipeline through and in the vicinity of the Dunton Hills Garden Village proposal to reduce effects. Therefore, the Project is not anticipated to affect the planning application and not expected to sterilise the area for future development during operation (and maintenance).</p>		

## 15.9 Sensitivity Testing

### Flexibility in Construction Programme

- 15.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has shown that there would be no new or different likely significant effects to those identified in the baseline scenario assessed in Section 0.

### Flexibility in Design

- 15.9.2 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing considering alternative pylon and underground cable route within the proposed LoD, has shown that there would be no new or different likely significant effects because of the pylons being placed in a different location, except for Buckingham Hill Landfill (historic landfill). Should pylons (i.e. TB256 and TB257) be moved to the west to avoid St Cleres Hall Golf Club, the anticipated significant adverse effect on the golf club during construction could potentially be reduced. This will continue to be reviewed and assessed in the Socio-economics, Recreation and Tourism chapter in the ES.

## Flexibility due to Design elements not fixed at Statutory Consultation

- 15.9.3 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that there would be no new or different likely significant effects arise from the alternative designs.

# 16. Traffic and Transport

# 16. Traffic and Transport

## 16.1 Introduction

16.1.1 This chapter reports the results of the preliminary assessment of the potential effects of the Project on Traffic and Transport. The chapter covers effects on the following during construction:

- Increase in baseline traffic flows as a result of the Project, due to the use of the surrounding local highway network being used by construction vehicles

16.1.2 There are interrelationships related to the potential effects on Traffic and Transport and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 7: Air Quality
- Chapter 8: Ecology and Biodiversity
- Chapter 10: Health and Wellbeing
- Chapter 11: Historic Environment
- Chapter 13: Landscape and Visual
- Chapter 14: Noise and Vibration
- Chapter 15: Socio-economics, Recreation and Tourism

16.1.3 This chapter will be supported by the following figures in Volume II and appendices in Volume III:

- Figure 16.1: Primary Access Routes
- Figure 16.2: Sensitive Receptors
- Figure 16.3: Collision Data
- Appendix 16.1: Traffic and Transport Baseline Conditions
- Appendix 16.2: Future Baseline
- Appendix 16.3: Traffic and Transport Preliminary Construction Effects

## 16.2 Regulatory, Planning Policy Context and Guidance

### National Policy Statements (NPS)

16.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project including the NPS EN-1 (DESNZ, 2024). This is supported by NPS EN-5 (DESNZ, 2024). EN-1 states that energy projects have the potential to have a variety of impacts on traffic and transport which has been considered within this chapter.

16.2.2 NPS EN-1 states at Paragraph 5.14.1 states *'The transport of materials, goods and personnel to and from a development during all project phases can have a variety of*

*impacts on the surrounding transport infrastructure and potentially on connecting transport networks, for example through increased congestion. Impacts may include economic, social and environmental effects’.*

- 16.2.3 Paragraph 5.14.4 states ‘*The consideration and mitigation of transport impacts is an essential part of Government’s wider policy objectives for sustainable development as set out in Section 2.6 of this NPS’.*
- 16.2.4 Paragraph 5.14.6 states ‘*National Highways and Highways Authorities are statutory consultees on NSIP applications including energy infrastructure where it is expected to affect the strategic road network and / or have an impact on the local road network and applicants should consult with National Highways and Highways Authorities as appropriate on the assessment and mitigation to inform the application to be submitted’.*
- 16.2.5 Paragraph 5.14.11 states ‘*Where mitigation is needed, possible demand management measures must be considered. This could include identifying opportunities to:*
- *Reduce the need to travel by consolidating trips,*
  - *Locate development in areas already accessible by active travel and public transport,*
  - *Provide opportunities for shared mobility,*
  - *Re-mode by shifting travel to a sustainable mode that is more beneficial to the network,*
  - *Retime travel outside of the known peak times,*
  - *Reroute to use parts of the network that are less busy’*
- 16.2.6 NPS EN-1 states at paragraph 5.14.21 that: ‘*The Secretary of State should only consider refusing development on highways grounds if there would be an unacceptable impact on highway safety, residual cumulative impacts on the road network would be severe, or it does not show how consideration has been given to the provision of adequate active public or shared transport access and provision’.*
- 16.2.7 NPS EN-5 does not specifically cover transport.

## Other National Legislation and Policy

- 16.2.8 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- Transport Act 2000
  - Highways Act 1980
  - NPPF (Department for Levelling Up, Housing and Communities, 2023) and accompanying planning practice guidance

## Regional and Local Policy

- 16.2.9 Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy. Further key local strategies relevant to Traffic and Transport, that has informed this PEIR and will inform the assessment within the ES, comprises:

- Local Transport Plan 4, 2021-2036 (Norfolk County Council, 2022)
- Joint Core Strategy (Broadland, Norwich, and South Norfolk Council, 2011 and 2014)
- Suffolk Local Transport Plan 2011-2031, Part 1 Transport Strategy (Suffolk County Council, 2016)
- Essex Transport Strategy: The Local Transport Plan for Essex (Essex County Council, 2011)
- Thurrock Transport Strategy 2013-2026 (Thurrock Council, 2022)

## Guidance

16.2.10 Relevant guidance, specific to Traffic and Transport, which has informed this PEIR and will inform the assessment within the ES, comprises:

- Transport Evidence Bases in Plan Making and Decision Taking (Department for Levelling Up, Housing and Communities, 2015)
- Travel Plans, Transport Assessments and Statements (Various, 2014)
- DMRB LA 104 Environmental Assessment and Monitoring (National Highways, 2020)
- Environmental Assessment of Traffic and Movement ('IEMA Guidelines') (IEMA, 2023)

## 16.3 Scoping Opinion

- 16.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 16.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Traffic and Transport is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III. Further details of consultation and engagement undertaken to date are provided in Section 16.4.

## 16.4 Project Engagement and Consultation

- 16.4.1 National Grid has held several meetings with relevant consultees including Local Highway Authorities and National Highways representatives along the Project.
- 16.4.2 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment is provided in Table 16.1.

Table 16.1 - Stakeholder Engagement

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<p>Local Highway Authority Thematic Group Meeting (Essex, Norfolk, Suffolk, and Thurrock), and National Highways, July 2022</p>	<p>Local Highway Authorities raised the need to consider cumulative effects, AIL routes, agreement on the sensitivity of roads/area, commitments for effects resulting from operation and decommissioning, and appropriate mitigation measures.</p>	<p>The assessment methodology used in this PEIR has included the sensitivity of the roads/surrounding area along the Primary Access Routes, that has been shared with the relevant highway authorities and comments received have been considered in the classification of the road sensitivity.</p> <p>In the ES the significant effects for all roads identified in this PEIR along the Primary Access Routes will be assessed. The assessment will follow the IEMA Environmental Assessment of Traffic and Movement (2023) guidelines that include:</p> <ul style="list-style-type: none"> <li>i. Cumulative effects on the local highway network and Strategic Road Network (SRN) from this Project and all other relevant developments</li> <li>ii. Appropriate routes for abnormal load movements and mitigation strategies to secure safe passage.</li> </ul> <p>The assessment of traffic and transport effects during operation (and maintenance) and decommissioning has been scoped out of the ES (and this PEIR) (i.e. not included as effects are considered to be negligible) as per the Scoping Opinion (Planning Inspectorate, 2022).</p> <p>Embedded, Standard and Additional Mitigations related to traffic and transport at this stage have been described in Section 16.7. Further mitigation measures will be included in a separate Transport Assessment (TA) and Outline CTMP.</p>
<p>Local Highway Authority Thematic Group Meeting, August 2023</p>	<p>Local Highway Authorities requested an early agreement on link sensitivity, traffic counts, AILs, and data and underlying assumptions behind traffic and workforce calculations.</p>	<p>Link sensitivity and traffic count survey locations have been shared with the relevant highway authorities and their comments taken on board. The CTMP will confirm the strategy/routes for AILs, and will be</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	<p>Local Authorities raised potential issues with carrying out traffic surveys in November (as poor weather could encourage more car traffic and result in fewer walkers and cyclists).</p> <p>It was suggested that waterways transport for AIL, and cable drum deliveries was considered.</p> <p>Suffolk County Council requested assessment work to be undertaken beyond looking at collision clusters.</p> <p>Norfolk County Council raised the importance of reinstatement after removal of site accesses following the completion of the Project.</p>	<p>agreed with the relevant highway authority.</p> <p>Preliminary workforce numbers are provided in Chapter 15: Socio-economics, Recreation and Tourism and anticipated to comprise 800 Full Time Equivalent (FTEs), updates and further assumptions behind these numbers will be provided in the ES.</p> <p>Traffic counts have been conducted in November 2023 to support the assessment within this PEIR. These counts are classified for vehicles movements to understand the total number of vehicles and HGV. It was agreed with the Local Highways Authorities that spot checks would be undertaken to alleviate concerns raised regarding the time of year surveys will be undertaken.</p> <p>Separate non-motorised user (NMU) counts will be undertaken late spring 2024.</p> <p>The Project will explore multi-modal transport options to support construction. These options include the use of regional ports to support the delivery of large items such as Super Grid Transformers, and the use of rail or water-borne transport modes to supplement movements by road where practical and appropriate. Further details will be provided in the ES.</p> <p>Collision analysis has been undertaken along the road links and at junctions identifying the total number of collisions and severity, collisions involving cyclists and pedestrians. Work has also been undertaken to look beyond collision clusters that includes looking at routes with road safety concerns.</p> <p>Reinstatement of site accesses would be undertaken, with relevant discussions with the local highway authority and landowners.</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
<p>Local Highway Authority Thematic Group Meeting, September 2023</p>	<p>Local Highway Authorities requested further detail on the vehicle types that would use the Primary Access Routes.</p> <p>Local Highways Authorities also requested Public Right of Way (PRoW) assessment is provided within a separate chapter in the ES.</p>	<p>An overview of the type of construction vehicles that would use the Primary Access Routes has been shared with the Local Highway Authorities.</p> <p>As per the EIA Scoping Report (National Grid, 2022) and Scoping Opinion (Planning Inspectorate, 2022) a separate PRoW chapter has not been provided. This is because PRoW is assessed using different methodologies by several different environmental topic chapters including, traffic and transport, socio economics, health and wellbeing and landscape and visual. Instead, PRoW is assessed separately within each relevant topic chapter and cumulative effects on a single PRoW presented within the cumulative effects chapter. This will be replicated within the ES together with clear signposting.</p> <p>A Draft PRoW Management Strategy is included as Annex B to Appendix 4.1: Draft Outline CoCP in Volume III.</p>
<p>Transport Working Group Regional Meeting (Thurrock), September 2023</p>	<p>It was agreed Department for Transport (DfT) traffic data from 2019 should be used in assessment in the ES.</p> <p>Thurrock Council raised concerns regarding changes to traffic patterns following the pandemic. Validation of traffic patterns between 2019 and 2023 is expected. Brentwood Road was given as an example of a road with a pattern change.</p> <p>Thurrock Council also requested that the construction programme does not overlap with other development such as Lower Thames Crossing (LTC).</p>	<p>Where DfT traffic count data was not available for all roads along the Primary Access Route, additional traffic count surveys were undertaken in November 2023. The locations of the surveys were shared and agreed with Thurrock Council.</p> <p>We have undertaken traffic surveys near to several existing DfT count sites. These were used to compare the recorded flow data with the predicted 2023 vehicle flows using the 2019 DfT count data and applied growth factor. This was undertaken to validate the use of the DfT survey data in relation to concerns on changes to travel patterns because of the pandemic (which it did).</p> <p>Traffic numbers from cumulative developments or 'committed development' will be included within the numbers presented in the ES which will be used to undertake the</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
		assessment in the ES and the TA. A preliminary assessment is provided in Chapter 17: Cumulative Effects.
<p>Transport Working Group Regional Meeting (Norfolk), September 2023</p>	<p>Norfolk County Council raised concerns regarding the alignment through the A1066 Victoria Road (Diss). It was noted this is a congested route. DfT counts in Norfolk are largely only available up to 2019. It was agreed DfT traffic data from 2019 should be used in assessment in the ES. Norfolk County Council suggested additional surveys may be needed to support assessment.</p>	<p>Concerns regarding the sensitivity of routing construction vehicle through Diss have been considered. The CTMP prepared in consultation with Norfolk County Council would address concerns regarding the crossing of the A1066. A Draft Outline CTMP is provided as part of the statutory consultation documents.</p> <p>Where DfT traffic count data was not available for all roads along the Primary Access Route, additional traffic count surveys were undertaken in November 2023. The locations of the surveys were shared and agreed with Norfolk County Council.</p> <p>Furthermore, we have undertaken traffic surveys near to several existing DfT count sites, including the A1066. These were used to compare the recorded flow data with the predicted 2023 vehicle flows using the 2019 DfT count data and applied growth factor. This validated the use of the DfT survey data in relation to concerns on changes to travel patterns because of the pandemic.</p>
<p>Transport Working Group Regional Meeting (Suffolk), September 2023</p>	<p>Suffolk County Council noted restricted vehicle movements on the A12 to access to B1068 (H13B-A1) (restricted slip roads).</p> <p>Suffolk County Council identified that they hold a database of recent traffic surveys that could be used within our assessment. Suffolk County Council agreed to the use of 2019 DfT traffic data for assessments. However, it was highlighted that this may represent an exaggerated worst-case when compared with current 2023 data, as a result of a changes to</p>	<p>Initial mitigation measures regarding the A12 and access to the B1068 were assessed to ensure all movements could be accommodated safely. However, the access to the Project in this area via B1068 (superseded route H13B-A1) has been discarded and the access would be via B1070 (route H13-A1).</p> <p>Survey data from Suffolk County Council was requested and the data received informs the preliminary assessment within this PEIR.</p> <p>Where DfT traffic count data was not available for all roads along the Primary Access Route, additional traffic count surveys were undertaken</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	<p>traffic levels and patterns following the COVID-19 pandemic.</p>	<p>in November 2023. The locations of the surveys were shared and agreed with Suffolk County Council.</p> <p>Furthermore, we have undertaken traffic surveys near to several existing DfT count sites, including the A1120 Bell's Lane. These were used to compare the recorded flow data with the predicted 2023 vehicle flows using the 2019 DfT count data and applied growth factor. This was undertaken to validate the use of the DfT survey data in relation to concerns on changes to travel patterns because of the pandemic.</p>
<p>Transport Working Group Regional Meeting (Essex), September 2023</p>	<p>Essex County Council requested a more focused discussion on the new EACN Substation access.</p> <p>Essex County Council requested additional information on the usage of Bentley Road, inc. pedestrians / cyclists etc.</p> <p>Essex County Council identified initial area of concern e.g., Wick Lane, Mill Road, and constrained junctions in Whitham.</p> <p>Essex County Council requested a review of road widths and white lining.</p> <p>Essex County Council agreed using 2019 DfT traffic data for assessments. However, noted this may represent an exaggerated worst-case when compared with current 2023 data.</p>	<p>A meeting was held with Essex County Council on 16 October 2023 to provide more information on the proposals on the new EACN Substation access via Bentley Road.</p> <p>Automated Traffic Counts (ATC) and Non-motorised user (NMU) counts have been undertaken in November 2023 for the EACN Substation on Bentley Road and the A120 to help inform the extent of mitigation required along the proposed construction route. Further ATC and NMU surveys to inform the ES will be undertaken late spring 2024.</p> <p>Areas of concern are noted along the Primary Access Route and have been taken into consideration. Further assessment will be undertaken within the ES and TA.</p> <p>In terms of road widths and white lines the Construction Access Drawings (issued as part of statutory consultation) were prepared using OS Mapping. Each proposed vehicle type (anticipated to be needed to construct the Project) was tracked, taking road widths into consideration. Road markings were also identified and potential mitigation noted, where changes may be required to facilitate movements. This is detailed on the Construction Access Drawings.</p>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
		<p>Where DfT traffic count data was not available for all roads along the Primary Access Route, additional traffic count surveys were undertaken in November 2023. The locations of the surveys were shared and agreed with Essex County Council.</p> <p>Furthermore, we have undertaken traffic surveys near to several existing DfT count sites including the A1341 Via Urbis Romanae. These were used to compare the recorded flow data with the predicted 2023 vehicle flows using the 2019 DfT count data and applied growth factor. This was undertaken to validate the use of the DfT survey data in relation to concerns on changes to travel patterns because of the pandemic.</p>
<p>Transport Working Group Meeting (Norfolk, Essex, Suffolk and Thurrock) January 2024</p>	<p>Meeting held with Norfolk, Essex, Suffolk and Thurrock to discuss the Draft Outline CTMP when the document was being drafted.</p> <p>Local Highway Authorities provided high level feedback on proposed structure and content, including lessons learned from previous projects.</p> <p>Feedback has been recorded for consideration throughout the development of the Draft Outline CTMP, including:</p> <ul style="list-style-type: none"> <li>• Pre and post construction condition surveys and any remedial measures to be agreed with Local Highway Authority.</li> <li>• Additional consideration given to working hours.</li> <li>• Consideration for the process that the CTMP would follow before being applicable, including reviews by stakeholders and local authorities.</li> </ul>	<p>The Draft Outline CTMP refers to:</p> <ul style="list-style-type: none"> <li>• Pre and post construction condition surveys and any remedial measures to be agreed with Local Highway Authority.</li> <li>• Details on the core working hours, and permitted activities which could occur outside of these hours.</li> <li>• Details on the process that the development of the CTMP would follow to post DCO, and the Local Highway Authority and Local Street Authority input into the variations of the CTMP.</li> <li>• Details on the process for recording activity against the mitigation measures and the compliance procedure.</li> </ul>

Organisation and Date	Summary of Issues Raised	Project Response and consideration in PEIR
	<ul style="list-style-type: none"> <li>Any variations to the CTMP must seek prior agreement with the relevant Local Highway Authority and the Local Street Authority. Request to manage closures to not be in excess of time required.</li> <li>Request for measures in place to monitor assumptions.</li> </ul>	

16.4.3 In addition to stakeholder engagement, meetings have been held with the North Falls and Five Estuaries wind farm project teams. These wind farms are proposed to be located off the coast of East Anglia and connect into the proposed EACN Substation. Both projects involve the construction of new substations, which are proposed to be located adjacent to the EACN Substation. Project teams have worked collaboratively to reduce potential cumulative traffic effects should they be undertaken in parallel. Engagement with a third customer, an interconnector being progressed by Tarchon, has to date been more limited due to the earlier stage of their project development. Collaborative engagement will continue to inform the assessments in the ES.

## 16.5 PEIR Approach and Methods

16.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology / approach used to undertake the preliminary assessment on Traffic and Transport. The overarching approach is also described in Chapter 5: EIA Approach and Methods. This section also identifies further assessment needed to be undertaken as part of the ES.

### Study Area

16.5.2 As per the EIA Scoping Report (National Grid, 2022) the study area for Traffic and Transport includes all roads along the Primary Access Routes, to and from the Project up to where it connects to the SRN/Major Road Network (MRN)<sup>71</sup>, and meets the following criteria based on the IEMA Guidelines (IEMA, 2023):

- Roads where traffic flows are predicted to increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) is predicted to increase by more than 30%)
- Other specifically sensitive areas where traffic flows are predicted to have a net increase by 10% or more

<sup>71</sup> The Strategic Road Network comprised motorways and A roads managed by National Highways. The Major Road Network are important A roads and local roads that are managed by local highway authorities

- Any highway link where there are significant changes in the composition of traffic, e.g. a large increase in the number of HGVs
  - Roads are likely to be significantly affected by temporary road restrictions and traffic management measures required to construct the Project
- 16.5.3 Sensitive areas have been identified and are defined by the presence of sensitive receptors, such as hospitals, residential properties, community centres, conservation areas, schools, equestrian facilities, or collision black spots and routes with road safety concerns, or junctions and highway links at (or over) capacity, located within a radius of 150 m of the Primary Access Routes.
- 16.5.4 The Primary Access Routes have been identified for the construction of the Project and form the basis of the initial assessment presented in this PEIR as presented in Figure 16.1: Primary Access Routes in Volume II. The Primary Access Routes have been discussed with the relevant Local Highway Authorities, as detailed in Table 16.1. Any new or alternative Primary Access Routes identified post statutory consultation will be considered and subject to a feasibility assessment. The final construction routes will be assessed in the ES which will accompany the DCO application.
- 16.5.5 The study area also includes all Public Rights of Way (PRoW) within the draft Order Limits and cycle routes on the Primary Access Routes.

## Existing Baseline

### Data Collection

- 16.5.6 The baseline assessment has been informed by a desk study which has drawn on the following key information sources and surveys:
- AADT flows from the DfT traffic count data for 2019 on the roads (as agreed with all Local Highway Authorities) and road links that form the Primary Access Routes to and from the Project
  - ATC, Manual Classified Link (MCL) counts via cameras, and Radar Surveys were used to obtain classified traffic flow data for a seven-day period for those roads forming the Primary Access Routes where existing DfT survey data was not available at the time of writing this PEIR in 2023
  - Identification of constraints on the highway network, such as height and width restrictions, on-street parking, visibility constraints or capacity issues on roads and junctions of the Primary Access Routes, obtained from google imagery of the highway network
  - Identification of pedestrian, horse-riding and cycle infrastructure provision along the Primary Access Routes, obtained from google imagery of the highway network
  - PRoW maps obtained from Local Highway Authorities of Norfolk County Council, Suffolk County Council, Essex County Council and Thurrock Council
  - Road collision data for the latest available three-year period (2020-2022) for all the roads and junctions on the Primary Access Routes, from STATS19 database (DfT)
  - Public transport information on the roads along the Primary Access Routes, including bus routes and bus stops obtained from the Local Authorities websites and google imagery of the highway network

- National Cycle Routes obtained from Sustrans
- Aerial mapping

### Site Visit

16.5.7 Data collection has been further supported by site visits undertaken by car that allowed a visual inspection of the local roads and junctions along the Primary Access Routes with video footage recorded. Focused site walkovers were also undertaken where further investigation was required. The site visits helped confirm the findings from the desk-based study, and identified further constraints/sensitive areas, ensuring suitability for use by construction movements between the SRN/MRN and the proposed haul roads.

## Further Data to be collected to inform the ES

- 16.5.8 In addition to the data collected to inform the PEIR, the ES will be informed by the following additional third-party data or surveys:
- PRow usage surveys – where there is a need for a survey on specific PRow, the scope and location of the survey will be discussed with Local Authority PRow officers
  - Traffic and speed surveys - on roads forming the Primary Access Routes where data could not previously be collected, on roads forming alternative access routes (if required), at haul road crossover points (if required), and on those roads that would form the Secondary Access Routes<sup>72</sup>. The requirement, scope and location of the surveys will be discussed with Local Highway Authority.
  - Information on other development (committed) within the study area received from relevant planning authorities
  - Committed transport schemes along and in the vicinity of Primary Access Routes

## PEIR Assessment Methodology

16.5.9 The assessment in this PEIR is based on the Primary Access Routes identified to be used during the construction of the Project and the preliminary construction traffic forecasts provided by the FEED contractor. The preliminary construction traffic is presented in Table A16.3.1 in Appendix 16.3: Preliminary Construction Effects in Volume III.

### Increase in Traffic Levels

16.5.10 The percentage increase in total traffic and / or HGVs associated with the Project along each road on the Primary Access Routes has been used to undertake an initial assessment on the effect on traffic levels, based on IEMA Guidelines (IEMA, 2023). The guidelines provide screening criteria under Rules 1 and 2 to identify areas where effects associated with the Project should be subject to further assessment to understand if the Project would give rise to any significant effects:

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<sup>72</sup> Secondary Access Routes will be identified as part of the Outline CTMP, for light vehicles (cars and vans) only moving between adjacent haul road sections, where the haul road is not continuous due to a river, main road, railway or other obstruction

- Rule 1: Include highway links where the total traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%)
  - Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more
- 16.5.11 Increases below 10% are considered insignificant given that daily variations in background traffic flow would usually fluctuate by this amount. Therefore, changes in traffic flow below this level are assumed to result in no discernible environmental effects. These roads will not be assessed in the ES (although there will be a back check following any design changes made post statutory consultation).
- 16.5.12 For the purposes of this PEIR assessment, this chapter determines where Rule 1 or Rule 2 applies and further environmental assessment will be undertaken and presented in the ES.
- 16.5.13 A high level summary of potential effects (without mitigation) is also provided within this chapter based on professional judgement and experience on other similar National Grid and other linear projects.

## Preliminary Assessment Key Parameters and Assumptions

- 16.5.14 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- Construction traffic forecasts are based on an initial high-level estimate of construction materials and programme and are considered to provide a reasonable worst-case scenario. It is considered that these limitations do not affect the robustness of the assessment, but further assessment within the ES may be required
  - The PEIR considers two design alternatives at the Waveney Valley, as detailed in Table 4.3 in Chapter 4: Project Description, an overhead line design and an underground cable alternative. The quantitative preliminary assessment within this chapter uses traffic data, provided by the FEED, for the overhead line solution at the Waveney Valley. However, for the Waveney Valley Alternative, this chapter provides text describing how the traffic numbers would differ from the overhead line solution which are based on recently received data and professional judgement. An assessment of the preferred option will be provided within the ES
  - Traffic flows for year 2019 have been obtained from DfT's static traffic counters and used to establish the future baseline (start of construction activities from 2027). While the latest year for which traffic flows are available on the DfT website is 2022, as the result of the Covid-19 pandemic in 2020, this data is considered to represent atypical travel patterns and flows. As such, using the 2019 traffic flow data to assess the potential effect from traffic associated with the Project is more robust. This approach has been agreed with all the Local Highway Authorities, as detailed in Table 16.1. Additional ATCs have been conducted at various spot check locations and a validation of the traffic patterns between 2019 and 2023 has been conducted
  - An assessment has been undertaken to identify the percentage increase in HGV and in total traffic because of construction traffic on the local road network using future baseline traffic flow data. Due to the extensive construction programme, each road link comprising the Primary Access Routes experiences its peak activity during

a different month. The peak construction period for each link is presented in Table A16.2.1 within Appendix 16.2: Future Baseline in Volume III. The predicted increase has been assessed against 12-hour weekday flows (07:00-19:00 hrs)

- Based on infrastructure projects of comparable size and complexity, it is anticipated that construction activities at the weekend and on bank holidays (08:00-17:00 hrs) would be notably less than weekday activities. As such the assessment of predicted effects from construction traffic against 12-hour weekday flows (07:00-19:00 hrs) represents the worst-case scenario
- Some construction operations may take place outside of the core working hours, for example, deliveries of cable drums by AILs
- It is anticipated that all construction traffic would access the draft Order Limits from the Primary Access Routes along the local highway network. The Primary Access Routes would connect to the SRN and Major Road Network (MRN), i.e. those routes between major settlements and ports / airports across Great Britain
- It has been assumed that construction workers would report to a compound before loading into a site vehicle and travelling to site
- No admin staff, visitors, or additional tradesmen to compounds during the construction period have been considered at this stage

16.5.15 These key parameters and assumptions will be reviewed based on the design presented in the DCO application and, where required, updated, or refined, for the ES.

## Further Assessment within the ES

16.5.16 This chapter provides preliminary assessment based on the development of the Project to date and data gathered at this point. Full details of the methodology will be presented within the ES, together with further assessment detail, assigning value (sensitivity) to receptors as well as criteria for assigning impact magnitude. The criteria will consider the scale/extent of the predicted change and the nature and duration of the impact. The factors are combined to give an overall significance of effect, using a matrix following guidance set out by the DMRB LA 104 Environmental Assessment and Monitoring (National Highways, Aug 2020) (in the absence of industry standard guidance).

16.5.17 The ES will include updated construction traffic route details based on the design presented in the DCO application.

16.5.18 The ES will also include an assessment of the following, as per IEMA Environmental Assessment of Traffic and Movement (2023):

- Potential effects related to driver delay and public transport delay to passengers
- Potential effects related to pedestrian, cyclist and horse-rider delay, severance, and amenity
- Potential effects related to fear and intimidation
- Potential effects on collisions and road safety
- Potential effects on parking and loading

16.5.19 PRoW baseline user survey data will be collected in 2024 where required, following discussions with the PRoW officers within the relevant Local Authorities. Table 16.4 provides a summary of recreational PRoW routes that have initially been identified as

having the potential for higher usage. These routes include those PRow with extensive connectivity and/or with social significance such as Long-Distance Trails, recreational circular routes or LA's promoted routes. Surveys will be conducted with classified user counts undertaken over a 12-hour (7am-7pm) period on a typical weekday and weekends via a manual and/or video survey. Survey information will be provided in the ES.

16.5.20 The ES will also include an assessment of localised effects on the SRN/MRN following further information.

## 16.6 Baseline Conditions

16.6.1 Baseline conditions have been gathered from desk-based information and site surveys, and presented with reference to the section of the Project that they are located.

### Construction Traffic Route Roads and Junctions

16.6.2 The Primary Access Routes have been developed using the following criteria where possible:

- Construction HGV traffic would access the various Project site access points (bellmouth junction) from the Primary Access Routes along the Local Road Network (LRN). The Primary Access Routes would then connect to the closest junction with the SRN /MRN
- From the site access points, construction vehicles would be routed off the public highway along haul roads to access the various construction sites. These haul roads are temporary in nature and would be managed by National Grid
- Shorter available routes, where practical, between the SRN/MRN and the draft Order Limits have been selected
- Existing highway constraints, such as road geometry, height and weight restrictions, junction arrangement and other physical constraints, have been avoided where possible
- Settlements and sensitive locations such as schools or hospitals along the Primary Access Routes have been avoided to reduce potential effects on receptors

16.6.3 Table 16.2 provides a summary of the SRN/MRN junctions that would connect to the Primary Access Routes used by construction traffic to site. There are one or more Primary Access Routes that connect to each SRN/MRN junction.

Table 16.2 - Construction Traffic Route - SRN

SRN/MRN Junction	Project Section	Primary Access Routes (PAR)
A47 / Ipswich Road Roundabout	Section A	H01-A1
A11 / Browick Road Roundabout	Section A	H01-A2 / H02-A1 / H03-A1
A140 Norwich Road / B1134 Station Road	Section A	H03-A2 / H04-A1

<b>SRN/MRN Junction</b>	<b>Project Section</b>	<b>Primary Access Routes (PAR)</b>
A140 / A1066 Victoria Road	Section A	H04-A2 / H05-A1
A140 / A143 Old Bury Road	Section B	H05-A2 / H06-A1
A143 / B1113 Finningham Road	Section B	H06-A2 / H07-A1
A14 J50	Section B	H07-A2 / H08-A1 / H09-A1 / H10-A1
A14 J52	Section B	H10-A2 / H11-A1
A14 J55	Section B	H11-A2 / H12-A1
A12 J31	Section C	H12-A2 / H13-A1
A12 / Ipswich Road interchange	Section C	H14-A1
A12 / Birchwood Road	Section C	H15-A1 / H16-A1
A120 Bentley Road	Section C	H17-A2
A12 J29/ A120 Ardleigh Crown Interchange	Section C	H18-A1 / H19-A1
A12 J28	Section D	H19-A2 / H20-A1
A12 J26	Section D	H20-A2 / H21-A1 / H22-A1
A120 / Great Tey Road junction	Section D	H23-A1
A120 Colchester Road	Section D	H24-A1
A120 / B1018 Roundabout	Section E	H24-A2
A12 J21	Section E	H25-A1
A120 / A131 Great Notley Roundabout	Section E	H25-A2 / H26-A1 / H27-A1 / H28-A1
A12 J15	Section F	H28-A2 / H29-A1 / H29-A2 / H30-A1 / H30-A2 / H31-A1 / H32-A1
A127 Southern Arterial Road / A176 Noak Hill Road Interchange	Section G	H33-A1
A127 Southern Arterial Road / Dunton Road Junction	Section G	H33-A2 / H34-A1
A13 Stanford-Le-Hope Bypass / A1013 Stanford Road	Section H	H36-A1
A1089 St Andrew's Road / Fort Road	Section H	H37-A1 / H38-A1

16.6.4 Primary Access Routes are formed of one or more roads within the LRN between the SRN/MRN junctions and the site access points, and are summarised in Table 16.3 and

presented on Figure 16.1: Primary Access Routes in Volume II. Further details of the roads forming the Primary Access Routes are presented in Table A16.1.1 and Table A16.1.3 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.

Table 16.3 – Primary Access Routes

Primary Access Routes (PAR)	Project Section	Roads forming PAR
H01-A1	Section A	PAR 1 A140 Ipswich Road / PAR 2 Mangreen Lane
H01-A2	Section A	PAR 3 Stansfield Road / Wymondham Road / PAR 4 B1113 / PAR 5 Wymondham Road
H02-A1 / H03-A1	Section A	PAR 3 Stansfield Road / Wymondham Road / PAR 4 B1113 / PAR 6 Fundenhall Road
H03-A2 / H04-A1	Section A	PAR 7 B1134 Station Road / B1134 Long Road
H04-A2 / H05-A1	Section A	PAR 8 A1066 Victoria Road / A1066 Park Road / A1066 High Road
H05-A2	Section B	PAR 9 A143 Old Bury Road / PAR 10 Lion Road
H06-A1	Section B	PAR 9 A143 Old Bury Road
H06-A2	Section B	PAR 11 B1113 Finningham Road / B1113 Walsham Road / PAR 12 Wickham Road / PAR 13 Eastland Lane / Haul Road / PAR 14 Thornham Road
H07-A1	Section B	PAR 11 B1113 Finningham Road / B1113 Walsham Road / PAR 12 Wickham Road
H07-A2 / H08-A1	Section B	PAR 15 A1120 Church Road
H09-A1	Section B	PAR 16 A1120 / Haul Road / PAR 17 Mill Lane
H10-A1	Section B	PAR 16 A1120 / PAR 18 B1113 Needham Road / B1113 Stowmarket Road
H10-A2 / H11-A1	Section B	PAR 19 B1113 Bramford Road / B1113 Loraine Way / PAR 20 Bullen Lane
H11-A2 / H12-A1	Section C	PAR 21 A1214 London Road / PAR 22 A1071
H12-A2	Section C	PAR 23 B1070 Hadleigh Road / PAR 24 B1070 / PAR 25 Acacia Road
H13-A1	Section C	PAR 23 B1070 Hadleigh Road / PAR 24 B1070
H14-A1	Section C	PAR 26 Ipswich Road

<b>Primary Access Routes (PAR)</b>	<b>Project Section</b>	<b>Roads forming PAR</b>
H15-A1	Section C	PAR 27 Birchwood Road / PAR 28 Wick Road / Grove Hill / PAR 29 Perry Lane
H16-A1	Section C	PAR 27 Birchwood Road
H17-A2	Section C	PAR 30 Bentley Road / PAR 31 Ardleigh Road / Little Bromley Road
H18-A1	Section D	PAR 32 Old Ipswich Road / Haul Road / PAR 33 Wick Lane
H19-A1	Section D	PAR 32 Old Ipswich Road / PAR 34 Turnpike Close
H19-A2 / H20-A1	Section D	PAR 35 A1341 Via Urbis Romanae / PAR 36 A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway
H20-A2	Section D	PAR 37 A1124 Halsted Road / Haul Road/ PAR 38 Mill Road
H21-A1 / H22-A1	Section D	PAR 37 A1124 Halsted Road
H23-A1	Section D	PAR 39 Great Tey Road
H24-A1	Section E	PAR 40 A120 Colchester Road access to pylons TB72– TB84 (site access point TB-B054).
H24-A2	Section E	PAR 41 B1018 Braintree Road / B1018 Witham Road
H25-A1	Section E	PAR 42 B1389 Hatfield Road / PAR 43 Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill
H25-A2	Sections E and F	PAR 44 A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road
H26-A1	Section F	PAR 44 A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / PAR 45 B1008 Essex Regiment Way
H27-A1	Section F	PAR 44 A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / PAR 46 B1008 Braintree Road / B1008 Main Road / PAR 47 Chatam Hall Lane
H28-A1	Section F	PAR 44 A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / PAR 46 B1008 Braintree Road / B1008 Main Road / PAR 48 Chelmsford Road
H28-A2	Section F	PAR 49 A414 Three Mill Hill / A1114 London Road / PAR 50 A1016 Westway / A1016 Waterhouse Lane / A1016 Rainsford Lane / PAR 51 A1060 Rainsford Road / A1060 Roxwell Road
H29-A1	Section F	PAR 49 A414 Three Mill Hill / A1114 London Road / PAR 50 A1016 Westway / A1016 Waterhouse Lane / A1016 Rainsford Lane / PAR 51 A1060 Rainsford Road / A1060 Roxwell Road / PAR 52 Vicarage Road

Primary Access Routes (PAR)	Project Section	Roads forming PAR
H29-A2 / H30-A1	Section F	PAR 49 A414 Three Mill Hill / A1114 London Road / PAR 53 A414 Greenbury Way / A414 Ongar Road
H30-A2	Section G	PAR 54 B1002 / PAR 55 Wantz Road / PAR 56 Ivy Barns Lane
H31-A1	Section G	PAR 54 B1002 / PAR 57 Church Lane
H32-A1	Section G	PAR 54 B1002 / PAR 57 Church Lane / Haul road / Tabrums Farm Bridge
H33-A1	Section G	PAR 58 A176 Noak Hill Road / A176 Laindon Road / PAR 59 A129 London Road / A129 Rayleigh Road
H33-A2	Section G	PAR 60 Dunton Road / Brentwood Road
H34-A1	Section G	PAR 61 B148 West Mayne / PAR 62 Lower Dunton Road
H35-A1	Sections G and H	PAR 63 A128 Brentwood Road access to pylons TB229 – TB253 and TB South Satellite compound (site access point TB-B128)
H36-A1	Section H	PAR 64 A1013 Stanford Road / PAR 65 Buckingham Hill Road
H37-A1	Section H	PAR 66 Fort Road / PAR 68 Cooper Shaw Road
H38-A1	Section H	PAR 66 Fort Road / PAR 67 Tilbury Substation Access Road

## Highway Network

- 16.6.5 Primary Access Routes and a description of the highway network along each route can be found within Table A16.1.1 and Table A16.1.3 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.
- 16.6.6 Table A16.1.3 provides a description of each road, including the type of carriageway, character, speed limits, highway constraints, presence of street lighting, bus routes and on-carriageway parking, and pedestrian, equestrian and cycle provision. These roads are presented on Figure 16.1: Primary Access Routes in Volume II.
- 16.6.7 In addition to the Primary Access Routes, there are roads located on the local highway network where a crossover point is provided. This allows construction vehicles to cross over the road and progress along the proposed haul roads. It is important to note that these intersections would not contribute to an increase in baseline traffic along the local road; hence, they have not been assessed within the PEIR. Temporary traffic management measures would be in place to avoid delays at cross over points. These cross over points are listed and described within Table A16.1.2 and Table A16.1.4 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.

## Traffic Flows

- 16.6.8 Where available, baseline traffic flows have been obtained from the DfT's static traffic counters for road links forming the Primary Access Routes. The DfT static traffic counter sites are shown on Figure 16.1: Primary Access Routes in Volume II.

- 16.6.9 Appropriate growth factors derived from TEMPro were applied to the 2019 traffic flows to account for growth in background traffic between the year the surveys were undertaken and future baseline year for peak construction activity.
- 16.6.10 The resultant AADT flows were converted into average weekday traffic flows and 12-hour flows (07:00-19:00 hrs) by applying an appropriate factor. This factor was derived from a standard daily traffic profile from the DfT's online road traffic statistics Table TRA0307.
- 16.6.11 For links that do not have available or recent DfT traffic flows, traffic survey data was collected. In addition, traffic flow data held by Suffolk County Council was obtained where available to inform the assessment. Traffic survey site location are shown on Figure 16.1: Primary Access Routes in Volume II.
- 16.6.12 Baseline traffic flows on road links forming the Primary Access Routes and links where surveys have been undertaken are presented in Table A16.1.5 in Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.

## Sensitive Receptors and Sensitive Areas

- 16.6.13 A description, location, and the sensitivity level of identified sensitive receptors within the study area are summarised in Table A16.1.6 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III and presented on Figure 16.2: Sensitive Receptors in Volume II. Sensitive receptors and sensitive areas include walkers, cyclists and horse riders, schools, nurseries and playgrounds.

## Public Rights of Way (PRoW)

- 16.6.14 There are several PRoWs used by walkers, cyclists and horse riders that would be affected by the Project, predominately by proposed haul roads. These routes are presented on Figure 16.1: Primary Access Routes in Volume II.
- 16.6.15 PRoWs that have been initially identified as potentially highly used and have extensive connectivity and / or social significance such as long distance trails, recreational circular routes or Local Authority promoted routes. PRoWs are presented in Table 16.4. Further details of PRoWs are included within Chapter 15: Socio-economics, Recreation and Tourism and discussions with PRoW officers from all relevant Local Authorities will continue to be undertaken to confirm these key routes.

Table 16.4 - Potentially Highly Used PRoWs

PRoW Ref. No.	Project Section	Location
Roydon South Norfolk FP14	Section A	Angles Way Long Distance Trail, section Diss Mere to Redgrave B1113 at Roydon (Near RG87)
W-267/021/0	Section B	Gislingham Circular Route 1 (Near RG118)
W-267/022/0	Section B	Gislingham Circular Route 1 (Near RG119)
W-267/014/0	Section B	Gislingham Circular Route 2 (Near RG114)
W-392/001/0	Section B	The Wimble Circular Walk, near RG136
W-499/007/0	Section B	Mid Suffolk Footpath, near RG145

<b>PRoW Ref. No.</b>	<b>Project Section</b>	<b>Location</b>
E-227/063/0	Section B	Earl Stonham Circular Walks Gold Route (Near RG155)
E-227/062/0	Section B	Earl Stonham Circular Walks Gold Route (Near RG157)
W-209/023/0	Section B	Needham Market to Stowmarket Gipping Valley River Path (Near RG163)
PROW 139_1	Section C	St Edmund Way and Stour Valley Path, West of Stratford St Mary
PROW 139_2	Section C	Langham Circular Walk, west of Stratford St Mary
PROW 139_3	Section C	Langham Circular Walk, west of Stratford St Mary
PROW 139_3	Section C	Langham Circular Walk, west of Stratford St Mary
PROW 139_43	Section C	The Essex Way Walk, at Langham (West of Stratford St Mary)
PROW 135_31	Section D	The Essex Way Walk, at Great Horkesley (Near TB35)
PROW 134_33	Section D	The Essex Way Walk, between Fordstreet and Mill House (Near TB50)
PROW 137_42	Section D	The Essex Way Walk, between Coggeshall and East Goves (Near TB71)
PROW 120_15	Section E	White Notley Circular Walk (Near TB106)
PROW 74_19	Section E	The John Ray Walk, between Silver End and Rivenhall (Near TB98)
PROW 120_15	Section E	The Essex Way Walk, between Fairstead and White Notley (Near TB106)
PROW 221_40	Section F	The Essex Way Walk, between Great Leigh and Terling (Near TB124)
PROW 222_76	Section F	Little Waltham and Broomfield Circular and Pleshey and Great Waltham loop (Near TB138)
PROW 222_74	Section F	Little Waltham and Broomfield Circular (Near TB140)
PROW 214_1	Section F	Saffron Trail (Near TB143)
PROW 214_5	Section F	Pleshey and Great Waltham loop (Near TB150)
PROW 226_13	Section F	The St Peter's Way Walk, between Mill Green and Margaretting (Near TB181)

16.6.16 There are no key PRoWs initially identified in Sections G and H. However, this will be confirmed following statutory consultation.

## Collision Data

- 16.6.17 Personal injury collision data has been obtained from DfT Road Safety Data for the roads along the Primary Access Routes. The latest three-year personal injury collision data (2020-2022) has been summarised in Table A16.1.7 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III for the roads and junctions on the Primary Access Routes. The location of all collisions are shown on Figure 16.3: Collision Data in Volume II.
- 16.6.18 The collisions involving pedestrian and cyclist casualties are recorded in Table A16.1.8 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.
- 16.6.19 A collision cluster has been determined by the following criteria:
- A location where there are six or more injury collisions occurring within a junction or a 100 m stretch
  - A location with three or more fatal and/or serious collisions happening either within a junction or within a 100 m stretch
- 16.6.20 In addition to these criteria, the collision data has been analysed along the full length of the links to identify patterns in accident locations in order to establish any areas of safety concerns.
- 16.6.21 From the collision data analysis, a collision cluster has been identified on the Primary Access Routes at the A1016 Rainsford Lane / A1016 Parkway / A1060 Rainsford Road junction (Links PAR 50 and PAR 51).
- 16.6.22 At the A120 Colchester Road (Link PAR 40) there are no collisions in the vicinity of the Site Access Point, there is a safety concern due to the high number of collisions along A120 between Coggeshall and A12 J25 Marks Tey.
- 16.6.23 At A128 Brentwood Road (Link PAR 63) there is a high number of collisions along A128 between A127 Southern Arterial Road and A128 Stanford-Le-Hope Bypass. Recently this road has had speed cameras introduced as a road safety measure due to the accident record on the route.
- 16.6.24 Additionally, the following collision clusters have been identified at SRN/MRN junctions that connect to Primary Access Routes:
- A14 J50 Cedars Interchange
  - A14 J52 Claydon Roundabout
  - A14 J55 Copdock Interchange
  - A12 J29/ A120 Ardleigh Crown Interchange
  - A12 J26 Eight Ash Green Interchange
  - A12 J25 Marks Tey Interchange
  - A120 / B1018 Roundabout
  - A127 Southern Arterial Road / A176 Noak Hill Road Interchange
  - A13 Stanford-Le-Hope Bypass (Orsett Cock Roundabout)

## Road Sensitivity

- 16.6.25 The road/area sensitivity, which follows IEMA Guidelines, has been assigned to all roads and road links on the Primary Access Routes. The road sensitivity is defined based on the identified receptors, the assessment of the roads, the number of personal injury collisions and the collision clusters where identified. The assigned classification of each road link is presented in Table A16.1.9 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III.

## Future Baseline

- 16.6.26 Based on the proposed construction programme for the Project, the peak year for construction activities that would affect each road link comprising the Primary Access Routes has been estimated. The future baseline traffic along these road links has been calculated by firstly applying an appropriate growth factor derived from TEMPro to the baseline traffic flows for year 2019 to the DfT traffic flows and year 2023 on the 2023 surveyed traffic flows. These flows are summarised in Table A16.2.1 within Appendix 16.2: Future Baseline in Volume III.
- 16.6.27 The future baseline also considers any known or anticipated changes to the current baseline when construction of the Project commences. The future baseline flows are summarised in Table A16.2.2 within Appendix 16.2: Future Baseline in Volume III. Note that this data only includes traffic flow data for the overhead line design for the Waveney Valley.
- 16.6.28 For the Waveney Valley overhead line design, it is anticipated there would be a worst-case daily increase from the baseline of 6% in total vehicles and an increase of 46% in HGVs on the 12h weekday flows. For the Waveney Valley Alternative from an initial review of recent data and having applied professional judgement it is anticipated there would be a worst-case daily increase from the baseline of 8% in total vehicles and an increase of 57% in HGVs on the 12h weekday flows and together with a maximum of six daily AIL movements across a four month period along the Waveney Valley Alternative additional PAR from Thetford (along the A1066).
- 16.6.29 A review of all committed developments will be undertaken for the assessment within the ES to identify other developments that could generate additional traffic along the construction routes. The information that will be used to undertake this review is presented in Appendix 17.1: Long List of Other Developments in Volume III.
- 16.6.30 The future baseline for Walkers, Cyclists and Horse-Riders will also be assessed in the ES and will reflect any anticipated changes affecting these users.

## 16.7 Embedded, Standard and Additional Mitigation Measures

### Embedded Mitigation

- 16.7.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 16.7.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.

- 16.7.3 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 which Chapter 4: Project Description. Relevant to Traffic and Transport, this includes the inclusion of a largely continuous haul road to reduce effects on the local highway network during construction, that would only be discontinued at major obstructions along the corridor (major roads, railways, areas of environmental or historical significance and/or major watercourses).
- 16.7.4 The design of the Project is on-going and embedded mitigation measures will continue to be developed until submission of the DCO application.

## Standard Mitigation

- 16.7.5 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
- 16.7.6 Appendix 4.1: Draft Outline CoCP in Volume III contains a list of relevant standard measures relating to traffic and transport. These include but are not limited to (note: measures have been assigned references, for example (GG01). These align with the references provided in Table 5.1 of Appendix 4.1: Draft Outline CoCP in Volume III for ease of cross-reference):
- GG05: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
    - Pollution prevention and pollution incident response
    - Dust management and control measures
    - Location and protection of sensitive environmental sites and features
    - Adherence to protected environmental areas around sensitive features
    - Working hours and noise and vibration reduction measures
    - Working with potentially contaminated materials
    - Waste management and storage
    - Flood risk response actions
    - Agreed traffic routes, access points, etc.
    - Training of construction and maintenance workers in the handling and use of potentially hazardous substances and the associated risks
  - GG09: A CTMP will be produced prior to the defined 'commencement' of construction. The Main Works Contractor(s) will undertake regular visual site inspections to check conformance to the Management Plans – which will be defined within the DCO
  - GG36: Members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will typically include the notification of 'noisy activities', heavy traffic periods and start and end dates of key phasing. A contact number will be provided which members of the public can use to raise any concerns or complaints about the Project. All construction-related

complaints will be logged by the Main Works Contractor(s) in a complaints register, together with a record of the responses given and actions taken

- S02: PRowS crossing the working areas will be managed in discussion with the relevant local authorities and potential temporary closures applied, where required. Access disruption would be reduced while construction activities occur where possible. Any required temporary diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns. *A Draft PRow Management Strategy has been prepared and can be found at Annex B to Appendix 4.1: Draft Outline CoCP in Volume III*

16.7.7 Control measure specific to Traffic and Transport are included within the Draft Outline CTMP. Identified provisional control measures (subject to change following statutory consultation) proposed to be applied during the construction phase of the Project at this stage include:

- The Main Work Contractor(s) and sub-contractor vehicles arriving at site would comply with appropriate safety and environmental standards
- All construction HGVs would adhere to the designated construction routes to and from the site
- Emergency access protocols would be put in place and would be identified within the site Health and Safety Plan
- The Main Works Contractor(s) would ensure that debris deposits onto the public road because of construction traffic are minimised as much as possible and are cleared away if they occur
- Appropriate road signs warning motorists of the site access/egress and of construction HGVs turning in and out of the site would be provided and installed
- Provision of appropriate road markings and signs would be in place to warn the public of increased traffic movements to and from the site during construction
- Site inductions would cover traffic safety, highlighting the need to pay special attention to vulnerable road users
- Measures for highway reinstatement
- A commitment for the Main Works Contractor(s) to prepare a Driver Information Pack prior to construction commencing covering variety of topics and providing information on the requirements of working on the Project
- Staff Travel Plan would be prepared by the Main Works Contractor(s) prior to construction commencing with the aim of proactively managing trips to and from the site, to minimise local effects by reducing the number of single occupancy vehicle trips and encouraging the uptake of sustainable modes of travel

16.7.8 The Draft Outline CTMP provides details of the proposed traffic management of delivery vehicles and other traffic generated during the construction phase at this stage of the Project. It identifies measures designed to avoid and reduce the effect wherever possible between construction site traffic and other road users. The CTMP(s) would be implemented by the Main Works Contractor(s) to ensure that all traffic movements associated with the Project's construction works operate in a compliant manner.

16.7.9 The Project would require AILs delivering equipment components. The Outline CTMP will confirm the strategy/routes for AILs movements for construction mitigation which will

be developed through discussions with the relevant Local Highway Authority. The Draft Outline CTMP currently identifies those Primary Access Routes that have been initially identified for use by AILs.

- 16.7.10 The mechanisms by which mitigation measures would be secured and delivered will be set out in the ES.

## Additional Mitigation

- 16.7.11 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.
- 16.7.12 The assessment undertaken within this PEIR has not identified any requirements for additional mitigation at this stage.

## Waveney Valley Alternative

- 16.7.13 The Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 Thetford, which would be used to bring in cable drums to avoid highway constraints through Diss. However, all other mitigation measures as outlined above for the overhead line design would be relevant for the Waveney Valley Alternative.

## 16.8 Potential Residual Effects and Preliminary Likely Significant Effects

- 16.8.1 The preliminary likely significant effects of the Project have been assessed using current available data relating to the construction phase of the Project. The preliminary potential residual effects are outlined below. It assumes that all mitigation - embedded (design measures) and standard practice mitigation are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2023).
- 16.8.2 It should be noted that this assessment is ongoing and is subject to change through ongoing development of the Project proposals.
- 16.8.3 A full detailed assessment will be presented within the ES submitted with the DCO application.

## Preliminary Construction Effects

- 16.8.4 The primary traffic and transportation effects associated with the Project would be as a direct result of an increase in traffic flows on the surrounding roads used by construction vehicles. An assessment was undertaken to identify the percentage increase in HGV and total traffic due to construction on the local road network using future baseline traffic flow data. The predicted increase has been assessed against 12-hour weekday flows (07:00-19:00 hrs).
- 16.8.5 Traffic and transport effects associated with the construction phase on receptors / resources relates to the change in traffic flow and composition and with the link sensitivity. The level of sensitivity of the link specific receptors has been identified in

Table A16.1.6 within Appendix 16.1: Traffic and Transport Baseline Conditions in Volume III and presented on Figure 16.2: Sensitive Receptors in Volume II.

- 16.8.6 Appendix 16.2: Future Baseline in Volume III sets out the predicted increase in traffic on the local road network associated with predicted worst-case daily construction traffic movements during the worst-case month for each Primary Access Route. These were then assessed against the assigned sensitivity of each road link.
- 16.8.7 The predicted increase for 12-hour HGV flows (07:00-19:00 hrs) exceeds the 10% threshold (for sensitive roads) and 30% threshold (for non-sensitive roads) on the majority of the assessed local road links forming the Primary Access Routes and will be subject to further assessment within the ES.
- 16.8.8 The following road links that form part of the Primary Access Route network are below the assessment threshold and would not be subject to further assessment:
- Link PAR40 - A120 Colchester Rd
  - Link PAR45 - B1008 Essex Regiment Way
  - Link PAR61 - B148 West Mayne
  - Link PAR67 - Port of Tilbury 2 access
- 16.8.9 The following road links were not assessed within the PEIR owing to design changes at a late stage in the PEIR process. However, traffic surveys will be undertaken on these roads (and along any other routes that are identified as a result of further changes to the design) and if necessary they will be fully assessed within the ES:
- Link PAR24 - B1070
  - Link PAR25 - Acacia Road
  - Link PAR31 - Ardleigh Rd / Little Bromley Road
- 16.8.10 Table 16.5 summarises the preliminary assessment of potential significant effects associated with the Project. This is in relation to the diverse types of resource/receptors and instances (not inclusive) are provided of where assessments would be required on Primary Access Routes. Where an increase in baseline traffic exceeds 10% for sensitive roads and 30% for non-sensitive roads because of the construction flows associated with the Project, there is potential for negative effects on receptors and users of the road network, which may lead to the potential significant effects outlined in Table 16.6. However, this is dependent upon each road characteristics and the surrounding environment.

**Table 16.5 - Construction phase – Preliminary Assessment of Potential Effects Prior to Mitigation**

<b>Resource / Receptor</b>	<b>Potential Effects (prior to mitigation)</b>	<b>Assessment</b>
Pedestrians	Reduced ability to cross the road. Changed journey times and distances. Loss of amenity.	Roads with presence of footways and/or pedestrian crossings (formal or informal) i.e.: ● Link PAR4 - B1113

Resource / Receptor	Potential Effects (prior to mitigation)	Assessment
	<p>Potential issues due to increased traffic flows and change in composition.</p> <p>Reduction in road safety.</p>	<ul style="list-style-type: none"> <li>• Link PAR 8 - A1066 Victoria Rd / A1066 Park Rd / A1066 High Rd</li> <li>• Link PAR15 - A1120 Church Rd / A1120 Bell's Ln</li> <li>• Link PAR28 - Wick Rd / Grove Hill</li> <li>• Link PAR35 - A1341 Via Urbis Romanae</li> <li>• Link PAR36 - A134 Northern Approach Rd / A134 Wildeve Avenue / A134 Nayland Rd / A134 The Causeway</li> <li>• Link PAR37 - A1124 Halsted Rd</li> <li>• Link PAR39 - Great Tey Rd</li> <li>• Link PAR42 - B1389 Hatfield Rd</li> <li>• Link PAR43 - Spinks Ln / Highfields Rd / Spa Rd / Flora Rd / Faulkbourne Rd / Church Hill</li> <li>• Link PAR44 - A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Rd</li> <li>• Link PAR50 - A1016 Waterhouse Ln / A1016 Rainsford Ln</li> <li>• Link PAR51 - A1060 Rainsford Rd / A1060 Roxwell Rd</li> <li>• Link PAR54 - B1002 Main Rd</li> <li>• Link PAR59 - A129 Sun Street / A129 London Rd / A129 Rayleigh Rd</li> <li>• Link PAR64 - A1013 Stanford Rd</li> </ul>
Cyclists	<p>Reduced ability to cross the road.</p> <p>Changed journey times and distances.</p> <p>Loss of amenity.</p> <p>Potential issues due to increased traffic flows and change in composition.</p>	<p>Roads with cycle lanes, shared footway/cycleway and/or cyclist crossings, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR 8 – A1066 Victoria Rd / A1066 Park Rd / A1066 High Rd</li> <li>• Link PAR9 – A143 Old Bury Rd</li> <li>• Link PAR16 – A1120 south of A14 J50</li> </ul>

Resource / Receptor	Potential Effects (prior to mitigation)	Assessment
	Reduction in road safety	<ul style="list-style-type: none"> <li>• Link PAR19 – B1113 Bramford Rd / B1113 Loraine Way</li> <li>• Link PAR23 - B1070 Hadleigh Rd</li> <li>• Link PAR41 - B1018 Braintree Rd / B1018 Witham Rd</li> <li>• Link PAR49 - A414 Three Mill Hill / A1114 London Rd</li> <li>• Link PAR58 - A176 Noak Hill Rd / A176 Laindon Rd / A129 Southend Rd</li> </ul> <p>Roads with cycle routes, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR18 – B1113 Needham Rd / B1113 Stowmarket Rd (NCN51)</li> <li>• Link PAR38 - Mill Rd (NCN13)</li> </ul> <p>Roads where cyclists are required to join the primary carriageway, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR1 - A140 Ipswich Rd</li> </ul>
Horse-riders	<p>Reduced ability to cross the road.</p> <p>Changed journey times and distances.</p> <p>Loss of amenity.</p> <p>Potential issues due to increased traffic flows and change in composition.</p> <p>Reduction in road safety.</p>	<p>Roads with bridleway crossings, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR35 - A1341 Via Urbis Romanae</li> </ul> <p>Roads with bridleway connection, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR7 - B1134 Station Rd / B1134 Long Row</li> <li>• Link PAR11 - B1113 Finningham Rd / B1113 Walsham Rd</li> <li>• Link PAR12 - Wickham Rd</li> </ul>
Bus passengers	<p>Changed journey times and distances.</p> <p>Reduction in road safety.</p>	<p>Roads with various bus routes and bus stops, i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR8 - A1066 Victoria Rd / A1066 Park Rd / A1066 High Rd</li> <li>• Link PAR11 - B1113 Finningham Rd / B1113 Walsham Rd</li> <li>• Link PAR15 - A1120 Church Rd / A1120 Bell's Ln</li> <li>• Link PAR28 - Wick Rd / Grove Hill</li> </ul>

Resource / Receptor	Potential Effects (prior to mitigation)	Assessment
		<ul style="list-style-type: none"> <li>• Link PAR37 - A1124 Halsted Rd</li> <li>• Link PAR50 - A1016 Waterhouse Ln / A1016 Rainsford Ln</li> <li>• Link PAR51 - A1060 Rainsford Rd / A1060 Roxwell Rd</li> <li>• Link PAR64 - A1013 Stanford Rd</li> </ul>
Car drivers and passengers	<p>Changed journey times and distances for private and commercial vehicle occupants.</p> <p>Reduction in road safety.</p>	<p>Roads with collision clusters or with a concentration of accidents along the road link, roads with capacity concerns i.e.:</p> <ul style="list-style-type: none"> <li>• Link PAR 8 - A1066 Victoria Rd / A1066 Park Rd / A1066 High Rd</li> <li>• Link PAR 15 - A1120 Church Rd / A1120 Bell's Ln</li> <li>• Link PAR 16 - A1120 south of A14 J50</li> <li>• Link PAR 19 - B1113 Bramford Rd / B1113 Loraine Way</li> <li>• Link PAR 21 - A1214 London Rd</li> <li>• Link PAR 22 - A1071</li> <li>• Link PAR 35 - A1341 Via Urbis Romanae</li> <li>• Link PAR 36 - A134 Northern Approach Rd / A134 Wildeve Avenue / A134 Nayland Rd / A134 The Causeway</li> <li>• Link PAR 50 - A1016 Waterhouse Ln / A1016 Rainsford Ln</li> <li>• Link PAR 58 - A176 Noak Hill Rd / A176 Laindon Rd / A129 Southend Rd</li> <li>• Link PAR 59 - A129 Sun Street / A129 London Rd / A129 Rayleigh Rd</li> </ul>

16.8.11 The likely level of effect and significance of effects for all roads along the Primary Access Route will be subject to further assessment and determined within the ES. However, it is anticipated that the potential effects would not be significant following the

implementation of the proposed mitigation measures, outlined in Section 16.7 and contained within the Draft Outline CTMP (designed in consultation with the Local Highways Authority).

### **Waveney Valley Alternative**

- 16.8.12 The PEIR considers two design alternatives at the Waveney Valley, as detailed in Table 4.3 in Chapter 4: Project Description, an overhead line design and an underground cable alternative. The quantitative preliminary assessment within this chapter uses traffic data, provided by the FEED, for the overhead line solution at the Waveney Valley.
- 16.8.13 Paragraph 16.6.28 provides the 12 hr weekday flows for both Waveney Valley overhead line design and the Waveney Valley Alternative. The Waveney Valley Alternative would exceed the traffic flow threshold for further detailed assessment, as per the overhead line design. In addition, the Waveney Valley Alternative would introduce the need for an additional Primary Access Route, along the A1066 from Thetford, which would be used to bring in cable drums to avoid highway constraints through Diss. It is anticipated that this would introduce a maximum of six daily AIL movements across a four month period along this route. Therefore, this would not trigger the need for any further assessment, and therefore not significant. Should the Waveney Valley alternative be taken forward a full assessment in the ES would be undertaken.

## **16.9 Sensitivity Testing**

### **Flexibility in Construction Programme**

- 16.9.1 This chapter assumes the base construction schedule described in Chapter 4: Project Description for the purposes of the assessment.
- 16.9.2 The construction programmes for cabling, substations and the overhead line activities have been reviewed by the FEED to help identify a worst case (peak day) for vehicle traffic movements expected for each construction activity to inform the trip generation calculations. This method presents a worst-case scenario to support a robust assessment within the PEIR.
- 16.9.3 The assessment reports the highest effect of the Project on each Primary Access Route during the construction programme, which is not currently defined. Given a worst-case scenario has been assumed for the current design, it is likely that there would be no new or different significant effects to those identified in the baseline scenario assessed in Appendix 16.3: Traffic and Transport Preliminary Construction Effects in Volume III.

### **Flexibility in Design**

- 16.9.4 This chapter has assumed the pylon locations and underground cable alignment provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II.
- 16.9.5 Sensitivity testing considering alternative pylon or undergrounding locations, within the proposed LoD, has shown that any changes within the LoD may affect the haul road alignment, however, it is expected that the Project site access points and associated Primary Access Route assessed within the PEIR would be retained. Therefore, there would be no significant changes in the likely significant effects from a change in design

within LoD compared to those identified in the baseline scenario assessed in Appendix 16.3: Traffic and Transport Preliminary Construction Effects in Volume III.

## Flexibility due to Design elements not fixed at Statutory Consultation

16.9.6 With regards to the other aspects of design flexibility summarised in Table 4.3 in Chapter 4: Project Description the following has been assumed:

- Where the draft Order Limits have been widened to allow for changes to the alignment, this is unlikely to have a significant effect. This is because although Project haul roads and site access point locations may potentially change, that they would still be accessed by the same Primary Access Routes and unlikely to generate significantly different construction traffic flows. Therefore, the assessment would be unaffected
- The PEIR assumes a worst-case that two trenchless crossing locations of the River Stour are required. Should only one crossing be required, it is assumed that the proposed haul road to the south and north of the river would retain the same Project site access point and connection to the assessed Primary Access Route. Therefore, the assessment would be unaffected
- There are two options for cable installation where the Project interacts with the Lower Thames Crossing Project, located to the west of Tarmac and Muckingford Road. The first option considers that cables would be laid in ducts pre-installed as part of the proposed Lower Thames Crossing Project. The second option considers that if the two projects are unable to coordinate due to programme or other factors, the cables would be installed by trenchless methods. However, if Lower Thames Crossing Project does not go ahead, the crossings associated with this Project would be removed and the cables would be installed via open trench methods. The PEIR assessment considers the installation of cables via trenchless methods as it represents worst-case scenario. Therefore, the assessment would be unaffected
- There are two options for a satellite compound in Basildon. The PEIR assessment currently assumes both compounds would be used. Should only one compound be required, this may potentially increase the number of construction vehicles accessing the site from associated the Primary Access Route, leading to a potential change in the significance of effects, although following the implementation of mitigation measures residual effects are likely to be not-significant
- The Primary Access Route to the EACN Substation is proposed via Bentley Road off the A120. However, in addition to this Primary Access Route an alternative offline and shared haul road with the North Falls and Five Estuaries Windfarm Projects is also being considered (and shown on Figure 4.1: Proposed Project Design in Volume II). Discussions are ongoing with the North Falls and Five Estuaries Windfarm Projects and it is unknown at this time when the alternative offline shared haul road would be available to the Project. Therefore, as a worst case this chapter assumes all traffic would use Bentley Road for the construction phase. The assessment will be updated in the ES to reflect a more likely scenario once construction phasing is understood

# 17. Cumulative Effects

# 17. Cumulative Effects

## 17.1 Introduction

17.1.1 This chapter sets out the preliminary CEA for the Project. Cumulative effects occur when impacts caused by past, present, and reasonably foreseeable activities combine to create an increased effect on a receptor(s). A single development or a single environmental impact resulting from a development may not be significant on its own but can become significant when combined with other developments or environmental impacts.

17.1.2 Cumulative effects are the result of multiple actions on environmental receptors or resources. There are two major sources of cumulative effects: 'intra-project' and 'inter-project' effects (IEMA, 2011<sup>73</sup>).

- **Intra-project effects** (also referred to as 'inter-relationships between topics',) occur when a receptor, resource or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development (IEMA, 2011). For example, a community may be affected by noise and dust impacts resulting from the construction phase activities of a single development
- **Inter-project effects** (also referred to as 'cumulative effects', Planning Inspectorate, 2019) occur when a resource or receptor or group of receptors is potentially affected by more than one development at the same time and the impacts act together additively and / or synergistically (IEMA, 2011). For example, the construction traffic effects of a development combined with the construction traffic effects of another development may result in additional cumulative effects on the surrounding highway network

17.1.3 This chapter has links with all environmental chapters as it considers the interrelationships between a number of topics.

17.1.4 This chapter is supported by the following figures in Volume II and appendices in Volume III:

- Figure 17.1: Cumulative Long List of Other Developments
- Figure 17.2: Cumulative Short List of Other Developments
- Appendix 17.1: Long List of Other Developments
- Appendix 17.2: Short List of Other Developments
- Appendix 17.3: Preliminary Assessment

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<sup>73</sup> IEMA, 2011. The State of Environmental Impact Assessment Practice in the UK.

## 17.2 Regulatory, Planning Policy Context and Guidance

- 17.2.1 Chapter 2: Key Legislation and Planning Policy Context sets out the overarching policy relevant to the Project.
- 17.2.2 The Environmental Impact Assessment (EIA) Regulations Schedule 4 paragraph 5 requires the assessment of cumulative effects stating: *'description of the likely significant effects of the development on the environment resulting from, inter alia: ... (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'*.

### National Policy Statement (NPS)

- 17.2.3 The Overarching National Policy Statement for Energy (EN-1) (January 2024) contains the following paragraphs relating to Cumulative Effects which have been considered within this chapter:
- 17.2.4 Paragraph 4.1.5 states *'In considering any proposed development, in particular when weighing its adverse impacts against its benefits, the Secretary of State should take into account: ... its potential adverse impacts, including on the environment, and including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce, mitigate or compensate for any adverse impacts, following the mitigation hierarchy'*.
- 17.2.5 Paragraph 4.2.12 set out the requirement for *'The cumulative impacts of multiple developments with residual impacts should also be considered.'*
- 17.2.6 Paragraph 4.3.3 states *'The Regulations require an assessment of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, transboundary, short, medium, and long-term, permanent and temporary, positive and negative effects at all stages of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects'*.

### Other National Legislation and Policy

- 17.2.7 There are no further specific national legislation or policies related to this topic.

### Regional and Local Policy

Chapter 2: Key Legislation and Planning Policy Context sets out relevant regional and local policy for the draft Order Limits. There is no additional regional or local policy relevant to this chapter.

### Guidance

- 17.2.8 Relevant guidance, specific to cumulative effects, that has informed this PEIR and will inform the assessment within the ES, comprises:
- Advice Note 17 'Cumulative effects assessment relevant to nationally significant infrastructure projects' (Planning Inspectorate, 2019)

## 17.3 Scoping Opinion

- 17.3.1 The scope of the assessment has been informed by the Scoping Opinion provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State, following the submission of the EIA Scoping Report (National Grid, 2022). The scope has also been informed through consultation and engagement with relevant consultees.
- 17.3.2 A summary of the Scoping Opinion together with a response from National Grid against each point for Cumulative effects is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion in Volume III.

## 17.4 Project Engagement and Consultation

- 17.4.1 There will be ongoing discussions with the local authorities the Project is located within, together with the three County Councils and surrounding local authorities in which the cumulative planning applications overlap, to finalise the long list and short list of other developments. The final lists will be presented within the ES.
- 17.4.2 In addition, meetings have been held with the North Falls and Five Estuaries wind farm project teams. These wind farms are proposed to be located off the coast of East Anglia and connect into the proposed EACN Substation. Both projects involve the construction of new substations, which are proposed to be located adjacent to the EACN Substation. Project teams have worked collaboratively to reduce potential cumulative traffic effects should they be undertaken in parallel. Further details will be presented within the ES.

## 17.5 Intra-Project Cumulative Effects

### PEIR Approach and Methods

#### Study Area

- 17.5.1 The intra-project cumulative effects study area is the same as that presented within each of the environmental chapters assessed in the PEIR for each topic.

#### Existing Baseline

##### Data Collection

- 17.5.2 The baseline information has drawn on the following key information sources:
- A review of the receptors and likely effects identified within each of the environmental topic chapters in this PEIR

#### PEIR Assessment Methodology

- 17.5.3 There is no standard approach to the assessment of intra-project effects, therefore a matrix has been used to assess receptors with multiple effects, as shown in Tables 17.2 and 17.3.
- 17.5.4 Representative groups and/or individual receptors, such as people or protected species, have been identified for each topic. These represent the areas that are most sensitive to impact interactions as described in the relevant environmental topic chapters within the

PEIR. Potential synergistic effects between topics have been identified as well as stating if effects are, positive, negative, neutral and likely to be significant (following the implementation of mitigation).

- 17.5.5 Key Project activities have been identified for the construction phase and are grouped into the following categories:
- Effects due to construction machinery and vehicles (e.g., general construction activities, set up of site compound, increase in traffic during construction)
  - Effects due to land-take for temporary works (e.g., vegetation removal, materials storage, installation of haul roads)
  - People, services, and goods (e.g., construction staff living and working within the area, materials being purchased for the Project etc)
- 17.5.6 Key Project activities have been identified for the operation (and maintenance) phase and are grouped into the following categories (further details on these activities are included in Chapter 4: Project Description):
- The presence of permanent new transmission infrastructure
  - Normal operational activities (including inspection visits)
  - Maintenance activities (such as refurbishment)
- 17.5.7 Where the same receptor is identified in more than one chapter, this may indicate a spatial overlap of effects. Potential spatial overlaps of effects are then checked for a temporal overlap of effects. Where both a spatial and temporal overlap exists, this indicates a potential intra-project cumulative effect. The next step is to identify whether the effects are already assessed within other assessment chapters, to avoid double counting of effects. Following these checks, an assessment has been undertaken and recorded in this chapter, using professional judgement and the effects recorded in each environmental topic chapter to determine if effects on receptors are likely to be positive, neutral or negative, and if they are likely to be significant.

### **Further Assessment within the ES**

- 17.5.8 Potential intra-project cumulative effects identified in the PEIR will be reviewed once the EIA has been undertaken. The detailed assessment within the ES will consider receptors which are likely to experience minor, moderate or major significance of residual effects in the individual environmental topic chapters. Receptors with negligible effects will not be included within the assessment. If the same receptor is identified in more than one ES chapter (such as an ecologically designated site), this will indicate a spatial overlap of effects which will then be checked for a temporal overlap. If both spatial and temporal overlaps exist, then the receptor would be assessed for intra-project cumulative effects.
- 17.5.9 Where potential significant intra-cumulative environmental effects are identified, additional mitigation measures and monitoring requirements will be considered and outlined.

### **Baseline Conditions**

- 17.5.10 Each environmental topic chapter provides a description of the current and future baseline conditions. The location of baseline conditions for each of the environmental topics are set out in Table 17.1 and are not repeated in this chapter.

Table 17.1 - Environmental Topics and their Location within this PEIR

<b>Environmental Topic</b>	<b>Chapter Where Covered</b>
Agricultural and Soils	Chapter 6
Air Quality	Chapter 7
Ecology and Biodiversity	Chapter 8
Contaminated Land, Geology and Hydrogeology	Chapter 9
Health and Wellbeing	Chapter 10
Historic Environment	Chapter 11
Hydrology and Land Drainage	Chapter 12
Landscape and Visual	Chapter 13
Noise and Vibration	Chapter 14
Socio-economics, Recreation and Tourism	Chapter 15
Traffic and Transport	Chapter 16

## Embedded, Standard and Additional Mitigation Measures

- 17.5.11 Relevant embedded, standard and additional mitigation measures are listed within each of the environmental topic chapters listed in Table 17.1 and are not repeated here.

### Waveney Valley Alternative

- 17.5.12 No additional mitigation over and above those outlined within each environmental topic chapter are considered to be required for the Waveney Valley Alternative.

## Potential Residual Effects and Preliminary Likely Significant Effects

- 17.5.13 The preliminary likely significant effects of the Project have been assessed using currently available data relating to both the construction and operation (and maintenance) phases of the Project. The preliminary potential effects are outlined below. It assumes that all mitigation - embedded (design measures), standard practice, and any additional mitigation measures as outlined in each environmental topic chapter are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022). However, in the ES, where potential significant intra-cumulative environmental effects are identified, additional mitigation measures and monitoring requirements will be considered and outlined.
- 17.5.14 The preliminary intra-project cumulative effects matrices in Tables 17.2 and 17.3, undertaken at this PEIR stage, identify several potential effects from construction and operation (and maintenance) activities that may affect individual receptors. This is a preliminary assessment based on the initial findings set out within the preceding chapters. Where multiple effects affect an individual receptor, there is the potential for effects to combine and adversely affect that receptor. A detailed intra-project cumulative assessment will be undertaken and presented in the ES.

## Preliminary Construction Effects

17.5.15 Table 17.2 presents receptors with the potential to experience intra-project cumulative effects during construction.

Table 17.2 - Cumulative Receptors and Preliminary Construction Effects

<b>Cumulative Receptor</b>	<b>Environmental Topics</b>	<b>Potential Residual Effect</b>	<b>Potential for Significant Effect?</b>
Public Rights of Way (PRoW) (including users of)	Landscape and Visual, Socio-economics, Recreation and Tourism, Health and Wellbeing, Traffic and Transport	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Designated Biodiversity Sites	Ecology and Biodiversity, Hydrology and Land Drainage	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Watercourses	Ecology, Hydrology and Land Drainage	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Flood Zones and Land Drainage	Hydrology and Land Drainage, Contaminated Land, Geology and Hydrogeology	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Residents of residential properties	Noise and Vibration, Air Quality, Health and Wellbeing, Traffic and Transport and Landscape and Visual	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Local businesses	Noise and Vibration, Socio-economics, Recreation and Tourism and Traffic and Transport	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Users of the Primary Access Routes	Traffic and Transport, Noise and Vibration, Air Quality, Health and Wellbeing	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Great Waltham and Little Waltham	Landscape and Visual and Historic Environment	Negative	Likely to be significant based on preliminary assessments – however, this will be reviewed following statutory

Cumulative Receptor	Environmental Topics	Potential Residual Effect	Potential for Significant Effect?
			consultation and an updated assessment will be presented in the ES.
Sensitive soils	Agriculture and Soils, Ecology and Biodiversity, Health and Wellbeing	Negative	Unlikely to be significant following the implementation of agreed mitigation measures
Community facilities	Socio-economics, Recreation and Tourism, Health and Wellbeing and Traffic and Transport	Negative	Unlikely to be significant following the implementation of agreed mitigation measures

#### Waveney Valley Alternative

17.5.16 There are likely to be additional traffic movements along the Primary Access Route at Diss and an additional a Primary Access Route needed for cable drum deliveries from Thetford should the Waveney Valley Alternative be taken forwards – however, following mitigation effects are likely to be not significant. In addition, based on the preliminary assessment there may be additional negative effects on sensitive peat soils as a result of the Waveney Valley Alternative – however, it is hoped that a successful mitigation package can be developed with the Suffolk Wildlife Trust, Natural England and the relevant Local Planning Authority to avoid significant effects.

#### Preliminary Operation (and Maintenance) Effects

17.5.17 Only two preliminary operational cumulative effects have been identified across the environmental topics for the Project, these are presented in Table 17.3. No potential significant intra-project cumulative effects have been identified during operation at this PEIR stage.

Table 17.3 - Cumulative Receptors and Preliminary Operation (and Maintenance) Effects

Cumulative Receptor	Environmental Topics	Potential Residual Effect	Potential for Significant Effect?
Great Waltham and Little Waltham	Landscape and Visual and Historic Environment	Negative	Likely to be significant based on preliminary assessments – however, this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.

<b>Cumulative Receptor</b>	<b>Environmental Topics</b>	<b>Potential Residual Effect</b>	<b>Potential for Significant Effect?</b>
Flood Zones and Land Drainage	Hydrology and Land Drainage, Contaminated Land, Geology and Hydrogeology	Negative	Unlikely to be significant

### Waveney Valley Alternative

- 17.5.18 During operation (and maintenance) negative effects in this area on visual receptors and specific heritage assets are likely to be reduced. However, following the implementation of mitigation measures as presented in each environmental topic chapter the preliminary effects recorded above would be the same.

## 17.6 Inter-Project Cumulative Effects

### PEIR Approach and Methods

#### Study Area

- 17.6.1 The study area for inter-project effects comprises a number of ZOIs. A ZOI is the geographic area within which a Project is likely to affect environmental receptors. As such, the ZOI will vary for different types of receptors. The ZOI used for the PEIR is based on relevant distances (according to the individual environmental topics) extending from the draft Order Limits.
- 17.6.2 The ZOIs for each environmental topic for the inter-project cumulative effects assessment are listed in Table 17.4. The rationale for the distances chosen are explained in the relevant environmental topic chapters.

Table 17.4 - ZOI for Environmental Topics

<b>Environmental Topic</b>	<b>ZOI</b>
Ecology and Biodiversity	0.2 – 2 km <sup>74</sup>
Landscape and Visual	3 km <sup>75</sup>
Historic Environment	3 km
Air Quality	2 km
Agriculture and Soils	1 km
Hydrogeology; Hydrology and Land Drainage	<0.5 km
Noise and Vibration	0.3 km

<sup>74</sup> The study area / ZOI in Chapter 8: Ecology and Biodiversity did consider SACs up to 30 km where bats were a qualifying feature, however non were identified.

<sup>75</sup> The study area in Chapter 13: Landscape and Visual did consider up to a 5 km, however, no likely significant effects have been identified to date beyond the 3 km study area.

<b>Environmental Topic</b>	<b>ZOI</b>
Geology	0.25 km
Socio-economics, Recreation and Tourism	1 km
Traffic and Transport	

## Existing Baseline

### Data Collection

- 17.6.3 The baseline information has drawn on the following key information sources:
- A review of planning applications from the local planning authority records within the ZOIs (including the Planning Inspectorate’s Programme of Projects, local planning authority planning portals, and local development plans)

## PEIR Assessment Methodology

- 17.6.4 The staged methodology used to determine inter-project cumulative effects is outlined in Advice Note 17 ‘*Cumulative effects assessment relevant to nationally significant infrastructure projects*’ (Planning Inspectorate, 2019). The methodology involves identifying a long list of ‘other reasonably foreseeable development’ that could interact with the Project within identified ZOIs (Stage 1A and 1B). These are screened at Stage 2, against spatial and temporal thresholds to see if they should progress to Stage 3. Environmental information is then gathered for each of the shortlisted developments at Stage 3, and these developments are assessed to identify whether there are likely significant effects with the Project (Stage 4). These stages are explained in more detail below.
- 17.6.5 Stages 1A, 1B and 2 have been completed for this PEIR. Stages 3 and 4 will be undertaken and presented in the cumulative effects chapter of the ES. In addition, as part of the PEIR, a preliminary assessment has been undertaken to provide stakeholders with additional information regarding the potential for likely significant cumulative effects.

### Stage 1A: Identify Zone of Influence (ZOI)

- 17.6.6 Relevant ZOIs are listed in Table 17.4.

### Stage 1B: Identify Long List of Other Developments

- 17.6.7 For the inter-project assessment, a long list of other developments to be considered in the cumulative effects assessment has been prepared. An initial search of planning applications held on the relevant planning authority websites and the Planning Inspectorate’s Programme of Projects was undertaken in September 2023 and a preliminary long list of other developments to be considered for this Project has been prepared (see Appendix 17.1: Long List of Other Developments in Volume III and Figure 17.1: Cumulative Long List of Other Developments in Volume II). This list has been informed through early engagement with the relevant planning authorities. The long list will be updated periodically through an ongoing planning search to consider any new planning applications, or applications for development consent made since the undertaking of the initial scoping exercise.

- 17.6.8 The following development types were included in the assessment:
- NSIPs listed on the Planning Inspectorate’s Programme of Projects
  - Major developments (defined under The Town and Country Planning (Development Management Procedure) (England) Order 2015 (as amended))
  - Sites allocated in relevant Local Development Plans
- 17.6.9 Major developments (defined under the above Order) are defined as development involving any one or more of the following:
- (a) The mining and working of minerals or the use of land for mineral-working deposits
  - (b) Waste development
  - (c) The provision of dwelling houses where:
    - (i) The number of dwelling houses to be provided is 10 or more
    - (ii) The development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i) (above)
  - (d) The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more
  - (e) Development carried out on a site having an area of 1 hectare or more
- 17.6.10 Rejected and withdrawn planning applications were included in the long list but have been excluded from the short list on the assumption that planning approval would not be pursued further. Allocated sites in Local Plans or other Development Plans which are not yet subject to planning applications were identified in the long list but have not been shortlisted. This is because the development or operational timeframes of these proposed development sites was not known at the stage of this assessment (however, this will be kept under review). Discounted sites and sites of a development size or type below the threshold criteria for a ‘major development’ have also been excluded.
- 17.6.11 Minor planning applications have been excluded from the assessment, as these relate to developments of small scale and local significance. These developments, such as a velux rooflight on a property in a Conservation Area are highly unlikely to give rise to significant cumulative environmental effects over and above the Project in isolation.
- 17.6.12 The assessment also considers other National Grid projects where these meet the spatial and temporal parameters and there are sufficient details available to assess the potential cumulative effects. This includes projects known at that time that may require (but have not yet submitted) an application for development consent or planning permission and permitted development projects. Where the parameters are met, these projects have been added into the long list of developments for further consideration.
- 17.6.13 Advice Note 17 identifies three tiers of development based on where they are in the planning process and recognises that the amount of information available to inform the assessment varies according to which tier it fits in to. Tier 1 projects are the most certain, with a high level of publicly available information, while Tier 3 projects are the least certain, with limited publicly available information to inform assessments. Details of the three tiers are listed in Table 17.5 and the relevant tier is referenced in Appendix 17.1: Long List of Other Developments in Volume III.

- 17.6.14 National Grid developments that are being implemented under permitted development powers have been assigned a tier based on availability of information and the stage that the development is at. No other National Grid projects under Permitted Development have been identified within the list.
- 17.6.15 ZOIs were used to identify the topics that could have cumulative effects with the other developments identified. This has been used to screen the long list to identify whether developments should proceed to Stage 2.
- 17.6.16 The long list will continue to change as new planning applications or applications for development consent are submitted, approved, rejected, or withdrawn. Additional developments will be added to the long list as they are submitted to planning portals, with an intended cut-off date two months before the Project’s application being submitted to enable the assessment to be concluded.

**Table 17.5 – Criteria used to determine the tier of development for inter-project cumulative effects assessment**

<b>Tier</b>	<b>Development Status</b>	
1	Development under construction.	Decreasing level of available data  ↓
	Permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented.	
	Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.	
2	Developments on the Planning Inspectorate’s Programme of Projects or in the local planning authorities’ portal where a Scoping Report has been submitted.	
	Developments in the local planning authorities’ planning portal where a Scoping Report has been submitted.	
3	Developments on the Planning Inspectorate’s Programme of Projects or in local planning authorities’ portal where a Scoping Report has not been submitted.	
	Developments in local planning authorities’ portal where a Scoping Report has not been submitted.	
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited.	
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.	

**Stage 2: Identify Shortlist of Other Developments**

- 17.6.17 The next step was to establish a shortlist of developments using threshold criteria to determine whether the developments have the potential to give rise to significant effects in combination with the Project.

17.6.18 Professional judgement has been used to identify whether potential cumulative effects are likely to be significant (positive or negative); only potential significant effects are taken forward to the next stage of assessment. The following inclusion / exclusion criteria has been used for the assessment:

- **Temporal Scope:**

Other development within the ZOI with overlapping construction phases based on the base construction programmes presented in Chapter 4: Project Description (2027 - 2031) and operational phase (2031 onwards) has been scoped into the assessment. Planning applications submitted up to ten years prior to the planned commencement year of construction (2027) have been included in the assessment to consider potential acceleration or delays to proposed development construction schedules. Applications submitted outside this temporal scope have been excluded.

- **Scale and Nature of Development:**

Development identified as Schedule 1 and 2 developments in the EIA Regulations have been considered further. Developments not identified as Schedule 1 or 2 developments have been scoped out of the assessment, except where it was considered that potential significant environmental effects may arise in combination with the Project.

- **Sensitivity of the Receiving Environment:**

Where there are potential source-pathway-receptor linkages between the Project and other developments, cumulative effects have been considered further. Other developments with no clear source-pathway-receptor linkage have been scoped out of the assessment.

### Stage 3: Information Gathering

17.6.19 Stage 3 will be completed and presented as part of the ES once assessments are complete. Where available, environmental assessment information (for example, ESs or EIA Scoping Reports) will be reviewed for each of the shortlisted developments to determine the baseline environment and potential environmental effects arising from the proposed developments. Design information, planning documentation, location plans, and proposed construction, operation and decommissioning programmes would also be reviewed, where available.

17.6.20 Information will be gathered from sources including local planning authority planning portals, the Planning Inspectorate's website, and engagement with local authorities.

17.6.21 Details from the information gathering exercise will be tabulated in the format presented in Matrix 2 provided in Appendix 2 of Advice Note 17 (Planning Inspectorate, 2019).

### Stage 4: Assessment

17.6.22 At the ES stage, the Stage 4 assessment will be undertaken by an environmental specialist to describe and evaluate the likely significant inter-project cumulative effects arising from the Project and other developments. The results of the assessment will be documented and presented in an accessible format like the Matrix 2 provided in Appendix 2 of Advice Note 17 (Planning Inspectorate, 2019).

17.6.23 The value of a resource and magnitude of impact will be determined according to the criteria set within the environmental topic chapters. Significance of effect will be lifted

from the environmental topic chapters to identify the significance of cumulative effects with other developments. Effects will be identified as direct, indirect, short-term, or long-term, permanent, or temporary.

### **Preliminary Assessment Key Parameters and Assumptions**

- 17.6.24 It was considered reasonably likely that developments related to permissions granted before 2017 will have been completed before the Project construction works start. Such developments were therefore considered unlikely to give rise to cumulative effects during construction, and operational effects would already form part of the baseline / future baseline environment.
- 17.6.25 Further limitations at this PEIR stage include that the information is preliminary, as the full EIA has not yet been undertaken for the Project, and the effects presented in the environmental topic chapters are based on available information and the use of professional judgement. The likely effects identified could change as new information and further assessment is undertaken, potentially changing the receptors and effects that are carried through to the assessment. The cumulative assessment assumes that mitigation identified within the preceding chapters and/or within the EIAs of other proposed developments is included before undertaking the assessment.
- 17.6.26 The assumptions for when the other developments would be constructed, and therefore whether there would be any overlap with the Project construction works, are taken from the planning portal and assume that consented development could start immediately or could take up to 10 years following consent. It is assumed that the other development descriptions presented within planning documents are accurate.
- 17.6.27 Traffic numbers from cumulative developments or 'committed development' will be included within the traffic numbers presented in the ES which will be used to undertake the air quality, noise and vibration and traffic and transport assessments in the ES and the TA. Therefore, the cumulative effect resulting from traffic and transport between the Project and other development will be inherent to those assessments. The conclusions from these assessments will not be repeated in the cumulative assessment chapter in the ES.
- 17.6.28 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

### **Further Assessment within the ES**

- 17.6.29 As previously noted, only Stages 1A, 1B and 2 have been completed for this PEIR. Stages 3 and 4 will be undertaken as part of the EIA once assessments are complete and presented in the cumulative effects chapter of the ES.

### **Baseline Conditions**

- 17.6.30 The long list of cumulative development within the study area is presented within Appendix 17.1: Long List of Other Developments in Volume III. This represents the baseline for inter-project cumulative assessment at this PEIR stage.

## Embedded, Standard and Additional Mitigation Measures

- 17.6.31 No embedded, standard or additional mitigation measures specific to cumulative effects have been identified at this stage, over and above those identified within each environmental topic chapter. This will be reviewed within the ES.

### Potential Residual Effects and Preliminary Likely Significant Effects

- 17.6.32 The Stage 1 preliminary long list comprises other developments and records of NSIPs, planning applications, relevant development plan allocations, and other known developments within the identified ZOI. The information is captured in a template based on Matrix 1 of Appendix 1 from Advice Note 17 (Planning Inspectorate, 2019) as a basis. The long list is presented in Appendix 17.1: Long List of Other Developments in Volume III and the locations of other developments are shown on Figure 17.1: Cumulative Long List of Other Developments in Volume II.
- 17.6.33 Following the application of thresholds during Stage 1, a short list was created that identified other development that could lead to potential cumulative effects with the Project. The shortlist of other developments produced for the PEIR is presented in Appendix 17.2: Short List of Other Developments in Volume III and shown on Figure 17.2: Cumulative Short List of Other Developments in Volume II. These will be taken forward to Stages 3 and 4 of the assessment which will be presented and completed in the ES.
- 17.6.34 The short list, for the PEIR, was further refined to understand if the other developments identified were likely to have an overlap in temporal scope or if the scale and nature of the other development was likely to have a significant effect. Those developments identified to have either were then subject to a preliminary assessment. The preliminary assessment undertaken of each of the other developments identifies the potential for significant cumulative effects with the Project during construction and operation (and maintenance). This preliminary assessment assumes that the embedded measures standard and additional mitigation measures within Appendix 4.1: Draft Outline CoCP in Volume III are in place and that existing features are reinstated where practicable, for example replanting hedgerows and reinstating the soil profile and land use. This would limit the potential effects of the Project and therefore the potential for significant cumulative effects with other proposed developments. The preliminary assessment is presented in Appendix 17.3: Preliminary Assessment in Volume III. The assessment identifies the likely significant effects that have been determined at this PEIR stage.
- 17.6.35 At this stage, the preliminary assessment is based on professional judgement and knowledge of similar projects. Further assessment will be undertaken and presented in the ES including the extent of likely significant effects.

### Preliminary Construction Effects

- 17.6.36 The preliminary assessment has identified topics where there could be the potential for significant cumulative effects between the Project and other developments. At this stage, a qualitative assessment has been undertaken based on professional judgement and using similar project experience.
- 17.6.37 There is the potential for inter-project cumulative effects for example on ecology and biodiversity, landscape and visual, noise and traffic and transport during the construction stage. A detailed assessment of the likely significant inter-project

cumulative effects will be undertaken during the EIA, following the assessment methodology outlined in Section 17.5.

### Waveney Valley Alternative

There would be no additional effects over and above those identified above if the Waveney Valley Alternative was to be taken forwards.

### Preliminary Operation (and Maintenance) Effects

- 17.6.38 During operation (and maintenance), the preliminary assessment presented in Appendix 17.3: Preliminary Assessment in Volume III shows that there may be the potential for significant cumulative effects between the Project and other proposed development.
- 17.6.39 Potential inter-project cumulative effects during operation (and maintenance) have been identified in relation to historic environment and landscape and visual. No cumulative effects would be expected on other topics as all mitigation measures would have been implemented during construction. However, the extent of significant cumulative effects during operation (and maintenance) will be confirmed through a detailed assessment of the likely significant inter-project cumulative effects following the assessment methodology outlined in Section 17.5 and the results will be presented within the ES.

### Waveney Valley Alternative

There would be no additional effects over and above those identified above if the Waveney Valley Alternative was to be taken forwards.

## 17.7 Sensitivity Testing

### Flexibility in Construction Programme

- 17.7.1 This chapter assumes the base construction programme described in Chapter 4: Project Description for the purposes of the assessment. Sensitivity testing considering alternative project phasing, such as a later construction start date, has been undertaken. Proposed developments that may fall within a two-year window either side of the base construction programme will be considered as part of the assessment presented within the ES.

### Flexibility in Design

- 17.7.2 This chapter has assumed the pylon locations, CSE compounds and underground cable alignments provided as part of the 2024 preferred draft alignment, as presented within Figure 4.1: Proposed Project Design in Volume II. Sensitivity testing has been carried out to determine the potential for likely significant effects should alternative pylon locations, CSE compounds and/ or underground cable route change within the proposed LoD. It should be noted that these indicative pylon locations are not regarded as fixed and could be subject to change in response to feedback or additional information. Sensitivity testing has been carried out to determine the potential for likely significant effects should alternative pylon locations be taken forward within the proposed LoD. This sensitivity testing has shown that there would be no new or different likely cumulative significant effects because of the pylons being placed in a different location.

## Flexibility due to Design elements not fixed at Statutory Consultation

- 17.7.3 With regard to the other aspects of design flexibility, summarised in Table 4.3 in Chapter 4: Project Description, it is considered that none of the alternatives would result in any new or different effects than reported in this chapter

# 18. Summary and Next Steps

# 18. Summary and Next Steps

## 18.1 Introduction

18.1.1 This chapter summarises the preliminary residual likely significant effects that are anticipated as a result of the Project at this preliminary stage following the implementation of proposed mitigation measures outlined within Table 4.1 in Chapter 4: Project Description, each individual environmental topic chapter in the PEIR and within Appendix 4.1: Draft Outline CoCP in Volume III.

## 18.2 Preliminary Residual Likely Significant Effects during Construction

18.2.1 Table 18.1 summarises the preliminary residual likely significant effects reported within each individual environmental topic chapter in this PEIR during construction.

Table 18.1 – Preliminary Residual Likely Significant Effects During Construction

<b>Description of Preliminary Residual Likely Significant Effect - Construction</b>
<b>Agriculture and Soils</b>
Negative likely significant effects on Best and Most Versatile (BMV) agricultural land owing to 3,858 ha temporary land take during construction.
Temporary negative likely significant effects on soil quality and its associated ecosystem services owing to temporary stripping and stockpiling of soil resources during construction.
<b>Air Quality</b>
No likely significant effects identified at this stage; however this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.
<b>Ecology and Biodiversity</b>
Potential negative significant effects on North Thames Estuary and Marshes Proposed SSSI owing to the details of this designation at the time of drafting this report being unknown. Due to this uncertainty potential for direct effects to habitats and species from physical disturbance (e.g. habitat loss, fragmentation, reduction or loss of receptor quality/function), as well as disturbance, harm, or mortality of associated species during construction have been assessed. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Contaminated Land, Geology and Hydrogeology</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.

<b>Description of Preliminary Residual Likely Significant Effect - Construction</b>
<b>Health and Wellbeing</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.
<b>Historic Environment</b>
Temporary negative likely significant effects on Designated Heritage Assets (215 listed buildings, five scheduled monuments, six conservation areas and one registered park and garden) owing to changes to elements of the assets settings that make a notable contribution to their value, as a result of construction activities. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Permanent negative likely significant effects on 94 Non-Designated Heritage Assets (archaeological remains) owing to physical effect from construction activities. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Hydrology and Land Drainage</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.
<b>Landscape and Visual</b>
Negative likely significant effects on key landscape characteristics in 34 Landscape Character Areas and nine Landscape Character Types as a result of direct or indirect effects from construction and associated vegetation clearance. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Negative likely significant effects on views and visual amenity across a number of visual receptors across the Project as a result of construction activities. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Noise and Vibration</b>
Potential negative likely significant effect on Jasmine Cottage, Bentley Road (Section C) as a result of noise from construction traffic on the public highway. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Socio-Economics, Recreation and Tourism</b>
Temporary negative likely significant effects are anticipated on a number of built assets (including local businesses) within the draft Order Limits as a result of temporary acquisition of land and construction activities. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Temporary negative likely significant effects are anticipated on a number of areas of recreational land as a result of close views of construction activities. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Temporary negative likely significant effects are anticipated on recreational routes owing to potential temporary closures and diversions as a result of the construction of the Project. however, this will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.

<b>Description of Preliminary Residual Likely Significant Effect - Construction</b>
<b>Traffic and Transport</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Cumulative Effects</b>
Likely significant effects on Great Waltham and Little Waltham resulting from landscape and visual and historic environment effects. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.

## Waveney Valley Alternative

18.2.2 All topic chapters have concluded that the Waveney Valley Alternative would not result in additional significant effects beyond those reported above.

### 18.3 Preliminary Residual Likely Significant Effects during Operation (and Maintenance)

18.3.1 Table 18.2 summarises preliminary residual likely significant effects reported within each individual environmental topic chapter in this PEIR during operation (and maintenance) of the Project.

Table 18.2 – Preliminary Likely Residual Significant Effects During Operation (and maintenance)

<b>Description of Preliminary Likely Significant Effect - Operation (and maintenance)</b>
<b>Agriculture and Soils</b>
Permanent negative likely significant effects on BMV agricultural land owing to approximately 50 ha being permanently required for the permanent infrastructure (such as for the CSE compounds, substation extensions and the EACN Substation). This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Air Quality</b>
Effects on Air Quality were scoped out during operation (and maintenance).
<b>Ecology and Biodiversity</b>
Potential positive likely significant effects on Round Wood and Writtle-Writtlepark Wood Ancient Woodland owing to the removal of existing 132 kV infrastructure which would allow the woodland to regenerate. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Contaminated Land, Geology and Hydrogeology</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.

<b>Description of Preliminary Likely Significant Effect - Operation (and maintenance)</b>
<b>Health and Wellbeing</b>
No likely significant effects identified at this stage; however this will be reviewed following statutory consultation and an updated assessment will be presented in the ES.
<b>Historic Environment</b>
Permanent negative likely significant effects on Designated Heritage Assets (119 listed buildings, one scheduled monument, two conservation areas and one registered park and garden) owing to the presence of the overhead line alignment, CSE compounds and/or new or expanded substations within the setting, and in some cases views of these assets. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Hydrology and Land Drainage</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Landscape and Visual</b>
Negative likely significant effects on key landscape characteristics in 28 Landscape Characteristics Areas and nine Landscape Character Types as a result of direct or indirect effects from the Project's permanent assets. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Negative likely significant effects on views and visual amenity across a number of visual receptors including residents, road users and recreational receptors across the Project as a result of the Project's permanent assets. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Noise and Vibration</b>
No likely significant effects identified at this stage; however, this will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Socio-Economics, Recreation and Tourism</b>
Negative likely significant effects are anticipated on a number of built assets within the draft Order Limits owing to restrictions in business activity/viability and permanent land take as a result of the presence of the Project. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
Negative likely significant effects are anticipated on a number of areas of recreational land as a result of visual amenity effects on users of the sites. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.
<b>Traffic and Transport</b>
Effects on Traffic and Transport were scoped out during operation (and maintenance).

## Description of Preliminary Likely Significant Effect - Operation (and maintenance)

### Cumulative Effects

Likely significant effects on Great Waltham and Little Waltham resulting from landscape and visual and historic environment effects. This will be reviewed following statutory consultation, and an updated assessment will be presented in the ES.

## Waveney Valley Alternative

- 18.3.2 All topic chapters have concluded that the Waveney Valley Alternative would not result in additional significant effects beyond those reported above, with the exception of Chapter 11: Historic Environment and Chapter 13: Landscape and Visual, which have reported the following.
- 18.3.3 The preliminary Historic Environment assessment outlined that the Waveney Valley Alternative, following reinstatement including historic field boundaries, would reduce the effects on the Grade I listed Church of St Remigius (ID: 1050237) and Grade II listed Grove Farmhouse (ID: 1050236) from significant negative to a neutral effect and not significant.
- 18.3.4 The preliminary Landscape and Visual assessment has concluded that there would likely be a reduction in visual effects during operation, in the longer term within Visual Receptor Area A11 Fen Street and Area A12 Roydon and Diss should the Waveney Valley Alternative be taken forward. This is owing to the re-establishment of hedgerows over the cable route and the proposed planting within the Environmental Areas around the CSE compounds. Some significant visual effects would reduce to not significant in parts of the valley, though some would likely remain significant (negative) due to the visibility of the terminal pylon adjacent to the A1066.

## 18.4 Next Steps

- 18.4.1 This PEIR is published as part of the statutory consultation material to provide consultees and interested parties with a description of likely significant environmental effects predicted as a result of the Project.
- 18.4.2 All conclusions and assessments presented within this PEIR are by their nature preliminary and are based on the proposed Project design and assumptions described within this PEIR. All assessment work has and continues to apply a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario has been assessed.
- 18.4.3 Following the completion of statutory consultation, National Grid will develop the Project proposals, taking into account consultation responses. The updated design and draft Order Limits will then be used to inform the ES, which will be submitted as part of the application for development consent.
- 18.4.4 National Grid will continue to collect baseline data through site surveys and desk-top sources to ensure the ES is informed by a robust environmental baseline. This data will be presented in the ES and will be used as the basis of the environmental impact assessment. National Grid will also continue to work with statutory organisations and interested parties about the potential effects, potential mitigation and opportunities to enhance the environment (where relevant).

# 19. Abbreviations

# 19. Abbreviations

<b>Abbreviation</b>	<b>Full Reference</b>
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
AC	Alternating Current
AIL	Abnormal Indivisible Loads
AIS	Air Insulated Substation
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQAL	Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ARN	Affected Road Network
ATC	Automatic Traffic Counts
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BNL	Basic Noise Level
BPM	Best Practicable Means
BRES	Business Register and Employment Survey
CBS	Cement Bound Sand
CEA	Cumulative Effects Assessment
CGS	County Geodiversity Sites
CIEEM	Chartered Institute of Ecology and Environmental Management
CNP	Critical National Priority
CoCP	Code of Construction Practice
CPRSS	Corridor and Preliminary Routeing and Siting Study
CRTN	Calculation of Road Traffic Noise
CSE	Cable Sealing End
CTMP	Construction Traffic Management Plan

<b>Abbreviation</b>	<b>Full Reference</b>
CWS	County Wildlife Site
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department of Environment, Food and Rural Affairs
DESNZ	Department of Energy Security and Net Zero
DfT	Department for Transport
DLL	District Level Licensing
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operators
EACN	East Anglia Connection Node
EclA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic fields
ES	Environmental Statement
ESO	Electricity System Operator
EU	European Union
EWP	Energy White Paper
FWRA	Foundation Works Risk Assessment
FEED	Front End Engineering Design
FLL	Functionally Linked Land
FRA	Flood Risk Assessment
GHG	Green House Gas
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GP	General Practitioner
GREEN	Green Energy Enablement
GW	Gigawatts
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
HER	Historic Environment Record

<b>Abbreviation</b>	<b>Full Reference</b>
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
HVDC	High Voltage Direct Current
IACPC	Impact Assessment and Conservation Payment Certificate
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDB	Internal Drainage Board
IEMA	Institute of Environmental Management and Assessment
IIA	Integrated Impact Assessment
INNS	Invasive Non-Native Species
IPC	Infrastructure Planning Commission
IRZ	Impact Risk Zones
kV	Kilovolt
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LEMP	Landscape and Ecology Management Plan
LGS	Local Geological Site
LI	Landscape Institute
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserves
LoD	Limit of Deviation
LOAEL	Lowest Observed Adverse Effect Level
LONI	Letters of No Impediment
LPA	Local Planning Authority
LTC	Lower Thames Crossing
LSOA	Lower Super Output Area
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site

<b>Abbreviation</b>	<b>Full Reference</b>
MAGIC	Multi-agency Geographic Information for the Countryside
MCA	Mineral Consultation Areas
MCC	Manual Classified Counts
MPS	Marine Policy Statement
MRA	Minerals Resource Assessment
MSAs	Mineral Safeguarding Areas
MWMP	Materials and Waste Management Plan
NERC	Natural Environment and Rural Communities
NETS	National Electricity Transmission System
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NGR	National Grid Reference
NHLC	National Historic Landscape Characterisation
NIA	Noise Important Area
NNR	National Nature Reserve
NOA	Network Options Assessment
NVC	National Vegetation Classification
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	National Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptors
OHID	Office for Health Improvement and Disparities
ONS	Office for National Statistics
OS	Ordnance Survey
PBDE	Polybrominated diphenyl ethers
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
PPG	Planning Practice Guidance
PPE	Personal Protective Equipment

<b>Abbreviation</b>	<b>Full Reference</b>
PRA	Preliminary Roost Assessment
PRoW	Public Right of Way
RBD	River Basin District
RBMP	River Basin Management Plan
RIGS	Regionally Important Geological Site
SAC	Special Area of Conservation
SLA	Special Landscape Area
SOAEL	Significant Observed Adverse Effect Level
SGT	Super Grid Transformer
SNCI	Site of Nature Conservation Importance
SQSS	Security and Quality of Supply Standard
SPA	Special Protection Area
SPZ	Source Protection Zone
SRN	Strategic Road Network
SRP	Soil Resources Plan
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
SuDS	Sustainable Drainage Systems
TA	Transport Assessment
TEMPro	Trip End Model Presentation Program
TGN	Technical Guidance Note
TPO	Tree Preservation Order
UK	United Kingdom
UXO	Unexploded Ordnance
WER	Water Environment Regulations
WFD	Water Framework Directive
WSI	Written Scheme of Investigation
WWII	World War 2
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

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## 20. References

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