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Executive Summary

National Grid Electricity Transmission plc (NGET) referred to as National Grid in this report is developing proposals to reinforce the high voltage power network in East Anglia. It is National Grid that is developing plans for Norwich to Tilbury (the 'Project'). The 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 transmission network.

This Design Development Report (DDR) (document reference 5.15) presents the main changes that have been made to the Project since the completion of statutory consultation in 2024 and also of various targeted consultations in 2025. The Project design has been informed by feedback received during these consultations, along with that received during the 2022 and 2023 non-statutory consultations. All the feedback has been carefully reviewed and considered alongside the results of various environmental, socio economic, transport and engineering studies and the findings from an environmental impact assessment.

National Grid have backchecked and reviewed previous studies defining the project need along with the underpinning assumptions and confirmed that the core requirement for reinforcement of the National Electricity Transmission System in response to new connections remains. There is also no change in the preferred strategic proposal that best responds to the need which requires a combination of reinforcement projects, one of which is Norwich to Tilbury. It continues to be the case that there is no single point to point connection that will meet the reinforcement need.

Decision making about the design of the Project has a focus on National Planning Statements EN-1, EN-3 and EN-5 (which respectively cover Overarching NPS for Energy, Renewable Energy and Electricity Network Infrastructure) which were designated in January 2024. Changes to policy that have occurred include a strengthened duty to further the purposes of National Landscape which has informed design and mitigation considerations and the UK Government's Clean Power 2030 Action Plan provides further programme importance.

We have considered the changes in policy and conclude that the current policy supports the Project progressing as an onshore connection. This being achieved with a predominantly conventional steel lattice pylon overhead line with a change to underground cable for technical reasons and in areas where the route is through or in such close proximity as to substantially affect the Dedham Vale National Landscape if progressed as overhead line.

This conclusion reflects our duties under the Electricity Act to be economic and efficient and reflects the relative costs of alternative technologies in addition to a duty to have regard to the environment which is manifest through routeing, siting and technology (overhead line or underground cable) selection decisions. The independent Institution of Engineering and Technology has published new confirmation that the costs of onshore AC underground cable are in the order of four or five times the cost of conventional lattice pylons with HVDC whether onshore and offshore typically at a greater premium to achieve the same power transfer.

This DDR (document reference 5.15) explains the main reasons for change to routeing and siting of the Project infrastructure. It addresses the more extensive or frequently raised modifications proposed in response to the 2024 statutory consultation and 2025 targeted consultations. Those more extensive changes which have been confirmed following careful consideration, are set out below with others described in the main document. The response to

requests for smaller changes not covered by this report are explained within the Consultation Report (document reference 5.1).

These changes build on the derivation of the 2024 statutory consultation design which was sequentially developed, initially within the Corridor and Preliminary Routeing and Siting Study (2022) and then subsequently as reported in the 2023 and 2024 Design Development Reports which are all available in the document library on the project website.

The more extensive changes made that are covered by this report are:

Table ES1 Extensive changes

Location of Change	Explanation
RG30 to RG39	Reposition alignment midway between properties, respond where possible to landowner requests and achieve greater separation from a Model Flying club.
RG94 to RG102	Increased extent of undergrounding of the UK Power Network 132 kV overhead line network to allow 400 kV realignment to follow the vacated route of the 132 kV and reduce the extent of environmental effect change and support continued flight activity from Brook Farm airstrip.
RG136 to RG143	Overhead line alignment change to increase separation to properties and reduce effects on agriculture and ecological receptors.
Underground cable route amendments and inclusion of Holton St Mary temporary construction access	Underground cable alignment change from west side to east side of the CSE compound at Raydon and provision of temporary construction access road to bypass Holton St Mary
Cable re-route to west at Langham plus compound and access road change	Underground cable alignment change to reduce potential effects on ecology, loss of trees, community and socio-economic effects along with reducing technical risk.
TB1 to TB7	Swapping the alignment adopted by the adjacent underground cable and overhead line alignments for the two connections into the EACN Substation in response to potential minerals plan allocation.
TB77 to TB81	Re-alignment to pass to the south of residential properties to reduce residential amenity effects and close views
TB93 to TB96	Realignment to avoid veteran tree associated with historic entrance to adjacent grade II* house but with potential reduction in solar panel extent
TB136 to TB142	Alignment change to avoid veteran trees and protected species, along with, subject to technical confirmation, change to four low height lattice pylons north of the River Chelmer to reduce heritage effects and return to standard lattice design south of the River

Location of Change	Explanation
TB207 to TB212	Chelmer to reduce residential visual amenity effects and community concern about the pylons.
TB238 to TB243	Increased extent of undergrounding of 132 kV lattice pylon line allowing for 400 kV to be repositioned to reduce cumulative effects along with a move of the construction compound.
TB264	Change to low height lattice pylon design and realignment to allow continued flight activity on Thurrock Airfield.
	New Tilbury North Substation and associated modifications to allow connection to the existing YYJ overhead line responding to difficulties of achieving a connection to Tilbury due to other infrastructure and Thames Freeport.

The DDR (document reference 5.15) also explains why certain other conclusions on various design related matters have been reached. These include:

- Confirming the crossing of the Waveney Valley will be by overhead line. The policies that guide our decision making and that we are judged against do not support the use of underground cable outside National Landscapes except where the level of effects is higher than we have identified
- The presentation of a number of alternative outcome scenarios where the adoption of either a Scenario A or Scenario B is dependent on a factor outside National Grid’s control that remains uncertain. For example whether a site is confirmed to be allocated within the Minerals plan
- The absence of an alternative overhead line routeing solution and no reasonable expectation that an underground cable variant could be justified, leading to the proposed closure of an unlicensed airfield on its current runway alignment
- The use of T-pylons is not being taken forwards for the Project. The use of the T-pylon should be in locations where they may be considered to be an acceptable design but must also be consistent with the mitigation hierarchy given they are around 1.6 times the lifetime cost of conventional lattice pylons. This means that the effects of lattice pylons must be inconsistent with policy before T-pylons are considered. No such locations, except where underground cable is the appropriate decision, have been identified.

The culmination of the work that constitutes the Project is a proposal by National Grid to upgrade the electricity transmission system in East Anglia between Norwich and Tilbury, comprising:

- A new 400 kilovolt (kV) electricity transmission connection of approximately 180 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation, a new East Anglia Connection Node (EACN) Substation and a new Tilbury North Substation, including:
 - Approximately 159 km of new overhead line supported on approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some of which would be gantries (typically up to 15 m in height) within proposed Cable Sealing End (CSE) compounds or existing or proposed substations

- Approximately 21 km of 400 kV underground cabling, some of which would be located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB))
- Up to seven new CSE compounds (with permanent access) to connect the overhead lines to the underground cables
- Modification works to connect into the existing Norwich Main Substation and a substation extension at the existing Bramford Substation
- A new 400 kV substation on the Tendring Peninsula, referred to as the EACN Substation (with a new permanent access). This is proposed to be an Air Insulated Switchgear (AIS) substation
- A new 400 kV substation to the south of Orsett Golf Course in Essex, referred to as the Tilbury North Substation (with a new permanent access). This is proposed to be a Gas Insulated Switchgear (GIS) substation
- Modifications to the existing National Grid Electricity Transmission overhead lines to facilitate the connection of the existing network into the new Tilbury North Substation to provide connection to the Tilbury Substation
- Ancillary and/or temporary works associated with the construction of the Project.

In addition, third party utilities diversions and/or modifications would be required to facilitate the construction of the Project. There would also be land required for environmental mitigation and Biodiversity Net Gain (BNG).

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.

The Project would be designed, constructed and operated in accordance with applicable health and safety legislation. The Project will need to comply with design safety standards including the Security and Quality of Supply Standard (SQSS), which sets out the criteria and methodology for planning and operating the National Electricity Transmission System (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 those proposed for the Project.

1. Introduction

1.1 Purpose of This Report

- 1.1.1 The purpose of this report is to provide an explanation of the main changes in the route alignment, infrastructure siting and technology (i.e. change from standard lattice to low height lattice pylon or change to, or in the extent of, underground cable) incorporated into Norwich to Tilbury (the 'Project') following review and consideration of the feedback received to the 2024 statutory consultation and to the targeted statutory and non-statutory consultations held in 2025.
- 1.1.2 This Design Development Report (DDR) (document reference 5.15) also addresses the main changes requested and those changes raised by a larger number of respondents but which may not have led to a change of project design. In all cases, factors relevant to the change have been considered (which can be multiple and potentially conflicting) and a balanced decision made taking into account environmental and socio-economic effects, engineering feasibility and risks, cost and programme amongst other factors.
- 1.1.3 The Environmental Impact Assessment (EIA) process and associated data collection has also both informed the response to feedback and led to consideration of specific changes. Examples include:
- Ecology surveys identifying features to be considered such as protected species (e.g. bat hibernacula) and veteran trees
 - Landscape assessment identifying the need for mitigation through route realignment and pylon positioning and informing a change of technology from overhead line to underground cable to respond to effects on the Dedham Vale National Landscape or the need to reduce potential cumulative effects
 - Heritage assessment leading to realignment and consideration of low height lattice pylons
 - Consideration of the socio-economic value of airfields and the development of measures to support continued flight activity.
- 1.1.4 This DDR does not cover all the changes made or requested to be made to the Project as many of the changes are small scale and comprise localised adjustments. Typically, such small scale changes include in-line pylon moves; repositioning of temporary works within the same fields; or minor adjustments to pylon positions (still with further change possible within Limits of Deviation), alignment or the Order Limits published at statutory consultation. The reasons for taking forward some minor changes and not others are set out within the Consultation Report (document reference 5.1).
- 1.1.5 Professional judgement has been used to determine the main changes to be reported in the DDR. The decision was based on including changes of technology, geographically more extensive changes, and those where there has been a particular focus of feedback including on alternative technologies and route alignments. Other changes responding to individual circumstances (e.g. responding to potential future minerals plan outcomes) that require more extended explanation are also addressed.

but those that do not drive or change the significant environmental effects of the Project in the geographic vicinity of the change or the Project more widely are not covered except where they provide an additional example to a change that is covered.

1.1.6 For those changes that are addressed, this DDR describes the change sought, outlines the National Grid response and sets out the main reasons for the decision to progress either with or without a change to the Project. Reference is made to other alternatives that may have also been requested and reported in previous DDRs. In some cases the need for change also arises in response to the findings of technical studies and through combinations of feedback (from community and statutory stakeholders) and technical studies.

1.1.7 The previously published DDRs (2023 (document reference 7.20) and 2024 (document reference 7.21) and the 2025 addendum for Thurrock 3 targeted consultation) provide an explanation of the reasons why other proposed changes raised in feedback to earlier consultations have or have not been progressed. These are not re-presented here but are available on the Project website.

1.2 Reporting of Changes

1.2.1 This report builds on previous design stages that have progressed through the identification of:

- A preferred strategic option comprising: Sea link, Tilbury Grain and Norwich to Tilbury (6 GW onshore connection) to meet the Project need case to connect new low carbon electricity generation sources to the National Electricity Transmission System by 2030
- The preferred strategic option identified the Norwich to Tilbury Project as a component element in conjunction with the strategic option to meet the need. For the Norwich to Tilbury element, National Grid presented information on how the Project was evolving from the evaluation of strategic options to a preliminary preferred graduated swathe within which new infrastructure (pylons and underground cables) could be located as well as a proposed new substation site on the Tendring Peninsula, as described within the Corridor and Preliminary Routeing and Siting Study Report (April 2022)
- A draft alignment presented in the 2023 non-statutory consultation with its development from the graduated swathe presented in 2022 reported in the 2023 Design Development Report (DDR) (document reference 7.20)
- A modified draft alignment presented in the statutory consultation (2024) with its development reported in the 2024 DDR (document reference 7.21).

1.2.2 This 2025 DDR (document reference 5.15) explains the changes to the Project as a result of the 2024 statutory consultation and the additional 2025 targeted consultations (these were completed in localised geographic areas where change was proposed after considering the statutory consultation with some as statutory and some as non-statutory) and forms one of a number of interlinking reports that have framed the evolutionary process of design. Their individual scope and inter-relationship are summarised below:

- DCO Project Description
 - The DCO schedule defines the works being applied for

- Chapter 4 of the Environmental Statement (document reference 6.4) presents this as a narrative description with details of methods of construction and is supported by various commitments log, outline management plans, etc
- DAS / DASSI – Design and Access Statement (document reference 7.15) / Design Approach for Site Specific Infrastructure (document reference 7.16)
 - The DAS (document reference 7.15) explains, the legislative, policy and physical context within which the design proposals have evolved and the way in which that context has influenced the final proposals, sets out design principles applied by National Grid and summarises the approach to good design and describes how the proposals have been influenced by consultation and informed by the design principles
 - The DASSI (document reference 7.16) sets out the approach to the design of site-specific infrastructure of non-linear works; this includes the proposed substations, works to substations and Cable Sealing End (CSE) compounds
- Corridor and Preliminary Routeing and Siting Study (CPRSS document reference 7.18). This covered stages comprising:
 - Need Case origination. Led to the identification of the strategic proposal of which Norwich to Tilbury was one element. This was published in the Corridor and Preliminary Routeing and Siting Study (CPRSS document reference 7.18) in 2022 as part of the 2022 non-statutory consultation
 - Development of the preferred route corridor, East Anglia Connection Node (EACN) Substation siting zone and graduated swathe. Rationale for corridor preference, EACN Substation siting preference and for the development of the graduated swathe (indicating more likely location for connection infrastructure) set out in the CPRSS (document reference 7.18) published as part of the 2022 non-statutory consultation
- Strategic Options Backcheck and Review (SOBR) (document reference 7.17)
 - Provided backchecked costs and updated and validated strategic proposal confirmed and reported in the 2023 (document reference 7.19) and 2024 publications (appendix to document reference 7.17) in respect of the 2022 and 2023 non-statutory consultations. The 2025 SOBR published as part of the DCO submission (document reference 7.17) and reporting on continued validity of the strategic proposal as the basis of the Project at the statutory consultation of 2024 and targeted consultation in 2025
- Design Development Reports (DDR)
 - The relationship between the DAS, DASSI and DDR in respect of ‘Good Design’ is set out in Appendix A: Guide to the Approach to Design
 - The DDRs explain the development of alignment and subsequent refinement of detailed design in response to environmental and technical studies and assessment, stakeholder engagement and consultation feedback. This has culminated in a route alignment, positioning of infrastructure (pylons, substation, Cable Sealing End (CSE) compounds) and identification of areas for reversing the presumption about the acceptability of overhead line and progressing with the use of underground cable

- The different DDR reports (as explained below) set out the reasons for taking forward certain changes and explaining why other changes are not taken forwards. Professional judgement is used to determine which changes are the main ones covered by the DDR with the remainder covered within the Consultation Report. Key scheme evolution reported includes
 - Published in 2023 (reporting on the 2022 consultation) (document reference 7.20) . Presented changes to corridor and change away from the graduated swathe along with an initial alignment. This included initial proposals for the use of underground cable (and initial CSE compound positions) through and extending beyond the National Landscape and within it is setting at Great Horkesley. Additional proposal for connection route and use of underground cables into Tilbury Substation
 - Published in 2024 (reporting on the 2023 consultation) (document reference 7.21) - A modified draft alignment and pylon positions and updates to CSE compound position and route alignment responding to feedback. A DDR addendum was published in early 2025 to support the targeted consultation for the proposed change to connection arrangements at Tilbury
 - The 2025 DDR (this document) reference 5.15 will be published as part of the DCO submission and reports on the changes made, including reasons. It reports on the changes made following the statutory consultation held in 2024 and the various targeted consultations held in 2025 which amongst other aspects reviewed the connection arrangements at Tilbury and presented the Tilbury North Substation proposal
- Consultation Feedback Reports
 - A comprehensive record of the rationale for decision making following consideration of all items of feedback received. Reports published in 2023, 2024 and as part of the DCO submission in 2025
- Other key submission documents
 - Environmental Statement - to demonstrate compliance with regulation and guides sensitive development of the Project to seek to embed mitigation through routing and design. Comprises topic chapter most notably:
 - Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2)
 - Chapter 3: Alternatives (document reference 6.3)
 - Chapter 4: Project Description (document reference 6.4)
 - Chapter 6 onwards – Technical topic chapters (document references 6.3 to 6.16).

1.3 Legislation, National Policy Statements and Other Relevant National Planning Policy

The Context for Decision Making

- 1.3.1 In developing the Project, a large number of interdependent decisions are made that build from aspects such as baseline environmental and socio-economic data and

informed by the Environmental Impact Assessments, are informed by consideration of consultation feedback with balanced decision making within the framework of the guidance of the Holford and Horlock Rules. This also sits within the context of the relevant National Policy Statements (Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2024a), National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b) and National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2024c)) and other material considerations e.g. National Planning Policy Framework (NPPF) that applies and our interpretation of the various duties, requirements and compliance under various legislation including the Electricity Act 1989. The policy background for this decision making is summarised below.

- 1.3.2 Numerous publications and announcements are influencing the shape of energy transmission. In NESO's Clean Power 2030 Report published in 2024, the need for the Project to be delivered by 2030 to ensure that it can help deliver the new sources of clean power generation was identified. The report represents NESO's analysis of the foundations for clean power, the core elements of a lean power system, pathways, critical enablers and the benefits and costs. NESO's assessment suggests that without the Project and the Sea Link project (both are components of the preferred Strategic Option as identified earlier), the clean power objective would not be achieved, leaving the clean power target short by around 1.6% in 2030 (assuming a typical weather year) and consumers could face extra constraint costs of around £4.2 billion in 2030. The Project was identified as critical to the delivery of a network that supports the clean power pathways.
- 1.3.3 Following the publication of the Clean Power 2030 report, the government published Clean Power 2030 Action Plan: A New Era of Clean Electricity. The Action Plan identifies a series of challenges which need to be addressed to secure the 2030 targets and particularly the need for construction of generation and transmission projects to commence by 2026 if they are to be operational by 2030. The Action Plan notes that around twice as much new transmission infrastructure will be needed in the nation's grid by 2030 as has been built in the past decade. The critical and urgent nature of the Project is recognised in the strongest terms within the Action Plan and Clean Power 2030 Report publications and identified as critical to assist in achieving Clean Power 2030 objectives.
- 1.3.4 Decision making has been guided by the policy context within which National Grid operates. The main legislation and policies relevant to the Project are identified below along with the key guidance they refer to. A more detailed review of the policies contained within the NPSs is set out in the Planning Statement (document reference 5.6) and the Policy Compliance Document (document reference 5.7).

The Electricity Act 1989

- 1.3.5 S9(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, s38 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’.

- 1.3.6 National Grid duties are also determined by the terms of its Transmission Licence. As part of National Grid’s Transmission Licence requirements, the transmission infrastructure needs to be capable of providing and maintaining a minimum level of security and quality of supply and of transporting electricity from and to customers. National Grid is required to ensure that the transmission system has sufficient capacity as customer requirements change. The transmission system must accommodate changes in demand, generation, and interconnectors.
- 1.3.7 National Grid must comply with Standard Condition D3 (Transmission system security standard and quality of service) of its Transmission Licence. This means that where the boundary capacity of the Main Interconnected Transmission System (MITS) is exceeded against the standards, National Grid must resolve the capacity shortfall under the terms of its Transmission Licence. The standards against which National Grid assesses these shortfalls are set out in the ‘Design of the Main Interconnected Transmission System’ section of the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).
- 1.3.8 The NETS SQSS also sets out in ‘Generation Connection Criteria Applicable to the Onshore Transmission System’ that connections to the transmission system must be secured to meet the identified requirements. Where the SQSS applies, the generator(s) are considered part of a ‘generation group’ for assessment against these criteria.
- 1.3.9 Generators apply to the National Energy System Operator (NESO) for connections to the NETS in Great Britain. NESO ensures the relevant onshore or offshore transmission owner undertakes generation connection process studies via the relevant process and makes a connection offer to the customer for a connection point and identifies the relevant infrastructure work needed to make the connection. Once this offer is signed the connection is recorded on the Transmission Entry Capacity (TEC) Register and forms a contractually binding connection location and timescale within which the transmission owner, such as National Grid, is required to connect the generation customer or undertake the works to facilitate their connection.
- 1.3.10 Once a connection offer is made and the date confirmed, National Grid is bound to achieve the date. Failure to meet the connection data has consequences including the payment of constraint cost to the contractor and direct penalties for National Grid.

National Planning Policy

Planning Act 2008

- 1.3.11 The Planning Act 2008 introduced a new consenting procedure for Nationally Significant Infrastructure Projects (NSIPs). Under s14(1)(b) and s16 of the Planning Act 2008 and the Planning Act (Electric Lines) Order 2013 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. For an NSIP the grant of development consent is required by the making of a DCO under the Planning Act 2008.
- 1.3.12 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 s115 of the Planning Act.

- 1.3.13 As noted above, if progressed with significant elements of overhead line, then Norwich to Tilbury would be classified as a NSIP and National Grid would need to obtain ‘development consent’ under statutory procedures set by Government. NSIPs are projects of certain types, over a certain size, which are considered by the Government to be of national importance, hence permission to build them needs to be given at a national level, by the relevant Secretary of State (SoS) (in this case the Secretary of State for Energy Security and Net Zero). Instead of applying to the local authority for planning permission, the developer must apply to the Planning Inspectorate for a Development Consent Order (DCO).
- 1.3.14 S104 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.
- 1.3.15 In deciding an application for development consent, s104 of the Planning Act 2008 requires the Secretary of State to determine the application in accordance with any relevant National Policy Statement (NPS). The NPSs relevant to this project are the Overarching National Policy Statement for Energy (EN-1) (DESNZ, 2024a), National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2024c) and the National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b) which came into force in January 2024. NPS EN-3 is of relevance to this Project insofar as it gives express support for the onshore infrastructure required to deliver new offshore wind developments.

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

- 1.3.16 NPS EN-1 sets out the Government’s overarching policy with regard to the development of NSIPs in the energy sector. 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*’ (paragraph 3.3.65).
- 1.3.17 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*’ (paragraph 3.3.68).
- 1.3.18 Section 4.2 sets out the critical national priority for low carbon infrastructure. ‘*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*’ (paragraph 4.2.1) concluding that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure. 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. Paragraph 4.2.6 of EN-1 also states ‘*the overarching need case for each type of energy infrastructure and the substantial weight which should be given to this need in assessing applications, as set out in*

paragraphs 3.2.6 to 3.2.8 of EN-1, is the starting point for all assessments of energy infrastructure applications'

- 1.3.19 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-economic, traffic and transport and waste management.

National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2024c)

- 1.3.20 NPS EN-3 also includes support for the onshore infrastructure required to deliver new offshore wind developments. Section 2.8 deals with offshore wind. Paragraph 32.8.1 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*'.
- 1.3.21 Paragraphs 2.8.24 to 2.8.33 (inclusive) reiterate the position set out in EN-1 and EN-5 that a co-ordinated approach to onshore-offshore transmission is required. Paragraph 2.8.25 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*'.
- 1.3.22 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 Statutory Nature Conservation Bodies (SNCB), both before and at the formal preapplication stage (a point also made in EN-1 at 4.2.7).

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

- 1.3.23 NPS EN-5 specifically relates to electricity networks. As identified in EN-1, government has concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure. '*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).
- 1.3.24 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. Paragraphs 2.2.1 and 2.2.2 of EN-5 state 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.*
- 1.3.25 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...*'.
- 1.3.26 Paragraph 2.2.10 of EN-5 reiterates the duties of transmission and distribution licence holders under s9 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...*'.
- 1.3.27 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*'.
- 1.3.28 Section 2.7 of the NPS deals with holistic planning. '*...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).
- 1.3.29 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)
- 1.3.30 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*'.
- 1.3.31 Paragraphs 2.9.16 and 2.9.18 of NPS EN-5 make specific reference to embodying the Holford and Horlock rules in the applicant's proposals for new overhead lines (Holford) and the infrastructure associated with new overhead lines (Horlock).
- 1.3.32 The Holford Rules and supplementary notes state that routing of high voltage overhead transmission lines should where possible adhere to the following:
- 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 somewhat increased in consequence
 - Rule 2: Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle pylons, 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 pylons

- Rule 4: Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to 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 pylons 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, so as 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, carefully assess the comparative costs of undergrounding.

1.3.33 The Horlock Rules in summary state the following:

- In the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements against the consequential environmental effects, in order to avoid as far as possible adverse effects
- Siting of substations, Cable Sealing End Compounds and line entries should seek to avoid 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 should be protected as far as reasonably practicable
- 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
- Proposals should keep visual, noise and other environmental effects to a reasonably practical minimum
- Land use effects of the proposal should be considered when planning the siting of substations or extensions
- 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
- 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, while also having regard to future extension of the substation
- Design of access roads, perimeter fencing, earth shaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings

- In open landscapes especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as 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.

1.3.34 Paragraphs 2.9.20 to 2.9.25 of EN-5 along with EN-1 (for example paragraph 5.10.34) provide the basis for the consideration of reversing the strong starting presumption in favour of overhead lines and taking the project forward with underground cable. This reversal is assumed within a designated landscape, Elsewhere consideration should be given to reversal of the presumption when infrastructure is proposed within the setting of such areas and in certain other circumstances with the highest level of effects with decision making also considering whether the costs are justified.

Levelling Up and Regeneration Act 2023

1.3.35 The Project includes a section that is within the Dedham Vale National Landscape and as such the Levelling Up and Regeneration Act 2023 is relevant and has changed the emphasis in the duties of National Grid (among others). S245 (Protected Landscapes) of the Levelling-up and Regeneration Act 2023, with the requirement incorporated into s85 of the Countryside and Rights of Way Act 2000, places a duty on relevant authorities which includes National Grid as a statutory undertaker. National Grid, as the relevant authority, *'must seek to further the purposes of...'* National Landscapes affected by their proposals. This has been supported by 'Guidance for relevant authorities on seeking to further the purposes of Protected Landscapes' published in December 2024 (Department for Environment, Food and Rural Affairs (Defra), 2024). This duty strengthens the previous version of s85 of the Countryside and Rights of Way Act 2000 which required relevant authorities to 'have regard' to the statutory purpose of National Landscapes.

National Planning Policy Framework

1.3.36 While the application for development consent must be determined in accordance with the relevant NPS, under s104 of the Planning Act 2008, regard must also be had to any other matters of importance and relevance, which may include relevant policies in the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2025). The revised NPPF sets out government's planning policies for England and how these are expected to be applied.

1.3.37 Economic growth is the focus of the revised NPPF as reflected in Section 6: Building a strong, competitive economy. Paragraph 85 states:

'Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future. This is particularly important where Britain can be a global

leader in driving innovation, and in areas with high levels of productivity, which should be able to capitalise on their performance and potential’.

- 1.3.38 The revised NPPF also states that local authorities should support planning applications for all forms of renewable and low carbon development, giving significant weight to the benefits associated with renewable and low carbon energy generation and the proposal’s contribution to a net zero future (Paragraph 168).
- 1.3.39 The Project is identified as critical to delivering a network which supports the delivery of clean power. There is a need for the Project to be delivered at pace to achieve the Clean Power 2030 target (UK Government (2025) Clean Power 2030 Action Plan) for the benefits to be realised and in doing so significant weight should be given in accordance with Paragraph 168 of the NPPF.

2. Project-Wide Considerations Relevant to Design Development

2.1 Overview

2.1.1 This section explains how any changes in the circumstances within which the Project was developed have been considered to ensure the Project has responded and remains valid. This includes changes in legislation, changes in status of features, changes in baseline data amongst others. Further detail is provided in the Strategic Options Backcheck and Review report (document reference 7.17).

2.2 Project Assumptions, Baseline Conditions and Parameters

Assumptions and Parameters

2.2.1 The high-level assumptions and parameters have been reviewed and the following concluded:

- The objectives and strategic context of the Project are fundamentally unchanged and remain valid as reviewed from Section 2.4. The inherent need for the Project to reinforce the NETS and connect new low carbon generation to meet the government's Net Zero commitments remains with new connections exceeding system capacity (this is set out in the Strategic Options Backcheck and Review report 2025). The Project has been identified as critical to delivering a network which supports the clean power pathways by NESO who has supported bringing the Project forward for a 2030 delivery (Clean Power 2030, NESO, 2024)
- The approach to routeing and siting and the options identification and selection process continues to be as set out in Chapter 3 of the CPRSS (document reference 7.18)
- There has been no change to the number of customer connection agreements at the EACN. Furthermore the customers with signed agreements at the EACN Substation are currently continuing to progress their projects connecting at the EACN Substation. The North Falls and Five Estuaries projects are currently within the recommendation phase of consenting. The Tarchon interconnector project has completed a first non-statutory consultation and is understood to be developing its siting proposals. This does not change the requirement for the EACN though further consideration of the siting of the EACN relative to alternative sites is provided in Chapter 6 of this report.

Baseline Conditions

2.2.2 Across all environmental, socio-economic, and technical domains, the review set out in the SOBR 2025 (document reference 7.17) found no material changes that would alter the strategic conclusions confirmed in the SOBR 2024 (appendix to document reference 7.17). Updates to flood mapping and reviews of new developments and infrastructure have been considered. None were found to significantly impact the

strategic viability of the assessed options. The levels of constraint represented by each category of environmental receptor remain the same as those set out in the CPRSS (document reference 7.18).

- 2.2.3 On the basis of the above it is concluded that there are no changes in Project assumptions, baseline conditions or parameters that lead to a conclusion that a different scheme should be progressed.

Legislation and Policy

East Atlantic Flyway

- 2.2.4 National Grid has previously noted the UK government's nomination, of various areas of the east coast as part of the East Atlantic Flyway UNESCO World Heritage Site (WHS). This would bring together a coastal network of wetlands and protected spaces that include Marine Protected Areas, Ramsar Sites, Special Protection Areas, and Special Areas of Conservation.
- 2.2.5 There have been no further announcements since the statutory consultation in 2024 and National Grid's current assumption continues to be that, if the nomination is successful, then any future management plan, would comprise similar protections to those applying to these designated sites as at present. The existing designations and protections were considered as part of routeing and siting as set out in the CPRSS (document reference 7.18), and as such it is not considered that the potential WHS designation is inconsistent with or would be undermined by the proposals so there is no driver for change to the preferred strategic option.

Draft National Policy Statements & Revised NPPF

- 2.2.6 A revised National Planning Policy Framework was published on 12 December 2024 and this version was amended on 7 February 2025 to correct cross-references from footnotes 7 and 8, and amend the end of the first sentence of paragraph 155 to make its intent clear. No changes have been identified in this document that would have implications for the backcheck leading to a conclusion that the DCO application did not need amendment.
- 2.2.7 In April 2025 the Department for Energy Security and Net Zero consulted on draft updates to the Overarching National Policy Statement for Energy (EN-1) (DESNZ, 2025a), National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2025c), and National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2025b).
- 2.2.8 At the point of submission of the Project, the NPSs designated in January 2024 are government policy. The emerging draft of the Overarching National Policy Statement for Energy (EN-1) reinforces the approach taken in the application. The draft revised EN-1 and EN-5 reiterate the government's commitment to the Clean Power Action Plan 2030, which aims for at least 95% of the UK's electricity generation to come from clean sources by 2030 and emphasises the urgency and critical national priority (CNP) of developing low-carbon infrastructure, thereby supporting the need case established in the ES.
- 2.2.9 The draft revised EN-1 and EN-5 maintain the assessment principles and generic impact considerations outlined in the current EN-1 and EN-5, ensuring continuity in evaluating environmental effects. They also introduce enhanced guidance on

biodiversity, flood risk, and climate resilience and the mitigation hierarchy. The ES is considered to be in compliance with these emerging draft NPSs.

- 2.2.10 The new draft NPS EN-1 (DESNZ, 2025a) includes several references to Clean Power 2030 to reflect the Clean Power 2030 Action Plan: *'We need to rapidly increase deployment of all relevant infrastructure to meet the Clean Power 2030'*. Clean Power 2030 is referenced throughout Section 3 on the need for new nationally significant energy infrastructure projects.
- 2.2.11 The new NPS EN-1 proposes a further strengthening of the CNP case for development. Clean Power 2030 is first and foremost in the revised CNP policy section with the opening paragraph now stating, *'Government has concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure to meet the Clean Power 2030 Mission and net zero'*.
- 2.2.12 In conclusion we consider that the proposed changes presented in the draft EN-1 and EN-5 (and where relevant within EN-3) would not change the appraisal outcomes. We also conclude that the new draft NPS EN-1 further strengthen the need case and CNP application for the Project.

Levelling Up and Regeneration Act 2023

How the Project Meets the Duty to 'Seek to Further the Purpose'

- 2.2.13 The strengthened duty introduced by s245 of the Levelling Up and Regeneration Act 2023 stating that relevant authorities, which in this context includes National Grid, must now seek to further the statutory purposes of protected landscapes came into force in December 2023. This was after the Project had undertaken the CPRSS (document reference 7.18) and two non-statutory consultations but in advance of the statutory consultation undertaken in 2024. Since the introduction of this strengthened duty, Defra has published guidance (Defra, 2024) and the application and consequences of the duty has been informed by a number of projects which have sought to evidence the duty when considering development both within protected landscapes and their setting.
- 2.2.14 In particular the basis for evaluating and determining the combination of response activities that are required to conclude, that in spite of the effects associated with the development, the purposes of the National Landscape have sought to be furthered is becoming clearer. This has informed National Grid's discussions with various parties with responsibility for the National Landscape. The current status of which are expected to be captured within Statements of Common Ground at the appropriate time and has been published as part of the DCO submission in a report titled National Landscapes – Duty to Seek to Further the Purposes Report (s85 Countryside and Rights of Way Act 2000) (document reference 5.10).

Back Checking Route Corridor Decision Making in Light of the Duty to 'Seek to Further the Purpose'

- 2.2.15 National Grid has also reflected on whether the strengthened duty would have led to a different decision in respect of the routeing between Bramford Substation and the EACN Substation. Previous decision making, set out in the CPRSS (document reference 7.18) concluded that a route through the Dedham Vale National Landscape using underground cable was preferred to a route around the protected landscape (paragraphs 5.5.26 to 5.5.32 of the CPRSS (document reference 7.18)).

- 2.2.16 Following further consideration of this, National Grid notes that NPS EN-5 has taken into account the strengthened duty imposed by s245 of the Levelling Up and Regeneration Act 2023, as noted at paragraph 2.2.11. NPS EN-5 however continues to recognise that electrical infrastructure can be routed through National Landscapes, though it also notes that in such areas the presumption that overhead lines should be the strong starting presumption for electricity networks will be reversed.
- 2.2.17 Routing from Bramford Substation to the EACN Substation by going around the Dedham Vale National Landscape presents a number of potential challenges as two connections will need to be routed between the north side of Colchester and the southern boundary of the National Landscape. In particular there are expected to be routing and technical challenges in places such as at the A12 crossing, Ardleigh reservoir, and the railway crossing to the northeast of Ardleigh.
- 2.2.18 National Grid's understanding of the constraints, which has developed since the CPRSS (document reference 7.18) was published, highlights the following particular challenges:
- If there was sufficient space for two connections to be routed around the above mentioned constraint points, then it is likely that if both connections were routed as overhead lines, the effects would be expected to be increased compared with the Project, these increases include the effects on the Dedham Vale National Landscape
 - In addition to retaining the existing undergrounding at Great Horkesley, the increase in effects is likely to require the second connection to be installed as underground cable from the east of Great Horkesley through to the EACN Substation. Technical challenges aside, in total this extent of undergrounding equates to around 16 km. This is similar to that confirmed in the Project for the route through the National Landscape
 - Whilst it is likely that the majority of that underground cable would be outside the Dedham Vale National Landscape boundary, an estimated 3km may be required to follow a route to the north of Langham on the Project corridor. This section of the route would be within the National Landscape because restrictions at the constraint locations require an alternative alignment to be followed
 - Overall, this means the Project as submitted for the DCO has a slightly longer length of underground cable within the National Landscape (excluding any where it is within the setting) at approximately 5.8 km compared with around 3 km in the alternative scenario. Note however that this comparable overall length of underground cable would be undermined if there proves to be a requirement to underground any of the overhead line route where it crosses the Stour Valley Project Area. It is noted that this area was taken forward as underground cable on the Bramford to Twinstead project.
- 2.2.19 National Grid does not consider that the slight reduction in the extent of routing within the National Landscape of around 3 km, which could potentially be interpreted to be more consistent with the duty to seek to further the purposes, justifies the much greater length and cost of overhead line required to achieve it. Around 25 km of additional overhead line would be required, the additional cost of which is less consistent with duties required by the Electricity Act 1989 to be economic and efficient.
- 2.2.20 Later sections of this document present consideration of alternative locations for the EACN Substation including a site at the former RAF Boxted. It is not considered that

this alternative location for the substation would change the conclusion reached above. This is on the basis that any apparent reduction in the cable route by removing the part of the 400 kV route between the two locations (EACN Substation and RAF Boxted) is offset by the need for the customer connections to be extended further inland from the EACN Substation, routeing along the Project corridor, with an expectation that two corridors will be required due to the number of cables and constraints to the routeing.

- 2.2.21 In conclusion we do not consider that the strengthened duty is better served by adopting a route around the National Landscape, nor is it considered that a modified EACN Substation location would serve the duty better. Neither the wording of the duty, national policy statements or Defra’s guidance (Defra, 2024) preclude undertaking works within the National Landscapes. In selecting the route and underground technology choice through the Dedham Vale National Landscape, the Project has used careful routeing and siting to identify an alignment away from particularly highly valued part of the protected landscape.

2.3 Other Studies

The Offshore Transmission Network Review (OTNR) and Offshore Coordination Support Scheme (OCSS)

- 2.3.1 These studies explored various opportunities to seek to improve the economic competitiveness and efficiencies that may be available through collaboration between projects. The OTNR has been progressed since its announcement in 2020. The review brought together key stakeholders involved in the timing, siting, design and delivery of offshore wind, to consider all aspects of the existing regime and how this influences the design and delivery of transmission infrastructure. The Five Estuaries and North Falls projects engaged in the OTNR.
- 2.3.2 In April 2022 the Government announced the OCSS which came as a result of the OTNR. The OCSS provided grant funding for projects to explore potential coordination options for offshore transmission infrastructure. The fund was available to those projects that were further developed than those eligible for the Holistic Network Design (HND). The HND provided a recommended offshore and onshore design for a 2030 electricity network which facilitated the government’s ambition of 50GW of offshore wind by 2030. At that stage five projects, including the North Falls and Five Estuaries offshore wind farms, Sea Link, EuroLink (now LionLink) and Nautilus committed to exploring coordinated network designs. Applications to the OCSS closed in February 2023 and a consortium of North Falls, Five Estuaries and Sea Link was successful in receiving grant funding. The consortium worked together to explore the potential options for coordination but notwithstanding the funding, ultimately the OCSS was not taken forward, following a government decision in September 2024.
- 2.3.3 One consequence of the consortium discussions is a continued co-ordination between North Falls and Five Estuaries over the onshore cable installation that has reduced the working width requirement of their onshore connections. This was identified by National Grid to potentially have implications for decision making regarding EACN Substation siting and has been reviewed with the findings set out in Chapter 6 covering Section C of this document.

East Anglia Network Study

- 2.3.4 In March 2024 the ESO (now NESO) issued the East Anglia Network Study. National Grid welcomed the independent assessment which the ESO (now NESO) delivered, to consider the consequential infrastructure impacts should the government decide to take the OCSS forward. The ESO study took a fresh look at the drivers for network reinforcement in East Anglia, alongside the various considerations that need to be taken into account. This includes the requirement for National Grid to develop proposals that represent value for money to consumers, while being in line with current planning policy, environmental legislation and our licence obligations. As stated above, the government decided not to award any further funding as part of the OCSS. A response to the NESO (formally ESO) East Anglia Network Study was dealt with by detailed response published on the Project website dated April 2024.

2.4 The Continuing Basis for the Need Case

- 2.4.1 The development of any project is always evolving as the knowledge about the project and the potential areas in which it will be sited, grows and/or alters. In addition, previous preliminary assumptions and/or decisions are the subject of constant checking and backchecking as part of the consideration and engagement process. This section presents the findings of reviews as they relate to main areas of change requested. In particular it draws on the 2025 Strategic Options Backcheck and Review (document reference 7.17).
- 2.4.2 The transmission system in East Anglia was built primarily to serve consumer demand from homes and businesses in the region. Peak regional demand by 2030/31 is anticipated to be 1,281 MW.
- 2.4.3 Consistent with the Government's Net Zero target, there has been, and continues to be, growth in the volume of renewable and zero carbon generation that is seeking to connect to the electricity transmission system in the East Anglia and Southeast regions. Generation capacity has recently been added to by several offshore windfarms with the existing generation totalling 6,552.4 MW of installed capacity. This is expected to grow substantially in coming years. In the East Anglia region, connection agreements have been signed for 26,919.9 MW of new generation (total generation of 33,472.3 MW minus Existing Generation of 6,552.4 MW). These future connection agreements comprise a large volume of offshore wind generation (including East Anglia Offshore Wind), gas-fired generation, energy storage projects, and a nuclear power station (at Sizewell C).
- 2.4.4 The SOBR (document reference 7.17) analysis shows that without reinforcement the capacity of the East Anglia existing network is insufficient to accommodate the connection of proposed new power sources connecting in the area. This need is emphasised by the analysis of the ESO, which has recommended consecutive 'proceed' signals to new 400 kV circuits in north and Southeast Anglia (NESO 2024), meaning that it considers the project as essential to meet the UK Government's 2030 offshore wind targets.
- 2.4.5 We considered the means to address this reinforcement need by considering the physical ability of electrical circuits to carry power. Where power flows are constrained by the transmission system across a specific number of circuits, this is termed a 'boundary' by NESO. Where capacity and capability of the transmission system are not sufficient, either from a generation group or across a boundary, we will be required to reinforce the network.

2.4.6 Table 2.1 below summarises the findings of the review which was that the previously considered combinations of projects remained valid. Any combination of one northern (EAN) and one southern (EAS) onshore options can be used to meet the need onshore, whilst Offshore 1 would be required to meet the need offshore. A Sea Link interactivity assessment is included in this document to show how it contributes 2,000 MW of capacity to the SC2, EC5, LE1 and Sizewell generation group. The full Sea Link project is subject to its own option assessment.

Table 2.1 Reinforcement combinations required to meet the need case

Boundary or Group	Onshore Options				Offshore
EC5N & EC3	EAN 1	EAN 2	EAN 3	EAN 4	Offshore 1
EC5 & LE1	EAS 1	EAS 2	EAS 3		
SC2, EC5, LE1 & Sizewell	Sea Link				

2.4.7 Across all environmental, socio-economic, and technical domains, the review found no material changes that would alter the strategic conclusions reached in 2024. Updates to flood mapping, legislative changes (e.g. strengthened AONB duties), and reviews of new developments and infrastructure have been considered, but none were found to significantly impact the strategic viability of the assessed options.

2.4.8 The 2025 SOBR (document reference 7.17) identifies that a key development since 2024 is the increasing constraint on routeing new offshore connections into the Tilbury Substation. This is due to a combination of new and approved developments (e.g. Tilbury Freeport), pending planning applications (e.g. Tilbury Port expansion), and potential environmental designations (such as proposed SSSI status). While we do not consider that this rules out an offshore based connection to Tilbury, the complexity and associated risks have increased. The potential development of Tilbury North Substation may offer a more viable connection point for an offshore alternative, albeit likely requiring a more remote landfall likely to the east of Tilbury.

2.4.9 No new technologies have been identified and cost assessments are continuing to align with the RIIO-T2 price control framework (2021–2026) (RIIO-T2 is the current price control for electricity and gas transmission networks in Great Britain, running from 2021 to 2026. It sets out the framework for how much revenue network companies can collect and what they need to deliver for consumers). Based on a consistent pricing the comparative costs for the different reinforcement components remain as set out in Table 15.4 of Strategic Options Back Check and Review (see Appendix B of the 2025 SOBR (document reference 7.17)).

2.4.10 Taking everything into account, to meet the need to increase capacity across boundaries EC5N, EC5, LE1, SC2 and provide the required capacity for the Sizewell and Essex Coast Generation Groups the conclusion remained to take forward an onshore combination of EAN 4 OHL Norwich Main to Bramford and EAS 2 OHL Bramford via a new substation to Tilbury, alongside SCD1/Sea Link or an alternative connection from Sizewell area to north Kent. This aligns with the previous findings from the CPRSS (document reference 7.18), previous SOBRs and previous DDRs.

- 2.4.11 This would meet the urgent and critical need to increase capacity across boundaries EC3, EC5N, EC5, LE1 and SC2. As well as providing the required capacity for the Sizewell and Essex Coast Generation Groups. This onshore combination of EAN 4, EAS 2 and Sea Link resolves the needs case of:
- Provision of 9,225 MW of capacity across East Anglia EC5 Boundary and 4,931 MW of capacity across EC5N Boundary
 - Provision of 7,476 MW of capacity across the LE1 Boundary
 - Provision of 1,852 MW from the Sizewell Generation Group
 - Provision of 3,480 MW of connection capacity for the Essex Coast Generation Group.
- 2.4.12 The backcheck and review detailed in the 2025 SOBR (document reference 7.17) has concluded that at the current stage the preferred strategic proposal which provided the starting point for the CPRSS remains unchanged.

2.5 Overarching Themes

- 2.5.1 In their feedback, some stakeholders raised specific overarching queries and made recommendations in relation to the siting and routing of the whole Project. National Grid's response to these is provided below with full justification for the Project decision-making available in the CPRSS (document reference 7.18) and reviewed in the Design Development Reports (National Grid, 2023, 2024, and this document).

Consultation on a Single Project

- 2.5.2 Feedback has often raised the question of why only the preferred option (i.e. the preferred corridor and graduated swathe, or preferred alignment and infrastructure positioning) was consulted upon and not the other less favoured options. National Grid is required to consult on our proposal and provide the opportunity for the feedback to influence scheme design. Several rounds of consultation have been undertaken and considerable effort made to respond to the requests.
- 2.5.3 In developing the Project proposals at any stage, we undertake technical and environmental appraisals to identify the most viable and credible solution to respond to the feedback based on balancing various factors, including cost, environmental impact, the needs of the network and National Grid's statutory duties.
- 2.5.4 It would be disingenuous and not beneficial to present alternatives, that may be preferred by those consulted, in circumstances where they would fail to meet our duties and thus could not be progressed. We nonetheless present the alternatives considered with reasons for the identification of preference within documents such as the various Design Development Reports, Consultation feedback reports and Environmental Statement Chapter 3: Alternatives (document reference 6.3).

Why Are Overhead Lattice Pylons the Starting Presumption?

- 2.5.5 NPS EN-5 makes it clear that the government considers overhead lines should be the *‘strong starting presumption for electricity networks developments in general’*, although *‘this presumption is reversed when developments will cross part of a nationally designated landscape’* (para 2.9.20). It is also noted that EN-5 identifies that there may also be instances outside the nationally designated landscapes, where *‘a high potential for widespread and significant adverse landscape and/or visual impacts’* (para 2.9.24) may result in the use of underground cables in certain sections.
- 2.5.6 Where the effects arising from standard lattice pylons are considered to be inconsistent with policy and National Grid’s duties, the mitigation hierarchy is applied. The mitigation hierarchy sequentially considers localised specific mitigation measures, pylon position and routing, low height pylons, T-pylons and the use of underground cables. Applied in this way National Grid can demonstrate compliance with its duties under the Electricity Act and be assured the Project will be funded.

Use of Other Pylon Types

- 2.5.7 As noted above the application of the mitigation hierarchy includes consideration of alternative pylon types, of which two are available.

Low Height Lattice Pylons

- 2.5.8 Consideration has been given to the use of low height pylons in circumstances where standard lattice pylons are considered to be inconsistent with policy. These low height design lattice pylons are useful where height is a strong consideration, however they also occupy a greater footprint and have a bulkier and denser profile. They can therefore provide visual benefits in some scenarios, for example where a reduction in pylon height means that views of the tops of pylons are screened by intervening woodland. In other scenarios they can increase adverse visual effects, for example where relatively close to visual receptors without intervening filtering vegetation where they are likely to appear more noticeable in views from residential receptors. Low height lattice pylons have been proposed as necessary to reduce effects in two locations, to the north-west of Little Waltham and to the east of Thurrock airfield. The respective geographic sections below explain the background to these decisions.

T-Pylons

- 2.5.9 The latest independent report on the Comparison of Electricity Transmission Technologies: Costs and Characteristics (Institute of Engineering and Technology, 2025) confirms that whilst T-pylons provide an alternative to conventional overhead lines with potential benefits in visual impact and reduced land-take, this is at a higher cost. The build cost is approximately 2 to 2.5 times that of an equivalently rated conventional overhead line, and the lifetime costs are around 1.6 to 1.7 times that of a conventional overhead line. The current arrangements for the oversight of funding by Ofgem requires that the lowest cost acceptable design is taken forward rather than a more expensive design even if that design is perceived to reduce the level of effect.

- 2.5.10 As such consideration of their use follows after establishing a need to mitigate effects of the standard lattice design and after considering the benefit of adopting a low height lattice pylon design. T-pylons themselves are also less adaptable to varied terrains and require more substantial access infrastructure. Furthermore, their resilience and environmental impact are comparable to conventional overhead lines, but with increased carbon intensity due to construction materials. Attention also needs to be given to the transitions between pylon types. Given it is the surrounding context that drives the need for alternative design mitigation, where this is not required along the entire route, any visual break and transition in pylon design also needs to be carefully sited.
- 2.5.11 Assessment findings have concluded that, where there is not a reversal of the presumption to use overhead lines, the use of lattice pylons (either standard or low height) is consistent with planning policy throughout the route. Whilst there may be some locations (see Appendix A of the 2024 DDR document reference 7.21) where there may be a design preference for the use of T-pylons, the need to mitigate for unacceptable effects from lattice pylons is not engaged. On this basis T-pylons are not proposed for the Project.

Onshore and Offshore Alternatives to Overhead Line

- 2.5.12 National Grid are conscious of the interest in, and requests to take forward, alternatives to a predominantly overhead line proposal. This includes strategic alternatives such as an integrated offshore grid, offshore cabling from Norfolk to the southeast and onshore with full use of underground cabling. A brief summary of how these have been considered, and the reasons for not taking them forward, has been provided below. Full details of the assessment are available in the CPRSS (document reference 7.18) and SOBR ((document references 7.17, 7.19 and appendix to 7.19).

Offshore Solutions

- 2.5.13 There is no fully offshore solution to connect offshore wind to the grid, the power has to come onshore somewhere.
- 2.5.14 The Project did consider an equivalent offshore option (from Norwich to Tilbury) using HVDC (the appropriate technology in such circumstances) both in the CPRSS (document reference 7.18) as a component in a number of the Strategic Proposals as well as reviewing an offshore equivalent of the Project within the Strategic Options Backcheck and Reviews. Such an option requires converter stations at each end of the cables to integrate with the onshore alternating current (AC) based NETS and, to facilitate an equivalent connection. Factors which were considered in deciding not to progress with an offshore HVDC option, included, but were not limited to:
- The advice contained in adopted policy in the NPSs that overhead lines are appropriate technology in most circumstances
 - The potential for mitigation of onshore options including undergrounding - where justified and feasible
 - Cost and economics - the offshore options would be several billion pounds more expensive than onshore options. The comparative costs between onshore and offshore options are provided in the 2025 SOBR (document reference 7.17).

- 2.5.15 Even if a more integrated solution that connected from the windfarms directly was to be developed, and the programme delay and constraints costs ignored, the scale of power transmission required would necessitate multiple HVDC connection projects that all need connecting to the onshore network and would still require new onshore transmission reinforcement (existing HVDC connection projects provide for connections transferring up to 2GW of power, hence multiple projects are required to achieve the 6 GW transfer capability of the onshore AC predominantly overhead line based project).
- 2.5.16 It is also the case that the challenges of connecting into Tilbury Substation, which have led to a change of the arrangements and connection into the existing overhead lines to the north of the substation, would also apply to offshore connection solutions. This is due to the position of the Freeport area and planned expansion at Tilbury Port between Tilbury Substation and the Thames Estuary. Whilst this is not considered to render the offshore option unfeasible it increases the potential for increased cost for these options given that it reduces flexibility. It may be possible to connect into the existing ZJ route (Rayleigh to Tilbury) though this is understood to be operating at maximum capacity presenting a greater challenge to connect into either an alternative overhead line or establish a new connection on approach from the marine environment.
- 2.5.17 Overall we consider that it continues to be the case that an equivalent offshore HVDC solution would be at a cost to consumers that could not be justified. This reflects not only the acceptability of onshore solutions (overhead line and underground cable) in planning policy terms, as set out in NPS EN-1 and EN-5 but also the large cost differential relative to an onshore predominantly overhead line project, in addition to constraints costs to consumers to accommodate the delay beyond the current programme. The SOBR costs have been confirmed and the comparator explained in more detail in the 2025 SOBR (document reference 7.17) but in summary are calculated on the current regulatory RII0 2 price period (20/21 baseline) to ensure that strategic alternatives are considered on a like-for-like basis.
- 2.5.18 The relative cost differential between connection technologies is set out in the independent April 2025 IET report. This identifies that in relative terms:
- Conventional lattice pylon based overhead line connections (5 GW) are the lowest average lifetime cost
 - T-pylon based connections are around 1.6 times the average lifetime cost of conventional lattice
 - Onshore AC underground cables are around 4 to 5 times the average lifetime cost of conventional lattice pylon connections
 - Onshore HVDC comparators (2 GW) were not given for comparable connection lengths. Over longer distances where the high unit cost of converter stations is more diluted, comparisons noted HVDC cables being 1.9 times the average lifetime cost for just over a third of the level of power transfer
 - Offshore based HVDC solutions (whilst costings were noted to be sensitive to circuit length) had an average lifetime cost of just under 5 times that of onshore conventional lattice for just over a third of the level of power transfer.

Onshore Cables (AC and HVDC)

- 2.5.19 To justify the use of underground cables onshore, National Grid needs to consider NPS EN-5 which covers the development of new energy infrastructure and its duties under the Electricity Act (certain aspects of EN-1 are also relevant in respect of the need to underground in some cases within the setting of the National Landscape). EN-5 concludes that in most cases, the government expects that overhead lines will be appropriate and acceptable and should be the strong starting presumption to reinforce the Transmission grid, noting that exceptions apply with the presumption reversed in some cases as set out within the NPS. The assessments (in the CPRSS (document reference 7.18) and the SOBRs) have shown that the use of underground cables, whether through use of HVAC technology or use of HVDC systems, would be significantly more expensive, and presents their own environmental impacts and engineering challenges. Given the Planning Policy context and due to the higher cost that would be involved in an entirely onshore underground alternative, it is not considered that this would be the most suitable option as all costs ultimately go onto consumer energy bills.
- 2.5.20 The Project proposals do include the partial use of underground cabling in specific areas such as the Dedham Vale National Landscape. In areas where underground cables have been taken forward as a part of the Project, this has been after the local environment and habitats have been assessed, the mitigation hierarchy and mitigation measures applied to reduce the impacts, and where the selection of cable is required by technical considerations (e.g. crossing another 400 kV overhead line) or selection is justified by the relevant tests in NPS EN-5.
- 2.5.21 National Grid is aware that the Electricity System Operator's (ESO – now National Energy System Operator NESO) East Anglia Study published on 12 March 2024 suggested that if the Project was delayed for four years (until 2034) then an underground HVDC solution would become cost comparative with the onshore overhead line solution. However National Grid is legally obliged (under our Transmission Owner Licence) to provide capacity at the dates formally agreed in contracts with energy generators (or customers). Contract dates are set out by ESO (now NESO) independent of National Grid. Such a delay would cause significant additional constraint costs between 2030-2034 which would fall to energy consumers.
- 2.5.22 In addition, such delay would be putting at risk the delivery of a clean power system by 2030 in conflict with the identification of the Norwich to Tilbury Project as a Critical National Project. This is a project critical to delivering a network which supports the clean power pathways by NESO who has supported bringing the Project forward for a 2030 delivery (Clean Power 2030, NESO, 2024).
- 2.5.23 Whilst these onshore, whole route underground alternatives are difficult to justify in terms of existing national policy and the scope of the regulatory limits, the Project has remained open minded. Should there have been a change to national policy, or the ask from the regulator changed, or significant changes to costs and/or technology, then the proposals would have been reviewed in light of this. Just as we have remained open minded to all feedback from stakeholders, including local authorities and interest groups. Further consideration of this is given in the Strategic Option Backcheck and Review (2025) in a later part of the report.

Close Paralleling of Existing 400 kV Overhead Lines

- 2.5.24 National Grid recognises that close paralleling an existing overhead line has the potential to reduce the level of effects that may arise from a new overhead line. For this Project however there are some locations where the combination of physical and environmental features presents very substantial challenges to successful parallel routing. Where it may be possible, close paralleling is considered to lead to greater effects in the number of properties having overhead lines close to both/multiple sides of their properties including where new and existing overhead lines would have to converge and diverge around any areas with no likely close parallel route. Although there are some localised areas where close paralleling may appear beneficial, it has remained National Grid's view that the introduction of an overhead line separated from existing 400 kV overhead lines is preferred.
- 2.5.25 The use of underground cables with CSE compounds to cross existing overhead lines may be able to address the potential for additional effects from seeking to close parallel in specific locations. However, the additional costs along with limitations on the ability to secure the necessary number of outages required for construction, mean this would be less consistent with National Grid's duties under the Electricity Act.

Close Paralleling of Other Infrastructure (Roads, Rail, Utilities)

- 2.5.26 Close paralleling of existing, new or proposed infrastructure such as roads, rail, utilities, etc., was also considered in response to feedback. Respondents felt this offered the potential for reduced overall construction effects on the basis the disturbance would be limited to the same area. Specific feedback referenced the A12 (though this is no longer progressing) and a new Anglia Water supply pipeline. It was not considered that close paralleling the water pipeline, proposed in the vicinity of the National Landscape, or the A12 works offered any advantages. The infrastructure has different start and finish points compared to the Project therefore limiting the area where benefits may be available. The different timings of the projects and construction requirements further limits the potential for shared temporary construction infrastructure which would potentially reduce effects. Overall, although in some circumstances the nature of infrastructure may create routing opportunity, more typically close paralleling would not be certain to reduce environmental effects, improve compliance with the Holford Rules or be more consistent with the requirement to be economic and efficient.
- 2.5.27 The Project considered all specific suggestions and has previously included a change to closely follow an existing gas pipeline through and in the vicinity of Dunton Hills Garden Village proposals. Whilst gas pipelines provide a constraint in terms of construction works not generally being able to progress immediately above the pipeline (within around 10 m) and a preference to seek to reduce the number of crossings, the corridor also provides an opportunity for routing, in this case the presence of the gas pipeline creates a corridor free from built development due to the required safety standards.

2.6 Third Party Developments

Which Do We Consider?

- 2.6.1 Proposals for new development by third parties, that have some status within the planning system, have been considered and influenced the design. Other more speculative development was not considered due to the level of uncertainty. Sites and developments that have influenced the design include:
- Those identified within the local development plan or plan making process (or advised to us directly by local planning authorities as a site for future development)
 - Those identified within the Local Plan/Minerals Plan making process. Some refinement of sites must have been undertaken and a preferred site/sites been identified, or there was a strongly implied likelihood of the site progressing to allocation in the near future given the absence of clear constraints
 - Those which have been subject of a request for, or received, an Environmental Impact Assessment (EIA) screening or Scoping Opinion
 - Those subject of a submitted planning application.
- 2.6.2 Proposed developments consistent with the criteria set out above, have been considered on a case-by-case basis, balancing consistency with the Holford Rules against potential direct and indirect effects from and on the Project. In some cases where greater uncertainty exists, we have taken forward two scenarios, one assuming the development will occur and an alternative assuming the development does not proceed. An example of such a scenario would be a proposed minerals plan site allocation where two alternative scenarios are being progressed dependent on whether the site is allocated.
- 2.6.3 The Environmental Statement has considered the implications of Limits of Deviation covering the scenarios indicated. The cumulative and in-combination effects of the above developments are also reported as appropriate and where the appropriate level of information is available.

Airfields

- 2.6.4 National Grid appointed an independent aviation consultancy to assist with consideration of potential interactions with flying activities. Aviation interests identified have included civil and military aerodromes used by a variety of powered and unpowered aircraft types, heliports and helicopter landing sites (including those used by the emergency services), as well as hot-air ballooning and model aircraft sites. The majority of sites are unlicensed with National Grid and its advisors adopting an approach where the risks of interaction are considered on a site-specific basis. If an increased risk is identified then we have considered making modifications to the Project design (route, pylon height or pylon type) to minimise adverse impacts and also consulted with aerodrome operators to explore the possibility of agreeing reasonable changes to operational procedures (including publishing airfield information, altering circuit patterns, marking the obstacle).
- 2.6.5 Following engagement, and in response to feedback and further assessment, changes have been made to the Project in some cases and modifications required to flight activities in others. Overall in National Grid's view, flight activities at all but one

of the identified airstrips (where flight activity is confirmed) can continue to operate. Further details are provided in the Environmental Statement in Appendix 15.2: Review of Aviation Impact (document reference 6.15.A2)

- 2.6.6 The one exception to this is Chase Farm airstrip where engagement is ongoing with the operator. National Grid has considered different possibilities at this site including whether alternative overhead line alignments and pylon types are available which avoid the interaction with Chase Farm airstrip as well as an anti-clockwise re-alignment of the grass airstrip. No alternative route alignment and pylon combination alternatives have been identified that can avoid an impact. National Grid consider that runway realignment is a viable option albeit acknowledges that landform leads to a runway with a slight gradient falling away to the south west. However the site operator considers the gradient too steep meaning that closure is the only reliable option. The final arrangement with the airfield operator remains the subject on ongoing discussions with the potential for a solution to be captured within a Statement of Common Ground (SoCG).
- 2.6.7 Some sites have been confirmed or identified as closed or not operational and no further review was necessary. This includes Brock Farm (to the east of Ingatestone), and the former RAF Boxted (north of Colchester).
- 2.6.8 For a number of other sites we concluded after assessment and engagement that there is sufficient separation distance from the Project or the characteristics of flight activity and relationship with the Project are such that there is no material impact on flight activity. This includes sites operating as helipads at Broomfield Hospital and Dysons Farm, airstrips including West Horndon (Barnards), Nayland, Elmsett, Woringford (Gliding), Nayland, Garnons Farm, Laindon and Long Stratton.
- 2.6.9 Some airstrips have required more detailed engagement and identification of modifications. The changes are briefly summarised below with further information in the relevant sections below. The sites are:
- Brook Farm - alignment changes south of Diss (movement to the east) have at least partly been in response to feedback to concerns raised at Brook Farm airstrip. The position reached for the alignment of the overhead line allow for continued flight activity
 - Thurrock Airstrip - concerns have been responded to by a change in the alignment and a change of pylon type to benefit from screening by the existing 132 kV lattice pylons. The operator agrees with the assessment that the proposed alignment would not be detrimental to the operability of the airfield. The alignment is preferred even if housing proposals on the site (under appeal) progress, though reversion to standard pylons may be taken forward in that circumstance
 - South Norfolk Model Aircraft Club (Tacolneston) – in response to feedback (including other factors not just the model aircraft activities) and assessment, a design change was implemented to re-align the overhead line which has achieved an increase in separations distances from the site. These now exceed minimum distances recommended by the Civil Aviation Authority’s guidance and ensuring the Club can continue to operate
 - Priory Farm - The proximity of the line to the runway and effect on the published circuit pattern is considered to have low impact. Analysis suggests current operations can continue unchanged, with the exception of highlighting the presence of the line to users of the site

- Tibenham – With its focus on Gliding under the auspices of Norfolk Gliding Club, there is potential for interaction during cross-country flights (particularly on return to the airfield from the west) and when gliders are under aero-tow on take-off to the west overflying Priory Farm Airstrip. On the matter of aero tow, there is a height/ distance envelope, within which engine failure of the towing aircraft after takeoff (EFATO) could result in collision with the line or a pylon, if a pilot did not manoeuvre away from them. The assessment shows that there is sufficient distance between the runway and the line to manoeuvre and land safely in this scenario, if required, noting this may require additional briefing of pilots but this is considered a reasonable adjustment. On the matter of cross-country flights, which are often part of gliding competitions at this site, adjustments could be made through the specification of a competition finish ring or line at a height that would ensure adequate clearance from the line and a safe route to landing. It is noted that British Gliding Association (2024) guidance (BGA Competition Organisers' Guide 2024) refers to finishing ring heights in excess of 500 ft – 152 m (at an airfield boundary). Any such arrangement would provide appropriate clearance with a large margin of safety. As such, no change to alignment or pylon type is proposed in this area. This is in the context that a diversion of 1 km or more to the west requested by the airfield would add an estimated 2 km of additional route length, due to the need to route around various environmental features and residential properties, with commensurate increase in socio-economic and environmental effects as well as additional costs. It would also increase interaction with a new Met Office radar system being constructed in the vicinity. The current level of conflict with the new radar is considered acceptable to the Met Office due to the distance but the level of concern would be increased if the alignment was changed and moved further west
- Raydon Wings – The assessment demonstrates that clearances are adequate and would in fact meet the requirements for a licenced aerodrome, with the exception that there would be a penetration of the Inner Horizontal surface. Some temporary restriction during construction will be required at Raydon Wings where the airstrip is crossed by the underground cable. In this case installation of ducts and restoration of the airstrip will minimise the disruption though it is recognised that the grass will take some time to re-establish. There is potential for slight adjustments to the underground cable design to be made (to keep it as far to the eastern end of the runway as possible within the Order Limits) or for the agreement of construction management practises to minimise temporary disruption through engagement with the operator regarding aerodrome operations. It is also possible that only a limited part of the available runway length is required with scope to position this further to the west.

2.6.10 For other airstrips there is either no or negligible interaction.

Solar Developments

2.6.11 The Project has also considered its interaction with existing and planned solar farms seeking to avoid placing pylons within solar farms where practicable. During the development of the Project changes have been made to the alignment to reduce interactions with solar developments whilst balancing other constraints and the Holford Rules.

- 2.6.12 Excluding the very limited interaction as a result of oversail, some interaction is unavoidable at the following sites:
- Grange – further detail provided in Section B
 - Park Gate – further detail provided in Section E
 - Billericay Power – further detail provided in Section G.

Built Development

- 2.6.13 National Grid has been able to consider adjustments to reduce the interaction with 3rd party built developments. The main changes are themselves subject to a number of uncertainties in the 3rd party development consent and delivery.
- Warehouse development at TB20. Routeing alternatives to pass to the north or south of the warehouse have been developed in conjunction with the developer to respond to a range of potential final site arrangements. A slightly straighter more northerly alignment (scenario B) may be available and would be preferred but is subject to a confirmed change in the building arrangement progressed. Further detail is provided in Section D.
 - Housing at Chadwell St Mary. The modifications to the connection arrangements at Tilbury North Substation require some diversion of the existing overhead lines (into and out of Tilbury North Substation) to make the connection from them to the new substation. The diversions have to cross the Lower Thames Crossing (LTC) road scheme which has a DCO consent in place. In response to feedback to the 2025 targeted consultation we have reviewed whether the diversions could be achieved either by overhead line (scenario A) or underground cable (scenario B). Both arrangements are possible and acceptable but interact differently with the housing development area. Scenario A is the current proposal with the potential to change to capture an improved position through scenario B subject to ongoing discussions with 3rd parties and resolution of various interactions. Scenario B diverts the YYJ as underground cable which reduces the interaction with the potential housing allocation from around 8 hectares affected to around 3 hectares affected. Scenario A is for the ZB line to be replaced by a short section of cable to allow the YYJ to be diverted as overhead line. This has greater impact on the area of proposed housing development and on the LTC project. Further detail is provided in Section H below.
 - Housing at Dunton Hills Garden Village and adjacent areas. Subject to a number of commitments to guide the positioning of individual elements within the Order Limits and available Limits of Deviation, routeing by overhead line remains preferred to the use of underground cable which would more directly reduce built development. Further details are provided in Section G.

2.7 Conclusion to Backcheck and Review

- 2.7.1 It has been concluded that the need case for the Project remains robust. The identification of the preferred Strategic Proposal, which provided the context for the CPRSS (document reference 7.18), and which has been reviewed and reported on in subsequent SOBRs and DDRs, remains valid and an appropriate basis on which to take the Project forward at this stage.

- 2.7.2 No further changes have been identified which would result in a change to the consultation corridors set out in the CPRSS (document reference 7.18), (or as subsequently modified as reported in earlier DDRs) other than those areas which were the subject of the 2024 statutory consultation and 2025 targeted consultation.
- 2.7.3 Feedback received on the 2024 statutory consultation, 2025 targeted consultations and the development of the submission alignment has resulted in changes. The main changes made, whether prompted by feedback, assessments or in response to technical appraisal are set out in the geographic Sections A to H in the remainder of this document.

3. Overview and Summary of Changes Taken Forwards

3.1 Changes in Response to 2024 and 2025 Consultation

3.1.1 Following careful consideration of the feedback to the 2024 statutory consultation and the 2025 targeted statutory and non-statutory consultations, a number of changes to the location of individual elements of the permanent assets and temporary works have been taken forward in the design of the Project. Some more substantive changes are described in this document. Numerous minor changes have also been made with some examples identified below but with these reported within the Consultation Report (document reference 5.1).

Examples of Minor Changes to Design Not Covered by this DDR

3.1.2 Examples of the smaller changes that have been incorporated into the design, but which are not described in the DDR, are listed below. The detailed explanations for why these and other changes were or were not progressed are set out within the Consultation Report (document reference 5.1). In all cases Limits of Deviation apply subject to various commitments set out in the Environmental Statement. Some examples are as follows:

- RG6 moved northwards by approximately 15 m to avoid conflict with the emerging details of the alignment of a proposed third-party underground cable
- Permanent right of access (i.e. where there is no requirement for temporary or permanent construction works to establish the access) for future maintenance activities modified in line with landowner requests
- JC16 moved by approximately 15 m to increase the potential for existing trees to filter the view from a residential property to the north-east
- JC18 moved by approximately 80 m along the alignment (to the north side of Washbrook Lane) to move out of main view from residential property to the east to behind existing trees also filtering the view
- TB50 to TB53 moved marginally to avoid removal of veteran trees
- TB64 moved slightly to the north-west to ensure an appropriate safety separation was maintained to a group of gas tanks providing heating to agricultural business
- TB191 to TB196 re-position of pylons to avoid placement behind Buttsbury Church
- TB224 commitment to seek to utilise Limits of Deviation to the west to increase the separation to the residential property on site.

Main Changes to the Statutory Consultation Design Covered by this DDR

3.1.3 After considering feedback, the main changes taken forward within the Project design for the DCO application are set out below.

Table 3.1 Main design changes since 2024 statutory consultation

Location	Overview of Change
RG30 to RG39	Alignment change to respond to: <ul style="list-style-type: none"> To reposition alignment midway between properties Landowner requests Request to achieve greater separation from a Model Flying club.
RG48 to RG49	Optimisation of design details of haul road (including restricting to single land of trackway), permanent right of access, pylon heights and routing to respond to detailed survey findings and potential tree impacts.
RG94 to RG102	Increased extent of undergrounding of the DNO 132 kV overhead line network with consequential changes to temporary works: <ul style="list-style-type: none"> To reduce cumulative effects and to allow 400 kV realignment to adopt the alignment of the removed DNO infrastructure For the airstrip To reduce scale of change by adopting the alignment of an existing smaller lattice pylon route To benefit from tree screening opportunity.
RG112 to RG119	Alignment change and consequential changes to permanent and temporary access to: <ul style="list-style-type: none"> Benefit from screening by existing woodland Avoid veteran trees.
RG136 to RG143	Alignment change and temporary access moves to: <ul style="list-style-type: none"> Increase separation to properties Reduce agricultural effects Reduce effects on ecological receptors.
JC cable amendments and inclusion of Holton St Mary temporary construction access	Underground alignment change from west side to east side of the CSE compound at Raydon and other minor amendments as well as provision of temporary construction access road to bypass Holton St Mary

Location	Overview of Change
Cable re-route at Langham plus compound and access road change	Underground alignment change to: <ul style="list-style-type: none"> • Reduce impact on business activity • Reduce community effects • Reduce loss of trees • Reduce potential effects on ecology • Consequential reduction in technical risk.
TB1 to TB7	Swapping the alignment adopted by the adjacent underground cable and overhead line alignments for the two connections into the EACN Substation in response to potential minerals plan allocation.
TB70 to TB76	More equidistant positioning between residential properties and reduced effects on equestrian enterprise.
TB77 to TB81	Re-alignment to pass to the south of residential properties out of reported main views
TB93 to TB96	Realignment to avoid veteran tree associated with historic entrance to adjacent grade II* house.
TB128 to TB132	Extended Order Limits to allow for option of pylon alignment change in case of mineral plan allocation being confirmed.
TB136 to TB142	Subject to technical confirmation, change to four low height lattice pylons north of the River Chelmer to reduce heritage effects and repositioning and retention of standard lattice design to respond to community concern about the pylons south of the river. Alignment change to avoid veteran trees and protected species.
TB207 to TB212	Alignment change to reduce cumulative effects Increased undergrounding of UK Power Networks line Localised change to location of construction compound to benefit from additional hedgerow screening from residential properties to the east.
TB217 to TB220	Alignment change to move further from residential properties to be more equidistant to those to either side and also positioning the line onto lower ground. Amended temporary and permanent access routes
TB238 to TB243	Change to low height lattice pylon design and realignment to reduce extent of risk from aircraft engine failure and thus reduce effects on Thurrock Airfield.
TB264	New Tilbury North Substation and associated modifications to allow connection to the existing YYJ overhead line.

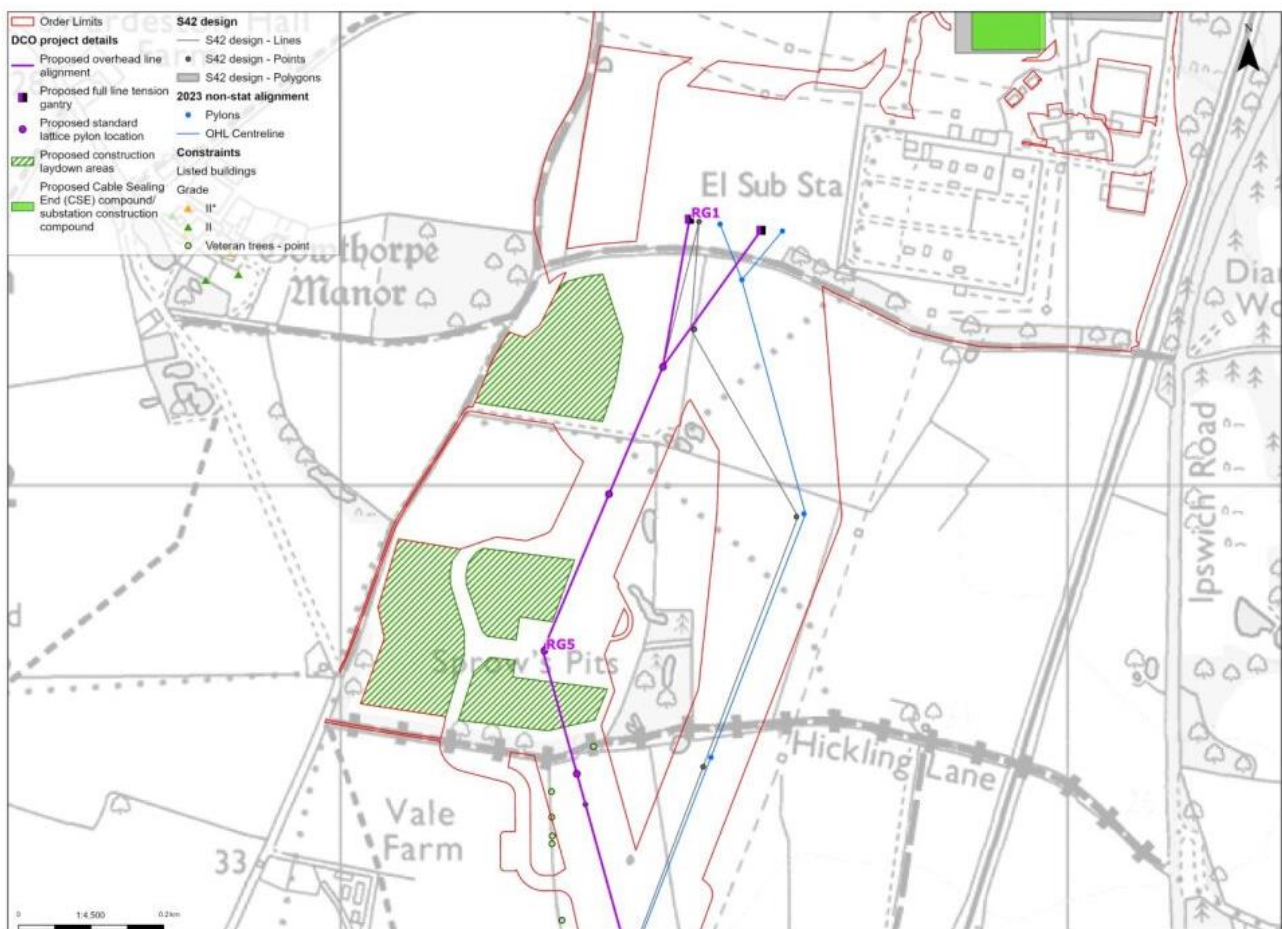
4. Section A South Norfolk – Siting and Routing Alternatives Considered

4.1 Temporary Works at Norwich Main Substation

4.1.1 Modifications to the temporary works areas are proposed on the land around Norwich Main Substation responding to the known and reasonably foreseeable status of a number of other developments. These modifications include removal of an area overlapping with a ‘Lorry Holding Area’ associated with a neighbouring development and the relocation of temporary construction laydown areas to land to the west of RG3 and RG5 (areas with cross-hatched and green in the map) to avoid an area proposed for similar use associated with a proposed battery energy storage site.

4.1.2 Further adjustment of siting of the alignment within the Limits of Deviation provided for within the Order Limits will respond to the final positioning of soil storage and landscaping associated with the construction of the Norwich Main Substation extension and the outcome of engagement activities with the battery energy storage site project to accommodate their underground cable route to the substation subject to them receiving consent.

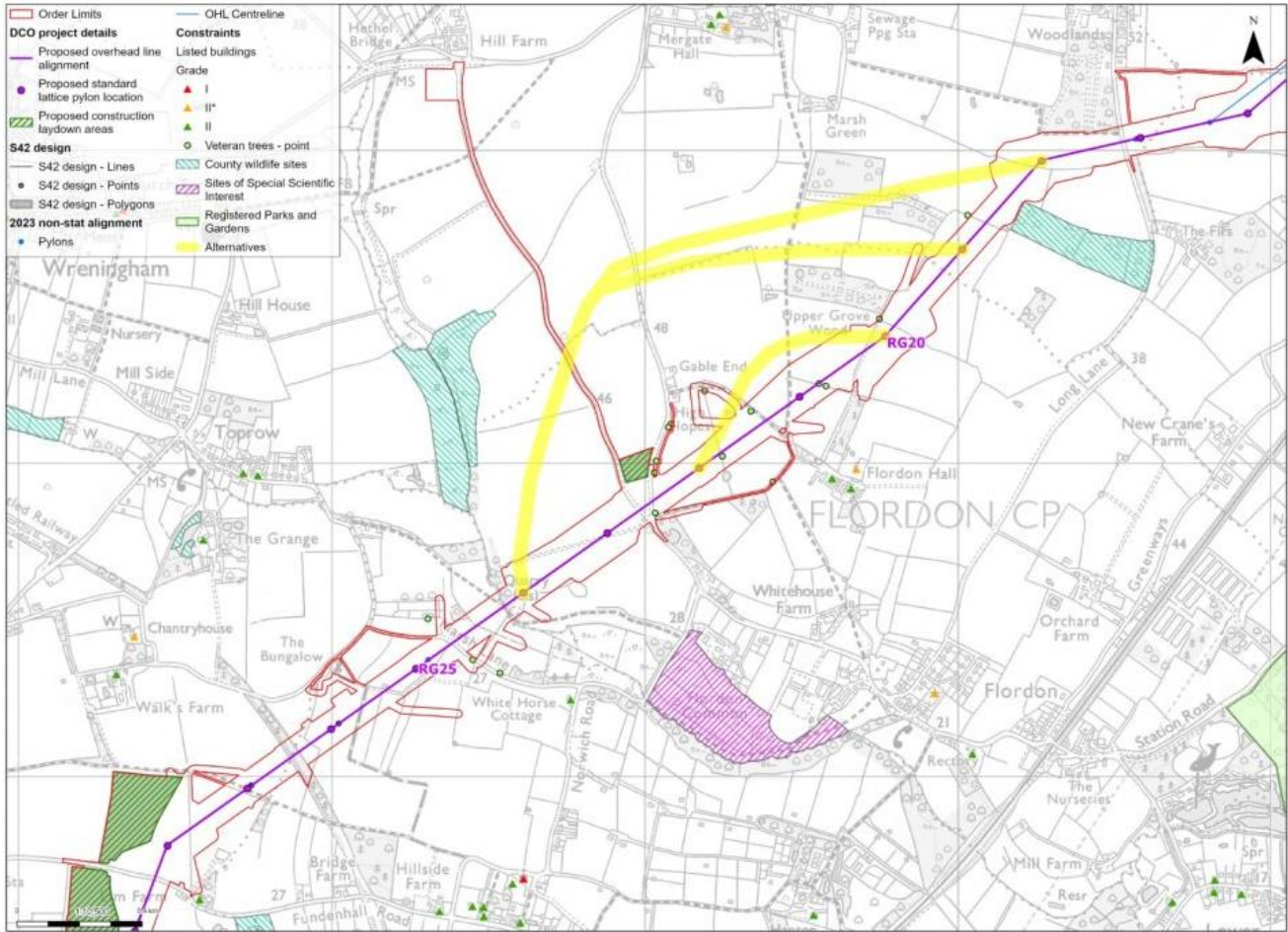
Figure 4.1 Change to temporary works compounds at Norwich Main Substation



4.2 Norwich Main to Flordon

- 4.2.1 A request to straighten the alignment and to position pylons to field boundaries between RG8 and RG12 has not been taken forward. While potentially increasing consistency with Holford Rule 3 by being straighter, such a change would potentially have increased effects on an area of woodland (less consistent with Holford Rule 2), would position at least one pylon within the panel area of a consented solar farm (Bloy's Grove) and present additional construction risk due to restrictions on stringing positions around RG8 and RG12/RG13.
- 4.2.2 A requested change to realign to the south of RG14, where the alignment oversails the existing solar farm, has not been taken forward. The requested change would have been longer with additional angles and would have positioned pylons either closer to residential properties to the north or required oversail of woodland areas (thus less consistent with the Holford Rules). However, an in-line change to RG14 (and consequently RG15) has been made to avoid the need for panel removal which, with repositioning of the temporary construction access, goes some way to responding to the change requested.
- 4.2.3 In response to feedback for a preference to divert to the west of Flordon Hall and the identification through site survey of the potential loss of veteran trees, the alignment near Flordon has been reviewed. A very localised diversion to the north-west between RG20 and RG22 (see Figure 4.2) would avoid effects to the veteran trees (improving consistency with Holford Rule 2) but require two additional angle pylons, reducing consistency with Holford Rule 3 and also reducing consistency with Holford Rule 2 with only limited reduction in respect of effects on Flordon Hall (with the more visible angle pylons) and was not preferred.
- 4.2.4 A more extensive diversion to the west, between either RG18 or RG19 and RG24 (Figure 4.2) crossing over the Bracon Ash Solar Farm and passing to the north and west of properties on Flordon Road, including Gable End and High Hopes, was also considered. On balance, this was less preferred as a result of some transfer of effects between some residential properties, being longer (by around 300 m) and requiring an additional suspension pylon and between one and three additional angle pylons (depending on the specific alignment design alternative) and thus being less consistent with Holford Rule 3. While effects on two veteran trees may be avoided and a slight reduction in effects on Flordon Hall may be possible (though the unreduced effects are not inherently unacceptable in policy terms), the alternatives would lead to direct loss of solar farm panels (from the creation of space for a likely two pylon bases within the development footprint) and increase agricultural impacts. While noting the importance of veteran trees as set out at Paragraph 5.4.53 of EN-1 (DESNZ, 2024a), in this case the combination of effects and additional costs of a longer route with additional pylons and more angles is considered to outweigh the loss of two veteran trees. As such, it is considered to meet the threshold set out in Footnote 192 of the aforementioned paragraph, with further details of a compensation strategy in Appendix B Ancient Woodland and Veteran Tree Strategy of the Outline Landscape and Ecological Management Plan (document reference 7.4). No change has been taken forward.

Figure 4.2 Indicative alternative alignments considered at Flordon

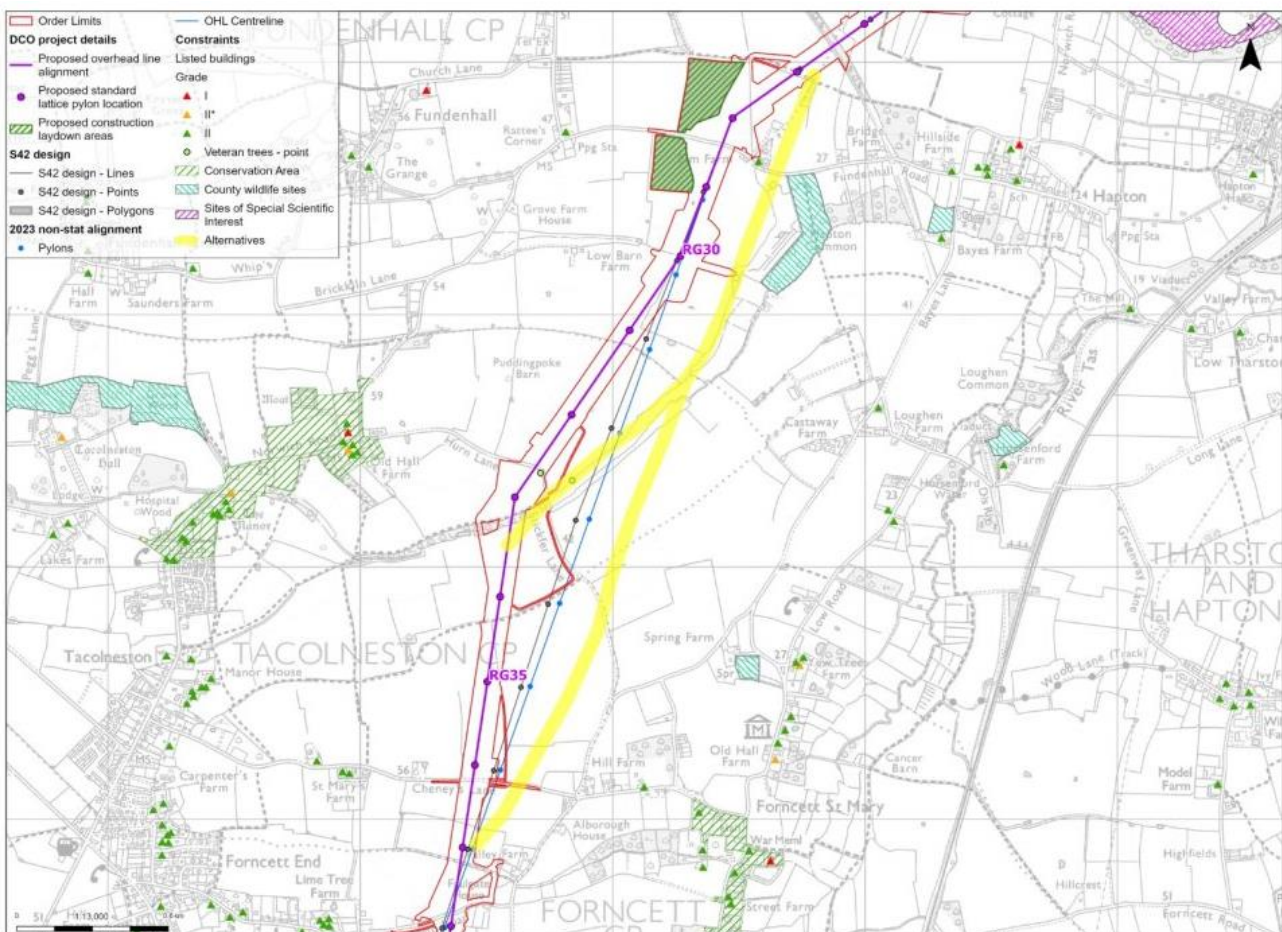


4.3 Flordon to Forncett End

- 4.3.1 A change between RG30 to RG39 was developed routing to the west of the 2024 preferred draft alignment. This change would respond to a number of points of feedback including to reduce effects on a site used for model aircraft flying, to reposition the alignment closer to be midway between residential properties on Northfield Road and to seek to position pylons to field boundaries where possible. A veteran tree was also identified through survey work and avoidance of it integrated into the change considered.
- 4.3.2 Further alternatives, deviating to the east between RG27 (or adjacent pylons) and either RG34 or RG39, were developed to seek to follow lower ground or to straighten the alignment as well as partially following lower ground. These alternatives are shown in Figure 4.3, along with the 2024 preferred draft alignment (Grey and Blue for alternatives not taken forwards; Purple for the alignment). These were considered but not taken forward. The alignment that rejoins at around RG34 does increase consistency with Holford Rule 5 by following a valley but brings conflict by effects on a County Wildlife Site (CWS) and residential properties at Fundenhall so is less consistent with Holford Rule 2 and the Supplementary Notes respectively. It also brings an increasing engineering risk due to increased complexity of the foundation design of 3-4 pylons within the peaty soil and flood zone (subject to detailed design and ground investigations). Rejoining at RG39 brings the same positives and negatives but additionally requires the relocation of the Model Flying Club. On balance neither alternatives was preferred to the 2024 preferred draft alignment.

- 4.3.3 Feedback from the South Norfolk Model Flying Club indicated that a separation of 300 m was necessary to reduce restrictions on normal flightpaths. A localised deviation to the east was considered zigzagging sharply between around RG33 and RG36 but would have been longer and required more and greater changes of direction (and therefore less consistent with Holford Rule 3). This was therefore less preferred.
- 4.3.4 The proposed deviation to the west achieves in excess of a 300 m separation from South Norfolk Model Flying Club. This additional separation is necessary to find a suitable position for an angle pylon (the repositioned RG33) with sufficient space for construction requirements. It also supports a realignment to a repositioned RG39 to the south that allows the pylon to be positioned on a field boundary and repositions the alignment closer to the mid-point between properties at Northfield Road. There are slightly greater impacts on views from a Public Right of Way (PRoW).
- 4.3.5 The alignment would move closer to Low Barn Farm, reducing the distance to the nearest pylon from approximately 430 m to approximately 360 m, but this is not considered inconsistent with the Holford Rules supplementary notes. The change ensures avoidance of the veteran tree but does require some tree management; however, this substantially comprises a transfer of effects between trees potentially affected by one alignment and trees potentially affected by the other possible alignments. This change to a slightly more western alignment has been taken forward.

Figure 4.3 Alternative alignments raised between Hapton and Forncett End



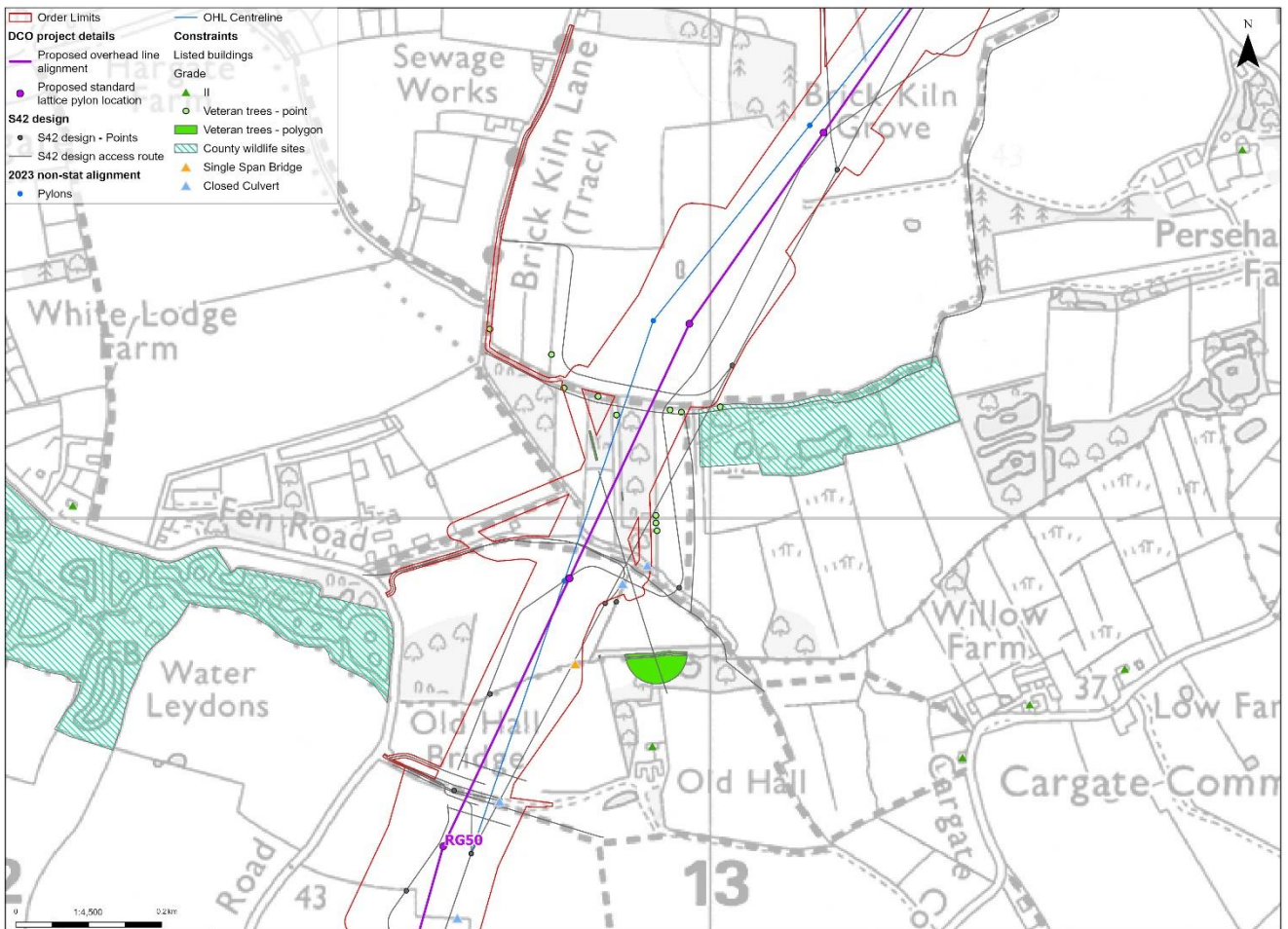
4.4 Crossing of the Tas Valley

- 4.4.1 Feedback to the statutory consultation and the findings of surveys completed to date have provided additional information that has now been taken into account. This includes a veteran tree positioned on the 2024 preferred draft alignment (which also includes an active honey bee population), information from arboricultural surveys about other veteran trees (a number on the site lead to categorisation as a veteran tree group – see Figure 4.4) and the implications for tree and canopy management from design responses, information that the open field (oversailed mid span between RG48 and RG49 and through which the haul road was proposed to be routed within the statutory consultation design) is the only field suitable for over-wintering of cattle, and the findings of site walkovers identifying a previously cleared area within the woodland as being potentially suitable as an alternative route for the haul road.
- 4.4.2 The proposed arrangements that have been considered are shown in Figure 4.4. These have been considered in conjunction with an increase in height of the pylons to the maximum Limit of Deviation. Alternative alignments passing just to the east of the single veteran tree would oversail a County Wildlife Site (CWS), would require additional angle pylons and would be less consistent with Holford Rules 2 and 3. A slight change of alignment to pass to the west of the single veteran tree would move the alignment midway between the 2023 and 2024 preferred draft alignments and ensure retention of the single veteran tree but require some canopy management of others. The change would potentially have been achieved by moving pylons RG48 and RG49 to the west by approximately 60 m with diminishing adjustments back to reconnect at RG46 and RG52 to the north and south respectively.
- 4.4.3 Subsequently, further feedback has indicated that Norfolk Wildlife Trust and Natural England are considering the findings of further surveys that suggest at least part of the woodland area may be designated as a County Wildlife Site in the near future. We have reflected further on this information and the distribution of trees and have established that the potential change referred to above, if implemented as described, could be optimised further to require a reduced level of canopy management and height reductions to veteran trees. If the movement of pylon RG49 is reduced (to an eastwards movement from the mapped position by 20 m, which would be within the Limits of Deviation) and pylon heights of RG48 and RG49 were to use the full vertical Limits of Deviation of 6 m then the level of canopy management would be reduced, allowing for around 9 m of the overall vegetation height to be retained subject to arboriculture assessment and techniques.
- 4.4.4 In proposing this change we have reviewed previous routeing decisions to deviate southwards from RG46 passing to the east of Cargate Common or more directly over the CWS. The former remains less preferred because it increases conflict with activities at Tibenham airfield and increases impacts on the historic small field pattern. It is less direct and passes closer to Tibenham village leading to greater community effects reducing compliance with Holford Rule 3 and Supplementary Notes albeit reducing some effects on some aspects of Holford Rule 2. The latter alternative is similarly less preferred as a result of a less direct alignment and increased effects by closer routeing to residential properties.
- 4.4.5 Tied in with the alignment change are amendments to the temporary and permanent access arrangements. The permanent access route to the adjusted pylon positions (used for infrequent maintenance activity) is proposed to continue southwards along Brick Kiln Lane before turning to the east along an existing track along the north edge of the woodland. This landowner requested change reduces the potential for effects

on agricultural cropping without other changes in likely effects and is therefore being taken forward. Other amendments to temporary haul road arrangements have also been considered and taken forward. To the east of TB48 to TB49, the proposal is to use a previously cleared area within the woodland for the haul road to avoid routing within the open field used for livestock over-wintering. In addition, other specific measures would be adopted to reduce woodland loss including the narrowing of the access road through the woodland and the use of trackway. The remainder of the haul road northwards to RG46 and southwards to RG52 have also been adjusted to predominantly remain to the east of the alignment with all but a short 50 m section remaining within the 2024 draft Order Limits.

4.4.6 Similarly, the movement of the alignment has modified the extent to which lower voltage infrastructure modifications are required, and which consequently responds to a change requested in feedback. The change in the alignment requires the 11 kV overhead line to be replaced by underground cable over a different section. It requires less 11 kV removal to the south but more removal to the north. The removal of the wood pole overhead line occurs to the field boundary to the north with the underground cable following alongside field boundaries and the haul road alignment, minimising the need for tree removal.

Figure 4.4 Tas Valley overhead line and construction access alignments



4.5 Tas Valley to Shelfanger

- 4.5.1 In response to feedback relating to RG50 to RG70, the potential for the Project to interface with flight activity at Priory and Tibenham airfields was reconsidered. It has been concluded that flight activity, runway orientation and distances are such that there will be no impediment to the continuation of powered flight activities at either airfield.
- 4.5.2 The Norfolk Gliding Club (based at Tibenham Airfield) has expressed concern that aero-tow to the east or arrivals from the west may be at risk of hitting the pylons and conductors given the shallow angle of climb of aero tow or glide paths for return. However, as set out in paragraph 2.6.9, it is considered that collision is not a realistic scenario at this height and distance from the airfield. Aero-tow under engine failure conditions are considered to have space to clear or be able to steer clear given the distance to the Project. It is also confirmed that under any reasonable approach to safety (arrival at the airfield with a margin of specified height to safely navigate to land) there would be more than adequate clearance at the pylon line to the west of the airfield.
- 4.5.3 Following the completion of geophysical survey, the potential for effects on heritage assets was identified if the construction laydown area location north of the B1134, presented as part of the statutory consultation, were to be used. An alternative location to the south of the B1134 has been identified and adopted. This can use the same access point proposed for the temporary construction access road and retains a separation from the nearest residential property of over 200 m. Alternatives further north would reduce efficiency by being further from the point of access and were therefore not preferred.

4.6 Crossing of the Waveney Valley

Feedback and Further Information

- 4.6.1 At statutory consultation, National Grid presented two possible approaches for the Project to cross the Waveney Valley on the Norfolk and Suffolk border encompassing pylons between and near RG80 to RG92. These were an overhead line alternative and an underground cable alternative (referred to as the Waveney Valley Alternative (WVA)).
- 4.6.2 The WVA was presented on the basis that the effects of an overhead line on the combination of local heritage, socio-economic and landscape character and visual amenity may have engaged consideration of underground cable in line with Paragraph 2.9.23 of NPS EN-5 (DESNZ, 2024b) and the associated Secretary of State decision-making criteria in Paragraph 2.9.25 (noting too that the use of underground cable may also have effects on landscape character and visual amenity in the short to medium term, especially if the installation method leads to tree removal).
- 4.6.3 It was noted at the time that it was important for making any such comparison for decision making to identify an undergrounding method that would not give rise to unacceptable ecological impacts. It was considered at that stage (based on professional judgement and engagement with Natural England) that installing the required underground cables in a series of open cut trenches through the river valley would, among other impacts, have had the potential to lead to significant loss of potential priority habitat (lowland fen) and hydrological impact on adjacent designated sites (Wortham Ling Site of Special Scientific Interest (SSSI) and Roydon Fen CWS). It would also have required extensive tree removal and affected high organic matter (peaty) soils. Existing understanding of the geology indicated the potential for an

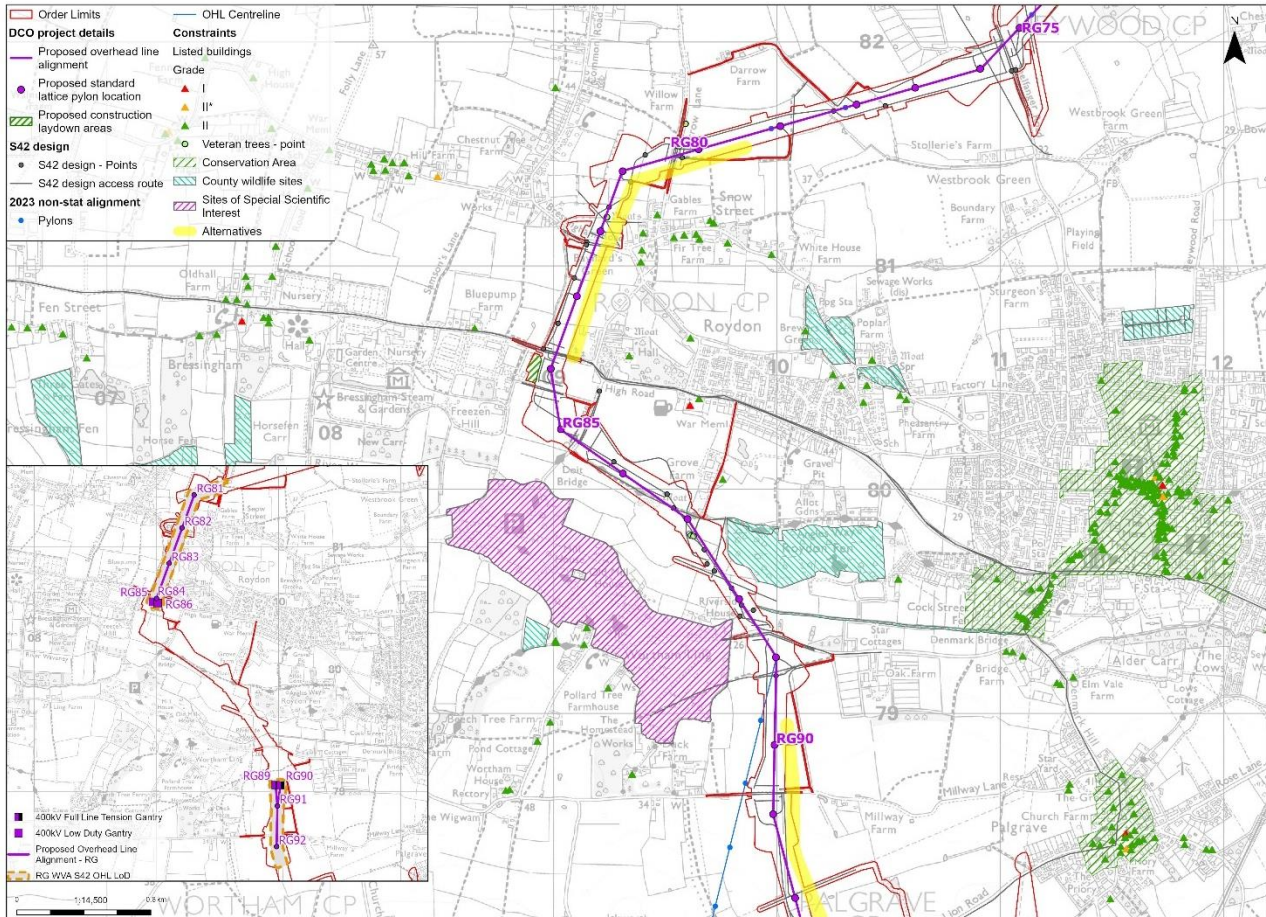
alternative trenchless method to be acceptable, though this required further investigation to allow necessary design work to be completed, and the potential associated environmental effects for the overhead line to be identified, to fully inform decision making.

4.6.4 Feedback received during the consultation included:

- Restatement of the preferences for the connection to be offshore, be via High Voltage Direct Current (HVDC) underground cable for the whole route or the route to be located within a different corridor with alternatives suggested to west and east of Diss with that to the east closely paralleling the existing 400 kV overhead line (referred to as the 4YM)
- Requests to extend the length of the underground cable of the Waveney Valley Alternative (WVA) (see Figure 4.5). To the north, feedback requested the movement of the CSE compound to beyond RG79 to reduce effects on visual amenity and move the CSE compound and pylons further from the valley to reduce landscape effects. To the south, the feedback requested movement of the CSE compound to beyond RG93 near Lion Road to move the CSE compound and pylons further from the valley to reduce landscape effects
- Preference expressed by Historic England and community respondents to take forward the underground cable alternative to address perceived heritage effects (with particular focus on Grade I listed Church of St Remigius)
- Preference expressed by community respondents to take forward the underground cable alternative to address perceived residential visual amenity effects
- Preference stated by Natural England (if the Project could not be routed elsewhere) to retain the use of overhead line (though no specific comment on alignment) to avoid the potential for effects on associated peat dependent habitats and associated ecological interest
- Feedback supporting the use of overhead line. While limited in number there was feedback from landowners and those connected to the church preferring the use of overhead line to reduce effects on land and potential effects of vibration from construction of the WVA on the fabric of the church
- Engagement with Suffolk Wildlife Trust also identified that the installation of underground cables through the valley (unless at a depth well below that used for opencut installation) had the potential to negatively impact the Waveney and Little Ouse Recovery (WaLOR) proposals (a Suffolk Wildlife Trust and Environment Agency project).

4.6.5 To respond to these comments this section is structured to initially focus on refining both an overhead line design and an underground cable design before determining which is taken forwards. For example there is consideration of whether the CSE compound locations should be moved (from one end of the yellow swathe to the other at both northern and southern ends respectively – see Figure 4.5) before consideration of whether the refined underground cable design is preferred to overhead line or not.

Figure 4.5 Waveney Valley crossing



4.6.6 In light of the feedback about the WaLOR project, further engagement with Suffolk Wildlife Trust was undertaken to establish the details and potential interaction. WaLOR is Defra funded and considered a pilot for other similar projects in the region with the aim to re-naturalise the River Waveney and the surrounding habitats. The WaLOR project aim is to enhance the natural heritage of the landscape and combat declines in biodiversity – whilst performing climate enhancing change. Although the land is not ecologically designated, the WaLOR project will enhance the surrounding landscape of the Waveney and Little Ouse Valley Fens Special Area of Conservation (SAC) and Redgrave and South Lopham Fens Ramsar site. The WaLOR project has also opened for investments in terms of ecosystem services, offering 5,346 biodiversity units as well as CO2 sequestration, reduction in nitrogen and phosphorous, flood storage and reduction in runoff.

4.6.7 Ground investigation studies have confirmed the geology of the valley as a shallow layer of peat/high organic matter soils (though it has not yet been confirmed whether there are any areas of active peat formation) over sand/gravel which presents technical risks to the successful use of trenchless techniques. Horizontal directional drilling (HDD) continues to be considered to be limited to a distance of around 150 m, with its use potentially further complicated by a number of field study investigations encountering artesian water at a depth of around 10 m.

Refining an Overhead Line Design

- 4.6.8 In order to provide the context for the further explanation in the subsequent paragraphs, the following sets out how the decisions on the WVA have been made. Modifications to both overhead line only and overhead line with underground cable alternatives have been considered and then a decision made based on those revised alternatives.
- 4.6.9 The feedback received on the design for the overhead line baseline (the statutory consultation design), including how it may interact with the WaLOR project, has been reviewed together with the level of effects arising from an overhead line against the policy criteria on topics such as heritage and landscape. With regard to the WaLOR project, the overhead line design has been modified to reduce the potential for interaction. This is achieved by a slight realignment and repositioning of pylon RG87 closer to the edge of the valley floor and closer to woodland, a change which has also allowed for the removal of one pylon within this section due to the topography of the valley. The change removes a pylon from a position where it was expected to affect the channel naturalisation. As well as the benefits for the WaLOR project, this slightly reduces effects on the setting of the Grade I listed Church of St Remigius and would reduce number of pylons visible from some residential properties to the north, albeit impacts on views from the Angles Way (a recreational route) would be locally increased.
- 4.6.10 There is also a non-designated moated site to the south of the statutory consultation overhead line alignment. The importance of this site in the regional context means it would be preferable to avoid physical impact to it. While all options that have been considered in this location avoid directly impacting the site itself, the underground cable alternative has an increased risk of dewatering/drying the site, which in the moat may contain sensitive and rare organic remains. Therefore, while there would be a likely significant adverse heritage effect to the moated site from the overhead line option, this would be preferred to underground cable as the physical impacts from underground cable would be more severe given the limited space available and expected direct effects on the immediate surroundings. This preference also extends to other likely 'medium' value archaeological / palaeoenvironmental remains within the draft Order Limits in the Waveney Valley due to the risk of some drying/dewatering of peaty soils if an underground cable were constructed, as dewatering would alter the conditions of the peaty soils that are likely to have preserved rare organic remains.
- 4.6.11 The potential for low height lattice pylons to be used to further reduce visual effects was also reviewed in line with the mitigation hierarchy for amongst other reasons to reduce impacts on visual amenity in views from the local community to the north and from Wortham Ling. However, restrictions on the angle of change of direction for low height pylon designs make it likely that this would only be achievable for the repositioned RG87 and one or two pylons to the south. While reducing height and thus visibility somewhat, these would not remove the limited visibility of the tops of pylons above the treeline and may increase visual effects for users of the recreational routes including the Angles Way along the valley floor due to both the bulkier structure and the transitional wirescape effects of changing from the standard to the low height pylon conductor arrangement. They may also increase the tree removal needed due to the wider span. On balance, low height lattice pylons were not preferred.
- 4.6.12 As a result of the removal of a pylon and slight realignment, the residual effects of an overhead line with standard lattice design on the setting of the Grade I Listed Church

of St Remigius would be slightly reduced and would be of a level which does not justify the adoption of underground cable nor justify a change to any of the identified alternative corridors to the east or west of Diss that were raised in other consultation. The other potential effects have also been reviewed and, while noting that the area is not a nationally designated landscape and that landscape, visual amenity and community effects will occur, planning policy does not, in this instance, require a change to the use of underground cable.

Refining the Underground Cable Design – CSE Locations

- 4.6.13 For the WVA (i.e. using an approximately 2 km length of underground cables), the feedback requesting both northern and southern CSE compound locations to be moved further from the Waveney Valley was considered but then dismissed. It is noted that effects on landscape character and visual amenity would be reduced if the length of underground cable in the WVA was extended, though it is also noted that underground cable options also inherently present concerns over impacts from construction (but persisting into operation) on the integrity of the historic field patterns (hedgerows could be replanted but trees could not be replaced) and landscape within the Waveney Valley. To the north, given the absence of any designated status (i.e. unlike the Dedham Vale it is not a National Landscape) pertinent to NPS EN-5 (DESNZ, 2024b), it falls to consideration of the level of effects relative to the test outlined from paragraph 2.9.23 of NPS EN-5 as to whether a change from overhead line to underground cable is justified.
- 4.6.14 In this case this is also informed by the extent to which some views from residential areas are filtered and screened. It is considered that the adverse effects of the overhead line do not meet the thresholds within paragraph 2.9.23 and even if they did are not at a level that would justify the additional cost associated with a northern movement of the CSE compound to beyond the residential area (requiring around a further 2 km of underground cable). Likewise, to the south the area is not subject to landscape designation (as with the section to the north it is not a National Landscape) in terms of NPS EN-5 and, with fewer numbers of potentially affected community receptors than at the northern end of the requested WVA northern extension, it is not considered that the adverse effects of overhead line engage the thresholds set in paragraph 2.9.23 nor justify the additional cost and effects of further underground cable. Therefore, no change to the CSE compound locations envisaged within the WVA was considered necessary and the siting of the CSE compounds to the north and south would remain as set out in the statutory consultation.

Refining the Underground Cable Design – Trenchless Crossings

- 4.6.15 Technical teams also considered the design required for different trenchless methods to be used to pass under the river valley. For HDD, primarily due to geology and the likely variability in drill direction, the length of drilling would need to be relatively short. This would increase the number of excavations (each potentially up to 8 m depth and extending to 200 m width) to launch and receive the drills, with consequent effects on tree removal and on the high organic matter soils. Additionally, the underground cable between, and to either side, of any HDD section, which would be shallower (buried at around a 1 m depth), would interact negatively with the WaLOR project as the naturalisation of the river channel would either need to be restricted or would present unacceptable risks to cable integrity.
- 4.6.16 Other trenchless techniques to avoid interactions with the WaLOR project (by use of driven pipes or tunnels) have been considered but would not provide a technically

acceptable solution for National Grid for the following reasons. Driven pipe techniques are unproven for underground cable installation of the length likely to be required to clear the areas of peat. Tunnelling would be possible but at a level of cost not considered to be compatible with National Grid's duties to be economical, nor consistent with the decision-making criteria of the Secretary of State as set out in Paragraphs 2.9.24 to 2.9.25 of NPS EN-5 (DESNZ, 2024b).

Conclusion on the WVA

- 4.6.17 Taking all this into account, alongside feedback from the statutory consultation and refinement of the overhead line design, it is considered that a solution that includes the use of underground cable would not be acceptable. It is acknowledged that there would be effects arising from overhead line infrastructure, but the level of such effects is not considered to meet the requirements set out at Paragraph 2.9.23 to 2.9.25 of NPS EN-5 in this area, which is not subject to a National Landscape designation. Additionally different undergrounding methods either give rise to a high level of impact on trees, high organic matter soils or the WaLOR project; present unacceptable risks to cable integrity; or are at a level of cost inconsistent with National Grid's duties and relevant planning policy (i.e. Electricity Act 1989 and NPS EN-5). It has therefore been concluded that an overhead line is the most appropriate solution to take forward for this section, with the final arrangement including one less pylon and a modified alignment compared with that presented at the statutory consultation.

Response to Feedback on Alternative Alignments Further to the West

- 4.6.18 In respect of alternative overhead line alignments, National Grid has reviewed its strategic studies and its corridor and route selection in light of feedback received, noting that the majority of feedback restates the respondents' preference for an alternative but does not present new information or suggest additional factors to be taken into consideration. The review considered the feedback in the context that an overhead line only option as presented at the statutory consultation is consistent with planning policy terms.
- 4.6.19 Overhead line alternatives further west, such as were identified in the 2024 statutory consultation in Figure 5.7 of the 2024 Design Development Report, are overall considered less preferred because they do not present an alternative with materially reduced effects and on some topics are materially worse. For example:
- A Grade I listed church (Church of St John the Baptist at Bressingham) would be passed at similar ground level around 550 m to the west, compared with the statutory consultation alignment which passes a Grade I listed church (Church of St Remigius at Roydon) at a closer distance of around 400 m but on lower ground
 - Ecological effects are considered to be greater (for the further west alternative and less consistent with Holford Rule 2) due to closer proximity (approximately 1 km compared with approximately 3 km for the alignment) to the various designations encompassing the area of Redgrave and Lopham Fens (variously SSSI, Ramsar site, National Nature Reserve, SAC). The route further west would also be through an area more central to the WaLOR nature recovery proposals than that of the Project alignment

- Alternatives further west would also lead to greater effects on high organic matter soils, which are more extensive to the west, when compared with the area crossed by the Project alignment
- Community effects are considered overall to be reduced (and more consistent with the Holford Rules supplementary notes) on the further west alternative. This is because there are slightly fewer residential properties within 200 m than within the same distance of the Project alignment (estimated at 18 compared with 25) and because it does not pass between the pinchpoint between Bressingham and Snow Street. With effects for the Project alignment reduced through filtering by existing vegetation and separations between residential property and the Project at distances generally greater than 200 m (a small number are at around 150m but others, including the more northerly properties at Bressingham Common which have less screening and filtering vegetation are at 300m), these potential reduced community effects are not considered to outweigh the increased ecological concerns and potential effects on peaty soils of the alternatives further west.

4.6.20 National Grid has concluded that, even without the difficulties raised by the WaLOR project in terms of cable affecting channel naturalisation, the effects of the use of overhead line for the Project alignment would not meet the levels (it is not a National Landscape and does not meet the thresholds in paragraph 2.9.23) to justify the use of underground cable. It was previously considered that the combination of effects, rather than any individual effect, may have engaged this aspect of the NPS EN-5; however, it has now been concluded that this is not the case. Nonetheless, it is recognised that others may take a different view so an alternative further west, incorporating the use of underground cable to replace a section of overhead line crossing the Waveney Valley, has also been considered. It was concluded that, even if the NPS EN-5 tests had been engaged, and an underground cable based solution considered, such an alternative to the west would be less preferred to the Project alignment and not justified for the following reasons:

- As the valley is wider further to the west, a longer length of underground cable would be required, compared with the WVA, in order to position CSE compounds outside flood zones and reduce effects on high organic matter soils. This would incur higher costs than presented for the WVA at the statutory consultation. Even if NPS EN-5 Paragraph 2.9.23 (DESNZ, 2024b) was engaged, the level of additional cost would mean that the use of underground cable is not justified against the Secretary of State's decision-making criteria
- Underground cable installation techniques on a further west alternative would be expected to encounter similar challenges to that of the WVA, given the same valley is being crossed only a short distance away and the WaLOR project area of interest also extends to cover this area. As such, this would require either more excavations for launch and receive pits or more extensive use of open cut trenching methods
- The use of underground cable would, subject to the siting of the northern CSE compound, be likely to reduce the effects of an overhead line on the Grade I listed Church of St John the Baptist at Bressingham. However, whichever underground cable installation method was adopted, there would be additional challenges to, and effects from, construction than from an overhead line alignment. These would result from the presence of more extensive areas of woodland and the presence of a number of water bodies which are potentially unavoidable around the launch

and receive pits for the multiple drives that would be required (one launch and receive pit for each of the 18 cables)

- As noted above, this area to the west is more sensitive ecologically than the area crossed by the alignment or areas to the east (see further below), with the effects from underground cable installation being expected to be more detrimental to the ecological interest (noting that to the east any solution involving underground cable would also impact high organic matter soils).

Response to Feedback on Alternative Alignments to the East of Diss

4.6.21

Alternatives to the east of Diss, such as those identified in the 2024 statutory consultation in Figure 5.7 of the 2024 Design Development Report, where there is an existing 400 kV overhead line from Norwich to Bramford (identified as the 4YM), were also reviewed in response to feedback at statutory consultation. It was concluded that, in terms of an overhead line connection, they remained less preferred to the alignment for the following reasons:

- An alternative route to the east would offer better access for construction traffic compared with either the alignment or the further west alternative, both of which would require Heavy Goods Vehicle (HGV) movements through Diss on the A1066. However, the overhead line or underground cable connection route to the east is longer than alternatives to the west of the town and as such is less consistent with Holford Rule 3
- A route to the east of Diss would have the potential for adverse effects on the Grade I Listed St Andrews Church at Frenze as a consequence of adopting a close parallel arrangement following the existing 4YM 400 kV overhead line to the east of the church. By routing close to the railway line to the west of the church, the potential heritage adverse effects would be reduced compared with passing to the east of the church and are comparable to the effects for the alignment
- Routing to the east would lead to community effects to two to three times more residential properties compared with either the alignment or the further west alternative, albeit some of these properties to the east would benefit from existing screening and filtering of views. It would also unavoidably position several residential properties between overhead lines (the proposal if it was routed here and the 4YM) with the lines close to both sides) at locations near Diss Business Centre and to the south of the A1066. While a route to the east of Diss would be less consistent with the Holford Rules supplementary notes, the landscape to the east is less sensitive to change
- A route to the east would need to cross Stuston Common where Diss Golf Club is located. This would have the potential for the construction access and construction works to restrict activity over several parts of the course for extended periods. The orientation of the crossing requires a number of pylons within the course (with construction access between them) unlike a golf course further south with oversail only. Additionally, the proximity of the existing 400 kV overhead line and residential properties (Stuston Hall and Lily Farm, both also Grade II listed buildings) to the south of the A143 would require either around a 2 km section of underground cable between CSE compounds, to cross under and then back under the existing overhead line, or repositioning of the existing overhead line to the east (called transposition and necessitating several periods of electrical outage) to create additional space for the Project, noting this would require additional angle pylons and more pylons overall.

4.6.22 While noting the reduced effects on landscape character and unchanged effects for heritage assets, the increased effects on residential amenity, the potential effects on the golf course, and the technical complexity, additional cost, and necessary outages to cross the existing overhead line, it was concluded that an overhead line alternative to the east of Diss is less preferred.

4.6.23 As set out above, while the area is out with any National Landscape and thus not one where the overhead starting presumption is reversed, it is also considered that the effects of an overhead line to the east of Diss are not sufficient to engage the criteria in NPS EN-5 Paragraph 2.9.23 (DESNZ, 2024b) justifying consideration of the use of underground cable. Noting that others may take a different view, this has nonetheless been covered in the main findings of an alternative incorporating some use of underground cable. Overall, this is considered less preferred with the level of additional cost not justified against the Secretary of State's decision-making criteria for the following reasons:

- It is likely that some residential properties would continue to be positioned closely between the existing and proposed overhead lines, given the need to route near to the railway line to reduce effects on St Andrews Church, from the close proximity in open views of parallel overhead lines and given the limitations of topography and general layout restrictions on CSE compound siting
- The same ground conditions (peat over gravel) as encountered with the WVA are expected in the vicinity of the River Waveney at the east of Diss, with similar restrictions on trenchless crossing length as noted for either the alignment or the further west alternative. As well as the effects arising from open cut trenching through high organic matter soils, a scheme incorporating a section of underground cable would also be expected to be more disruptive for a longer period to the activities of Diss Golf Club. The underground cable length required to the east would be around 25% greater than for the WVA (from north of the A1066 to south of Stuston Hall) and there would be conflict with the need to safeguard common land (identified along the route)
- The length of underground cable may be increased further to respond to the routing south of the golf course, required given the proximity of a residential property (which is also a listed building), closely alongside the existing 4YM overhead line.

Response to Feedback on Alternative Alignments Within the 2022 Preferred Corridor

4.6.24 An alignment within the 2022 preferred corridor has also been reviewed as it was raised as being preferred in feedback from some respondents, either as an overhead line only alternative or as overhead line with underground cable alternative, but both were considered to be less preferred for the following reasons:

- Route length for an alternative within the 2022 preferred corridor is expected to be comparable to that for the alignment. After back-checking the decision making, it has been concluded that adopting an overhead line only alignment within the 2022 preferred corridor would reintroduce the effects identified previously to be worthy of avoidance. It was concluded that these effects continue to be of a sufficient level to not require a change but to continue with the alignment. Those effects would be on the Grade I listed St Mary's Church at Wortham, passed on higher ground, compared with the alignment passing St Remigius on lower ground. It would reintroduce the likely oversail of parts of the Bressingham Steam

Museum and Gardens (an important local socio-economic site), would oversail a care and wellbeing business, and would increase the removal and thus effects on non-designated woodland. It would also either require a less direct route with greater angles (less consistent with Holford Rule 3) to avoid Brook Farm Airstrip or be likely to lead to closure of the airstrip due to the overhead line being unavoidably close with insufficient clearance for aircraft. An alignment within the 2022 preferred corridor is less preferred and has not been considered further

- Consideration of an alternative within the 2022 preferred corridor but with an element of underground cable is subject to the same difficulties as the alignment but compounded by a different pattern of constraints. The location is not designated as a National Landscape, nor are the effects considered to reach the thresholds in NPS EN-5 paragraph 2.9.23. Even if the effects did reach the threshold, the positioning of the Grade I listed St Mary's Church at Wortham would lead to extended length of cable meaning this alternative would be less favoured compared with WVA. The same ground conditions limiting trenchless technique deployment would also be expected.

Overall Conclusion on Alternative Alignments

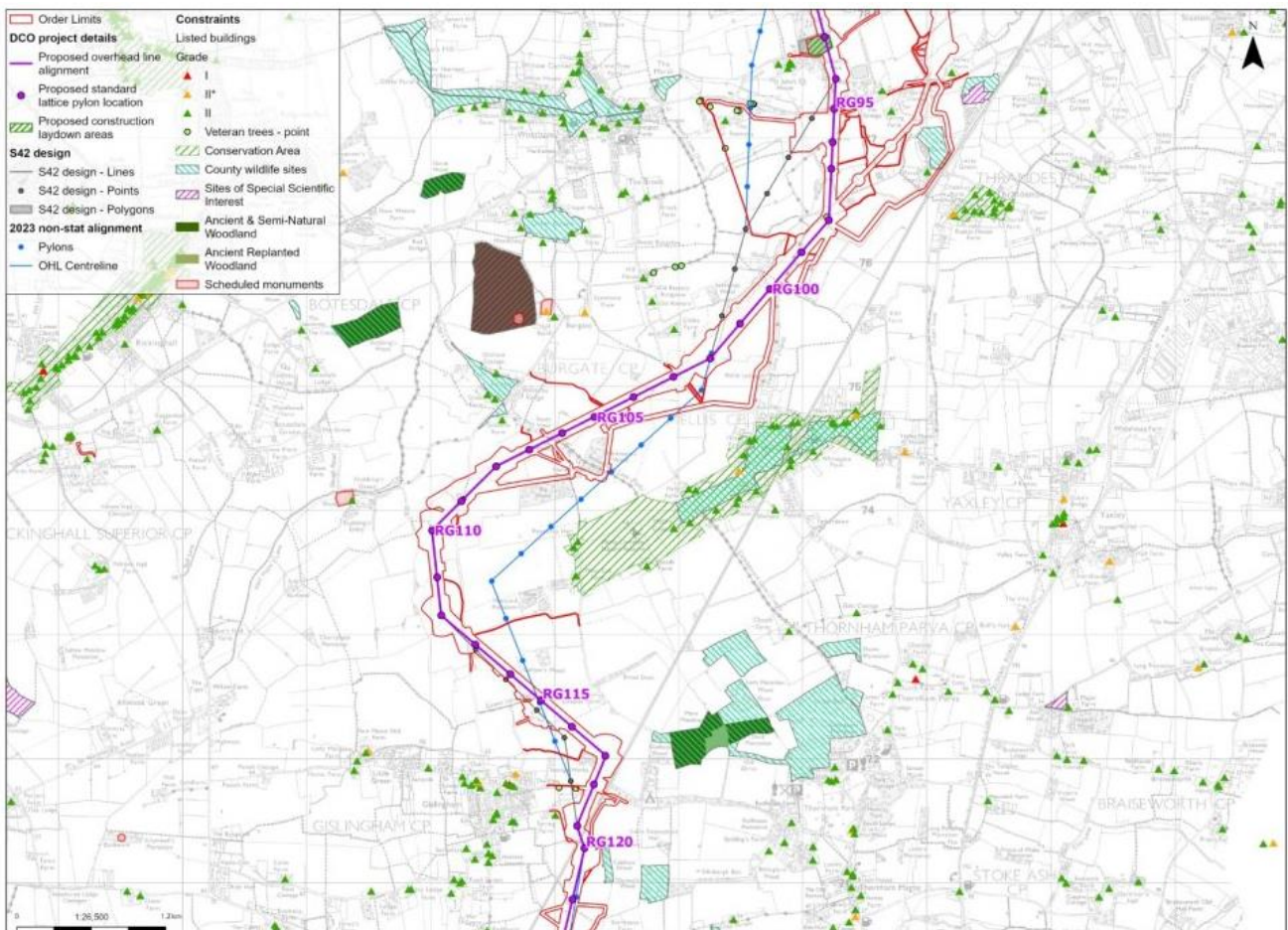
- 4.6.25 Overall, in terms of routeing at Diss for the crossing of the Waveney Valley, it has been concluded that the alignment (comprising an overhead line) is preferred. Despite the refinement since the statutory consultation, effects arising from the overhead line, including on landscape, community effects and heritage assets, are acknowledged. However, they are not considered to be at a level that engages the policy tests in NPS EN-5 (DESNZ, 2024b) for the use of underground cable in circumstances where the land is not associated with nationally designated landscapes. Even if the test were engaged, there would be detrimental consequences from the use of underground cable either for the WaLOR project, on ecology and soils, or because it is at a cost not justified in terms set out in NPS EN-5.
- 4.6.26 Alternative routes with some element of underground cable meet similar challenges. It is National Grid's opinion that these alternative routes are less preferred and that tests in NPS EN-5 Paragraph 2.9.23 are not engaged. Even if the tests were engaged, National Grid's view is that the level of effects are insufficient to clearly meet the terms required by the policy and also that, given the additional adverse effects arising from the installation of underground cables, the change in level of effects does not justify the additional costs. On this basis, it is considered that the alignment comprising overhead line remains preferred.

5. Section B Suffolk – Siting and Routeing Alternatives Considered

5.1 Adopting 132 kV Alignment – Palgrave to Mellis

5.1.1 Feedback in this area (RG94 to RG102) is somewhat conflicting. Feedback from residents in Palgrave responded that the alignment should revert to the earlier 2023 preferred draft alignment which was further from Palgrave. Feedback from the residents at various properties at the Old Rectory and Glebe Farm, to the south of Brook Farm, requested that the alignment adopted more of the existing 132 kV overhead line route (i.e. further to the north-east adopting the alignment up to around PKF30 rather than PKF25) to increase the beneficial filtering provided by existing trees, thereby reducing effects on their visual amenity. National Grid’s aviation advisers also identified, from feedback and subsequent engagement with the operator, that to achieve the necessary clearances to allow continued flight activity at Brook Farm airstrip pylons RG96 and RG97 needed to be positioned slightly further to the east. Figure 5.1 shows the sequence of evolution of the Project in the area between Palgrave and Gislingham.

Figure 5.1 Route alignment evolution at Palgrave



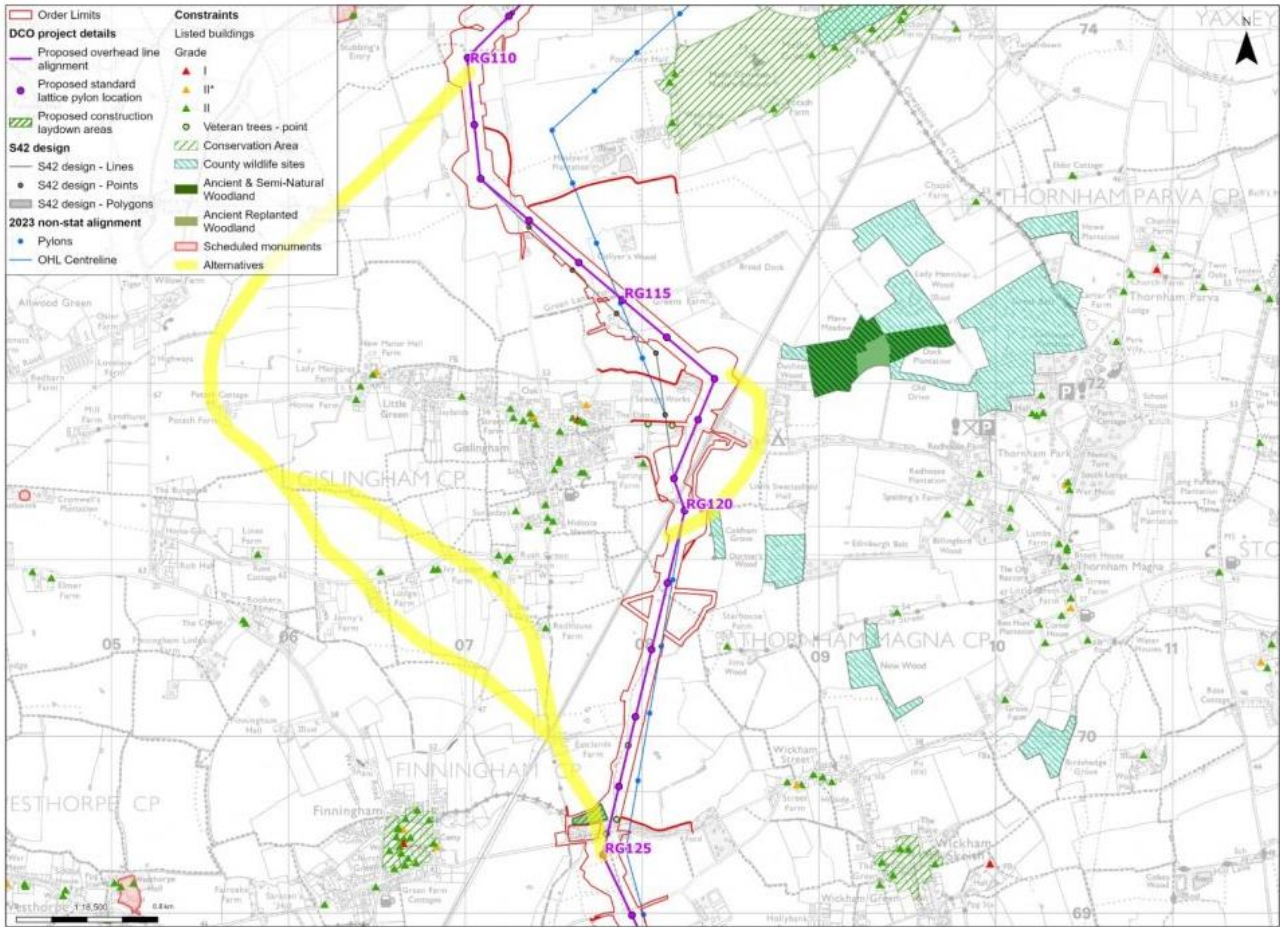
- 5.1.2 The proposed change reduces the angle of direction change at RG94 so that the alignment is more directly to the south before turning to the south-west at a repositioned angle pylon to the south of the 132 kV pylon PKF30, connecting to the 2024 draft alignment at RG102, which again is at a slightly reduced angle. Achieving the change requires the replacement of an extended length of the 132 kV PKF overhead line by 132 kV underground cable back to PKF35, removing an additional five pylons over a distance of around 1.9 km. The extent of 132 kV overhead line replacement with underground cable is governed by technical factors and to some degree by a beneficial reduction in potential cumulative effects and reduces the potential inconsistency with Holford Rule 6 in respect of wirescape. This reduction in effects and the scale of change benefits properties alongside the A143 at and between Spring Farm and Valley Farm, several of which would otherwise be closely positioned between overhead lines.
- 5.1.3 The change of alignment is considered neutral in terms of Holford Rule 3 with the same number of angle pylons and a route length difference of just over 100 m in a total length of around 2,500 m. It allows flight activity at Brook Farm airstrip to continue, though it is noted that this activity relates to use by only one or two aircraft. Preservation of the relatively limited level of use is not considered to constitute a major socio-economic benefit but does accord with the NPPF (Ministry of Housing, Communities and Local Government, 2024) position which seeks to maintain the availability of general aviation facilities.
- 5.1.4 The amended alignment moves closer to residential properties to the east (Mellis Lodge, and the Grange), albeit these are now at similar distance as several residential properties to the west around The Old Rectory with most being at around 350 m to 400 m. The change does not move pylons any closer to Palgrave where the amended alignment would be at around 1 km beyond the existing 132 kV overhead line. Overall, the change is considered consistent with the Holford Rules supplementary notes.
- 5.1.5 This change of alignment has consequential need for amendments to temporary and permanent access arrangements and also requires modification to the temporary compound positioning to the south of the A143.
- 5.1.6 Feedback requesting further 132 kV overhead line removal northwards to Diss substation has been considered but is not preferred to the change incorporated. Levels of potential cumulative effect arising from the combination of the 400 kV overhead line and the existing 132 kV overhead line are not considered to justify a need for further mitigation.

5.2 Gislingham

- 5.2.1 Feedback around Gislingham raised concerns about the proximity of the alignment (around RG112 to RG119) to properties along the northern and eastern edges of the village. Specific changes requested were to consider alternative routes passing to the west and south of the village (see Figure 5.2), to cross the railway line to the north of Thornham Road and to amend the alignment to pass to the east of an area of woodland closer to the railway. Other concerns were expressed about effects on trees, potentially including veteran trees, from the use of a track between Thornham Road and Coldham Lane to the eastern edge of the village and an area adjacent to the south side of Thornham Road as a temporary construction compound.

Routing at Gislingham

Figure 5.2 Alternative routes at Gislingham



- 5.2.2 If the alignment were to be moved to pass the west side of the village there would be reduced community effects for those within a number of properties to the eastern and north-eastern edges of Gislingham. However, those effects would be transferred to occupiers of other residential properties to the western and southern edge of Gislingham and potentially to the north-eastern side of Finningham, depending on the route used to return to the alignment. Additionally, any route to the west would also pass between properties less than 150 m apart, whereas this is the minimum separation distance to the closest residential properties when routed to the east. As a result of this, a western alternative route is less consistent with the Holford Rules supplementary notes.
- 5.2.3 In regard to heritage assets, a route to the west would increase separation to the moat to the west of Mellis Common but would require an alignment passing closer to a greater number of listed buildings, albeit overall there is considered to be no major difference in consistency with Holford Rule 2. However, the alternative to the west is considered less consistent with Holford Rule 3, being around 500 m longer with at least one more pylon. Overall, this requested change is considered to be less preferred to the alignment and has not been taken forward.
- 5.2.4 It is proposed to take forward a change requiring an additional pylon to be added, whereby RG116 becomes a suspension pylon with RG117 becoming an angle change pylon and relocated to the north-east. This change moves the alignment up to 100 m further from multiple properties at the northern edge of the village (around

400 m from RG116) and positions the angle pylon, now proposed at RG117, behind an established woodland. This reduces the separation of the residential property at Greens Farm by a similar amount, though it remains at approx. 300 m. Overall, the change is considered more consistent with Holford Rules supplementary notes. The change also allows for repositioning of temporary access arrangements, which is more consistent with Holford Rule 2, by reducing the need for tree management, including of veteran trees (now avoided), to achieve necessary visibility splays.

Railway Crossing and Compound Location at Gislingham

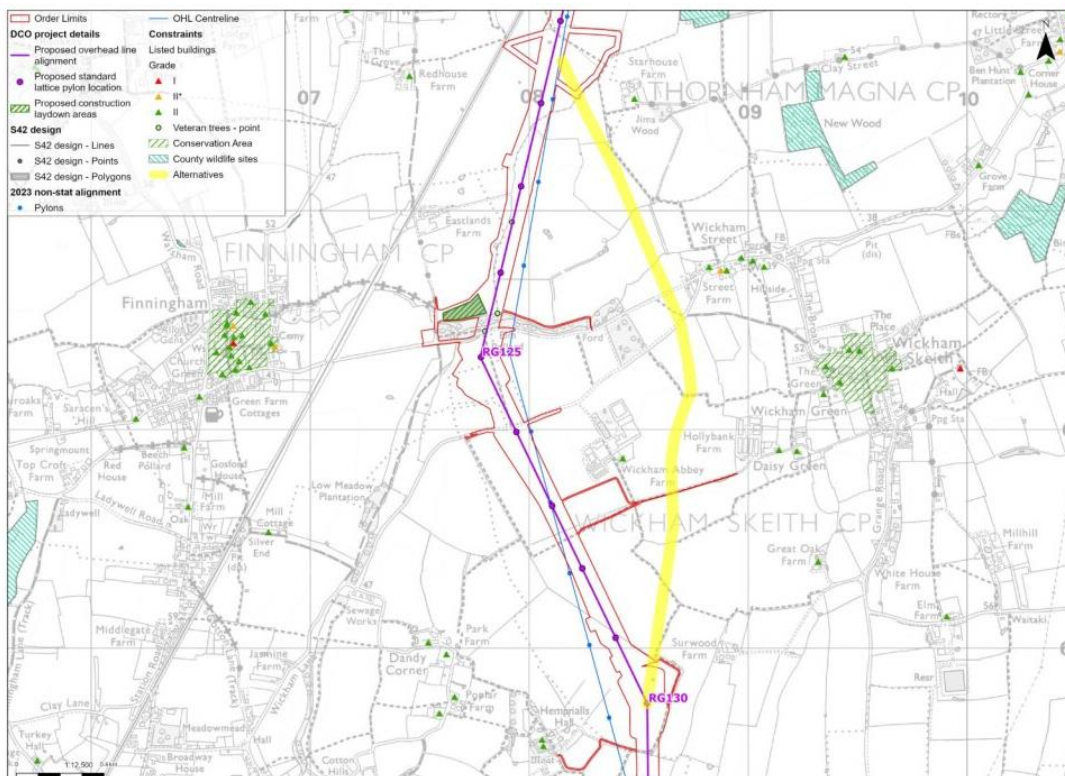
- 5.2.5 A more northern crossing of the railway has previously been proposed, and feedback was provided to the statutory consultation that the identification of residential properties (indicated by address point data) to the east was incorrect, with site activity comprising a seasonal event-focussed campsite. As a result, the feedback suggested crossing the railway to the north of the road was less disadvantageous than National Grid had previously assessed. Adopting this change would remove one angle pylon but be a slightly longer route as a result of positioning the overhead line to the other side of the railway line from Spring Farmhouse (a Grade II listed residential property). This would reduce heritage effects and potentially residential amenity effects at the property, noting however that some filtering of existing views is provided by existing vegetation. Effects would change to the east of the railway line from impacting residential properties to potentially affecting the campsite events business. There would be a requirement to clear trees from woodland alongside the road, with tree removal being greater on this alternative than for an amended route remaining to the west of the railway until south of the road. On balance, no change from the consultation alignment is proposed as effects substantially transfer to different receptors but from an initial position where the effects are not of themselves unacceptably in conflict with policy.
- 5.2.6 A requested change to cross the railway line further south, changing the pylon nearest Spring Farm from an angle pylon to a suspension pylon, was considered but is less preferred. Pylon RG119 is at around 200 m from the residential property with some filtering and screening of view by existing trees surrounding the property. A more southerly crossing position is less preferred as it would increase residential amenity effects for several properties along High Street (less consistent with the Holford Rules supplementary notes), in part because of a change to an angle pylon to make a sharper change of direction. It is also not preferred due to greater effects on heritage assets by closer routing to several listed buildings to the south of the village.
- 5.2.7 A change to the temporary construction compound location from its position to the south of Thornham Road is also being taken forward, moving it to alongside and to the west of the railway line on the northern side of Thornham Road. The change partly arises from the modification to the alignment being taken forward but also reduces the potential for effects on veteran trees (with two removed from the Order Limits) and adopts a location benefitting from screening/back-clothing by the railway embankment. It also responds to feedback to not use a track between Thornham Road and Coldham Lane as a right of permanent access for occasional maintenance activities and inspections. The alternative suggestion, to access Coldham Lane from High Street, has been reviewed and concluded that this would provide a suitable route for this access. It removes the requirement for vegetation management and avoids the effects that would otherwise have occurred. It has therefore been taken forward as the preferred arrangement for permanent access.

5.3 Wickham Skeith to Mendlesham Green

Wickham Skeith

- 5.3.1 Feedback at the northern part of this section requested a route (between around RG120 to RG130) moved further east to avoid a belt of woodland, by passing between Wickham Abbey Farm and Wickham Skeith, where it was noted that a proposed solar development was likely to have already affected the heritage assets and thus, in the respondent's view, removing the justification not to follow an alternative alignment northwards from around RG130 (see Figure 5.3). Feedback also noted a preference for siting pylons on field boundaries, a repositioning of the temporary construction access road and modification to the permanent right of access.
- 5.3.2 Where the alignment passes to the west of Wickham Abbey Farm, this has not been changed. Even if the details of the solar proposal were known, the effects from ground-mounted solar development on heritage assets are very different to those of 400 kV overhead line. Effects on a belt of woodland would be removed, but effects on various heritage assets within Wickham Street and Wickham Skeith would be increased along with effects on community receptors, albeit some would be a transfer from other similar receptors. However, it is not considered that the ground level solar proposals would lead to an effect on heritage assets to such an extent to justify a change and increased heritage effects. On this basis, no change to the alignment has been made.
- 5.3.3 It has not been possible to position additional pylons to field edges, but the construction access road has been amended to align with a requested realignment. Additionally, a suggested alternative permanent right of access to the south of Hempnalls Hall is acceptable and has been incorporated within the Project design.

Figure 5.3 Route further east at Wickham Street



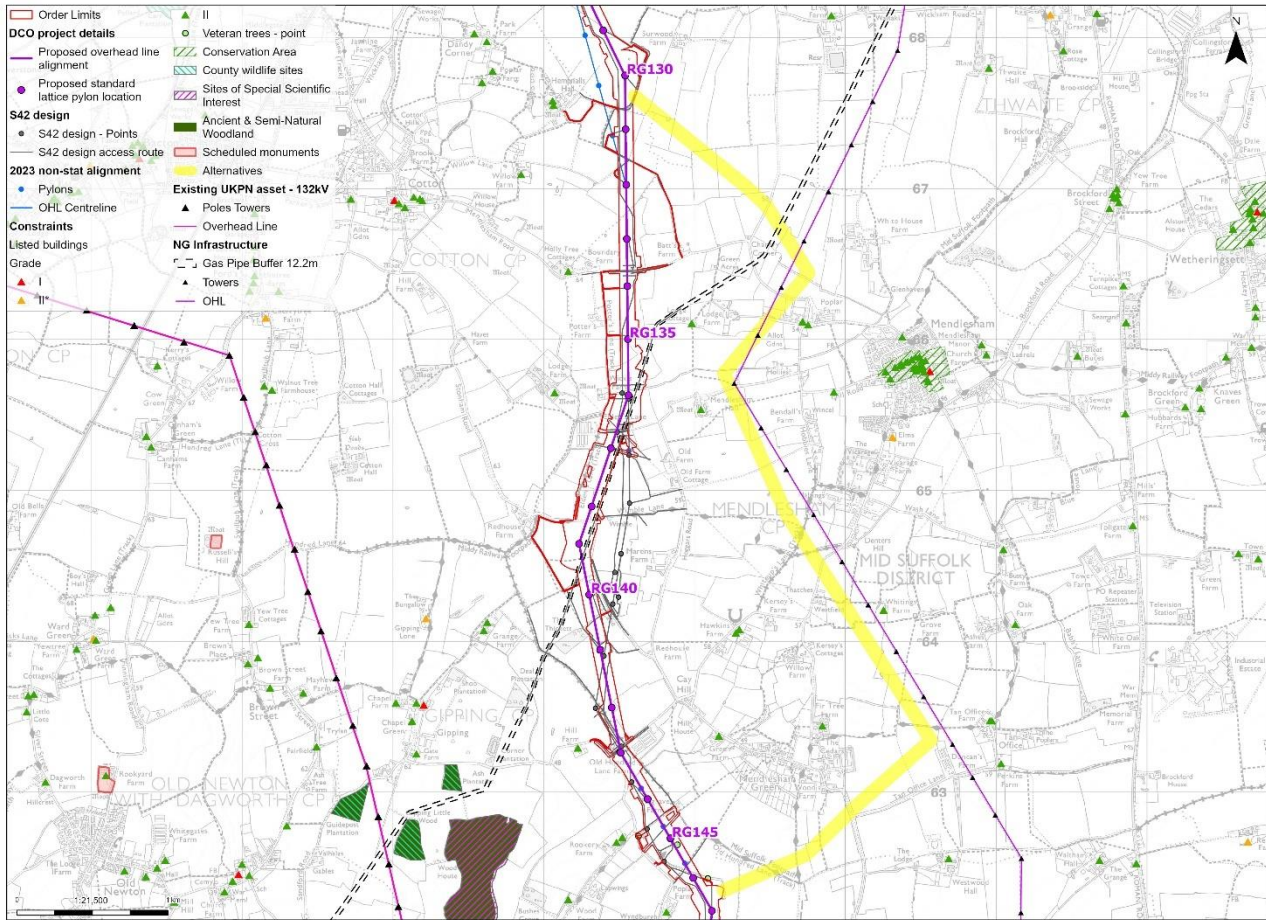
Mendlesham

- 5.3.4 Other feedback related to the alignment further south in the area around RG136 to RG143 and its proximity to residential properties, preference for field edges or existing tracks to be used for temporary and permanent works access, realignment to reduce tree removal at the corner of the woodland on Elden's Lane (east of RG137) and a preference for field edge routes for lower voltage diversions to reduce potential effects on an area of perceived ecological interest adjacent to the woodland east of RG137.
- 5.3.5 Feedback suggested various ways of delivering an alignment with more close paralleling of the existing 400 kV overhead line. The potentially most achievable of these would involve a continuation of the alignment in a south-easterly direction from RG130 towards, and then closely paralleling the existing 400 kV overhead line (referred to as the 4YM) to the south. It would then reconnect with the alignment to the south of Mendlesham Green around RG147. This change was proposed to reduce, from the various respondents' perspectives, the effects on residential amenity from locations such as Cay Hill and around Hempnalls Hall, and a number of other individual properties, including a number positioned with the overhead line relatively close to either side of the property such as Mendlesham Hall. Changes were also proposed to reduce effects on agricultural operations.
- 5.3.6 These alternatives have been considered but none are preferred. Although some feedback referred to the close parallel route being on lower ground this is not always the case, and the difference does not provide a clear basis for changing the alignment. In general terms, close parallel alternatives are less consistent with Holford Rule 3 as they are less direct and require additional angle changes for a relatively limited degree of close parallel alignment. In the alternative outlined above, the amended alignment would be around 1.2 km longer with potentially two additional angle pylons and larger changes of direction than the statutory consultation alignment. The increased route length would increase effects on agricultural activities. An indication of the route is provided in Figure 5.4.
- 5.3.7 The presence of other constraints, such as the gas pipeline and the existing 4YM overhead line, also increase the level of construction and future maintenance risks. For the alternative described above, additional construction risks and challenges arise from a need to cross the gas pipeline close to the existing overhead line. Here, leaving aside the requirement for space for maintenance of the gas pipeline, enough space is needed for both the stringing of the conductors for any new overhead line and for the future maintenance or refurbishment of the existing and proposed new overhead line. Responding to such risks would require further additional angle pylons and a greater degree of alignment separation at the larger angle changes of direction to create appropriate working areas. This could require the nearest pylon (an angle pylon) and the alignment to be sited very close to the Grade II listed Mendlesham Hall.
- 5.3.8 There would be changes in effects that are then transferred if close paralleling was adopted. For example, close paralleling avoids or reduces residential amenity effects for some properties close to the Project alignment, but the residential amenity effects are increased for other properties close to the existing 4YM overhead line that would be subject to greater effects from seeing both lines close paralleled. Increased effects are particularly the case for properties to the southern and eastern edge of Mendlesham Green and for those properties to the north and south of the close parallel section where the proposed and existing overhead lines converge/diverge.

Some residential views may have potential effects removed, such as westwards views of the proposed alignment from properties at Cay Hill, but at least some of these effects would transfer to other residential properties particularly close to the convergence points of the overhead lines. Similarly, some reduction in potential heritage effects would occur for some grade II listed assets but would be transferred to some degree to other assets, albeit there may be a slight reduction in overall heritage effects therefore increasing compliance with Holford Rule 2.

- 5.3.9 Taken together, and in the context of effects arising from the alignment being considered consistent with the Holford Rules and planning policy, the changes in levels of effect from close paralleling are not considered to offset the additional length of connection required (and reduced consistency with the Holford Rules) and engineering risks raised in this section. On this basis, the requested change to close parallel the 4YM is not preferred and therefore has not been taken forward.
- 5.3.10 Feedback was also provided about the localised alignment around RG138 in relation to potential proximity to proposed independent living accommodation and the impact on residential amenity because the alignment crosses open views to the south. The proposed accommodation has potential to be oversailed by the conductors under crosswind conditions (assuming maximum blowout and movement within the Limits of Deviation). An alternative was considered to pass to the west of the property. This would deviate from RG136 and reconnect to the alignment at RG143. The Holford Rules generally do not provide particular guidance in this case as there is no material difference between alternatives to the east or west of the property, which are of similar lengths and cross similar land uses. The alternative may have one additional angle (reducing consistency with Holford Rule 3), but this is countered by greater compliance with the Holford Rules supplementary notes by an increase in the likely separation from the property to around 100 m and removal of the potential oversail. This change would also reduce effects on residential amenity by moving the nearest pylons to the edge of views (e.g. RG138) compared with the positioning at statutory consultation. Overall, the alternative to the west, for the reasons above, is therefore preferred.
- 5.3.11 The change would also facilitate a modification to the temporary access arrangements between RG134 and RG137 to respond to feedback for temporary construction access to be routed close to field boundaries where possible. Some deviation from field boundaries is required for the site access point position to meet highway safety requirements. There is also potential to incorporate the requirement with existing tracks subject to establishing suitable measures to maintain safety for users of PRoWs.
- 5.3.12 In terms of ecological interest, the modification of the alignment southwards from RG136 removes the potential for oversail of woodland and thus for potential tree removal. Modifications to the diversions of lower voltage connections are possible between RG136 and RG138 for the underground cable to be routed around field edges. This reduces potential effects on ecological interest (therefore more consistent with Holford Rule 2) and also reduces the potential interface with agricultural activity in line with feedback.

Figure 5.4 Close parallel at Mendlesham



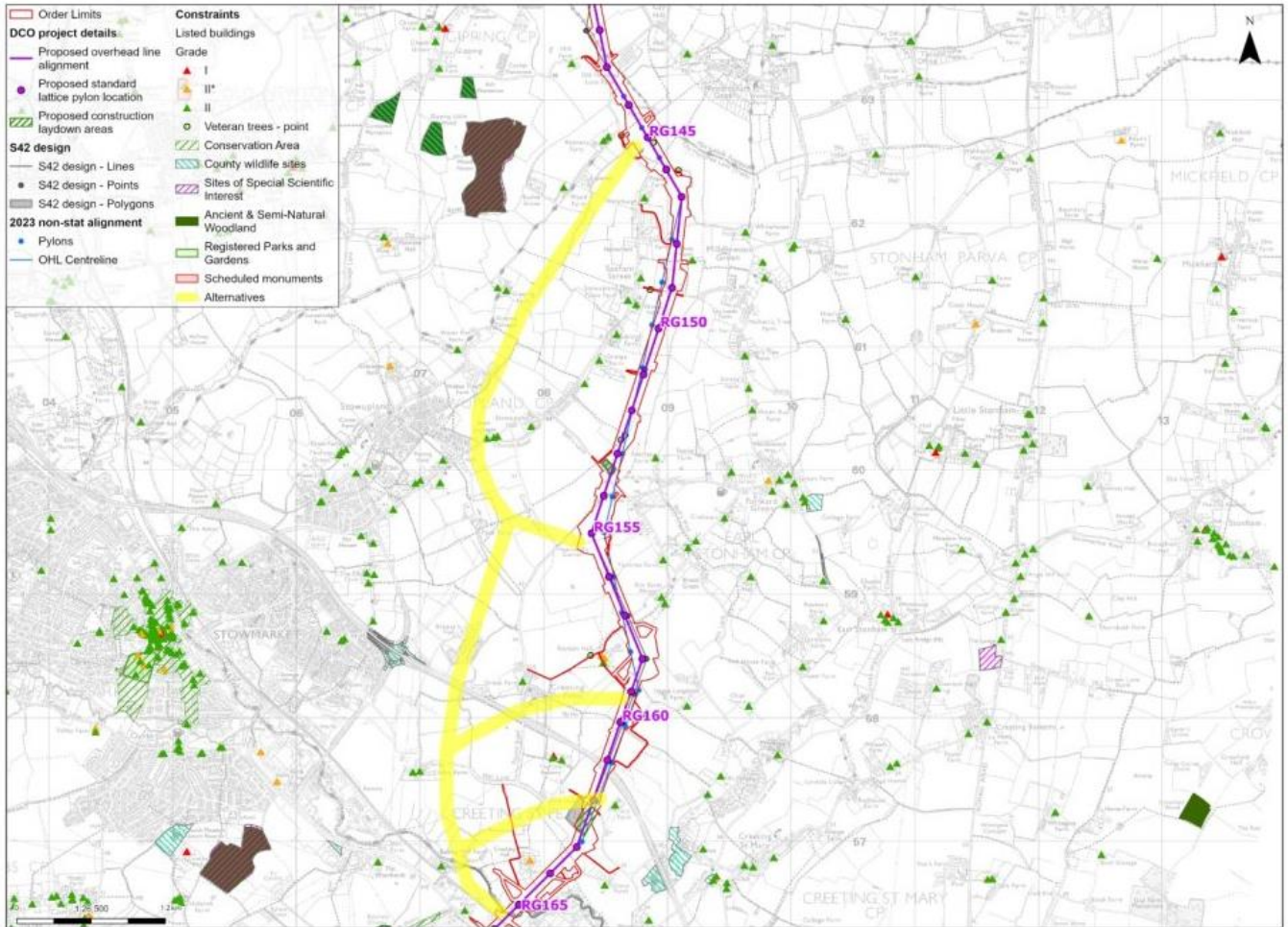
5.4 Mendlesham Green to Creting St Peter

- 5.4.1 Responses repeated an expressed preference for a route deviating further to the west around RG143 and being to the west of Saxham Street before crossing back to the alignment over the grounds of Stowupland Hall. In the absence of new information or further factors to consider, this continues to be less favoured. While in part following a shallow valley, it would require additional and larger angle changes than the alignment so would be less consistent with Holford Rule 3. There are also limitations on opportunities to cross back to the alignment with the suggested (and largest) gap at Stowupland Hall constrained by a planning application for light industrial units. Other gaps would position additional residential properties within 100 m of the alignment. No change is therefore proposed. This is shown on Figure 5.5.
- 5.4.2 Feedback requested a modification at RG157 to move the alignment around 20 m to the west to avoid oversailing the curtilage of a private property. This change was made with only minor adjustments by moving the angle pylon RG158 west by approximately 35 m and with very slight benefit to the Grade II listed farm house (The Elms) but otherwise no material change in effect on other receptors.
- 5.4.3 Feedback also restated a preference for alternative alignments that would pass to the north and west of Creting Hall to either reduce effects at the hall or more generally position the alignment closer to the Gateway 14 development (see Figure 5.5). The latter alternative was suggested in conjunction with a Grid Supply Point substation

and removal of lower voltage lines from Stowmarket Substation to Bramford, which would at least in part reduce effects on the setting or direct effects on Badley Conservation Area. However, it is considered that the effects arising from the Project are at a level that would either not justify the additional costs of further undergrounding of the existing 132 kV connection nor justify, as necessary mitigation, the replacement of the existing 132 kV connection by making the connection via the 400 kV network and a Grid Supply Point substation.

- 5.4.4 Alignments closer to Gateway 14 have been considered previously (reported within the 2023 and 2024 DDRs). In the absence of new evidence or identification of further factors they continue to be considered less preferred, with the main reasons being the effects from the alignment passing close to several residential properties at the western side of Creeting St Peter.
- 5.4.5 In terms of suggested alternative routing to the north and west of Creeting Hall, this is assumed to be achieved either by a diversion from RG158/RG159 and passing between the Church of St Peter and Creeting St Peter or from RG162 passing just to the south of Flint Hall (see Figure 5.5). While it is acknowledged that this would place the alignment to the same side of a property as other infrastructure, neither is preferred and no change has been taken forward. The more northern alternative would pass at just over 100 m to the north of the Church of St Peter, a Grade I listed building. No other Grade I listed building along the Project is passed this close and, as well as being less consistent with Holford Rule 2, this would potentially cause significant adverse effects. It would also require more and greater changes of direction and is therefore less consistent with Holford Rule 3. The alternative passing south of Flint Hall is also less consistent with Holford Rule 3, requiring more and greater changes of direction. It would also slightly increase effects on the listed buildings (Grade II and Grade II*) at Creeting Hall by passing to the north and west side (compared with just the south side with the proposed alignment). It would also increase visual effects at Flint Hall with the alternative expected to have to be within around 150 m of it (compared with approximately 400 m for the alignment). Taken together, no change has been made to the alignment in this area.
- 5.4.6 Feedback also requested that a different route be used for the permanent right of access to RG164 and RG165, with access via the road to Creeting Hall and passing the west and south of the properties rather than from the east using a bridge over a watercourse. In general, the identification of permanent right of access for future light maintenance and operations inspections has sought to follow the routes that the owners of the land on which the pylons are sited would take to gain access. Such access typically avoids crossing third party land. In light of the request and land ownership details, the change has been taken forward.

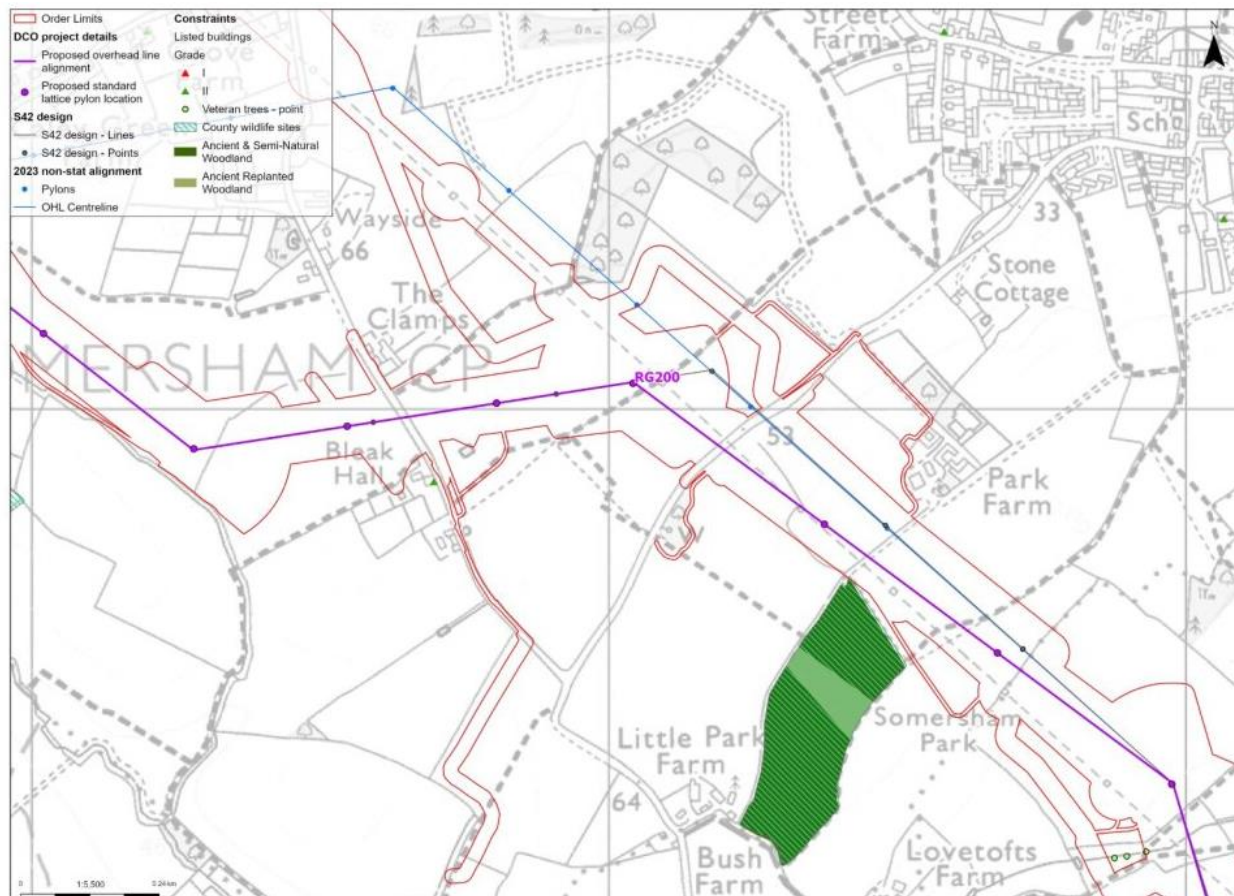
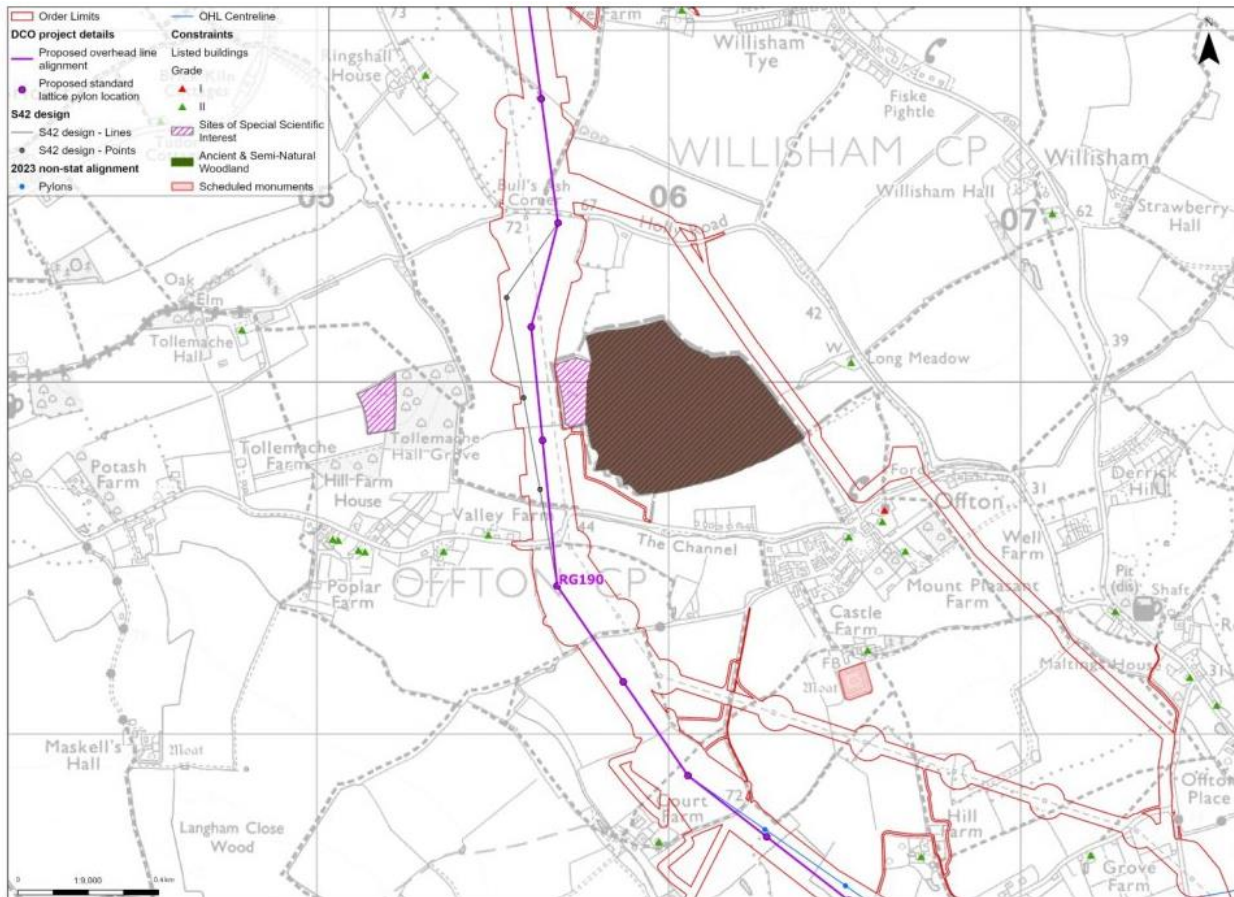
Figure 5.5 Alternative routes near Stowupland and Creting St Peter



5.5 Ringshall Stocks to Bramford

5.5.1 Feedback in the area from around RG180 to RG200 identified a preference for a change to the alignment in two locations where it was constrained by the presence of an existing 132 kV overhead line (the PI line). The two locations were to the west of Middle Wood (north of Offton) and to the west of Park Farm (south of Offton). In both cases the preferred final design solution is for the 132 kV overhead line to be replaced by 132 kV underground cable. See Figure 5.6 a) and b) below.

Figure 5.6 a) Middle Wood (top), b) Park Farm (lower)



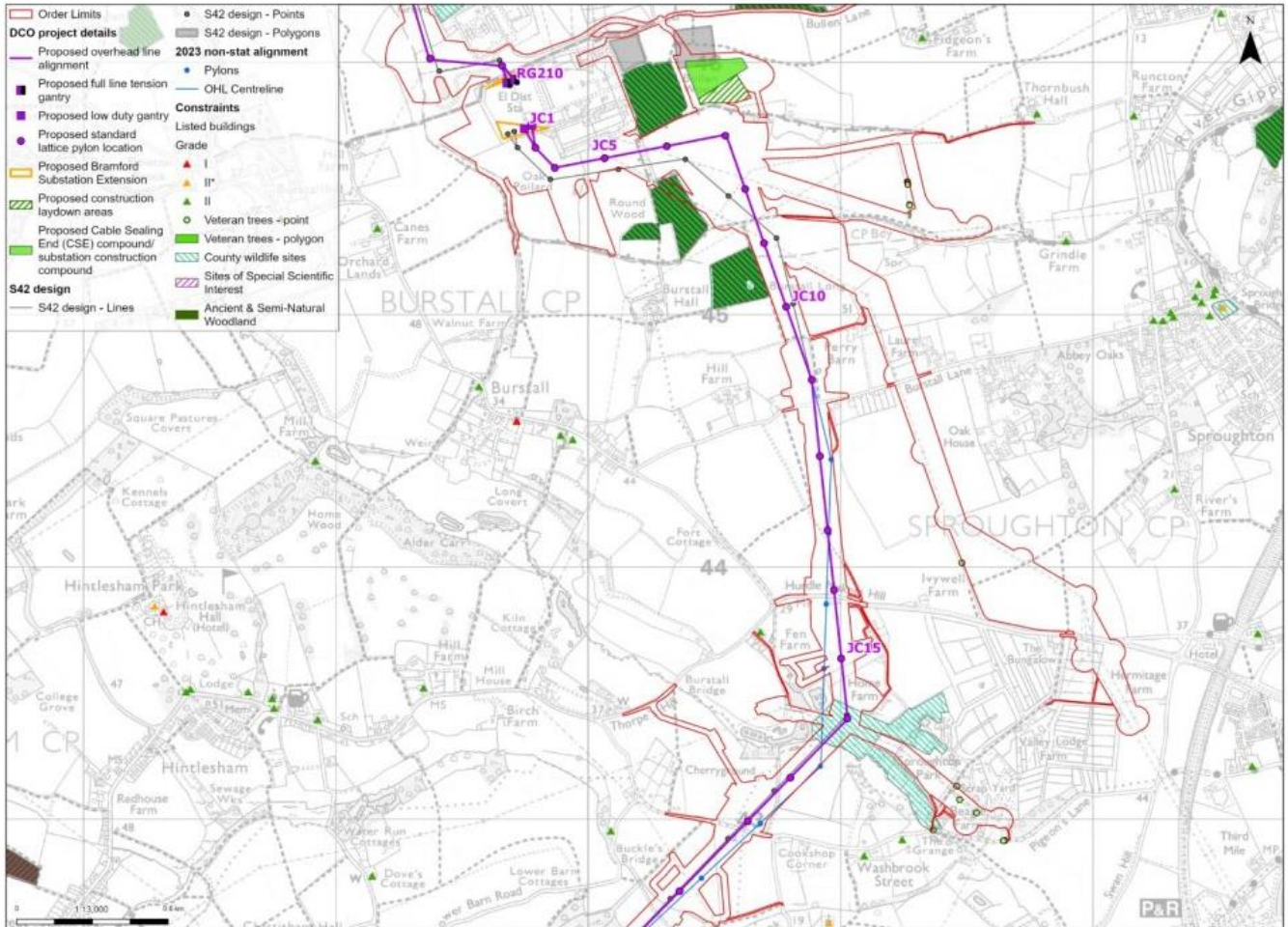
- 5.5.2 By replacing this 132 kV overhead line with an underground cable prior to the 400 kV Project construction, pylons (RG188 to RG189) can be positioned closer to Middle Wood (albeit still maintaining enough separation so as not to affect the ancient woodland and SSSI habitats). The realignment allows one pylon to be removed from the design, though also one pylon would be increased in height by one extension (3 m). This means the amended alignment would also benefit slightly from more back-clothing by the woodland and the angle changes will be slightly reduced, increasing consistency with Holford Rule 3.
- 5.5.3 The replacement of the 132 kV overhead line with underground cable prior to the construction of the Project also allows for an increase in the separation of the amended alignment to residential property at Park Farm (around RG 201) which can be almost doubled. Beneficial effects also arise from the move further from the house of the construction access road. The increased separation from the property increases consistency with the Holford Rules supplementary notes and would marginally shorten and straighten the alignment.
- 5.5.4 Following further design, the proposed alignment for the undergrounding of part of the existing 132 kV overhead line (referred to as the PI line), from north of Middle Wood at Offton to the south-east of Flowton, has also been modified. The length has slightly increased, and as a result of this the 132 kV underground cable route is outside the 2024 draft Order Limits in a number of locations:
- Around 132 kV pylon PI17, the route deviates to the west of the draft Order Limits to follow alongside field boundaries to reduce effects on agricultural use and avoid a veteran tree
 - To the north of the draft Order Limits near PI21, the route follows the field boundary to reduce the effects on agricultural activity
 - To the west of the draft Order Limits near PI25 to cross Blood Hill at a location where effects on trees can be avoided, to follow field boundaries and to seek to avoid a field otherwise unaffected by the works
 - To the east of the draft Order Limits west of Offton to follow the field boundary to the extent possible before crossing the field in a direction that would minimise disruption to agricultural use during construction
 - To the west of the draft Order Limits to the north of Offton Church to follow field boundaries and cross fields in an alignment that would minimise disruption to agricultural use during construction.
- 5.5.5 Very localised modifications to the alignment have also been made in response to feedback, for example to either side of RG182 the alignment has been moved slightly south-east to provide clearance from fishing lakes and as a result achieves in excess of 30 m clearance from the swung conductors. This avoids the need to seek to constrain fishing activity. Similarly, between RG195 and RG196 the temporary construction access road has been moved to the end of a field. This has reduced the interaction with activities on a small holding that is being established. It is not possible to avoid the field entirely due to a gas pipeline immediately to the north.
- 5.5.6 Pylons JC1 to JC9 are actually within Section B, but are discussed at the start of Section C given the influence on their positioning of routing factors that are within Section C.

6. Section C Babergh and Tendring – Siting and Routeing Alternatives Considered

6.1 Bramford Substation to Raydon CSE Compound

- 6.1.1 Feedback in this section was concerned that the connection point (for the connection from Bramford to Tilbury) into the substation was too far to the west and should have been made at the lower lying eastern corner. Other feedback related to specific pylon positioning relative to other infrastructure, the main views from residential property and to specific detail of the lower voltage diversion works. Respondents also restated previous preferences for the underground cable section through the National Landscape to be extended to the north closer to, or in some case all the way to, Bramford Substation, or for the overhead line alignment to take the route of the existing 132 kV overhead line towards Lawford Substation of the DNO.
- 6.1.2 The contours on the Ordnance Survey 1:25k maps do not indicate any substantial ground level change along the southern boundary of the substation, so it is not the case that a change would actually be onto lower lying ground. As it is, the connection point at the substation cannot be moved substantially further east as the south-eastern part of the substation is occupied by UK Power Networks and provides the link to the distribution network. It is impractical and economically inefficient to consider relocating all of that infrastructure. It is however possible to move the gantries (JC1 and JC2) and pylon JC3 around 60 m to the east. This would also move pylons JC4 to JC8 slightly to the north, increasing the separation to viewpoints to the south and slightly increasing the potential for foreground screening features (blocks of woodland) to filter views. Two angle pylons have also been replaced with a single larger angle pylon (JC7) which positions the angle pylon further from residential properties. This is shown in Figure 6.1.

Figure 6.1 Alternatives south of Bramford



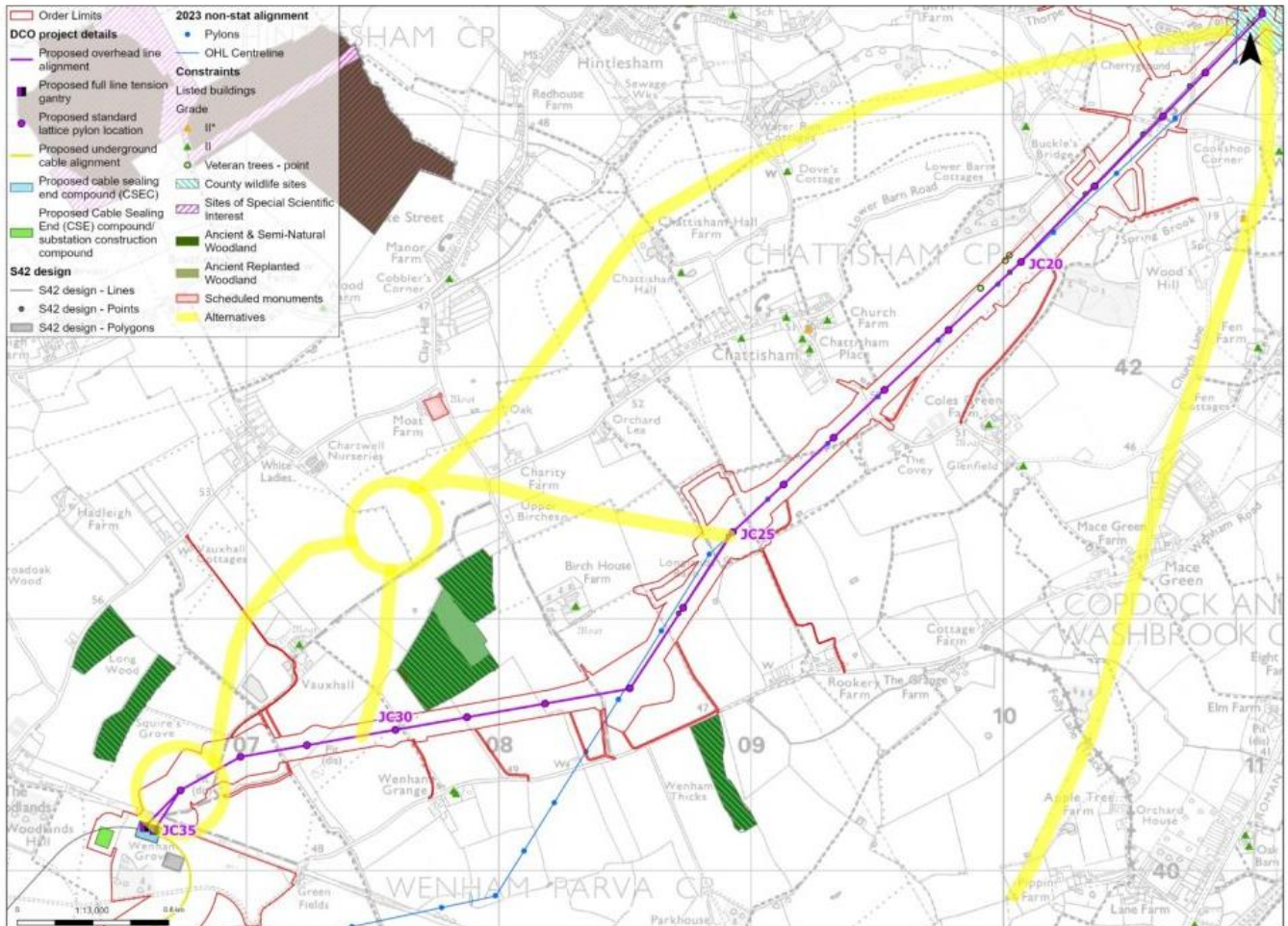
- 6.1.3 Feedback identified the potential for interaction of a temporary construction compound with a third-party battery storage project (to be located just to the east of Bramford Substation). Through discussion with the developer, an alternative location for the temporary compound, slightly to the south, has been identified in combination with a 1.8 km upgrade of access track arrangements. The compound is moved further from listed buildings and further from local receptors with a reduced impact on PRoW.
- 6.1.4 Small adjustments to pylon positions within the draft Order Limits have been made to increase the potential to filter or screen views of JC16 behind existing vegetation, and to position pylon JC18 to the north of Washbrook Street/Pigeons Lane out of a main view from a nearby residential property (see Figure 6.1). Adjustments have also been made around JC25 to reduce the potential to interact with the new Anglian Water pipeline in response to further detailed routing information.
- 6.1.5 Similarly, following further design, the proposed alignments for the undergrounding of parts of the existing 132 kV overhead lines to the south of Bramford (referred to variously as the PCB, PHB and PLD lines) have been modified. As a result of this, the 132 kV underground cable route was modified and as such the Order Limits were modified. These are as follows:
- PLD
 - To the north of the draft Order Limits, to the north of PLD48, to follow alongside field boundary to reduce effects on agricultural use

- PHB
 - To the north of the draft Order Limits, to the north of PHB28, to follow alongside field boundary to reduce effects on agricultural use
 - To the east of the draft Order Limits near PHB23, for technical reasons, to ensure the underground cable installation works do not create conflict with the works to remove the overhead lines, as well as following field boundaries to reduce effects on agricultural use
- PCB
 - To the south of the draft Order Limits near PCB2, for technical reasons, to ensure the underground cable installation works do not create conflict with the works to remove the overhead lines.

6.1.6 In terms of alternative route proposals and technologies, respondents restated their preference for alternatives that have been considered previously but provided no new information nor identified further factors to inform decision making. These alternatives included the following which are shown in Figure 6.2.

- A preference for following the existing 132 kV overhead line alignment between Bramford and Lawford Substations. This remains less preferred because of the constraints imposed by its close proximity to residential properties and other environmental features leading to greater effects if this alternative was followed
- Restated preference for alternative overhead line alignments moved further northwards which seek to further increase separation to Little Wenham and its cluster of heritage assets including grade I listed buildings. These include alternatives proposing the reposition of the Raydon CSE compound to be further east and north of its current position, for the overhead line to follow the 132 kV overhead line north of Chattisham, and combinations thereof. In considering these preferences it is noted that the project alignment is at around 1.5 km from Little Wenham and because of this, and existing intervening layers of vegetation, it may not be greatly visible in the majority of views from the buildings and immediate grounds of Little Wenham. Some limited effects may occur in views from the top of Little Wenham Castle but are at a distance that does not justify the additional costs and effects arising from a longer length of underground cable. These alternatives remain less preferred as, while reducing effects for a specific receptor, they would transfer effects to other similar receptors, often with effects increased by closer proximity. Moving the Raydon CSE compound to the north of Brimlin Wood, for example, would increase effects on a number of residential properties compared with the proposed site which benefits from the close presence of existing blocks of screening vegetation. Such a change would also require the alignment to route between properties at much closer separations (under 80 m). The 2023 DDR and 2024 DDR (document reference 7.20 and 7.21 respectively) set out further examples, and on this basis no change has been taken forward.

Figure 6.2 Alternative CSE compound siting and alignments near Chattisham



6.2 400 kV Underground Cable Alignment Raydon Airfield to the National Landscape

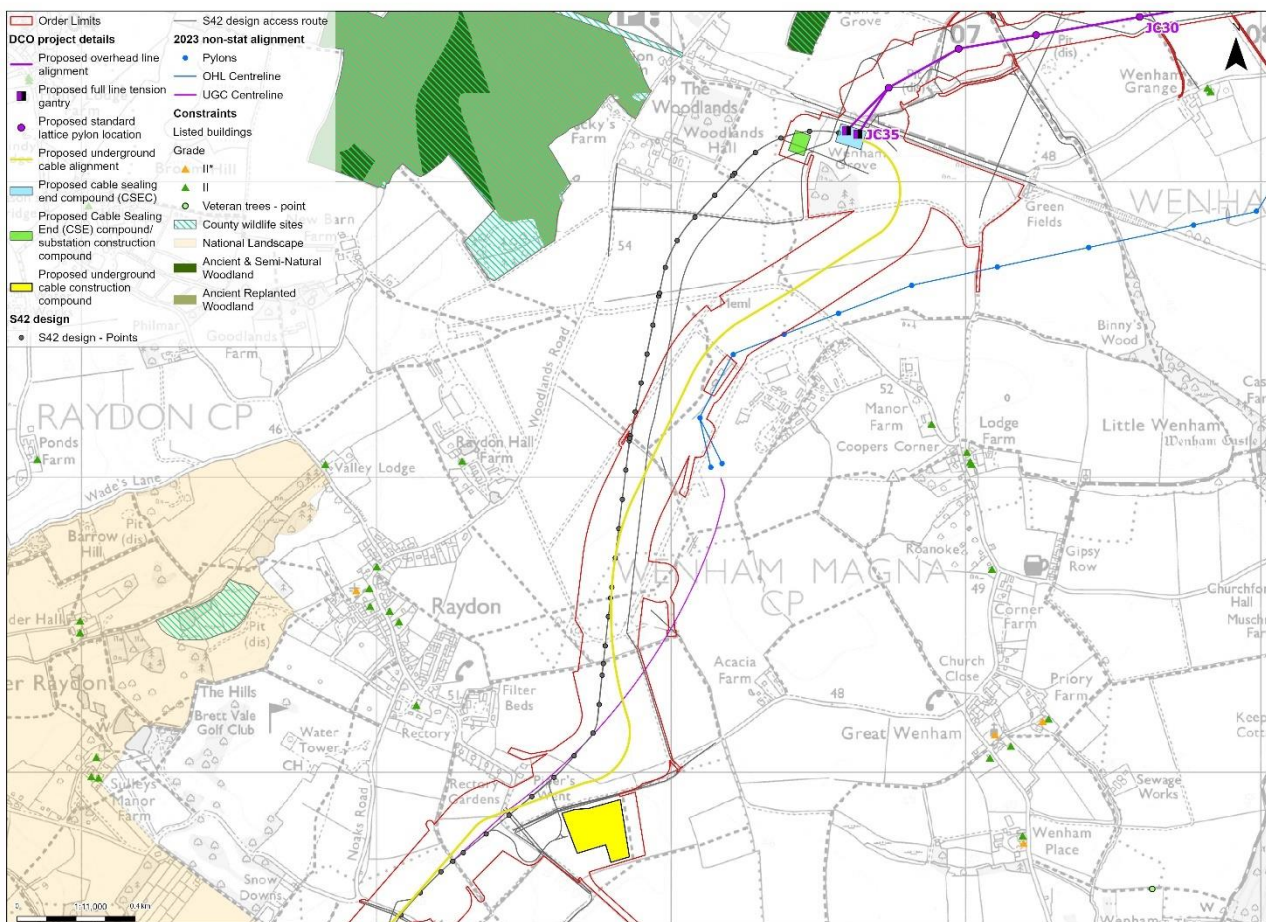
6.2.1 Feedback requested a number of changes to the alignment to reduce effects on residential amenity, to reduce the interaction of the underground cable installation works with agricultural activity, and to avoid locations identified through field surveys as having important or sensitive ecological interests. Proximity to a new Anglian Water pipeline was also highlighted during technical review as a factor restricting flexibility for construction of the alignment presented at statutory consultation. Additionally, the location of the proposed construction compound was requested to be moved further from properties.

6.2.2 In response to feedback, from the CSE compound through to chainage 1,900 m, an alternative underground cable route passing to the east of Wenham Grove was identified (see Figure 6.3). The change would be marginally longer and would move the underground cable away from properties to the west (which are at around 100 m from the draft Order Limits) but closer to properties to the east (closer to Bottle Bridge Cottages at 300 m from likely amended Order Limits). This change would also allow for more extensive screen planting to be established between residential properties to the west and the CSE compound than would be possible above the underground cables for the Project alignment, noting that a small stand of trees is already present between the CSE compound and amended cable corridor and the properties to the east. This change would also be expected to reduce the effects on

agricultural activity as the amended alignment, where it crosses the former RAF airfield, would be routed predominantly in two fields rather than crossing all four fields and leaving parcels of a more difficult shape for arable cropping. Responding to landowner feedback, the permanent right of access to the overhead line elements was changed to be from the north.

6.2.3 The potential effects on the existing Raydon Wings airstrip are unchanged albeit a different part of its airstrip is crossed by the alternative, but the interaction with the new water pipeline is reduced by a more eastern route. On balance, the alternative is preferred because of the potential to reduce effects on residential amenity, reduce disruption to agricultural activities and increase flexibility by removing the potential pinch point near the new water pipeline. This change has therefore been taken forward.

Figure 6.3 400 kV underground cable route at Raydon



6.2.4 Further feedback requested the underground cable alignment be moved to the east and closer to the road at chainage 2,600m to reduce residential amenity effects at the south-east corner of Raydon. Ecology surveys also identified benefits from a slight eastward shift as it would reduce effects on sensitive ecological receptors. While noting the effects relate to temporary construction effects, it has been established that this change can be made with a small increase in cable length, and this change has been taken forward.

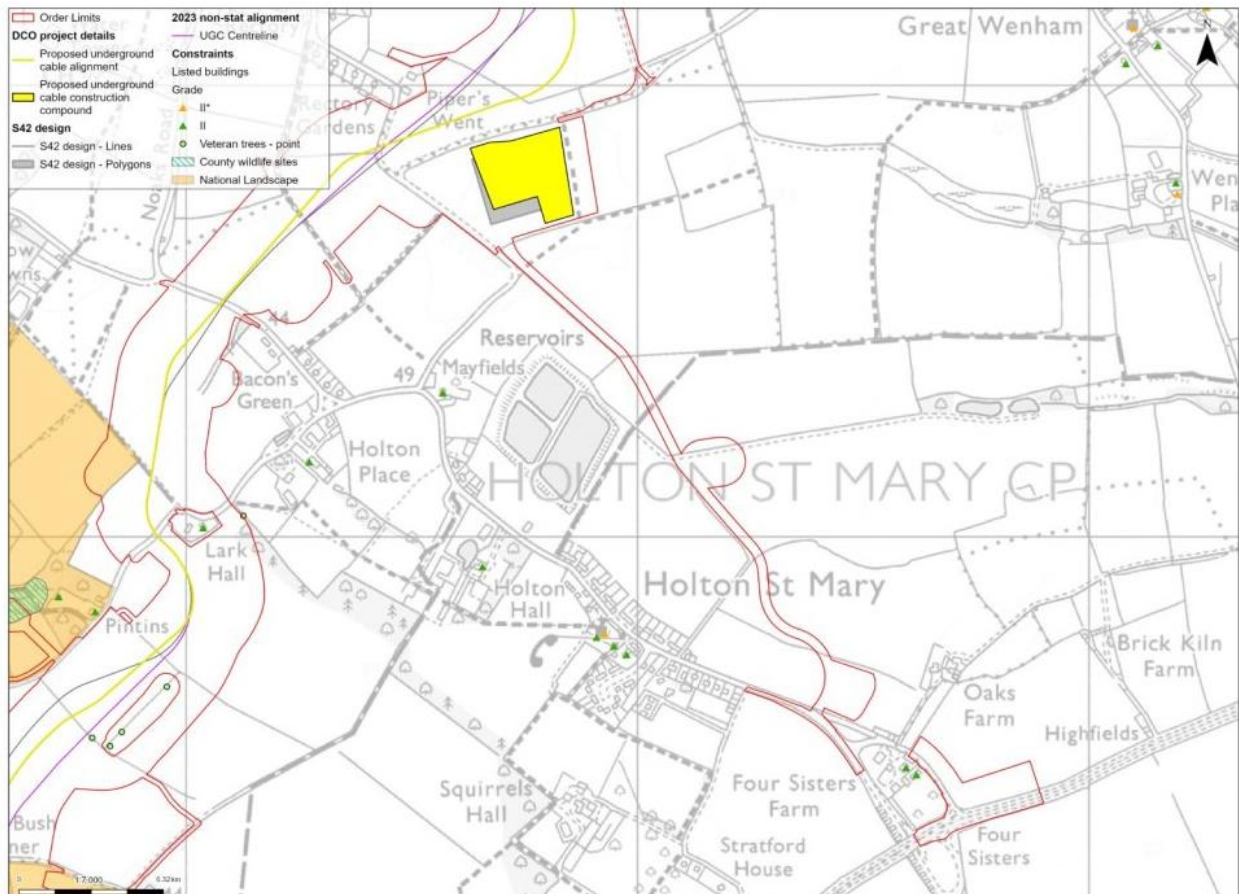
6.2.5 In response to feedback, a change to move the construction compound to the north-eastern end of the field was considered. However, moving this further from Raydon would lead to a greater proportion of the field being affected by access roads and the

CSE compound and an increased level of effects. The construction compound and access infrastructure have, however, been consolidated to the western end of the field, allowing continued productive use of the remainder. The change which has been taken forward does not completely respond to the feedback, as it is noted that the nearest residential properties are at around 160 m distance from the construction compound with some intervening hedgerow and trees present which provide some filtering and screening of the compound.

6.3 Temporary Works Access and Compound at Holton St Mary

6.3.1 Feedback was provided on the number of HGV movements and Abnormal Indivisible Loads proposed through Holton St Mary from the A12. Concerns included the potential need for traffic control measures and the potential for car parking on the roadside to lead to congestion. This has been reviewed and, while noting the potential to introduce parking restrictions, the potential to divert the access onto a temporary access road to avoid HGV routing through the village has been identified. This diversion would require the establishment of an approximately 1.3 km long off-highway solution, turning off the B1070 to the east of Holton St Mary and crossing agricultural fields to the north of the village to the construction compound located between Raydon and Holton St Mary (see Figure 6.4). The off-highway route has sought to follow alongside field boundaries where possible to reduce agricultural impacts. The potential for use of the B1070 would be retained in case the off-highway route is temporarily unavailable.

Figure 6.4 Temporary works access at Holton St Mary



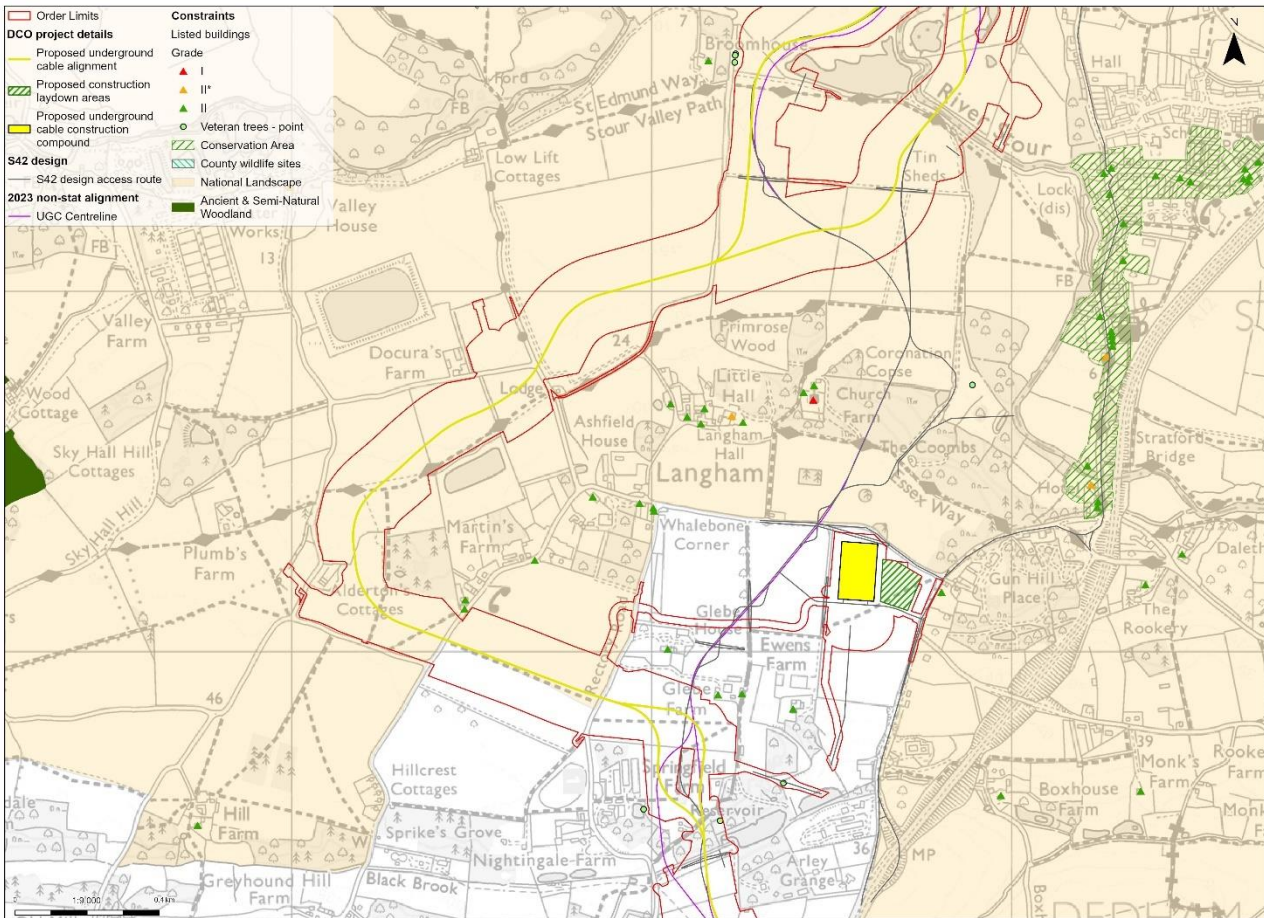
- 6.3.2 It is acknowledged that there would be increased effects on agricultural activities, but an increase in these effects to agricultural users/occupiers (which can be compensated for) are considered to be justified when balanced against the wider community and residential amenity benefits. Other primary access routes have been reviewed and there are no other similar locations where a similar off-highway response is required. This change has therefore been taken forward.
- 6.3.3 Following technical review, and partly informed by the above access arrangements, the location of the temporary construction compound has been modified and repositioned to the western end of the field in order to reduce impacts on agricultural activity.

6.4 400 kV Underground Cable Alignment South of the River Stour

- 6.4.1 Feedback in this location raised concerns about the potential effects of underground cable installation on areas of mature woodland and associated protected species near the Church of St Mary at Langham. The results from ecology surveys have confirmed the presence of protected species.
- 6.4.2 Feedback also raised concerns about impacts on a variety of diversified rural business activities and highlighted a desire that the Project should seek to avoid the removal of trees along a number of tree-lined access roads and be modified to avoid routeing through a narrow gap between properties at Glebe House and Glebe Farm. Alternatives to pass to the north and west were suggested as being preferred.
- 6.4.3 The use of trenchless technology to install the cables under the woodland adjacent to the Grade I listed Church of St Mary at Langham, along with various typical construction mitigation measures, was considered to be likely to mitigate effects on the Grade I listed church, its adjacent woodland and protected species. Nonetheless, there remains the potential for some low level residual effects on the woodland and protected species. For clarity, such trenchless techniques are not considered to be justified (over a greater distance or as a separate trenchless section) to avoid the removal of limited trees along tree-lined avenues given that they are outside the National Landscape and benefit from no specific legislative protection, though it is noted that similar avenues continue into the edge of the National Landscape.
- 6.4.4 The viability of an alternative underground cable alignment (see Figure 6.5) further to the west of Langham was confirmed. This would deviate to the west of the Project alignment just south of the River Stour passing around 1 km to the west of the church before reconnecting with the 2024 preferred draft alignment to the north of Black Brook. This alternative route is around 600 m longer but does not require any sections to be installed by trenchless techniques. It does not interact with the Church of St Mary at Langham or the adjacent woodland and protected species. The western alternative would pass close to and within areas of complex archaeology, increasing adverse effects on archaeology. It is expected that these impacts could be appropriately mitigated through standard excavation and recording approaches but this is expected to be more extensive than for the Project alignment. It would also reduce the loss of trees along a number of tree-lined roads (some are affected near Docura's Farm but overall loss is reduced compared with the statutory consultation) and reduces interaction with a number of diversified estate business activities. It does transfer effects including, in terms of agricultural land, transfer from diversified estate activities to land subject predominantly to standard arable cropping. Adopting the

western alternative would also lead to a transfer of effects between a small number of residential properties that are close to both alternatives.

Figure 6.5 Underground 400 kV cable route at Langham



6.4.5 On balance, given the sensitivity of the National Landscape and protected species it is considered that the alternative more western alignment is preferred even though it is somewhat longer and requires removal of some trees along a tree-lined road adjacent to Docura's Farm. It avoids the technical risks associated with a further trenchless crossing (beyond those common to all alternatives) and reduces environmental risk by avoiding an area with known sensitivity due to the presence of mature woodland and protected species. Landscape effects, within the National Landscape, are lowered compared with the design used for statutory consultation, by the reduced extent of removal of sections of tree-lined avenues. Land use compensation levels are reduced as a result of the effects being on overall less-intensive uses. Finally, the western shift increases the distance from the Church of St Mary at Langham albeit effects were not expected to be significant due to the proposed trenchless technique.

6.4.6 There remains uncertainty over whether there is a need for one or two corridors to accommodate the crossing of the River Stour. While engagement with the Environment Agency has suggested that works within the western corridor that overlaps with the source protection zone may be acceptable with appropriate controls, the results of ground investigations indicate that the nature of the soils on the western corridor present a risk to the success of trenchless cable installation methods. These risks are slightly reduced in the eastern corridor, though space is

also constrained by the location of a gas pipeline. The split corridor has therefore been taken forward but with a preference to seek to accommodate all trenchless crossing drives within the eastern corridor, potentially by shortening the drive distance to no more than 100 m if this is possible.

6.5 Connections Into and Out of the EACN Substation

6.5.1 The location of the EACN Substation has been identified as the most appropriate and economical means of achieving the network reinforcements that are needed and at the same time providing the connection point for three customers with signed connection agreements. The rationale for this was originally set out in the CPRSS (document reference 7.18) and has been subsequently reviewed in the 2023 and 2024 DDRs (document references 7.20 and 7.21 respectively) but has been raised in further feedback to the statutory consultation. After providing an overview of the feedback about the connections in the area around and concerning the EACN Substation, this sub section is structured to cover the following:

- Overview of feedback
- EACN Substation access arrangements
- EACN Substation siting
- The use of underground cables at Ardleigh
- Siting of CSE compounds if underground cable used
- Overhead line past Ardleigh and setting of National Landscape
- Furthering the Purposes of the National Landscape
- Alternative route alignments for the connection.

Overview of Feedback

6.5.2 To the north of Ardleigh feedback included:

- A request to alter the private Abnormal Indivisible Load route to the EACN Substation
- Preference for the EACN Substation to be at a different location and/or:
 - For alternative routes for the 400 kV TB route, and
 - For the use of underground cable for the TB connection from the EACN Substation past Ardleigh or
 - Consideration of a connection route passing to the south of Ardleigh
- Requests to use underground 400 kV cables to the north of Ardleigh from the EACN Substation for both connections in response to effects on heritage assets, effects on visual receptors including users of PRow and communities (residential areas) within and in the immediate vicinity of Ardleigh, and feedback regarding specific views from residential properties and effects on landscape character
- Route modifications to reduce or avoid effects on existing activities, including on fishing on the water body between Ardleigh Reservoir and the west side of

Ardleigh, and on a horticultural enterprise and fishing activities on the land and lake to the east of Ardleigh

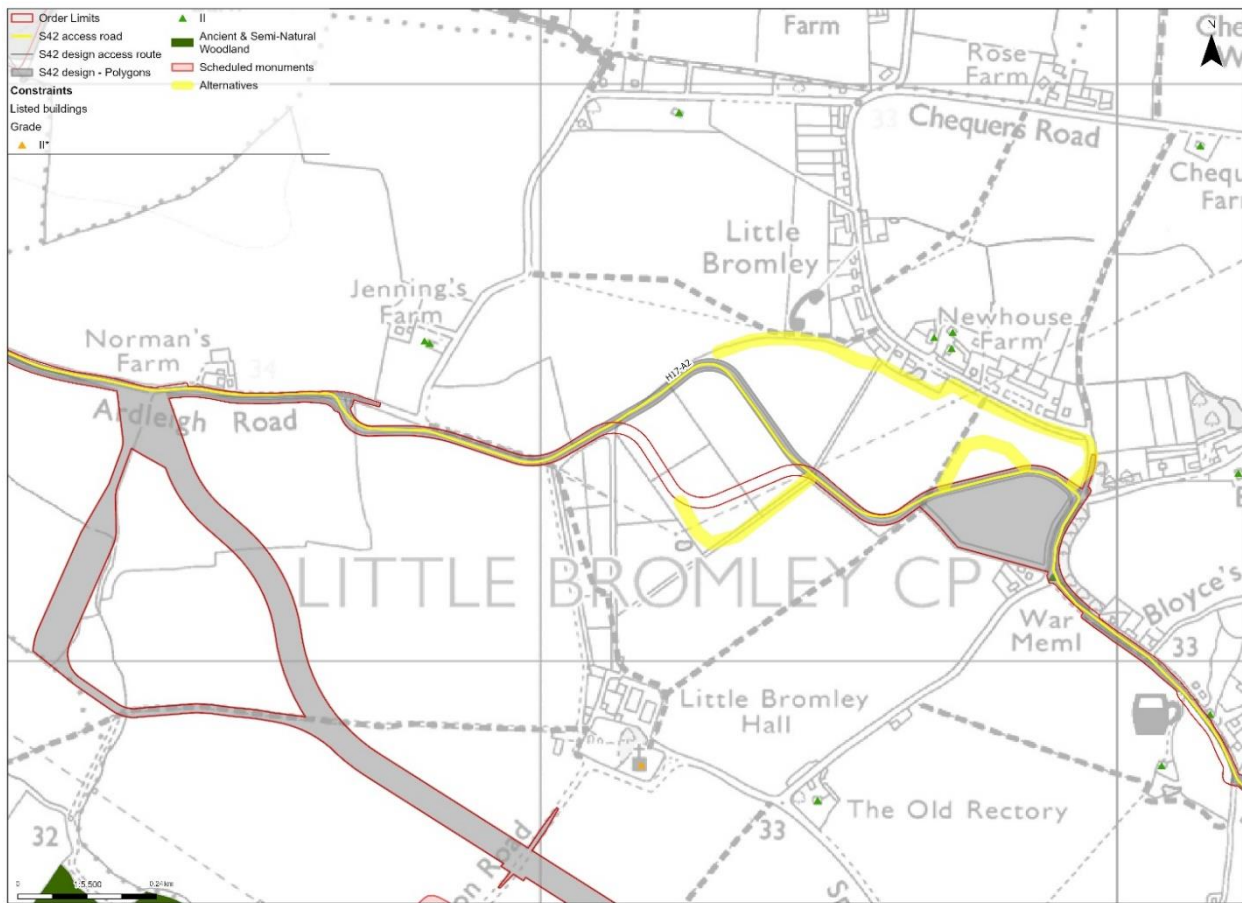
- A request for modifications in response to potential mineral plan allocations with particular focus on two fields to the south of Little Bromley Road (referred to as Martells 85 and Martells 86), noting that the sites are identified as potentially the only silica sand sites within Essex. The timescale for considering the consultation on the minerals plan is uncertain, but Essex County Council representatives have indicated a decision on the plan may be confirmed in mid-2025. This will be too late for the Project to definitively respond and instead an approach has been adopted that can respond to the site whether included or excluded from the minerals plan.

EACN Substation Access Arrangements

- 6.5.3 Feedback was provided to reposition the proposed permanent private access road to the western edge of a landholding. The land is under the same ownership, and the request after statutory consultation was to avoid the route through the centre of the ownership. Turning radii for the roads make it difficult to avoid land take at corners. In this case a route was devised that turns the corner then follows the north side of the existing wood pole line before routeing alongside the western boundary was taken forward. Whilst this does separate one paddock area to the other side of the road, this was considered to retain more useable area (albeit across the road) than the similar area that would be separated by an alternative that sought to hug the boundary. The left turn in particular having to first bend away from the boundary before then turning round to the west.
- 6.5.4 While there are no environmental impacts of this realignment, consideration has been given to whether the potential change to the west would lead to effects on the adjacent landholding, used for equine activities. The effects potentially arise from the vehicle movements that may use the route. This would include Abnormal Indivisible Loads, for which this is the only proposed route to the EACN Substation, as well as HGVs (primarily during the construction phase with only limited numbers during operation) delivering in support of the construction of the EACN Substation as well as the overhead line and underground cable works east of the railway line. The use by HGVs would only occur should the substation construction haul road along the customer export cable corridor be unavailable. This would depend on construction programmes but for the majority of the Project programme this haul road is expected to be available. Even if the private access road were used more extensively for construction HGVs, it is not considered that equine activities, or any foreseeable land uses, on the adjacent landholding would be precluded from being undertaken.
- 6.5.5 The change noted above formed one of the 2025 targeted consultation locations. Further alternatives were suggested. One was to follow the eastern field boundary and then the northern field boundary adjacent to the properties within Little Bromley. Whilst potentially a reasonable option for very occasional AIL movements the potential for this to be used for construction HGV movements until the substation haul road becomes available raises the level of environmental effect for residential occupants meaning this is considered less preferred.
- 6.5.6 A further alternative to align with agricultural activities was also revisited with the section immediately near Bentley Road following tramline orientation before turning to follow the field boundaries and reverting to the statutory consultation design. While

moving the proposed access slightly closer to properties in Little Bromley, this was not considered to lead to materially different environmental effects.

Figure 6.6 EACN Substation Permanent AIL Access road alignment



6.5.7 National Grid recognises that decision making is influenced to an extent by factors that are as yet uncertain, such as potential use by construction HGVs which depends on when North Falls or Five Estuaries commence their works. Whilst still to be confirmed National Grid is aware of some calls from LPAs involved with the windfarm DCOs (North Falls and Five Estuaries) for restrictions to be imposed to prevent wind farm construction before the Project is consented and free from judicial review risk. This increases the likelihood that the AIL route will be carrying construction HGVs. On this basis we propose to make no change at this stage to the route presented at the 2025 targeted consultation but we will continue to engage with the landowner(s) (as information continues to emerge) to either take forward the arrangements as proposed or, subject to necessary permissions being secured, may adopt one of the alternatives.

EACN Substation Siting

6.5.8 The evolution of the selection of the site of the EACN was described in the CPRSS (document reference 7.18) and balances factors relating to substation aspects (Horlock Rules) with factors relating to the electrical connections to them (for overhead lines this is the Holford Rules) as well as planning policy and National Grids various duties. This was developed and considered further in the 2023 and 2024 DDRs (document references 7.20 and 7.21 respectively). In summary terms a more inland location was favoured because of the effects that would have arisen

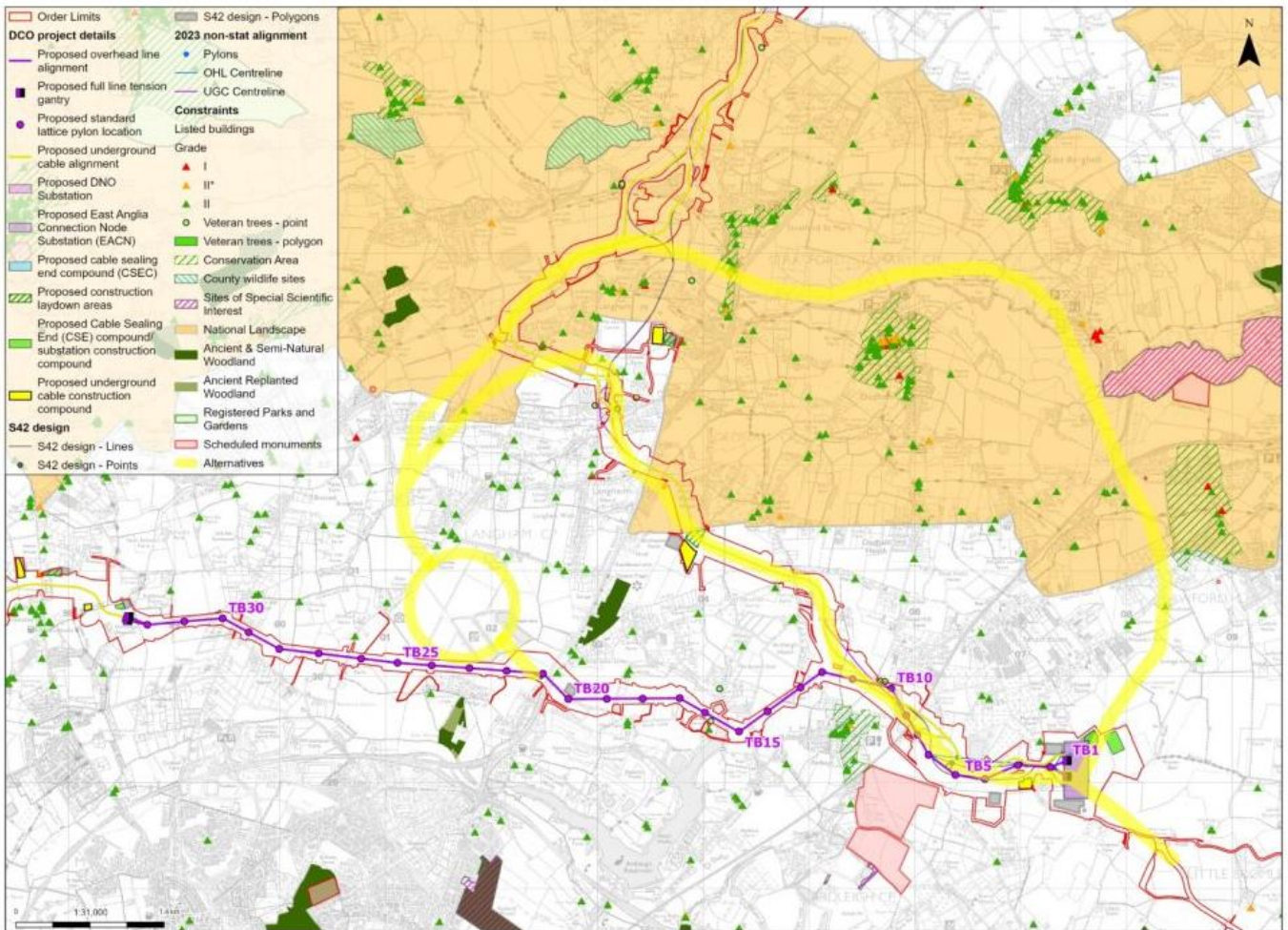
from the two overhead lines down the Tendring peninsula that would have been most likely to a more coastal location to make the necessary two points of connection (as the area is not a nationally designated landscape the use of underground cable is not likely). The specific siting of the EACN within the preferred area was then informed by consideration of the Horlock Rules and in particular the selection of a site benefitting from the presence of some existing screening vegetation. In response to feedback we have also considered locations further inland including to the west of the A12. As already described, decision making is informed by changes in the 400 kV connection as well as changes required to the customer connections to reach a balanced decision as set out below.

- 6.5.9 Feedback stating a preference for an alternative EACN Substation location on the site of the former RAF Boxted (see Figure 6.7) did not provide any new information in response to the statutory consultation nor identify additional factors to be considered within decision making. However, the requirement for multiple corridors to accommodate the connections for the three confirmed customer connections and the additional effects of these were a factor in the selection of the EACN Substation site as set out in the CPRSS (document reference 7.18) and subsequent DDRs in 2023 and 2024 (document references 7.20 and 7.21 respectively). As the construction widths have been reviewed and refined by the two wind farm customers (North Falls and Five Estuaries) who would connect their offshore wind farms into the EACN Substation, the substation's siting has been backchecked specifically in respect of the potential to site the substation on the former RAF Boxted Airfield, and also taking account of the progress made by a further customer who would connect into the EACN Substation (Tarchon).
- 6.5.10 In terms of an alternative site for the EACN Substation at the former RAF Boxted Airfield, and based on the design published in the statutory consultation, there would be removal of the need for certain 400 kV infrastructure (as the 400 kV connections from Bramford and to Tilbury do not need to go as far) but a requirement for longer customer connections (as they need to go further inland beyond the EACN Substation) and potentially for UK Power Networks connection (potentially connecting the Lawford Substation to the EACN Substation to rationalise the network and potentially support removal of an existing 132 kV overhead line). In aggregate terms, the reduction in 400 kV infrastructure would be the removal of one CSE compound (with the one to the east at the Great Horkelesley underground cable section removed) and a reduction in overhead line length of around 10 km (the distance from the EACN Substation to Great Horkelesley on the 2024 preferred draft alignment). Customer connections to the EACN for North Falls, Five Estuaries and Tarchon and a possible UK Power Networks connection to Lawford Substation would still be required.
- 6.5.11 If the EACN Substation were moved to the former RAF Boxted airfield, the close proximity of different development proposals and existing infrastructure around the A12/Wick Lane area would restrict the space available for routing of customer connections through to the relocated substation by the corridor adopted for the alignment. It is considered unlikely that the Project corridor, while considered suitable for a 400 kV overhead line or 132 kV overhead line as backfeed to Lawford Substation, could be used for an underground cable connection. One or more additional corridors would be required, at least to accommodate the connections for the three signed customers.

6.5.12 The two potential corridors that would be most likely to be used for extending the customer connections from the general proximity of Lawford Substation to an alternative location at Boxted are shown on Figure 6.7 below.

- The corridor used for the Project connection from Bramford Substation to the EACN Substation to pass to the north side of Black Brook before turning west then south between Langham Moor and Boxted Cross (around an 11 km connection length)
- A corridor through the Stour Valley passing to the west of Flatford Mill and between Stratford St Mary and the Church of St Mary at Langham before turning south in a combined corridor with the underground customer cables noted above and the rerouted Project underground cables from Bramford Substation to the relocated EACN Substation between Langham Moor and Boxted Cross (around a 14 km connection length).

Figure 6.7 Alternative EACN Substation siting and indicative extended underground cable corridors



6.5.13 The proposed coordination by North Falls and Five Estuaries has reduced the underground cable swathe and construction swathe width requirement compared with that known at the time of the statutory consultation. Consideration has been given as to whether a single corridor could accommodate these as well as the Tarchon HVDC connection, given the space restrictions at identified pinch points. On the basis of published information for North Falls and Five Estuaries, and the use of typical methods for the Tarchon HVDC requirement, two corridors would still appear

to be required. This is based on the available width on the corridor published for the Project being as limited as 80 m in some locations (such as Black Brook).

- 6.5.14 While the required number of underground cables for the three customers is slightly lower, at 16 underground cables compared with the 18 underground cables required for the Project, some additional separation between the separate customer cable groups would be expected to be required for the connection to Boxted to facilitate construction and maintenance and reduce the potential for interaction. Based on professional judgement, a minimum width of 80 m is estimated to be required, which is the same as the available space at Black Brook (just to the west of the A12 on the cable corridor to the south of the River Stour), but which leaves no flexibility and no margin to respond to unexpected conditions. There remains uncertainty as to whether the three customers would be able to agree this and the extent to which adjacent circuits may need to be switched off during any maintenance activity.
- 6.5.15 Even then, this minimum underground cable space requirement would only be achievable assuming a series of construction conditions could be accommodated. These conditions are that:
- All connections require careful coordination of survey and design activity to avoid the risk of one being left in a narrow (or blocked) corridor. It is assumed that all three customers are able to commit to an agreed design arrangement
 - The additional cost and programme risks of the restrictions on construction methods and working width are acceptable to the three customers. Risks may be minimised if all cables were to be installed at the same time though this requires all three customers to be in a position to commit to the cost this may entail
 - Ground investigations/encountered conditions do not disproportionately affect the customers, noting that there may be more ability for National Grid to respond to such circumstances than the customers by virtue of the scale of the Project and it being progressed for a single entity, thus potentially facilitating more flexibility in design
 - An additional section of trenchless crossing is likely to be required to cross the Black Brook a second time (for the route to the former RAF Boxted Airfield site noting that for the second crossing further to the west the space restrictions for the crossing of the Black Brook just to the west of the A12 do not apply) and to avoid extensive impact on mature woodland immediately adjacent to the National Landscape east of Boxted Cross. This can be expected to be required for both the 400 kV connection required by the Project and also for the customer connections, requiring a total of 34 underground cables (16 customer plus 18 National Grid) to be installed. Further to this, there would be increased risk and localised environmental effects also arising over an approximately 3 km section northwards from the former Boxted Airfield where all 34 cables would need to cross a high-pressure gas pipeline and follow the same general corridor.
- 6.5.16 Compared with the site to the east of Ardleigh presented in the statutory consultation, the alternative former RAF Boxted Airfield site has less flexibility to allow for future generation sources located to the east of the A12 (whether onshore or offshore), given the constraints associated with the routing of 34 underground cables. A second corridor through the National Landscape would be required for this future capacity. Any future connections are a matter for the National Energy System Operator, and while none are currently identified, it is reasonable to consider there is

at least some potential for such connections coming forward given the evolving UK power generation pattern.

- 6.5.17 As well as consideration of cable installation, the capacity of the former RAF Boxted Airfield site to accommodate the multiple developer facilities and the infrastructure required for the EACN Substation must be considered. Layout would be expected to be influenced by a preference to avoid multiple overlaps of cables routing to the individual developer substations and on to the relocated EACN Substation at Boxted. This may lead to a dispersed layout of customer substations on a site already restricted by an existing solar development. While the Tarchon convertor could be located to the east of Ardleigh, such a location would be expected to increase the required number of underground cables (two circuits each with three cables to allow for potential maintenance outages) to the alternative site at the former RAF Boxted Airfield.
- 6.5.18 When considered on the basis of National Grid substation infrastructure alone, there is no substantive difference between the alternative sites for the EACN Substation (near Lawford Substation or at the former RAF Boxted airfield) in terms of consistency with the Horlock Rules. When taken as a collective group (National Grid and customers on the basis of assumed co-location) the EACN Substation site near Lawford Substation has less existing screening than the former RAF Boxted airfield site and as such is less consistent with the Horlock Rules, albeit over time this screening can be established.
- 6.5.19 Both the EACN and former RAF Boxted sites require the routing of underground cables through the National Landscape. Alternative sites providing avoidance of the National Landscape, for the 400 kV connections, by corridor level routing of the 400 kV connections to the west of the National Landscape, were ruled out in earlier stages of routing as set out in the CPRSS (document reference 7.18) due to the greater difficulty of routing the customer connections to them. It is also concluded that the effects on the National Landscape from the customer connection routing, continuing on from the EACN to the alternative location are increased, flexibility for future connections reduced and substantive risks to programme introduced.
- 6.5.20 It is acknowledged that there would be a reduction in effects on the landscape and visual receptors east of the A12 by removal of the pylons TB1 to around TB24 by using the former RAF Boxted airfield for the EACN Substation. As noted above, in this scenario it may also be possible to extend the use of underground cable to connect with the Great Horkesley underground cable section, meaning the further removal of pylons between TB24 and TB34. This would be beneficial for some residential receptors but with some transfer of effects, including cumulative effects from the EACN and customer substations, to residential properties around the edge of the former airfield site. This would be in addition to the greater level of effects from the more extensive works to install the underground cables, albeit there may be more scope to mitigate effects of the substation/convertor station infrastructure than the overhead line.
- 6.5.21 Taken together, it is considered that the multiple aspects of uncertainty and construction risk, along with a reduction in future flexibility and increased risks to programme for the customers and for National Grid, which are associated with the potential constraint costs arising from such delays, do not justify the benefits potentially provided by the alternative site at the former RAF Boxted Airfield. In light of this, there is a continued preference for locating the EACN Substation to the north of the Lawford Substation.

Consideration to the Use of Underground Cables at Ardleigh

6.5.22 Consideration has been given to whether the effects of the proposed overhead line are sufficient to justify a change to the use of underground cable for both of the required connections into and out of the EACN near Ardleigh. This was due to the potential for the effects of an overhead line (including visual effects on the community and recreational receptors) to engage the NPS EN-5 (DESNZ, 2024b), notably Paragraph 2.9.23 and the Secretary of State’s decision-making criteria in Paragraph 2.9.25. Paragraph 2.9.14 also highlights the need to demonstrate consideration of alternatives, including the use of underground cable, where particularly significant landscape and visual impacts may occur. The following Paragraph 2.9.15 then sets out the requirement to explain in their ES the ‘*applicant’s rationale for eschewing feasible alternatives to the overhead line, and the mitigation cost-calculation methodology that this rationale may rely upon*’. Finally, it is noted that Paragraph 5.10.34 of NPS EN-1 (DESNZ, 2024a) states that ‘*The fact that a proposed project will be visible from within a designated area should not in itself be a reason for the Secretary of State to refuse consent*’.

6.5.23 This section is structured to discuss:

- The effects arising from an overhead line
- The potential siting of CSE compounds (covering rail crossing and EACN line entry)
- Overhead line and setting of the National Landscape
- Addressing the ‘furthering the purpose’ duty
- Alternative routing arrangements.

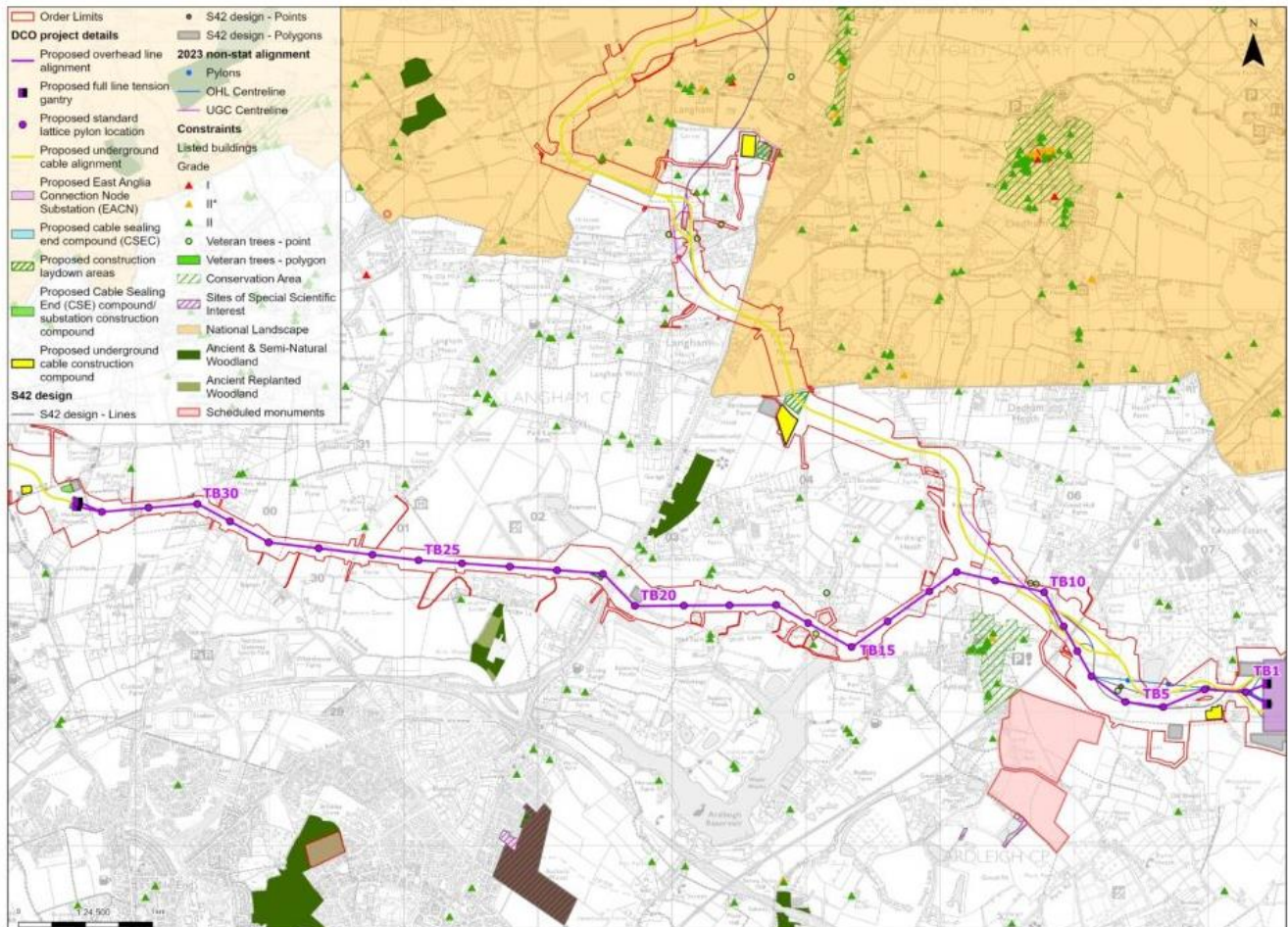
The Effects Arising From an Overhead Line

6.5.24 The Ardleigh area is not itself within a designated landscape and no environmental effect in isolation reaches the level in Paragraph 2.9.14 of NPS EN-5, but the aggregation of effects has been considered. At Ardleigh, the alignment (as set out in Figure 6.8) would be visible to the west, north and east of the settlement and would cross over roads and PRowS that connect into the settlement of Ardleigh to the north and east. The Project would also be relatively prominent in views from the A137, Wick Lane, Dead Lane and PRowS to the west of Ardleigh as well as from the B1029 to the south of Ardleigh. The alignment would also be highly visible from other nearby surrounding scattered and clustered communities.

6.5.25 Paragraphs 2.9.21 to 2.9.23 of NPS EN-5 consider the effects (using the term ‘harm’) directly on the National Landscape and those arising from infrastructure outside the designation. Harm is not reported in a Landscape and Visual Impact Assessment, which considers any identified adverse effect, but is considered in the planning balance. The Project alignment around Ardleigh varies in distance from the boundary of the National Landscape between approximately 1.3 km and 2 km. Parts of the landscape near Ardleigh are close to the edge of the area considered to form part of the setting of the National Landscape, but the Project itself around Ardleigh is not considered to be in the setting. A position statement from the National Landscape Partnership (The Development in the Setting of the Dedham Vale Area of Outstanding Natural Beauty (AONB) Position Statement (National Landscape Partnership, 2024)) is of relevance. The position statement clarifies that: ‘*The National Landscape Partnership...considers the setting to the AONB to be the area*

within which development and land management proposals, by virtue of their nature, design, scale, siting, materials and colour have the potential to result in substantial impacts, positive or negative, on the natural beauty and special qualities of the AONB.' It is considered (informed by Paragraph 5.10.34 of NPS EN-1 (DESNZ, 2024a)) that reference to substantial impacts equates to likely significant effects identified through the EIA of the Project.

Figure 6.8 Routing arrangements at Ardleigh



6.5.26 In considering the feedback to change to underground cables for both connections at Ardleigh, the 400 kV connection arrangements at the EACN Substation have been reviewed. Due to the specific arrangements at the EACN Substation, the adoption of underground cable 'in' and 'out' would require multiple crossings of underground cables and would require deeper installation for some of those underground cables with a consequent increase in long-term maintenance risks. The risks are such that underground cable 'in' and 'out' at the substation is not considered to be an appropriate basis to progress design, with at least a short section of overhead line required to leave the substation for one of the connections. It has been concluded that options for the immediate line entry (equating to the last one or two overhead line spans, for example TB1 to TB4) to the EACN Substation cannot comprise underground cables for both inbound and outbound connections to the substation.

6.5.27 Beyond TB3/TB4 on the route to and from Tilbury, some effects on the special qualities of the National Landscape are anticipated (albeit not considered to be significant in EIA terms) arising from, at least in part, the visibility from recreational routes and viewpoints within the National Landscape of pylons around Ardleigh,

including the taller pylons required for the necessary safety clearances for the railway crossing. It is inferred from NPS EN-1 Paragraph 5.10.34, that visibility of pylon infrastructure does not provide an automatic basis for considering a technology change from overhead line to underground cable, and there is not the same change in presumption as if within the National Landscape. The views include areas from which views would be possible that are closely linked to the artist John Constable ('Constable') and some of his paintings. The impact of the alignment here would have adverse but not significant effects on the following published special qualities of the National Landscape (published in Alison Farmer Associates (2016) Dedham Vale AONB Natural Beauty and Special Qualities and Perceived and Anticipated Risks Final Report):

- *'Iconic lowland river valley associated with the artist John Constable RA, the views he painted are still recognisable today'*
- *'Surprisingly long-distance views from higher ground along the valley in an area associated with large skies'.*

The Potential Siting of CSE Compounds if Underground Cable Were to Be Used

- 6.5.28 The use of underground cable is not without its own potential effects. Therefore, in order to consider whether a change from overhead line to underground cable was required to comply with policy, a potential underground cable solution was defined. To the west of Ardleigh, feedback to extend the use of underground cable as far as Great Horkesley (around TB34) was considered but it has been concluded that this would not be possible on the 2024 preferred draft alignment. Overhead line technology is required for the crossing of Ardleigh Reservoir (between TB15 and TB16) due to the unacceptable effects on underground cable performance from the depths of installation that would be required. There are also restrictions on the extent of launch and receive space for trenchless technology which may be difficult to overcome. Overhead line is also considered necessary to navigate a route through various adjacent developments (including mineral extraction, food related warehouse, reservoir and light industrial units) in the area between TB17 and TB22 where there is not enough space between development elements and existing infrastructure for underground cables which require a wider construction corridor.
- 6.5.29 On this basis, the most appropriate option balancing different considerations, if underground cable proved to be justified, was considered to be locating a CSE compound to the east of Dead Lane between TB14 and TB15. A location to the west of Dead Lane around TB15 would result in increased socio-economic effects (due to effects on a café and vineyard) with less space available for screen planting (to mitigate effects on the adjacent cafe) due to the proximity to the recreational resource of Ardleigh Reservoir. The preferred east of Dead Lane location, while positioning the CSE compound closer to residential areas, does have more potential for more extensive screen planting to be established.
- 6.5.30 As set out above, there are strong technical and practical reasons for retaining an overhead line from TB1 to around TB3/TB4, with any change being at or beyond TB4. Potential effects on the National Landscape are most likely from the two taller pylons (TB8 and TB9), each approximately 60 m in height, which are required to meet necessary electrical clearances for the railway crossing. Other pylons through to around TB24 would also be visible, albeit at around 4 km distance from the Constable related views. However, the effects arising from these and other pylons on the National Landscape were not considered to be significant, and visibility, as per

NPS EN-1 Paragraph 5.10.34 (DESNZ, 2024a), is not of itself a basis for requiring a change of technology. The pylons at the railway crossing can only be removed from the design if the transition of the overhead line from the EACN Substation to a CSE compound is undertaken to the east of the railway line.

6.5.31 A transition between overhead line and underground cable between TB4 and TB7, to the east of the railway, has been considered. However, it has been concluded that it is appropriate to continue the overhead line element from the EACN Substation to a point still to the east of the railway but beyond the western extent of the potential minerals site (i.e. to between TB7 and TB8). In reaching this decision, National Grid considers it more appropriate (in the context of its duties and relevant policy) to provide compensation for the short-term effects on the horticultural enterprise rather than to extensively sterilise the potential mineral resource. Some sterilisation of minerals due to pylon bases is likely to be unavoidable, but this is much reduced compared with the extent of sterilisation if the underground cables were to be positioned to the south of the road. In the event that the minerals resource proves to be of inferior quality, uneconomical to extract or it is judged to be an inappropriate location, the draft Order Limits have been extended for the underground cable and overhead line positioning to be reversed between TB4 and TB7 (i.e. positioning of the underground cable in from Bramford to south and overhead line out to Tilbury to the north of Little Bromley Road, as per the 2024 statutory consultation). This would reduce the effects on the horticultural enterprise which are considered to be greater than those on the arable cropping regime to the south of the road. It is also noted that this reversal may be appropriate if it is possible to extract the minerals resource prior to construction. However, this is unlikely to be achievable given the need to secure consent and complete detailed design to confirm the ability to establish suitable post-extraction conditions for pylon foundations or underground cable installation.

6.5.32 If a change of technology to underground cable were progressed, it would be expected to be from a new CSE compound to the east of the London to Ipswich railway line (in the vicinity of TB8) to a CSE compound located to the east of Dead Lane to the south of TB14 beyond the village of Ardleigh but before the reservoir. To install underground cables for both connections (i.e. the one from Bramford Substation to the EACN Substation and the one from the EACN Substation to Tilbury North Substation) under the railway line requires particular trenchless techniques to be used. HDD would not be possible (there is insufficient space for two sets of launch/reception pits), though it is considered possible for both connections to route under the railway line by one of several other trenchless techniques. This would potentially require the use of forced ventilation, housed within a head house (likely to be in the order of 40 m by 30 m and a height of up to 10 m at the side housing the ventilation equipment and 20 m by 10 m with height of 5 m at the other end) that would be subject to detailed design (which would not have been completed prior to DCO submission if this approach was progressed). The specific technique, and need for the head houses, would be informed by further ground investigation. Assuming installation by a trenchless technology, then if taken forward, there would be an additional cost indicatively estimated to be in the order of £80 million to £135 million (depending on installation technique) over that of on overhead line in this area.

The Effects on Setting Arising From Overhead Line Past Ardleigh and NPS EN-1 Paragraph 5.10.34

6.5.33 The effects arising from the use of overhead line for the connection to route from the EACN Substation towards Tilbury are initially focussed around Ardleigh. This village

lies on a relatively flat plateau, surrounded by large arable fields, particularly to the north and south-east of the village. Despite the general openness of the landscape, views from within the core, older part of the village are relatively well screened due to the presence of buildings and existing mature vegetation and trees. Due to the curving nature of the roads in Ardleigh there are few views up or down the roads. Views out into the countryside are typically restricted to the edges of the settlement, extending in places to mature vegetated boundaries bordering agricultural fields. A review of effects concluded the following:

- Heritage effects are considered in the context of NPS EN-1 Section 5.9. The area immediately surrounding the Ardleigh conservation area retains its historical setting, and as such its setting makes a considerable contribution to its value. As the draft Order Limits for an overhead line connection from the EACN Substation to Tilbury North Substation are located close to the conservation area, and due to the flat topography of the surrounding landscape, the draft Order Limits extend into the setting of the conservation area. A key view identified in the conservation area appraisal looks north-north-east from the northern edge of the conservation area across the alignment. In this view the overhead line would be present within the rural setting surrounding the conservation area, but during operation the historic agricultural use of the majority of the land would not be changed. It is concluded that there would be a not significant temporary negative effect during construction and a not significant permanent negative effect for operation. In terms of magnitude of impact, the assessment is that this is low as the change to the setting only affects a small amount of the features that contribute the value of the conservation area. This would therefore be a minor adverse significance of effect, which is not significant in EIA terms. In planning policy terms, this is considered to be 'less than substantial harm'
- Nature conservation concerns at Ardleigh Reservoir and surrounding waterways were originally identified as an area of potential bird collision risk, as the Stour and Orwell Estuaries Special Protection Area (SPA) is located 5 km north-east. The results of wintering bird surveys at this location have however found the risk of bird collision to not be significant with the reservoir not considered functionally linked to the SPA. While the greatest number of target and secondary species was recorded at this location across the Project, most flights observed were below collision risk height. Therefore NPS EN-5 Paragraph 2.11.1 (DESNZ, 2024b), which states, '*Where biodiversity impacts are identified, including those associated with bird collision with overhead lines, the Secretary of State should be satisfied that all feasible options for mitigation have been considered and evaluated appropriately*', is not applicable and further bird collision mitigation (including the potential for alternative routeing/cable design) is not required. Overall, there is no ecology reason in policy terms, to trigger the need to change the alignment or technology to the use of underground cable. Natural England have stated in relation to the Stour and Orwell Estuaries SPA that, in respect of the findings shared through the Scoping Request and PEIR, they '*...agree that the survey results show the collision risk is low so impacts can be screened out*'
- The landscape in and around Ardleigh is a relatively densely populated part of the Study Area, with many highly sensitive receptors lying close to the Project. Within and around the fringes of Ardleigh, the proposed overhead line would involve a number of changes in direction using angle pylons that have greater visual effects. The overhead line would be visible to the west, north and east of the settlement within around 200 m to 300 m and would cross over roads and PRowS that connect into the settlement to the north and east. It would also be relatively

prominent in views from the A137, Wick Lane, Dead Lane and PRoWs to the west of Ardleigh, as well as from the B1029 to the south of Ardleigh. The proposed overhead line would also be highly visible from other nearby surrounding scattered and clustered communities. In addition to community receptors and PRoWs, there is a concentration of other high sensitivity visual receptors (as defined in the Landscape Institute's (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition) including people visiting Ardleigh Reservoir, a campsite and a local vineyard to the west of Ardleigh. There would be likely adverse effects on the National Landscape arising from the visibility of the proposed overhead line on the skyline in medium to long distance views. While effects to individual receptors or a type of receptor do not in isolation justify undergrounding, when considered together, the landscape and visual effects (visual effects on community and recreational receptors, people moving in and around the area, and effects on landscape character, etc.) have the potential to be considered 'widespread' and/or 'particularly significant' due to the numbers and sensitivity of landscape and visual receptors. There are also considered to be significant cumulative landscape and visual effects arising from the overhead line together with the EACN Substation and multiple customer substations. The overall cumulative effects may well be increased subject to the siting also of Tarchon's infrastructure (which is expected to comprise a convertor station, which is a large warehouse-style scale of building, though details are as yet unconfirmed) and potentially other developments, which would permanently change the landscape character and visual amenity in the landscape to the east of Ardleigh.

- 6.5.34 On the basis of the above, it is considered that nature conservation and heritage effects are not drivers for change from overhead line to underground cable. There are effects, not significant in EIA terms, experienced at certain viewpoints within the National Landscape from infrastructure outside the setting of the National Landscape, but as set out in NPS EN-1 Paragraph 5.10.34 (DESNZ, 2024a) visibility is not in itself a basis to refuse consent. National Grid has a duty under the requirements of s85 of the Countryside and Rights of Way Act 2000 to '*seek to further the purposes of conserving and enhancing the natural Beauty of the [National Landscape]*'. In terms of NPS EN-5 Paragraphs 2.9.14 and 2.9.23 (DESNZ, 2024b), the overhead line effects stand to be assessed as to whether they are at a level which meets the thresholds of 'particularly significant' and/or 'widespread and significant', and if they do, the feasibility, effects arising and costs of undergrounding need consideration.
- 6.5.35 As set out above, the adoption of an underground cable solution would reduce the effects on landscape and views arising from the overhead line (on the National Landscape and for residential, recreational and community receptors) but introduce effects (lower overall than the Project) resulting from the introduction of the new CSE compounds (and potentially head houses if required). This would include visual effects on small parts of the community to the east side of Ardleigh and at the western end of the village (for community on Colchester Road) and be at additional cost estimated at between £80 million to £135 million (the upper end if tunnels with head houses prove to be required). Taking all factors into account, it is considered that the threshold is not met and the potential cost of adopting an underground cable solution is not justified for the level of benefit it would provide. Therefore, no change has been made to the arrangement published at the statutory consultation of one connection from Bramford Substation to the EACN Substation being progressed as

underground cable and one connection from the EACN Substation towards Tilbury North Substation as overhead line.

Addressing the Strengthened Duty to Further the Purpose of the National Landscape

- 6.5.36 During construction and in the short- to medium-term, the Project is considered to have a negative effect on some of the identified special qualities of the Dedham Vale National Landscape. In the longer term, the effects on most of the special qualities would not be significant. No significant effects on the special qualities of the National Landscape have been identified in relation to views towards the proposed overhead line infrastructure. However, there would be negative effects (although not significant in EIA terms) experienced at certain viewpoints within the National Landscape from infrastructure outside the National Landscape.
- 6.5.37 National Grid has a duty, which was recently amended by s245 (Protected Landscapes) of the Levelling-up and Regeneration Act 2023, under s85 of the Countryside and Rights of Way Act to seek to further the statutory purposes of the National Landscape.
- 6.5.38 As a result of this duty, Defra (2024) guidance states that Statutory Undertakers should take appropriate, reasonable, and proportionate steps to explore measures which further the statutory purposes of the designated landscape. The guidance is not prescriptive as to how this duty should be met; it can be evidenced through the consideration of a range of different measures, with the recent decision by the Secretary of State in respect of the Lower Thames Crossing (LTC) project establishing that the principle of meeting the duty could be confirmed pre-consent, with the specific details to be agreed between parties post-consent.
- 6.5.39 In the case of the Project, there are a number of measures which could be considered and explored to meet the duty. The appropriate combination and scale of each measure should consider and be responsive to the nature and scale of the effects of the Project on the National Landscape, noting the effects may be different during the construction and operational phases of the development. The range of possibilities include the following potential measures outlined below.
- Habitat establishment or enhancement, potentially including tree replacement
 - Educational programmes encompassing interpretive boards, outreach programmes, etc.
 - Marketing/profile campaigns promoting the National Landscape
 - Undergrounding of sections of, or rationalisation of, proximate or existing overhead lattice pylon connection infrastructure. This is most likely to involve the exploration of the removal of the PJ route which is a UK Power Networks-owned overhead lattice pylon line passing through two National Landscapes and close to Flatford Mill
 - A financial contribution to support projects which deliver the aims and objectives of the National Landscape Management Plan, which may be more appropriate where there may be existing measures that could be enhanced rather than duplicating them.
- 6.5.40 This list is designed to be illustrative of the type of measures which could be considered and explored and does not comprise a detailed or exhaustive list. The

measures identified would be adapted and expanded through engagement with the relevant stakeholders.

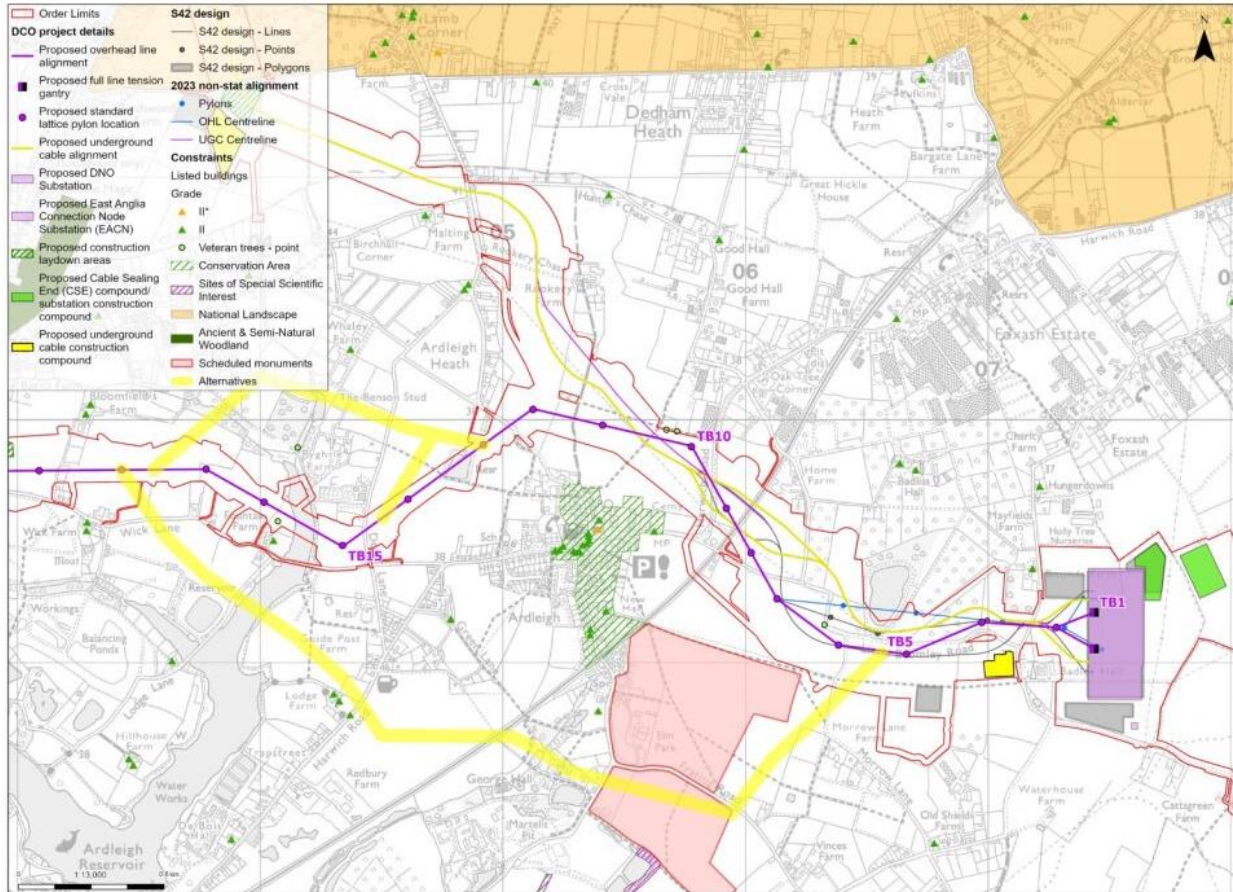
- 6.5.41 The approach taken, including the measures considered and explored, will be subject to the outcome of discussion and informed by the final assessment of effects on the National Landscape detailed in the Environmental Statement (Volume 6 of the DCO application). It would also be influenced by factors including:
- Agreement of funding level required to meet the ‘furthering the purposes’ test derived from assessment work
 - Confirmation of funding availability from Office of Gas and Electricity Markets (Ofgem)
 - Ability to reach voluntary agreement on land rights where land access or control over use is required for particular durations, and
 - Agreement over delivery mechanism and geographic scope.
- 6.5.42 National Grid considers that in combination with identified mitigation measures this approach meets the requirement of seeking to further the purposes. Further detail is provided in National Landscapes – Duty to Seek to Further the Purposes Report (s85 Countryside and Rights of Way Act 2000) (document reference 5.10).

Alternative Overhead Line Route Alignments

- 6.5.43 Having confirmed that there would be no change to technology, with the Project being taken forwards at Ardleigh as an overhead line for the connection from the EACN Substation to Tilbury North Substation, alternatives raised in feedback to follow other localised alignments have been considered, including a review of those raised in previous consultations. These are shown by the indicative yellow swathe ‘Alternatives’ but remain as not preferred for the main reasons set out as follows:
- Route options to the south of Ardleigh have the potential to be straighter in parts and more direct but would unavoidably oversail a scheduled monument and transfer some general amenity effects to other (albeit fewer) residential areas. Some oversail of gardens and crossing of, and potentially pylons within, local wildlife sites of Springhead Corner Meadow and Manor House Meadow would be unavoidable, and acquisition of residential or commercial property would be required to develop a route with appropriate clearances. Even overcoming these challenges, a crossing of the reservoir is not considered possible due to the extent of made ground to either side following mineral extraction, and the location of other existing and planned water bodies coupled with the challenges to system performance from the depth of underground cable installation
 - Route options to the north of the 2024 preferred draft alignment would follow the current proposed overhead line to around TB11 before diverting to the north of the reservoir. This would transfer effects to other (albeit fewer) residential areas but increase socio-economic impacts (stud farm and vineyard, among other affected uses), increase the potential for effects on the National Landscape through reduced separation, and require more extensive removal of trees to achieve appropriate clearances.
- 6.5.44 Other feedback in this area identified the need for a number of potential changes. Potential effects on the horticultural business and fishing interests to the north of Little Bromley Road have led to requests to reposition the overhead line pylons at

TB5 and TB6 to the south of Little Bromley Road. National Grid also became aware, during the statutory consultation, of the potential allocation of land south of Little Bromley Road within an updated Essex Minerals Plan as a site for silica sand extraction. The silica sand resource has been noted by Essex County Council as potentially the only silica sand site within the county, and potentially regionally.

Figure 6.9 Alternative alignments at Ardleigh



6.5.45 As set out at Paragraph 6.5.31, there are different options for the arrangement of underground cables and overhead line in this relatively congested area between TB1 and TB8. It is considered necessary to understand the implications of alternate routing options in order to establish the most effective combination of connections. The restrictions this affects are that the underground cable and overhead line are following the same route until after TB10. Underground cables through the National Landscape could predominantly be to the south of Little Bromley Road with overhead line to the north (as anticipated in the statutory consultation) or the arrangement could be reversed.

6.5.46 The preferred approach, which has been taken forward, reverses the 2024 preferred draft alignment. The underground cables are positioned to the north of Little Bromley Road which would be expected to reduce the sterilisation of the minerals resource (assuming confirmed and allocated in the minerals plan). This would lead to increased effects on the horticultural business to the north, though as already noted at Paragraph 6.5.31 National Grid has judged it more appropriate (in the context of its duty to be economical and in the context of relevant policy) to incur what is expected to be the lower compensation costs for the short-term effects on the horticultural enterprise rather than to extensively sterilise the potential mineral resource over the long term. It is acknowledged that some sterilisation effect, due to pylon bases being

positioned to the south of Little Bromley Road, is likely to be unavoidable, but this would be much reduced compared with the extent of sterilisation should all the underground cables be routed to the south of the road.

- 6.5.47 Given the uncertainty of the mineral resource quality and thus the potential for it to be concluded that the resource is uneconomical to abstract, or for it be judged to be an inappropriate location for abstraction, the draft Order Limits have been extended for the underground cable and overhead line positioning. This is in the context that the greater disruption (arising from the underground cables) should be to the arable cropping regime on the land to the south of the road, as this would be at reduced impact compared with that on the horticultural enterprise to the north. It is also noted that this reversal may be appropriate should it prove possible to extract the minerals resource prior to construction. However, this is unlikely to be achievable given the need to confirm the ability to establish suitable post-extraction conditions for pylon foundations or underground cable installation before detailed site design and planning applications have begun.

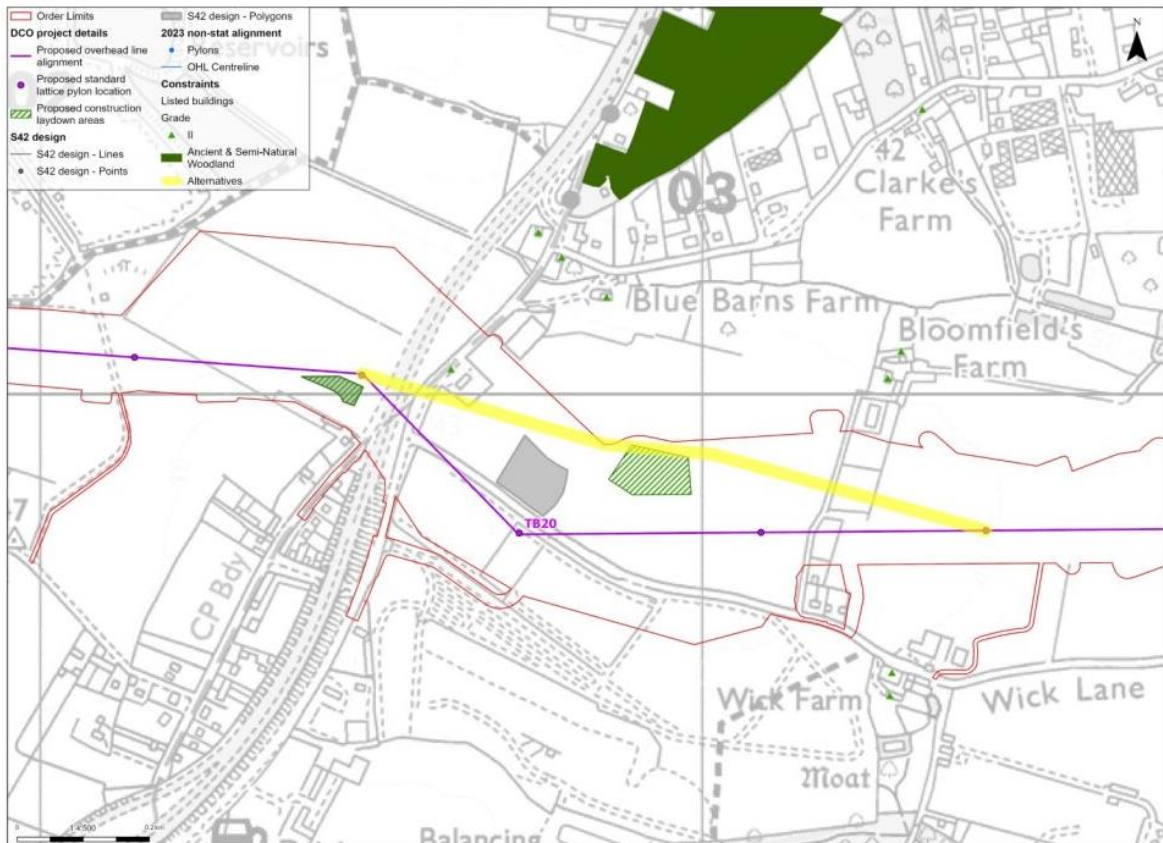
7. Section D Colchester – Siting and Routing Alternatives Considered

7.1 Around the A12 and Wick Lane Junction

7.1.1 National Grid has actively engaged with the promoters of developments to the north and south of Wick Lane near the junction with the Old Ipswich Road (around TB20). Through those discussions, the potential for interaction between the Project infrastructure and 3rd party developments has been identified. Some of those interactions have potential to vary depending on the outcome of variations to permissions that the 3rd parties are progressing for their own purposes to secure. These variations encompass modifications to use classes as well as modifications to the dimensions and arrangement of buildings on particular sites.

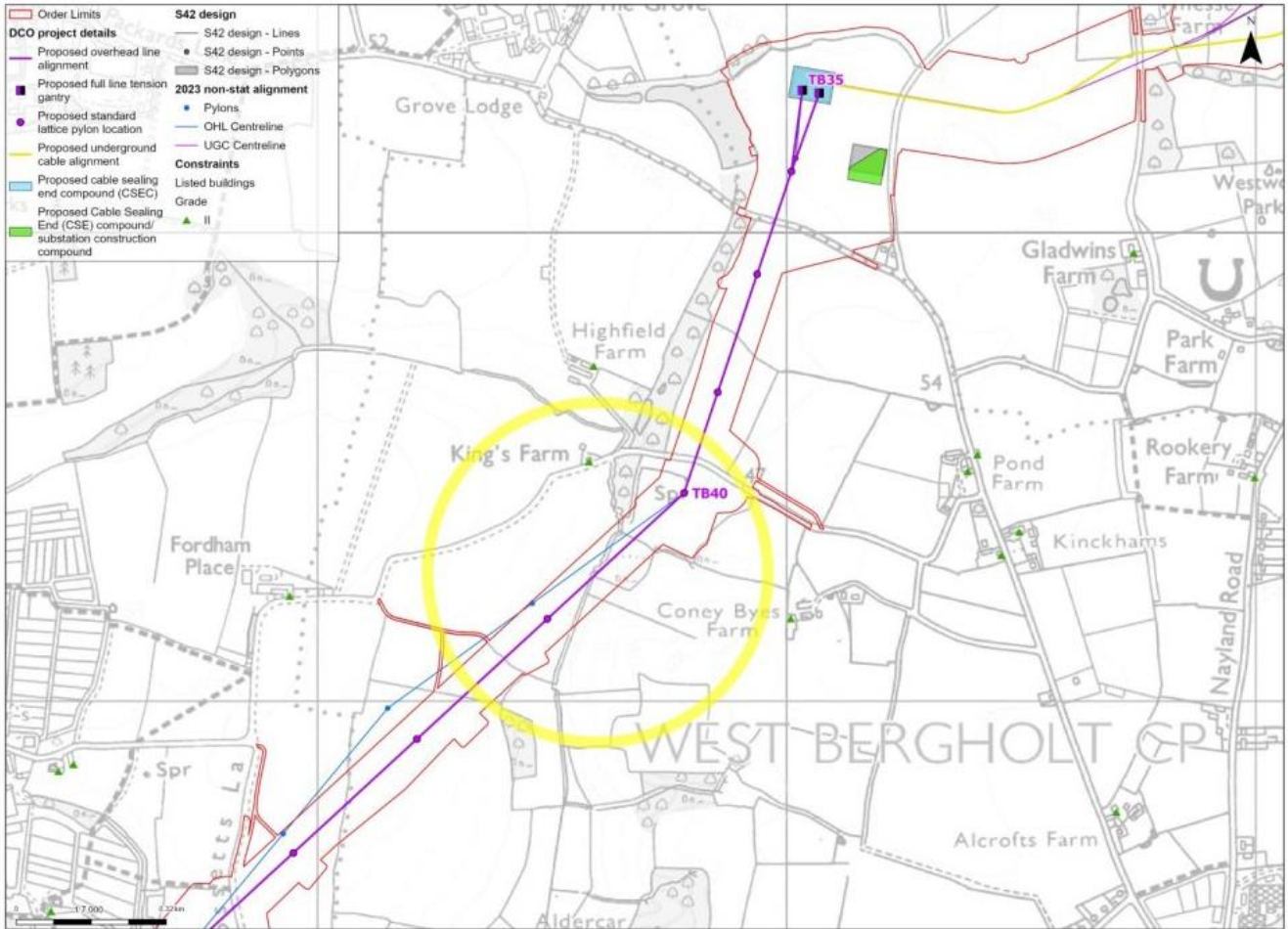
7.1.2 Some changes would create conflict between 3rd party use and the overhead line routing between TB19 and TB20. Equally changes to 3rd party developments to be secured around TB20 have the potential to facilitate an overhead alignment that remains to the north of Wick Lane (see Figure 4.1), is slightly straighter and thus more consistent with Holford Rule 2 as well as being slightly screened by industrial buildings and further from residential properties. It does lead to some conductor oversail of an existing vehicle repair facility but on balance a change to remain to the north of Wick Lane would be slightly preferred if it proves possible.

Figure 7.1 Wick Lane



- 7.2.3 After further consideration, it is still National Grid's view that the National Landscape is at sufficient distance from both the east and west CSE compounds and pylons for there to be no legislative or policy requirement to change the CSE compound location. The residual effects on the National Landscape and its special qualities are at a level below that considered to trigger engagement of NPS EN-1 Paragraph 5.10.34 and there is therefore no policy driver to increase the distance from the National Landscape. Neither are the effects at a level that is considered to engage NPS EN-5 Paragraph 2.9.23 (DESNZ, 2024b) though it is acknowledged that the changes, if they were made, may slightly reduce the level of effects.
- 7.2.4 Localised changes to move the eastern CSE compound into the next field to the east (around TB32) were also considered but are constrained by the position of existing gas and water pipelines and either cannot move sufficiently to reduce the agricultural effects or would have to move to an extent that it would lead to increased visual effects to an adjacent residential property. Moving more extensively, to the vicinity of TB31, has the potential to reduce the agricultural effects (though a similar area of land remains affected, albeit at a location perceived by the landowner to be less impactful), but this would increase the underground cable length by around 600 m and would introduce the risks of an additional gas pipeline crossing by the proposed overhead line. Neither of these locations present circumstances where the level of effect is such that it meets the thresholds to consider using underground cable in NPS EN-1 Paragraph 5.10.34 nor with NPS EN-5 Paragraph 2.10.23. More extensive moves towards the location of TB25 similarly are not required to reduce effects to acceptable levels and would introduce additional costs that are considered to be disproportionate to the benefit gained. For these reasons, no change has been made to the location of the eastern CSE compound.
- 7.2.5 To the western end of the underground cable section, National Grid considered an alternative CSE compound position further to the south, proposed by feedback to reduce effects on the National Landscape and to position the CSE compound on lower ground to reduce visual effects (see Figure 7.3). It was suggested this could be achieved without change to the underground cable length. National Grid considers the CSE compound position to be sufficiently far from the National Landscape such that there is no justification in policy terms for the movement. National Grid also considers the change to around TB40 or TB41 would require an increase in underground cable length. While recognising it would achieve a small reduction in effects, it is not required to be consistent with policy, noting additionally that the proposed site would require an additional length of underground cable (approx. 500 m further but subject to location) with its associated additional cost.
- 7.2.6 An alternative location to the east, midway between Vinesse Farm and Gladwins Farm was also proposed to reduce perceived effects on residential amenity. The alternative proposed however is a CSE site that is less screened by vegetation and landform and therefore less consistent with the Horlock Rules. It would reduce the length of underground cable and thus cost and provide for a straighter overhead line alignment (likely removing the angle pylon at TB46) and increasing consistency with Holford Rule 3. However it transfers visual effects arising from the CSE to other residential properties and is considered to increase visual effects arising from the overhead line for residents at a greater number of properties. On this basis no change is made.

Figure 7.3 Western CSE compound alternatives at Great Horkesley



7.3 Ford Street to Aldham

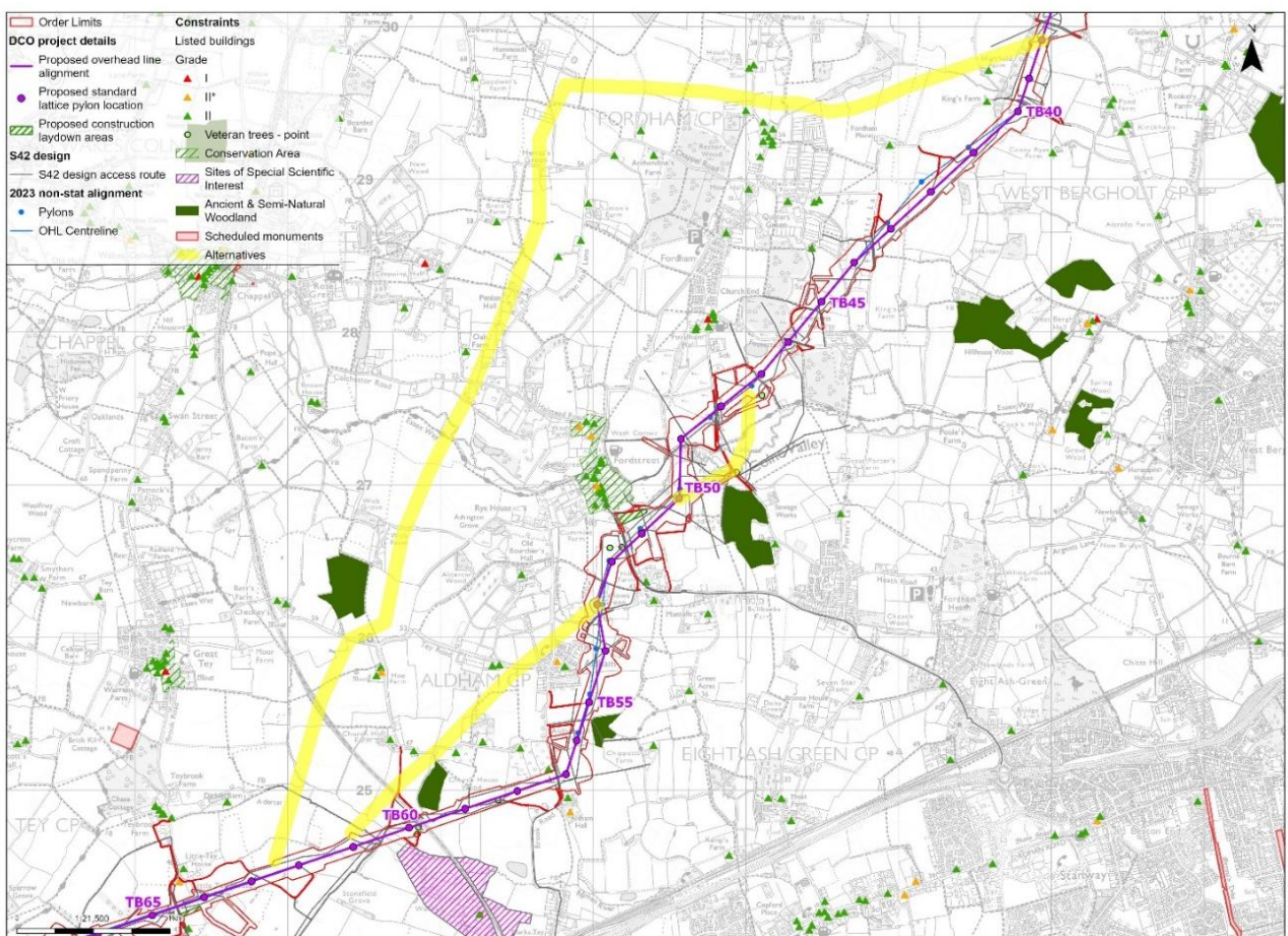
7.3.1 Feedback in this section restated a preference for alternative routeing (illustrated in Figure 7.4, including:

- Passing to the immediate west of Aldham on an alignment similar to that published in the 2023 non-statutory consultation
- Passing further to the west of Aldham, Fordham and Ford Street on the basis that gliding was suggested to be ending at Wormingford Airfield
- Suggesting an alternative crossing point across the River Colne just to the west of Fordham Bridge
- Other localised adjustments and micrositing of infrastructure were also proposed and are reported on in the Consultation Report (document reference 5.1), most notably adjusting the positioning of TB47 to avoid identified heritage assets which is achieved by an in-line adjustment of the pylon position.

7.3.2 With the exception of moving the River Colne crossing to the east, the other alternatives suggested have been considered previously. While the presence of gliding activity at Wormingford Airfield was not a particular factor in previous decision making, the potential closure raised in feedback was nonetheless checked. It has been confirmed that the current lease is ending, but the landowner advised of an expectation of a new lease being established, allowing gliding to continue. In the

absence of new evidence or the identification of further factors, National Grid remains of the view that the Project, which comprises an alignment to the east of Ford Street, Fordham and Aldham, is consistent with policy and appropriate. There are slightly lower overall environmental effects for the western alternative (there are for example slightly fewer residential properties in close proximity and it reduces the interaction with recreational activity), however the assessment continues to conclude that the Project is consistent with policy. The location is not designated in terms that engage NPS EN-5 Paragraphs 2.9.20 and 2.9.21 (DESNZ, 2024b) nor relate to the setting and engage NPS EN-1 Paragraph 5.10.34 (DESNZ, 2024a). More generally, the levels of effect are not considered to meet thresholds outlined in NPS EN-5 Paragraph 2.9.23 to consider the use of underground cable to be justified. On this basis, and in the absence of any clear policy basis, no change has been made.

Figure 7.4 Alternative routes Fordham to Aldham



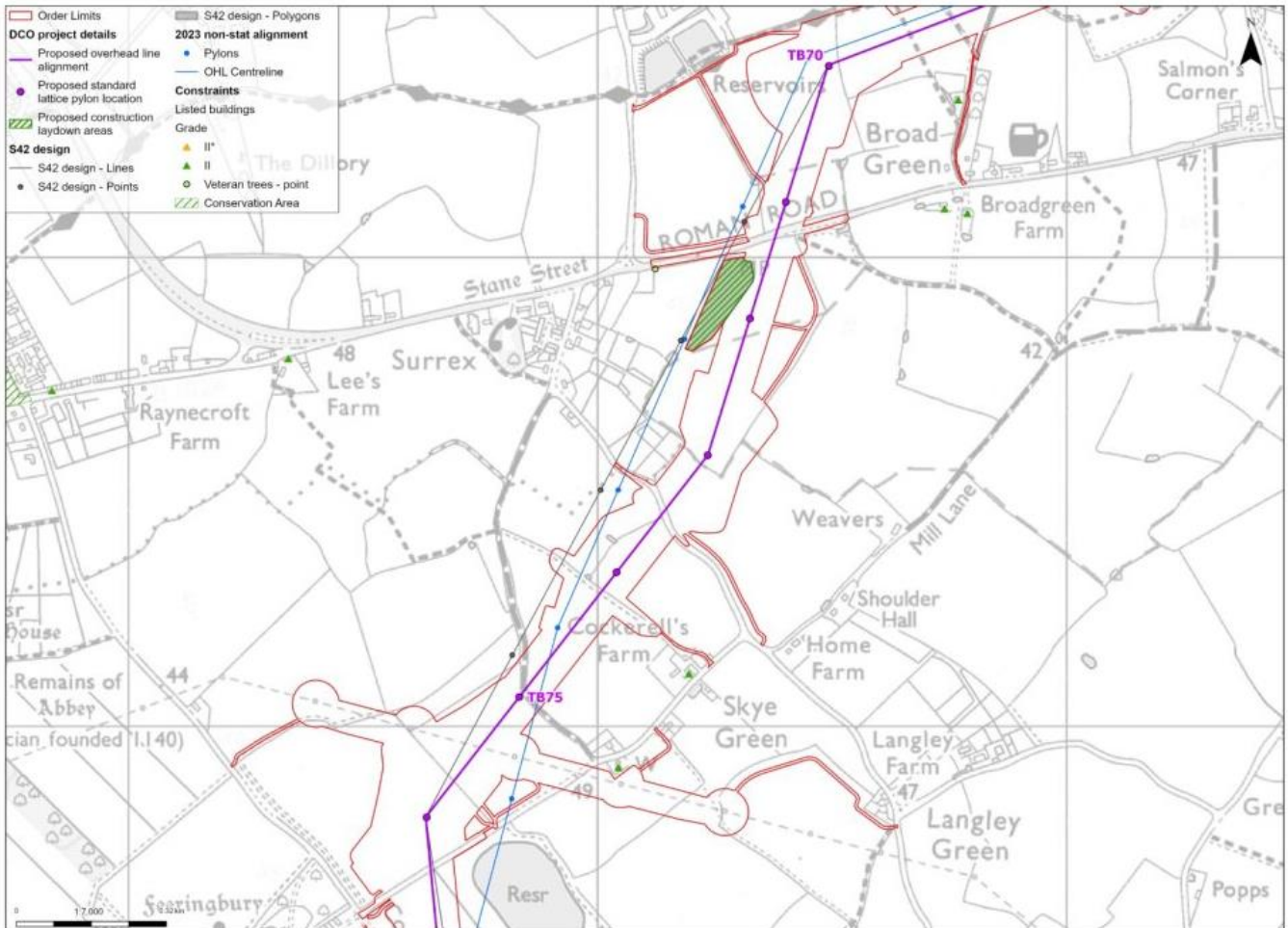
7.3.3 Feedback suggesting an alternative crossing of the River Colne to the east of Mill House has been reviewed. Such a change would move the crossing further from Fordstreet, but it would overlap with constraints and technical risks previously identified for alternative alignments passing to the north of Fiddlers Wood (an ancient woodland). These include various elements of pipeline infrastructure, the river itself and an extensive area of floodplain. The change would be expected to halve the distance to the nearest pylon from the residential property at Mill House and route closer to another property on Mill Road. However the constraints restricting pylon positioning would mean that it presents an unacceptable construction risk and for this reason, no change has been made.

8. Section E Braintree – Siting and Routeing Alternatives Considered

8.1 Surrex

- 8.1.1 Feedback requested the alignment be moved further east from Surrex to be more equidistant between properties. It also requested avoidance of oversail of horse paddocks to avoid the potential isolation of some fields due to the routeing of the temporary access track as well as perceived longer term microshock risks. Technical review also identified a preference to cross the A120 at an angle closer to 90 degrees, in part to reduce the extent of scaffolding requirements. Figure 8.1 shows the Project alignment (purple) the statutory consultation alignment in grey and the previous 2023 preferred draft alignment in blue.
- 8.1.2 The alternative requires the addition of one angle pylon but allows the height of a number of other pylons to be reduced by one extension. It improves the crossing angle, avoids oversail of the horse paddocks (ensuring the design mitigates the risks of microshocks) and balances the distance from properties more evenly to either side. The position of six bellmouths and the temporary access tracks would also be modified and the revised alignment routed close to field boundaries where possible to reduce effects on agricultural activities. Where possible pylons have been positioned to benefit from available filtering of their bases by existing tree cover. Distances to the closest properties are similar to either side of the route.
- 8.1.3 On balance the alternative is preferred and has been taken forward. While noting the alternative is less consistent with Holford Rule 3 by the addition of an angle pylon, this is balanced by a reduction in residential amenity effects (increasing consistency with the Holford Rules supplementary notes) noting that the new angle pylon is around 300 m from the nearest residential property. An improved crossing arrangement in engineering terms has been achieved and effects on the equine business reduced.

Figure 8.1 Alternative routes at Surrex

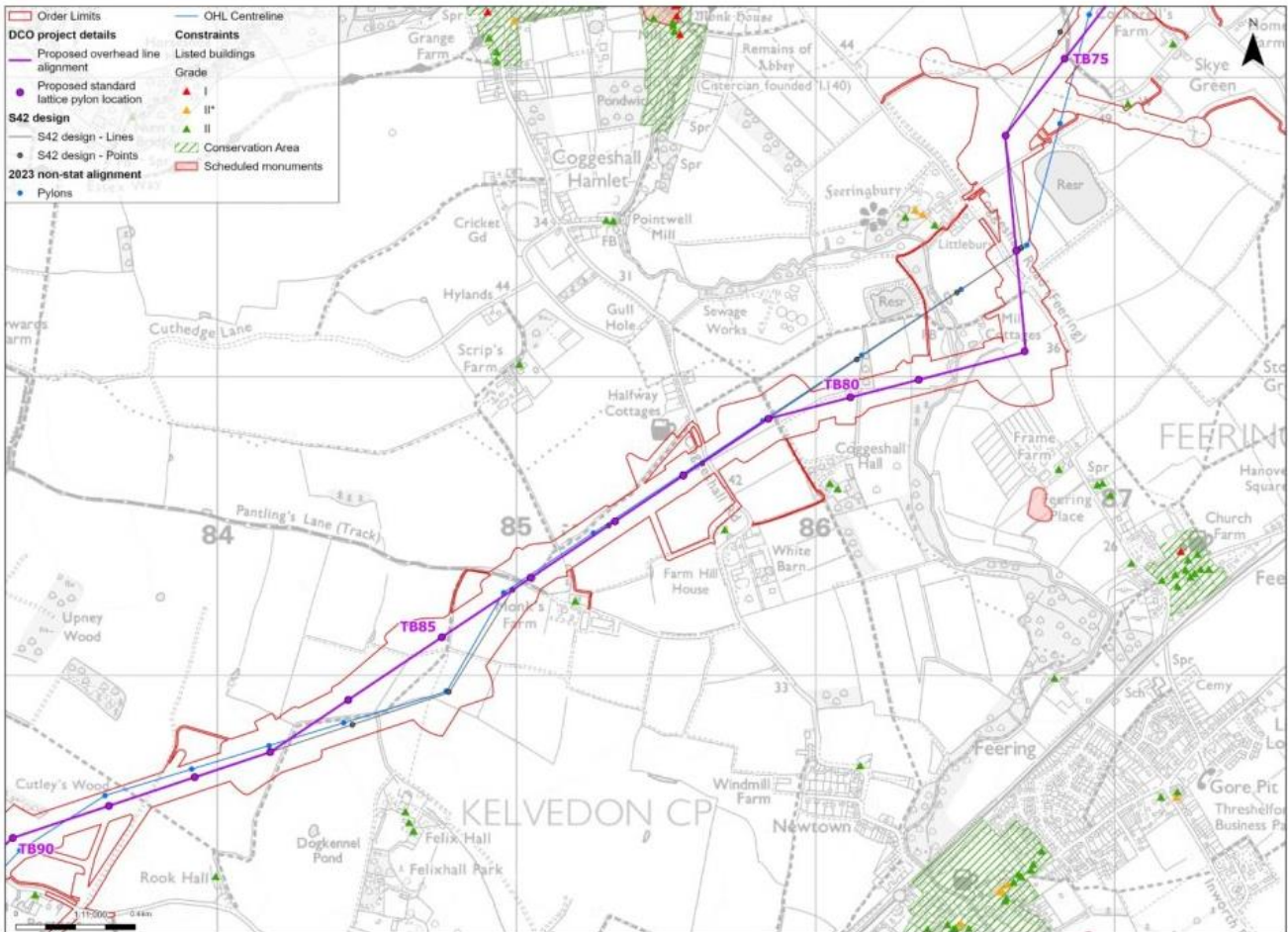


8.2 Around Feeringbury

- 8.2.1 Feedback at this location related to the positioning of pylon TB77 (on the statutory consultation) which was perceived to be positioned within the main view of two cottages (to the south of the pylon and shown as Mill Cottages) at a distance of potentially under 100 m (see Figure 8.2). National Grid was asked to consider whether the pylon could be moved along the alignment and also if an alternative alignment passing to the south of the cottages could be considered to reduce the potential effect on residential amenity.
- 8.2.2 In terms of movement along the alignment, the positioning of TB77 was constrained by a watercourse and landform to the west with a minimum movement of 150 m required to achieve a suitable position. This would create a very long span length and unbalanced span lengths, with the location of TB76 unable to be moved without creating an oversail of residential property and gardens. This would create too much technical risk and subject to ground investigation results may not be deliverable. This was not therefore preferred.
- 8.2.3 An alternative to pass to the south of the properties could be achieved by extending the alignment beyond TB76 (changing it to a suspension pylon) by one span, to a pylon in the field to the south of that where TB77 was proposed to be located. From this new angle the alignment reconnects to TB81. Overall, this requires one extra pylon. This alternative moves the renumbered TB78 and TB80 slightly closer to the

residential property to the south (the Grade II listed Coggeshall Hall Farmhouse and Frame Farm Cottages) but these are at around 350 m distance and for the farmhouse would benefit from some filtering by existing trees within a well-defined and unaffected orchard setting. The alternative requires some tree removal and management but would be a transfer of effects from the 2024 preferred draft alignment. Pylon positioning on the alternative has maintained the field edge/field boundary positioning achieved on the 2024 preferred draft alignment and access arrangements have also followed existing tracks and field boundaries where possible.

Figure 8.2 Alternative considered at Feeringbury



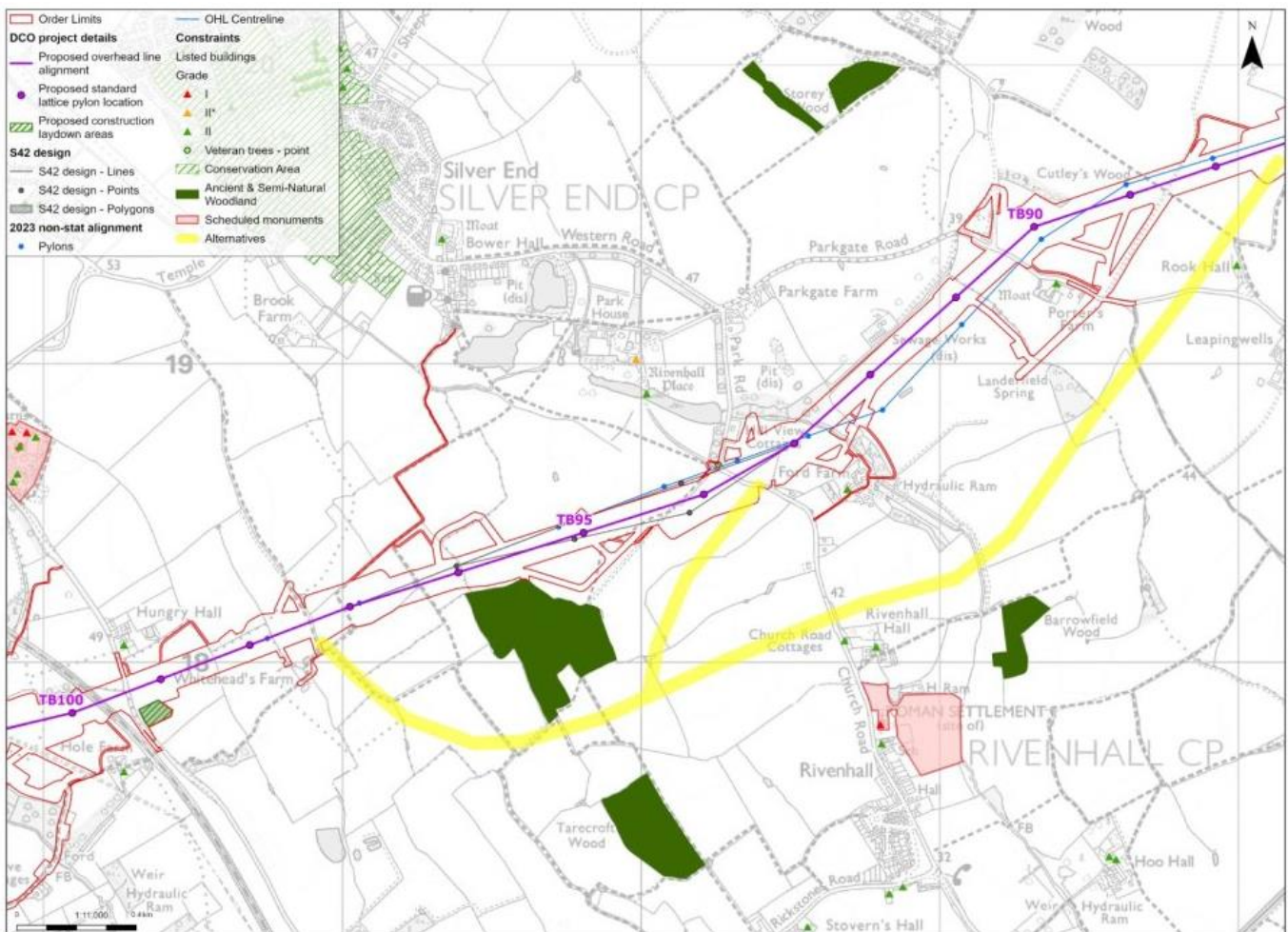
- 8.2.4 Given the uncertain deliverability and risks from repositioning the pylon TB77 (as numbered in the statutory consultation) along the alignment, the alternative is the only means of responding to the feedback. While an additional pylon is required and has cost implications this is considered appropriate to move the pylon from close proximity to, and in the centre of the main view of, residential properties without transfer of effects elsewhere. The change has therefore been taken forward.
- 8.2.5 Feedback around TB84 to TB85 raised the potential for interface with mineral extraction on a site potentially to be included in the minerals plan. National Grid has reviewed whether the site could be avoided but remains of the view that alternatives remain less preferred due to the closer proximity to residential houses and various other factors including linked heritage assets to the north. The preferred approach retains the use of wider Order Limits combined with the use of increased Limits of Deviation to allow for the diversion of the alignment should the sites planning status

change. The diversion cannot avoid effects but allows the positioning of pylons to the edge of the area where retention of the necessary pillar of support has reduced effect compared with the alternative of pylons more centrally positioned in the site.

8.3 Rivenhall and Silver End

8.3.1 Feedback at Rivenhall around TB94 comprised conflicting requests about the balance between effects on trees (one of which was classified as a veteran tree following assessment) and effects on a solar farm, and more generally on the Grade II* listed building at Rivenhall Place, its setting and setting of the Humphrey Repton designed parkland style garden. See Figure 8.3.

Figure 8.3 Rivenhall solar and veteran tree



8.3.2 Following review of the feedback, a change was proposed which increases the effects on the solar farm, reduces tree loss, and increases the separation slightly to the heritage assets. This change has been taken forward due to the association of the trees with a historic entrance to Rivenhall Place and notes that one of the larger oaks has been confirmed as a veteran tree. It is acknowledged that the solar farm is not constrained by grid connection and that some loss of panels is potentially unavoidable.

8.3.3 Alternative alignments to avoid both solar farm and effects on trees have been considered, including a suggestion to route to the south of Rivenhall Thicks (ancient woodland) between TB93 and TB99. This would be less direct with a greater change

of direction and would be less consistent with Holford Rule 3. It would pass close to a residential property with potential for pylons to be seen from front and rear views, increasing effects on residential amenity. It would also be less consistent with the Holford Rules supplementary notes. It would also be expected to increase effects on heritage assets by routeing closer to the Grade I listed Church of St Mary and All Saints and nearby scheduled monument and thus would be less consistent with Holford Rule 2. For these reasons no change has been made in respect of routeing south of Rivenhall Thicks. A more extended diversion from around TB87 was also considered but was less preferred for similar reasons as it would transfer effects, increase effects on the Grade I listed church and would be a less direct connection, and therefore less consistent with Holford Rules 2 and 3. See Figure 8.3.

- 8.3.4 Feedback also identified a landowner preference to position the permanent right of access to the eastern side of their landholding and to consider whether TB98 could be moved further from a residential property. In respect of the permanent right of access the proposed change would make greater use of existing roads and established tracks rather than being entirely routed around the edges of fields. The access to public highway is via Western Lane (a byway open to all traffic) with several residential properties using the same access, before joining established farm tracks with a reduced length around cropped agricultural land. Both alternatives run alongside existing PRowWs but any interaction with users can be safely mitigated through typical mitigation measures. Given the anticipated infrequent and low level of use of the permanent access for maintenance and inspections, the use of the byway is not considered to present a conflict with use by residential properties. On this basis the proposed change is preferred and has been taken forward.
- 8.3.5 Consideration has been given to moving pylon TB96 away from the solar farm. The ability to respond is limited by constraints and potential transfer of effects to the east and west. To the east positioning of TB94 is constrained by the consented Park Gate solar farm with eastwards movement restricted to avoid further loss of panel area. To the west TB99 and TB100 are positioned to achieve clearance over a road and a railway, movement of either pylon is therefore very restricted with the positions balanced to be broadly equidistant from nearest residential properties and to the side of views where possible. Movement north or south is also restricted with the currently straight alignment approximately equidistant from residential properties. Any change would introduce additional angle pylons and be less consistent with Holford Rule 3. Overall, no change to the position of pylon TB96 has been made.

8.4 Fairstead and Fuller Street

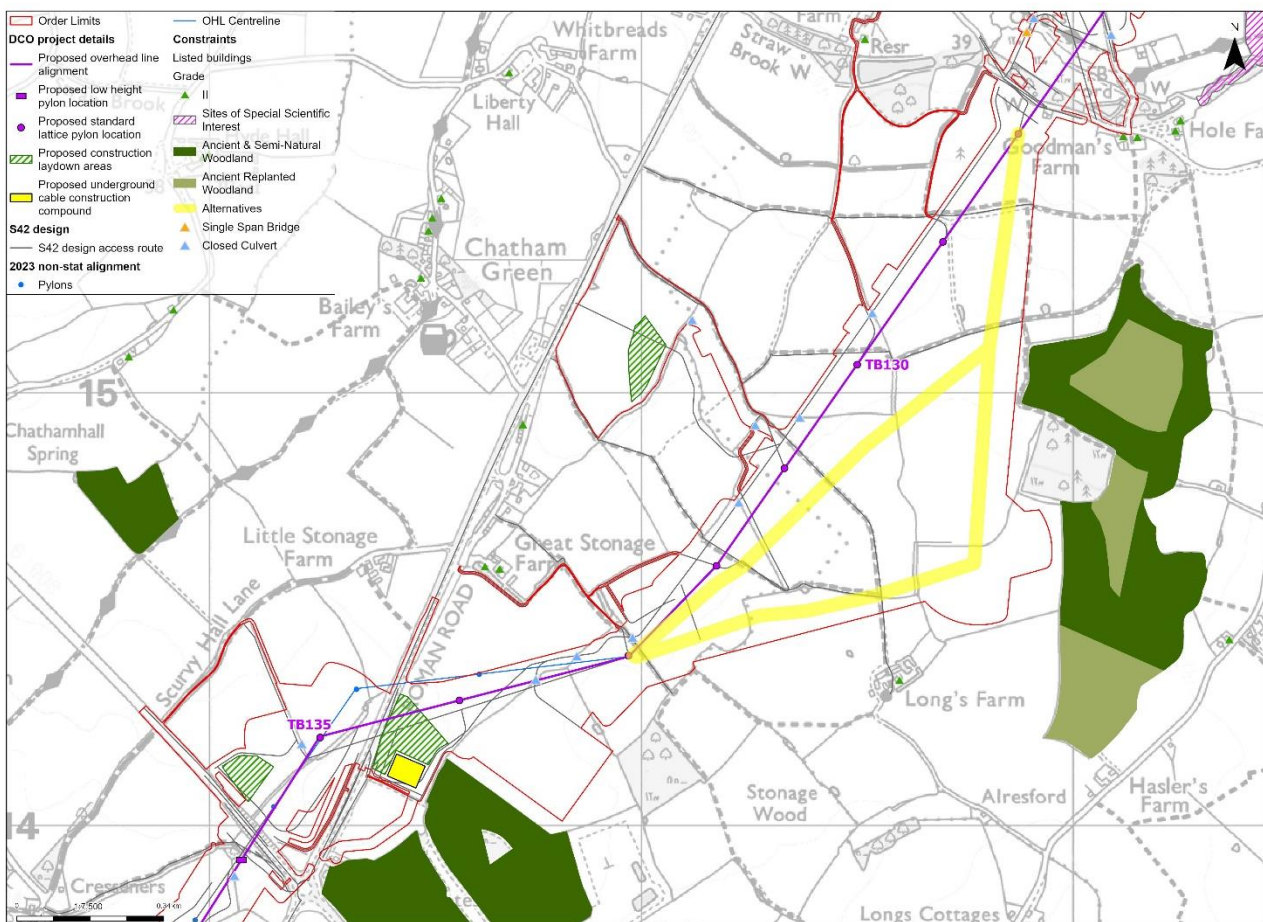
- 8.4.1 Feedback requested that the alignment from TB117 and the haul road are repositioned southwards. In both cases the aim was to reduce the potential removal of trees alongside the lane running south-east from Dines Hall, reduce effects on some protected species and to reposition the construction access so that it had reduced effects on agricultural activities. There are no environmental or other factors that would be affected by this change which, given the benefit to the landowner, has been made.
- 8.4.2 Following further design, the proposed alignment for undergrounding parts of the existing 132 kV overhead line to the west of Fuller Street (referred to as the PSB) has been modified. This change is made in order for the underground cable route to follow alongside field boundaries to reduce effects on agricultural use and has been taken forward.

9. Section F Chelmsford – Siting and Routing Alternatives Considered

9.1 Minerals Scenario at Lions Hall Wood

9.1.1 Along with feedback in this area, National Grid also became aware, during the statutory consultation, of the potential allocation of land between TB128 and TB131 and the consultation on an updated Essex Minerals Plan. Engagement with Essex County Council has suggested that this allocation may not be confirmed until mid-2025. To respond to this, two scenarios have been identified, however a change to Scenario B would only occur with a change in status of the site by it being accepted into the Minerals Plan. See Figure 9.1 with Scenario A being the alignment but with the possibility of moving to one of the yellow routes marked to support routing that avoids the minerals extraction area (subject to the minerals site development plan).

Figure 9.1 Possible overhead line route at Lions Hall Wood



9.1.2 Scenario A (the proposed overhead alignment) is based on an assumption that the site is not taken forward in the adopted plan and comprises the 2024 preferred draft alignment (subject to minor amendments for temporary works linked to the interface with the Chelmsford Bypass).

9.1.3 Scenario B (shown by the yellow swathe 'Alternatives' in Figure 9.1) would be taken forward if the site's allocation is confirmed. The alignment would then depend on the design of the mineral extraction with the image above showing an indicative maximum diversion alignment (based on an alignment provided by the landowner to the 2023 non-statutory consultation). Scenario B would require taller pylons and is unavoidably less direct, routing around the edge of the anticipated minerals site while maintaining an appropriate stand-off from an area of ancient woodland. While noting that this would move the proposed alignment closer to residential properties and a Grade II listed building at Long's Farm, at around 200 m from these features (compared with around 400 m with Scenario A), environmental effects are not considered to be a constraint to the adoption of Scenario B. On this basis the realignment to Scenario B would be preferred over the extensive constraint and sterilisation of mineral abstraction that would occur with Scenario A.

9.2 Route Alignment Around Great and Little Waltham

9.2.1 Feedback and further assessments and investigations relevant to the connection arrangements in the vicinity of Great Waltham and Little Waltham include:

- Restated preference for alternative alignments either to the east of Chelmsford, close paralleling the existing 400 kV and 132 kV overhead lines, or further to the west of Great Waltham, approximately midway between Great Waltham and Pleshey
- Preference for a different strategic option connecting into Rayleigh Substation
- Concern about effects on heritage assets most notably the Grade I Listed Langleys House a large historic house (which has a designed garden avenue view to the north-east) and its associated Grade II Registered Park and Garden, as well as the conservation areas at Great Waltham and Little Waltham. Feedback also noted the suggested presence of other heritage assets between Great and Little Waltham postulated from work around the Ash Tree Corner Scheduled Monument identified during bypass planning work
- Identified presence of veteran trees and protected species necessitating a slight realignment and repositioning of pylons between TB134 and TB139
- Impacts on the communities by the perceived severance between Great and Little Waltham, general recreational activity on PRoWs and visual amenity within and in the immediate vicinity of the alignment and specific views from residential properties along and near Chelmsford Road. There was also specific feedback to position TB140 closer to the River Chelmer, preferably to the north side
- Concern about heritage effects. Historic England expressed concerns regarding the level of harm, although they have acknowledged in subsequent meetings that change to setting caused by an overhead line in this location would not be considered as substantial harm
- A preference for the use of underground cable rather than overhead line on the 2024 preferred draft alignment
- Preference from some respondents to the 2024 statutory consultation to use low height pylons around Minnow End if the Project were to progress as overhead line. The feedback was more nuanced when such a design was presented at the 2025 targeted consultation where there was a preference from a heritage

perspective for low height pylons north of the River Chelmer but more general preference to return to standard height pylons (particularly set further back from the road) to the south of the River Chelmer.

Review of Alternative Alignments

9.2.2 National Grid has reviewed its strategic studies and corridor and route selection in light of feedback received and new information. An onshore connection from Norwich to Tilbury via Bramford Substation and the EACN Substation remains the most economical and efficient means to meet the Project need. No new evidence has been provided nor further factors identified to indicate that an alternative strategic option (with elements offshore or connections via other substations such as Rayleigh) or alternative corridor or route should be preferred.

9.2.3 Similarly, in the immediate vicinity of Chelmsford it is still considered that it is not feasible to adopt an alternative alignment to the east of Chelmsford, at least partly following the existing 400 kV overhead line or following or adopting the alignment of an existing 132 kV overhead line (in line with NPS EN-5 Paragraph 2.9.24 (DESNZ, 2024b)). While potentially reducing effects, there remain locations where other environmental features, homes and constraints are present that mean there is no available route for a 400 kV overhead line.

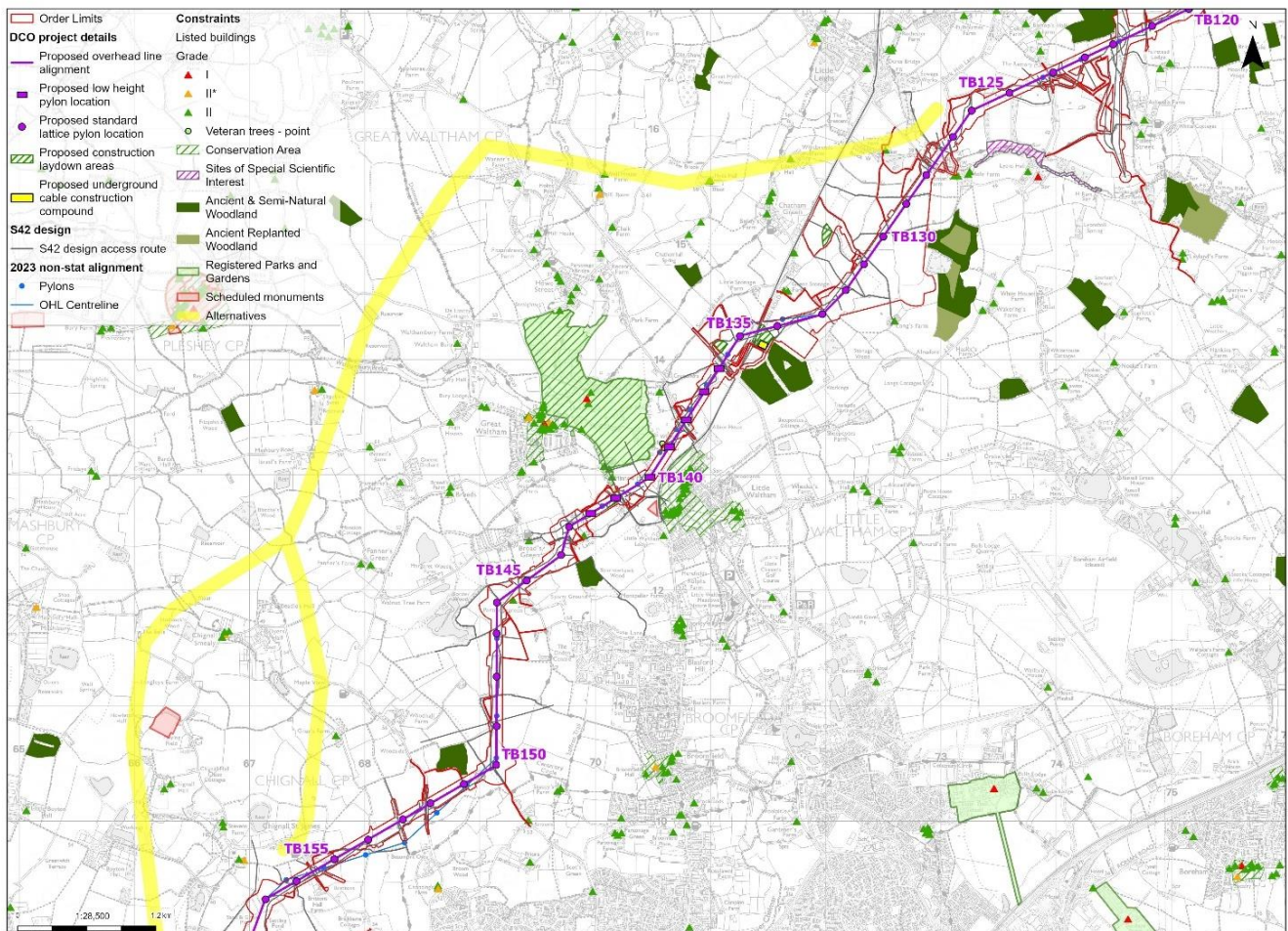
9.2.4 Around Great and Little Waltham, it is still considered that the 2024 preferred draft alignment (subject to minor adjustments related to protected species habitats) remains preferred compared with options further west. Figure 9.2 shows an indicative route developed in 2024 to form a basis for comparison. It is considered that:

- A western alternative would be longer by up to 3 km, increasing direct effects on landscape in terms of geographical area, but would generally be located within a less sensitive landscape. Both options would be in proximity to community receptors. The western alternative would, however, avoid some pinch points between settlements and clusters of properties, and reduce effects on long distance walking routes. That said the more eastern alignment is consistent with policy
- The western alternative would offer the opportunity to reduce potential heritage effects, routed through cropped farmland where there are relatively fewer listed buildings. It would however introduce the potential for additional effects to a scheduled monument east of Howletts and, given the relative openness of views between Pleshey and Great Waltham, may introduce effects to the scheduled monument (motte and Bailey of Pleshey Castle) and listed buildings at Pleshey
- The Project alignment routes between conservation areas and past the eastern edge of the Langleys Registered Park and Garden, though the adoption (in part) of low height pylons, screening by the bypass and from trees would reduce potential heritage effects on Little Waltham and does increase consistency with Holford Rule 4. In addition, the trees in the extensive parkland would provide filtering of views at Great Waltham as well as for direct views from the Grade I listed Langleys. Whilst the level of heritage effects for the alignment are not inconsistent with relevant heritage and planning policy heritage effects are likely to be reduced with the western alternative
- The western alternative would be in the order of up to 3 km longer and likely to require an additional eight or nine pylons. These would bring additional environmental and socio-economic effects and at increased Project cost. It would

also require an additional crossing of the gas pipeline and may necessitate additional installation of cathodic protection (trenches adjacent to the gas pipeline need to be dug to install the protection) over several kilometres, leading to additional effects on farming activities

- Overall, while noting the potential for some reduction to some effects (heritage and visual amenity) from the western alternative, it is noted that it would lead to some transfer of effects from some residential properties to others and would introduce effects and require additional infrastructure over a less direct and longer route and be less consistent with Holford Rule 3. By virtue of the longer route the alternative is also less economic and efficient. With the potential effects of the alignment not considered to be inconsistent with relevant policies in NPS EN-1 and NPS EN-5, National Grid has taken the view that on balance the alignment passing to the east of Langleys where there is some benefit to screening from trees (increasing consistency with Holford Rule 4) is the appropriate basis to progress for the Project.

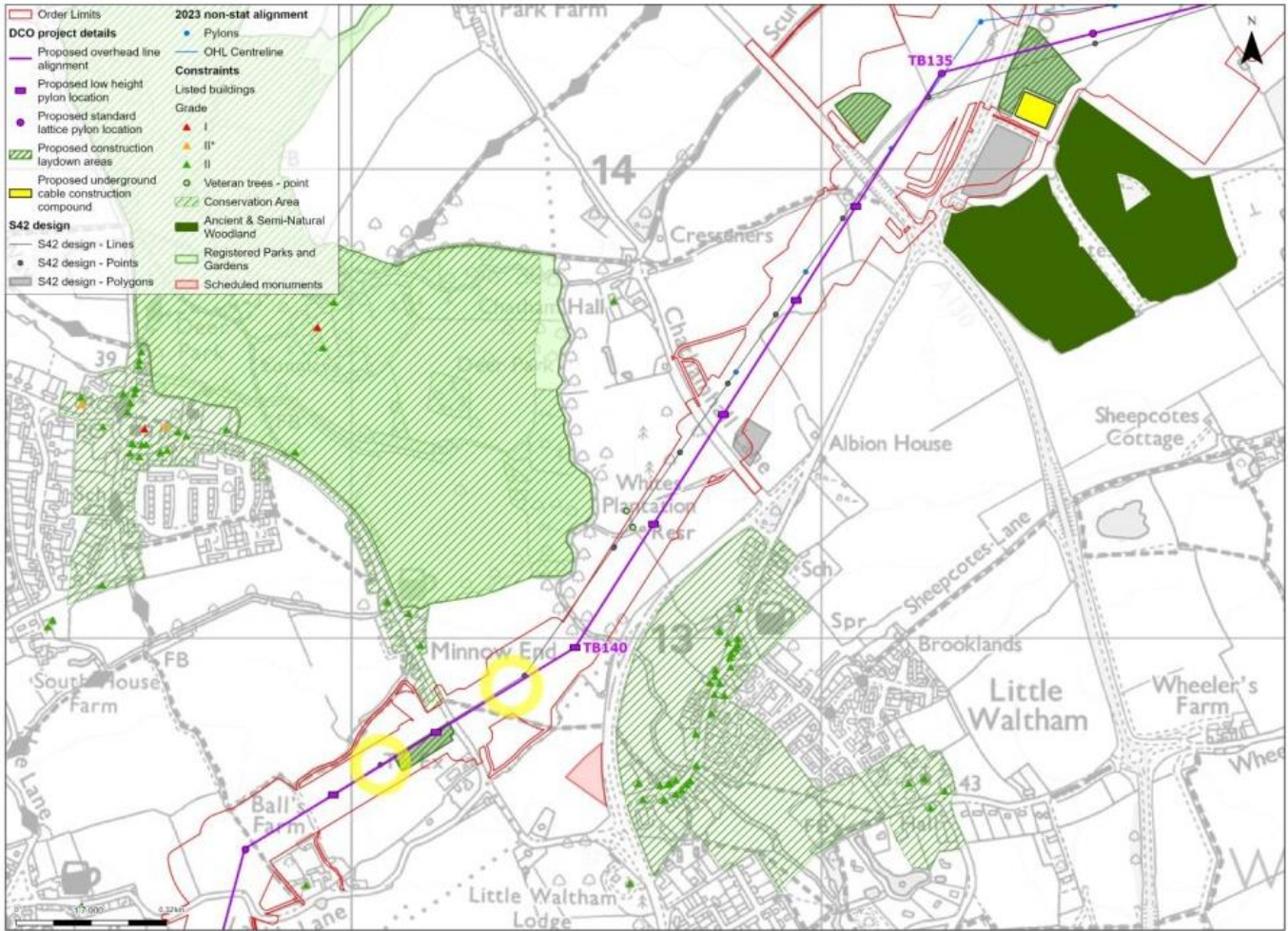
Figure 9.2 Western alternative at Great Waltham



Refining the Overhead Line Design

- 9.2.5 Responding to the identification of veteran trees and protected species, and on the basis that the Project proceeds as an overhead line design passing between Great and Little Waltham, the alignment has been moved slightly to the east on the north side of the River Chelmer to avoid the veteran trees and protected species, reducing conflict with Holford Rule 2. This change can be accommodated without material change of effects for other receptors. Over and above this change of alignment, alternative alignments and pylon types have been considered in the area to the north and south of the River Chelmer between TB135 and TB143.
- 9.2.6 Lower height lattice pylons are useful where height is a strong consideration, however they also occupy a greater footprint and have a bulkier and more dense profile. They can therefore provide visual benefits in some scenarios, for example where a reduction in pylon height means that views of the tops of pylons are screened by intervening woodland. In other scenarios they can increase adverse visual effects, for example where relatively close to visual receptors without intervening filtering vegetation where they are likely to appear more noticeable in views from residential receptors. In summary, the closest receptors are unlikely to experience a benefit from lower height pylons and the impact is likely to remain similar, though much depends on individual receptor positioning. More distant receptors will experience a benefit with the tops of the lower height pylons being less visible in views where trees provide screening.
- 9.2.7 The statutory consultation alignment positioned the standard lattice pylons a similar distance to either side of Chelmsford Road and a similar distance between properties alongside the road at Minnow End. An alternative low height lattice pylon arrangement was the subject of the 2025 targeted consultation. Responding to feedback received on this and the previous standard lattice pylon design, National Grid has also considered a hybrid of the two with low height pylons in a section to the north of the river and standard lattice pylons to the south of the river. The two arrangements are shown on Figure 9.3 with the hybrid positioning the standard pylons slightly to the east of the position in the 2024 statutory consultation.
- 9.2.8 Lower height lattice pylons have the potential to be positioned at the same span lengths as standard lattice pylons, though in practice some adjustments are required because of the wider lower crossarm and the different interaction with terrain and potential vegetation clearance requirements. For the low height design between TB136 and TB143 this led to a need for the relocation of pylons and an additional pylon between TB140 and TB143 to achieve clearances above the highway and acceptable span lengths. It is acknowledged that this moves a pylon closer to a property where the alignment crosses Chelmsford Road but also means that pylons visible in views to the front and back of the property are at a greater distance. TB135 and TB143 would remain as standard lattice pylons (but with the latter moved slightly north-east) and all intervening pylons changed to low height lattice pylons.

Figure 9.3 Arrangements between Great Waltham and Little Waltham



9.2.9 Feedback to consultation subsequently noted that there were different preferences expressed for the design to the north and south of the river. A more acceptable arrangement was expected to be provided by reducing visual effects for the nearest residential property and for those travelling along Chelmsford Road. This was achieved by reducing the number of low height design pylons, with the positioning of the low heights restricted to the north of the River Chelmer, and by slight repositioning replacing the three low height design pylons south of the river with two standard lattice pylons set further back from the road.

9.2.10 It is also relevant to note additional construction and maintenance risks associated with the use of a low height lattice design (the configuration of two conductor bundles on the lower cross arm presents additional challenge) which are among factors influencing their relatively infrequent use. While subtle shifts in pylon locations can provide benefits for visual receptors at a location, these shifts can conversely result in a transfer of effects onto other visual receptors. This would sometimes be the case in the settled area between Little Waltham and Great Waltham, where residential properties are scattered along the area. In terms of landscape, effects on landscape character are likely to be similar or greater due to the introduction of lower height pylons into the shallow valley area between Little Waltham and Great Waltham. The increased width of the structures mean greater levels of tall vegetation clearance could be required, subject to pylon positioning, but also noting that the alternative set out above leads to the avoidance of a number of veteran trees.

- 9.2.11 Use of low height pylons is expected to remove or reduce the visibility of pylons in views from within Great Waltham conservation area, from Langleys Registered Park and Garden and from within Little Waltham Conservation Area, which would be a beneficial change from the use of standard height pylons. The use of low height lattice pylons (to the north of the River Chelmer) would also remove a greater proportion of the upper parts of a standard lattice pylon from a designed garden avenue view to the north-east from the Grade I listed Langleys house. Whereas the top cross-arm of a standard lattice pylon would be visible only the top of the low height lattice (above the cross arm) would be visible in this view. This modification is considered to slightly reduce the impact caused through change to the setting on the Grade I listed Langleys. However, the scale of the change in impact is not enough to alter the EIA assessment or the degree of 'Less than Substantial Harm' assessment in planning policy terms, albeit the effect is lowered somewhat. The bulkier structure of the low height lattice pylons would be clearly visible from the closest edges of the conservation areas and in the more open views at the closest edges of the registered park and garden. However, such effects would be reduced as distance increases, especially in areas where intervening vegetation and screening by other buildings occurs. Overall, it is considered that the level of visibility across the park would be reduced for the low height lattice pylon compared with standard lattice pylons. This benefit from low height pylons is particularly the case to the north of the River Chelmer.
- 9.2.12 When considering the registered park and garden and Great Waltham conservation area overall, pylons of either design would be clearly visible from the edges of these areas. As such the use of low height pylons would not alter the assessment of magnitude of impact, despite the use of low heights being preferred for these assets. In a meeting with the Project team post the statutory consultation, Historic England expressed a preference for the use of the low height pylons in this location (with particular emphasis on the area north of the River Chelmer) and it was discussed that this modification in design would demonstrate that feasible alternatives had been considered to mitigate design impacts to the designated assets in this area.
- 9.2.13 While Langleys Registered Park and Garden is a CWS, the Project would have no direct impact on the CWS, since the alignment would be adjacent but not within the locally designated site. NPS EN-1 Paragraph 5.4.52 (DESNZ, 2024a) states '*The Secretary of State should give due consideration to regional or local designations. However, given the need for new nationally significant infrastructure, these designations should not be used in themselves to refuse development consent.*' As a local ecological designation should only be given 'due consideration' and the proposed works would have no direct impact on the CWS there is no ecological policy driver for a change in the alignment.
- 9.2.14 The River Chelmer and the associated valley location was originally identified as an area of potential bird collision risk, due to the proposed direct crossing of the CPRSS (document reference 7.18) blue corridor by overhead lines. NPS EN-5 Paragraph 2.10.2 (DESNZ, 2024b) states '*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.*'
- 9.2.15 The results of wintering bird surveys at this location have however found the risk of bird collision to not be significant. NPS EN-5 Paragraph 2.11.1 which states '*Where biodiversity impacts are identified, including those associated with bird collision with overhead lines, the Secretary of State should be satisfied that all feasible options for mitigation have been considered and evaluated appropriately*' is therefore not

applicable and further bird collision mitigation (including the potential for alternative routeing) is not required. Natural England have stated in relation to the Stour and Orwell Estuaries SPA that they ‘...agree that the survey results show the collision risk is low so impacts can be screened out’. Overall, there is no ecology reason in policy terms, to trigger the need to change the alignment nor adopt a different pylon design.

- 9.2.16 After consideration of the feedback National Grid is considering taking forwards a modified project that reduces the extent of the low height pylons and focuses these on the area north of the River Chelmer where they make a difference to the level of heritage effects. South of the River Chelmer it is possible that we will revert to the use of standard lattice pylons to reduce visual effects for those in adjacent residential properties or travelling along Chelmsford Road compared with those arising if low height lattice pylons were to be used. The potential change, for which certain technical details are being refined, would slightly modify the position of pylons (within Order Limits using Limits of Deviation) to allow three low height pylons to be replaced by two standard pylons south of the River Chelmer. Pending clarification of the details, the work plans show the alignment from the targeted consultation without the repositioned pylons or change to standard pylons south of the river which is awaiting confirmation. The vertical LoD have been increased for these three low height pylons as per the table of parameters in the Works Plans (document reference 2.3) to allow for this increase in height to support a reduction in the number of pylons. This LoD exceeds the normal LOD used elsewhere.

Consideration of Underground Cable

- 9.2.17 Consideration has also been given to whether there is a justified case to change to an underground cable design in this area. If a decision were taken to progress with the use of underground cables it would represent a change from the 2024 preferred draft alignment with standard lattice pylons or from a modified alignment incorporating low height lattice pylons. It is also likely that the CSE compounds would be located (as a minimum distance) at around TB133 to the north and TB142 to the southern extent with an underground cable length of around 2.5 km. Shorter distances would substitute effects from overhead lines and pylons with those from the CSE compound at the receptors hence the assumption of a relatively longer length of underground cabling. There would be additional costs for the two CSE compounds and underground cable of approximately £80 million to £100 million depending on detailed siting and the potential need for trenchless crossing techniques to cross under the River Chelmer.
- 9.2.18 The area does not fall within a nationally protected landscape nor the setting of such a landscape in terms that lead to the presumption to utilise underground cables (NPS EN-5 Paragraph 2.9.20). Decision making about the use of underground cables is therefore guided by policy identified in NPS EN-5 including Paragraphs 2.9.14, 2.9.23 and 2.9.25 (DESNZ, 2024b).
- 9.2.19 In landscape and visual assessment terms, both the overhead line and potential underground cable option would result in adverse effects during construction. The presence of filtering/screening vegetation in more distant views experienced by people would remain unchanged for both scenarios. There would be potential for the underground cable option to result in the potential for some transfer of visual effects to residents close to CSE compound locations. It is considered that the location does not, on the basis of landscape and visual effects, meet the requirements in the NPS

EN-5 policy. The effects, while significant in EIA terms, are not considered to be 'widespread' or 'particularly significant' therefore this does not meet the thresholds to be considered for underground cable as set out in NPS EN-5 Paragraph 2.9.23 relevant to areas that are not subject to relevant designation.

- 9.2.20 Longer term, a change from low height lattice pylons to underground cable would reduce the spread/extent of significant effects on high sensitivity visual receptors (as defined in the current edition of the Landscape Institute's (2013) Guidelines for Landscape and Visual Impact Assessment), such as residential receptors and visitors to Langleys Registered Park and Garden as well as reducing effects on views from people using promoted long distance walking routes (the house is not open to the public but parts of the estate are accessible from PRow and the Essex Way/Saffron Trail long distance routes).
- 9.2.21 A change to the use of underground cable has the potential to increase adverse effects on the ecological interests though this would be reduced if a trenchless crossing technique were to be used to cross the River Chelmer. Overall however the ecological interests do not form a factor influencing decision making between the use of overhead line or underground cable.
- 9.2.22 In conclusion as noted above, the assessment work has concluded that the adoption of low height pylons would result in no heritage assets experiencing substantial harm. Only the closest and open parts of the registered park and garden would experience harm, but when considered overall, the Grade II registered park and garden is considered to experience effects at the middle range of less than substantial harm. Feedback has indicated that there may be archaeological interest within the area between the registered park and garden and Little Waltham Conservation Area. However, research has identified no records of specific finds. It is acknowledged that reports, following investigations prior to the building of the Little Waltham Bypass, speculated on the potential presence of heritage interest but also note this was not based on any direct investigations or records within the Order Limits.
- 9.2.23 Considering the overall balance of effects on the area between Great Waltham and Little Waltham resulting from a low height lattice pylon alignment in the context of NPS EN-5 Paragraph 2.9.23, it is concluded that this does not provide a clear case to justify the costs and effects arising from the use of underground cable. The effects arising from overhead line on heritage assets comprise less than substantial harm with the Grade II registered park and garden experiencing effects that could overall be considered to be in the middle range of less than substantial harm. With the cost of an underground solution, indicatively estimated to be in the order of £80 million to £100 million for a 2 km to 3 km section (subject to CSE compound location and need for trenchless crossings), National Grid has concluded that the use of an overhead line utilising a section of low height lattice pylons should be taken forward in the vicinity of Great and Little Waltham.

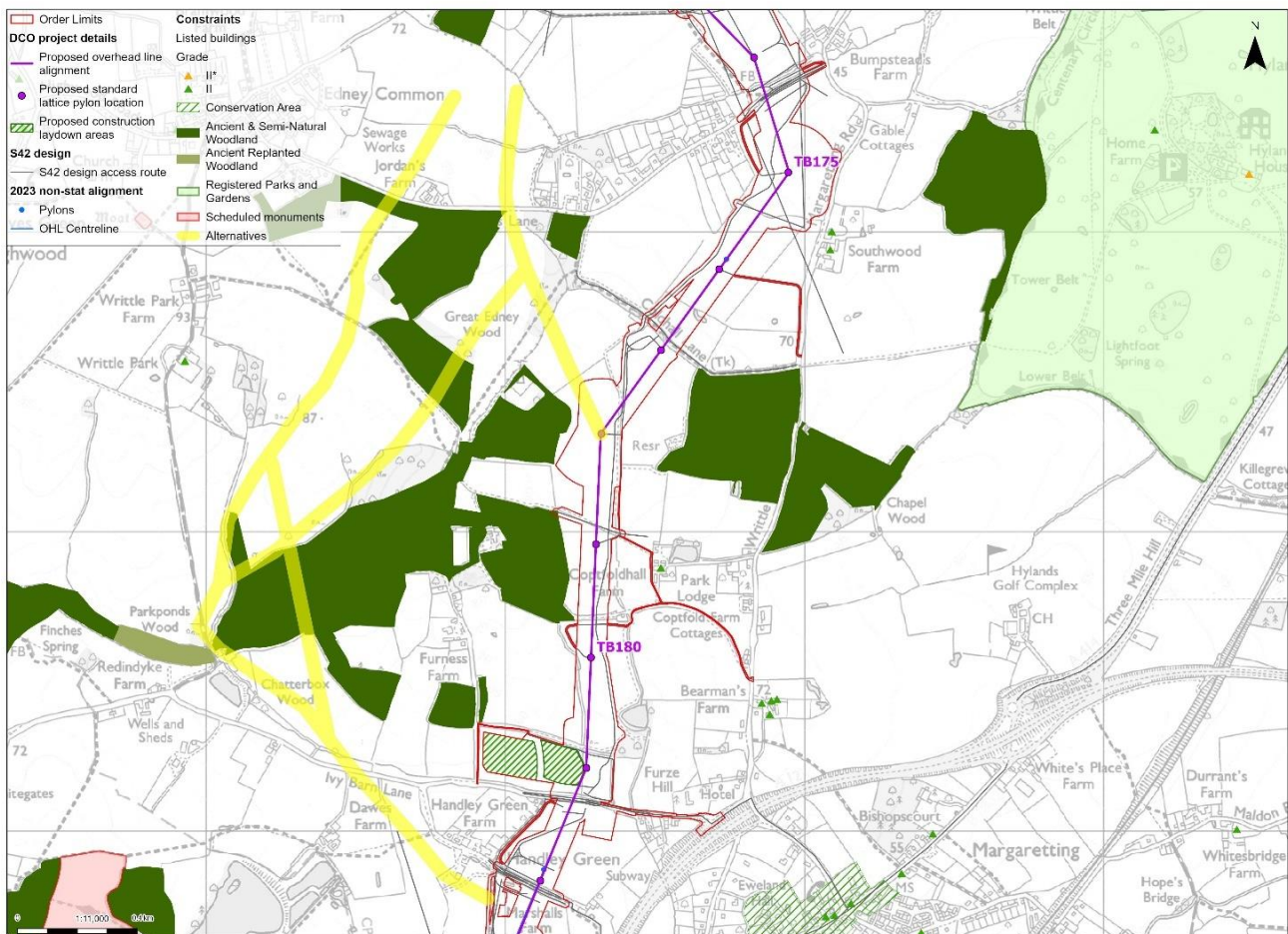
9.3 West of Writtle

- 9.3.1 Feedback in this area restated the preference for alignments routed to the east of Chelmsford (the reasons why these continue to be less preferred are set out at Paragraph 9.2.3 and not repeated) as well as also restating the preference for routes more directly crossing the Edney Common area. More localised alignment changes were proposed including alignments passing to the west of the gas compressor site on Roxwell Road and localised adjustments around Writtle College. The perceived

direct engagement National Grid is exploring opportunities to restrict local construction activities so as not to restrict the scheduled 2028 Jamboree proceeding on the site and is also exploring opportunities to support the relocation of the event to an alternative site.

- 9.3.4 Feedback around Edney Common restated the respondents' preference that more direct routes should be taken forwards. These have been suggested as routing through shallow valleys and avoiding more productive land. Illustrative options are marked on Figure 9.5. The respondent also noted that areas of ancient woodland had been coppiced and therefore should be considered as less restrictive to routing than stated. These alternatives have been reviewed and discussed with Natural England. In their opinion more frequent coppicing, to maintain clearances to overhead lines, will lead to a change in habitat that is incompatible with maintaining the status of the habitat as ancient woodland. No change has therefore been made.

Figure 9.5 Edney Common

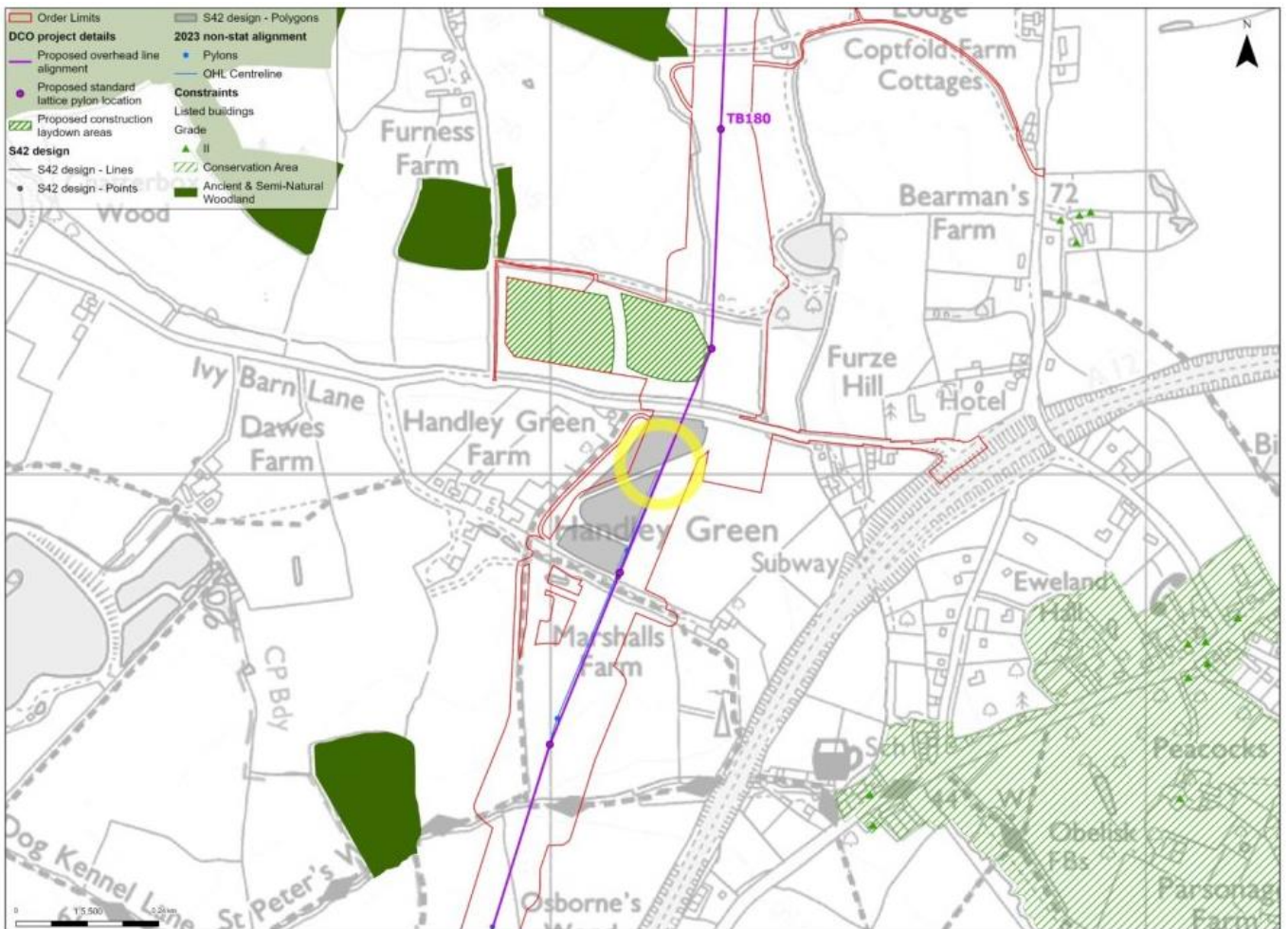


- 9.3.5 Localised adjustments to the alignment around Writtle have been considered but no change has been made due to the restrictions imposed by infrastructure constraints (various pipelines) which prevent a change or because a change would lead to a transfer of effects for example resolving perceived impacts on a view from one property but at the consequence of effects transferring to the view from another residential property.

- 9.3.6 The proposed temporary construction laydown area was previously located to the east of the overhead line adjacent to the bellmouth access point off Ivy Barns Lane,

Handley Green. Feedback from adjacent residential properties requested it be moved. In response the field to the north of Ivy Barns Lane has been identified as also being suitable. It is acknowledged that this change would transfer some effects from one part of the community to another. However, intervening existing trees and hedgerow vegetation would likely provide more filtering of views from the community towards the proposed construction laydown areas. This change has been taken forward.

Figure 9.6 Temporary Works Laydown Area at Margareting

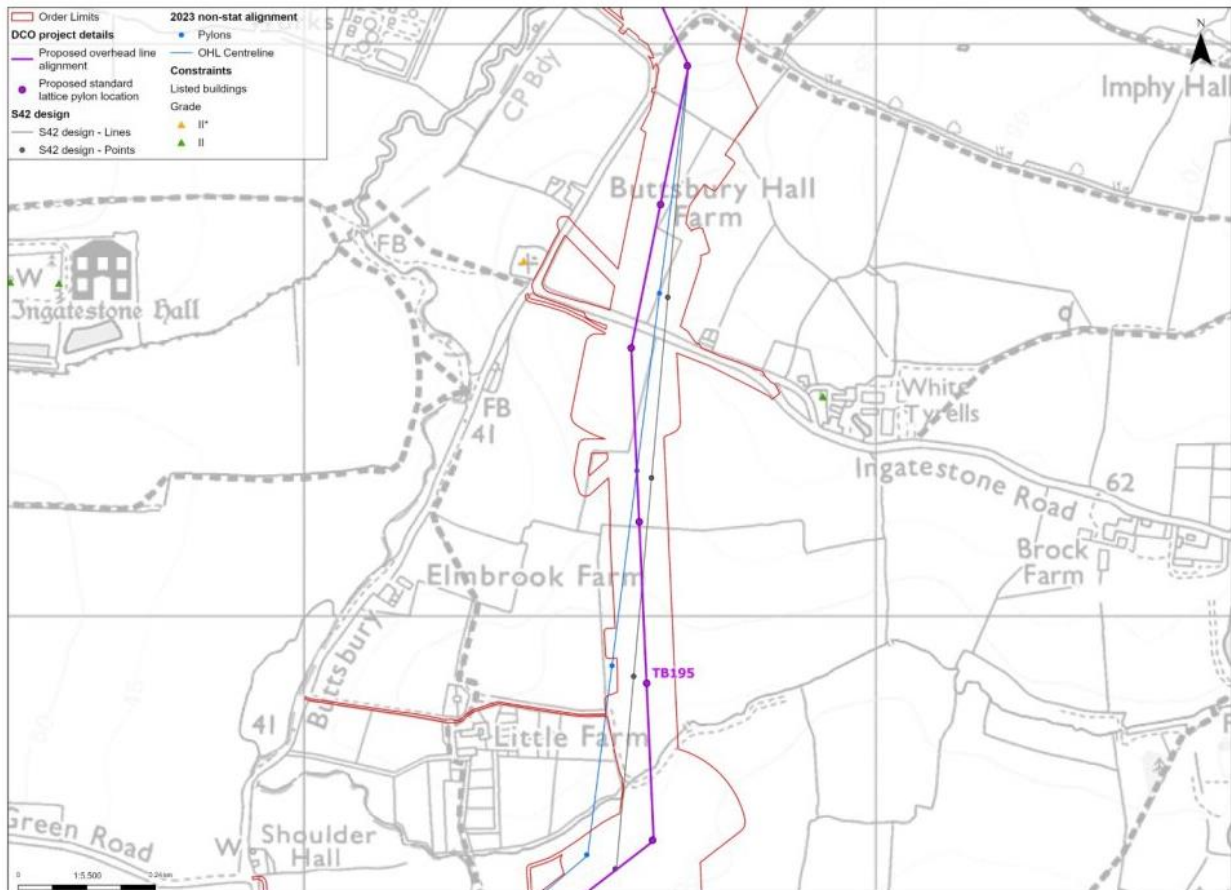


10. Section G Brentwood and Basildon – Siting and Routeing Alternatives Considered

10.1 Wid Valley at Buttsbury Church

- 10.1.1 Consultation feedback identified concern about the positioning of a pylon directly behind Buttsbury Church in views from the PRoW to the west alongside Ingatestone Hall. There was also feedback to increase the separation to a residential property (to the east of the Church and alignment) noting that routeing closer to the church was considered more acceptable given the church's relationship was with the valley to the west.
- 10.1.2 It is possible to position the pylons so that the church sits mid span (between TB192 and TB193) by adding an additional pylon to the alignment between TB191 and TB196 and introducing an additional angle pylon. This would also provide additional flexibility to allow positioning of pylons towards field edges as requested by landowners. By being less direct, this is less consistent with Holford Rule 3 but increases consistency with Holford Rule 2 by reducing the effects on the setting of the church. It also slightly reduces the effects on residential amenity by increasing separation from pylons and the alignment from the nearest residential property, and on balance is therefore preferred and has been taken forward.
- 10.1.3 The use of low height pylons to reduce effects was also considered but it was concluded that the reductions in height in this case would not reduce the impact by a meaningful amount, that would offset the greater effects in closer views for nearby residential properties. On this basis no change to pylon type has been made.

Figure 10.1 Buttsbury Church

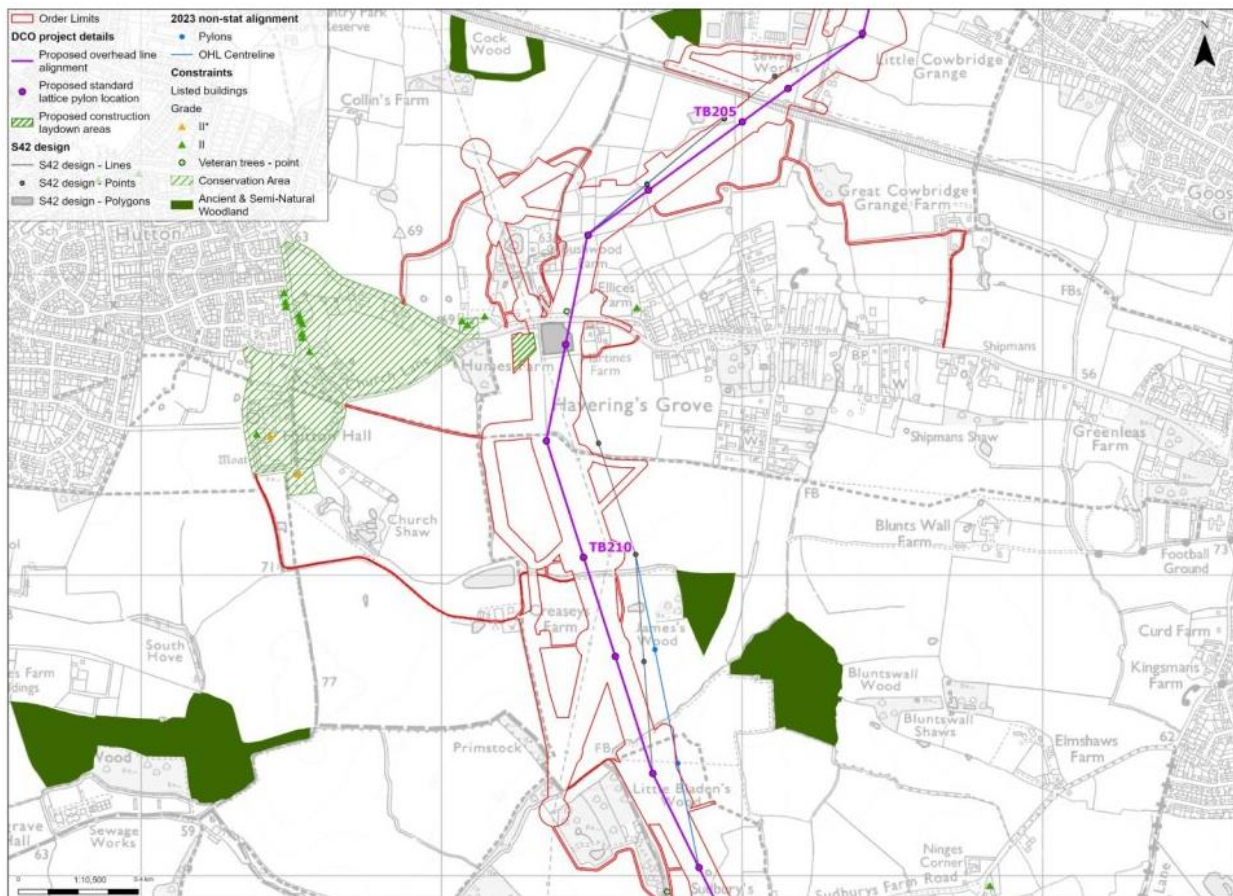


10.2 Havering's Grove

- 10.2.1 Feedback in this location raised concerns about the potential for in combination effects arising from the existing 132 kV overhead line in conjunction with those arising from the standard lattice pylons proposed for the Project. During the 2024 statutory consultation and previous non-statutory consultations, requests have included that the Project should take the alignment of the existing 132 kV overhead line or use underground cable for one or other of the overhead lines. Feedback also sought specific changes to reduce residential amenity effects, moving TB208 and TB209 further west. A request was also made to relocate the temporary construction compound further from residential properties.
- 10.2.2 It is considered that adopting the alignment of the existing 132 kV overhead line from the north of Bushwood Farm and across the A129 would not be appropriate. Such an alignment would cross the grounds of a school and require additional tree removal and management to create the necessary cleared corridor for a 400 kV alignment. It is however proposed to replace an approximately 2 km section of the 132 kV overhead line from north of Bushwood Farm to south of Creasey's Farmhouse with underground cable.
- 10.2.3 Replacement of part of the 132 kV alignment with underground cable creates the opportunity to modify the 2024 preferred draft alignment southwards from the A129. In this arrangement TB208 would be changed to a suspension pylon with the alignment continuing to the south-west for a further span before turning to the south-east to reconnect with the 2024 preferred draft alignment at TB212. This change

slightly increases consistency with Holford Rule 2 by removing a need for one angle pylon, reducing effects on residential amenity through the change of pylon type at TB208, and by the movement of TB209 to TB210 increasing consistency with the Holford Rules supplementary notes. It also removes the potential for in-combination visual effects at the properties at and in the vicinity of Bushwood Farm and to the south of the A129. The realignment also avoids the potential for tree removal around a pond to the west of James's Wood. This change has therefore been taken forward. Some reduction in effects during construction can also be achieved through slight repositioning of proposed construction access to the east of the Order Limits within the Limits of Deviation.

Figure 10.2 Alignment at Havering's Grove



10.2.4 The temporary construction compound is also proposed to be moved from the position presented at the statutory consultation, immediately adjacent to TB208, to a location in the next field to the west of the existing 132 kV overhead line and at the northern part of the field. This does not require a change to the proposed point of access but achieves the increased separation sought to the nearest properties and reduces residential amenity effects. This change has therefore been taken forward.

10.3 Routing and Access South From Botney Hill

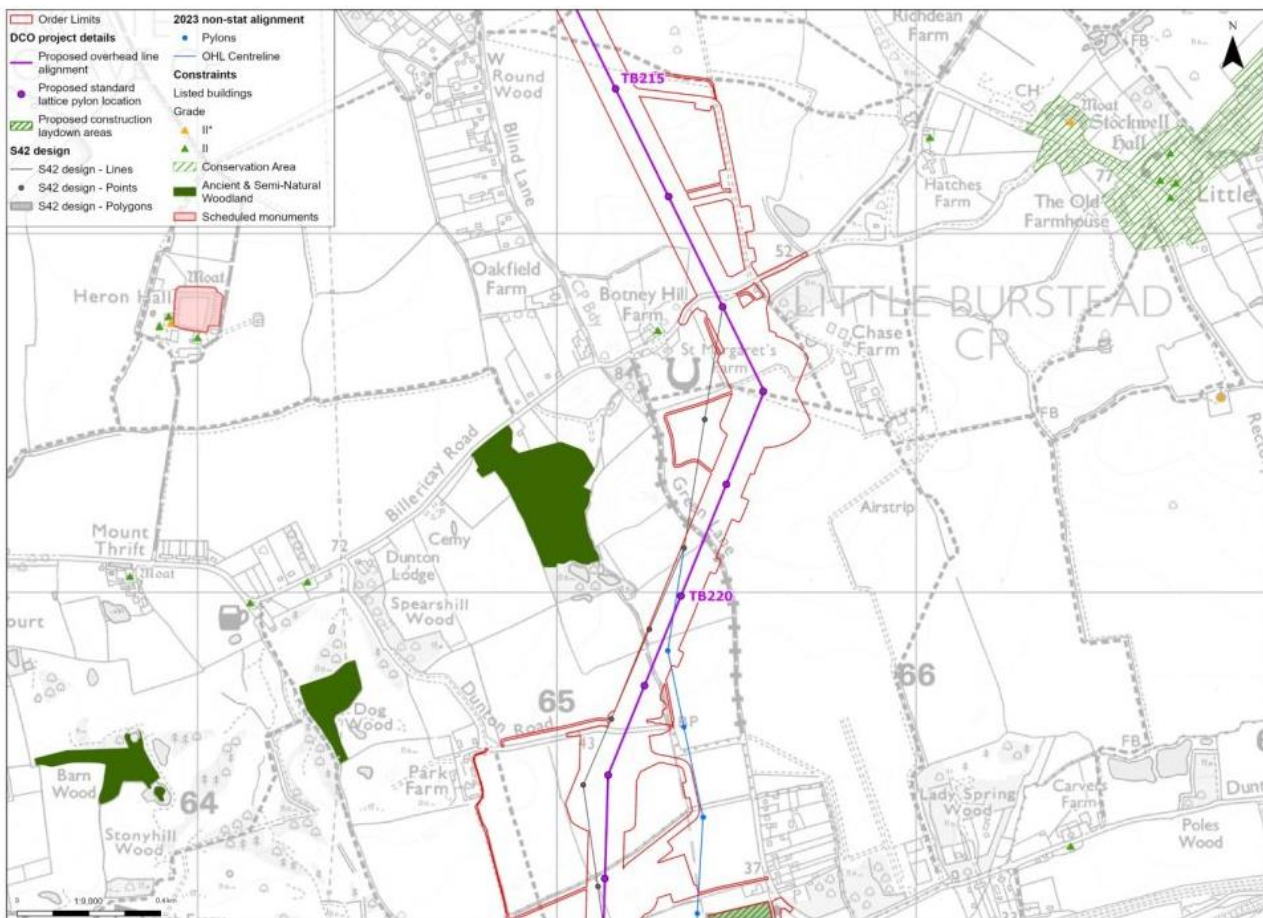
10.3.1 Feedback requested various modifications to temporary and permanent access arrangements to the north and south of Botney Hill Road. Feedback also requested repositioning of the pylon, located to the south of residential properties, at Botney Hill to move it further away or consideration be given to the use of underground cable at

this high point. Other feedback requested consideration of an alignment to allow continued flight activity at Chase Farm airstrip.

10.3.2 The bellmouth access to the south side of Botney Hill Road has been moved to the west to use the existing Chase Farm access. This access is adjacent to a residential property within the farm’s ownership and is already used by HGVs and is preferred as it would reduce the effect on agricultural activity. A staggered junction arrangement is less preferred, as it would require slow moving HGVs to use the road over a short distance. To avoid this, the bellmouth access to the north has been repositioned to the west, opposite the Chase Farm access to facilitate crossing by HGVs. To the north, the permanent access arrangement has been realigned as requested by the landowner.

10.3.3 A change to the alignment to reposition TB219 has also been considered, involving a change of TB217 from an angle pylon to a suspension with the alignment continuing on to the south-east for a further span. The relocated TB218 (which is moved around 200 m to the east) would then become an angle pylon with the overhead line turning from here to the south-west to a slightly repositioned TB219. This change would move the pylon off the high point positioning it to the south of the properties at 10 m lower elevation and at around 400 m distance compared with the previous 200 m distance and has been taken forwards.

Figure 10.3 Alignment at Botney Hill



10.3.4 In respect of the use of underground cable, the location is not subject to a national landscape designation or within the setting of such an area, so the reversal of the presumption to utilise overhead line as the starting point envisaged in NPS EN-5 Paragraphs 2.9.20 and 2.9.21 (DESNZ, 2024b) is not engaged. Consideration has

also been given as to whether the circumstances envisaged by NPS EN-5 Paragraph 2.9.23 apply and if so whether the decision-making balance factors for the Secretary of State at Paragraph 2.9.25 are sufficient to justify the use of underground cable. It has been concluded that the criteria are not met at this location.

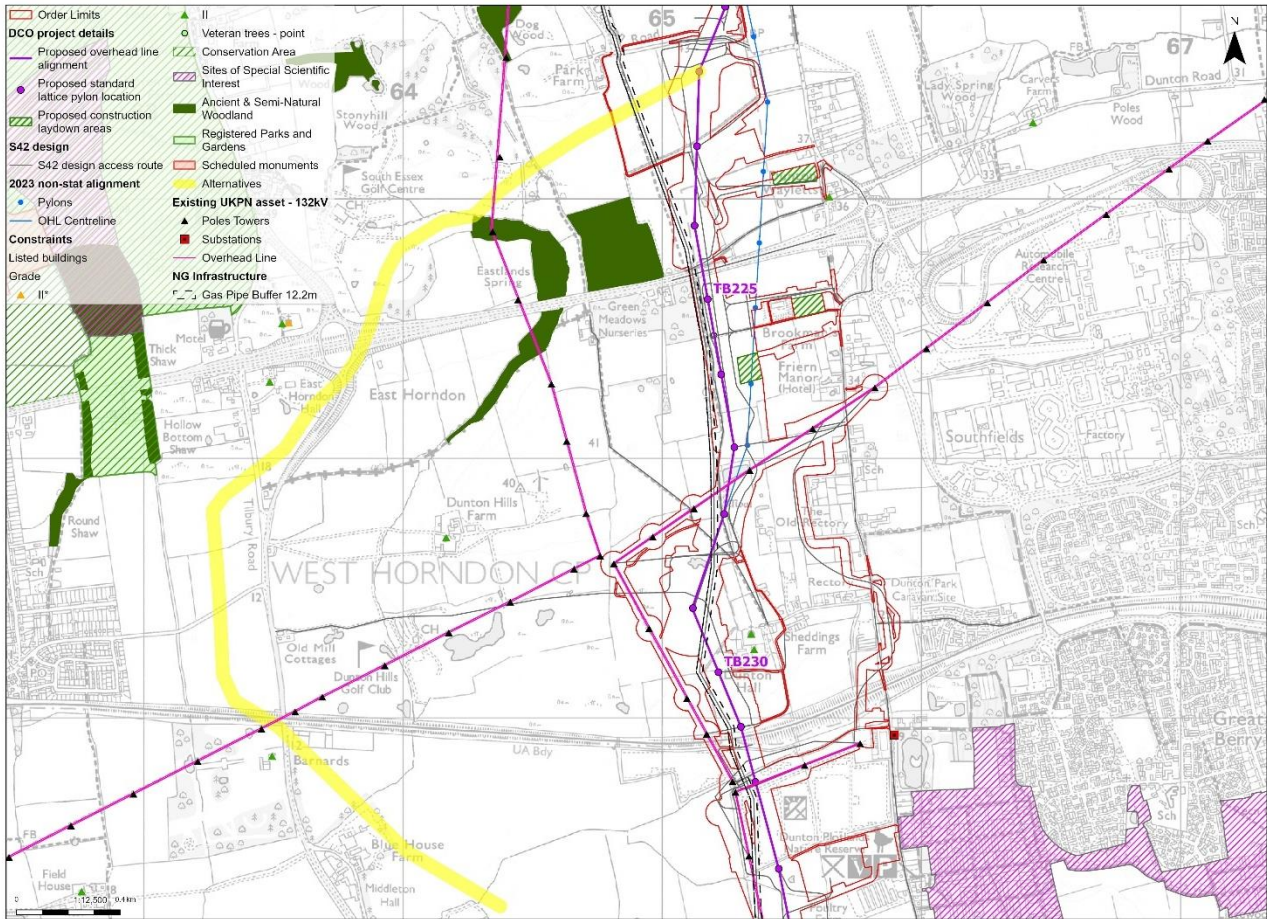
- 10.3.5 Regardless of the change to the alignment to reposition TB219, there was an identified need, due to the adverse effects of an overhead line alignment, for mitigation either by the relocation or reorientation of the grass runway at Chase Farm or a cessation of flight activities. National Grid has previously considered other strategic options and whether other alternative alignments are available to avoid the interaction with the airstrip. Findings on this were reported in the 2023 and 2024 DDRs (document references 7.21 and 7.22 respectively) during previous non-statutory and statutory consultations. In the absence of new information or the identification of new factors, the 2024 preferred draft alignment remains preferred. The use of low height pylons in combination with localised changes to the alignment further to the west have been considered. However the presence of features such as ancient woodland, a gas pipeline and other residential properties do not allow sufficient separation to be achieved to allow for continued flight activities on the current runway position. A relocation to the north-east or reorientation of the runway to align more to the south-west (rather than its current east–west orientation) is considered possible and would allow continued flight activities with the amended alignment. The final arrangement with the airfield operator is the subject of ongoing discussions.

10.4 Around Dunton Hills Garden Village

- 10.4.1 Feedback identified the potential for oversail of the curtilage of a private property (TB224 to TB225) as well as suggested modifications for the route of the underground cable (replacing 132 kV overhead line) to follow field boundaries and avoid areas subject to planning applications. Other suggested local changes to temporary works, to better integrate with landowner activities, were also considered. Appropriate adjustments have been made to respond to these as set out in the Consultation Report (document reference 5.1) including modifying the 132 kV underground cable route to follow alongside field boundaries to reduce effects on agricultural use and reduce the potential to restrict future land uses. In areas where there is proposed housing, the 132 kV underground cable route has been located within areas identified as green space or wildlife areas.
- 10.4.2 Other feedback proposed alternative routes for the overhead line further to the west to avoid the Dunton Hills Garden Village site and adjacent sites in Basildon (to the east of the gas pipeline) which are subject to consultation for inclusion in the Local Plan. To avoid the Dunton Hills Garden Village site and adjacent sites and to avoid effects on ancient woodland, any such alternative would have to deviate towards East Horndon Hall before turning back to the alignment close to Barnards to avoid an area proposed for housing. An illustration of the route is provided in Figure 10.4.
- 10.4.3 While reducing some effects to some receptors, the effects would be transferred to other s and potentially increase the effects. Subject to final routeing there are expected to be additional interfaces with the South Essex Golf Centre (likely only avoidable by impacting ancient woodland)' the crossing of the solar farm may have a greater direct effect rather than being likely limited to oversail. The route past East Horndon is more challenging because of the constraints of the road layout, the potential to restrict the Barnards Farm airstrip. and adjacent built development in the

DHGV phase 1. Overall it would be a longer and less direct alignment with additional larger angle pylons, less consistent with Holford Rule 3. In light of this and the greater effects this alternative is not preferred. On this basis no change was made.

Figure 10.4 Route to avoid Dunton Hills Garden Village Area



10.4.4 It is National Grid’s position that NPS EN-5 confirms that the routing of overhead lines near to residential property is not, as a point of principle, unacceptable. It is also noted that there are detailed design opportunities (including as outlined in National Grid’s ‘Sense of Place’ publication on existing examples of housing in close proximity to overhead lines) with the potential to reduce amenity effects that can be effective in maximising outcomes, particularly in circumstances such as Dunton Hills Garden Village where detailed design is to be completed. On this basis it is considered that requests to use underground cable past this development are not justified by policy.

10.4.5 The area is not the subject of any designations relevant to change the presumption in favour of overhead line as set out in NPS EN-5. Additionally the alignment does not directly restrict development on any areas that are not already constrained by the safety zone around the gas pipeline. In contrast trenchless crossing of the A127 would be likely to directly restrict development on two to three hectares (within an area subject to consultation for inclusion in the local plan). In light of the planning policy support for overhead line in areas not subject to particular designations, and the effect on development area of underground cables, it is considered that an overhead line is the appropriate design technology in this location and no change has been made.

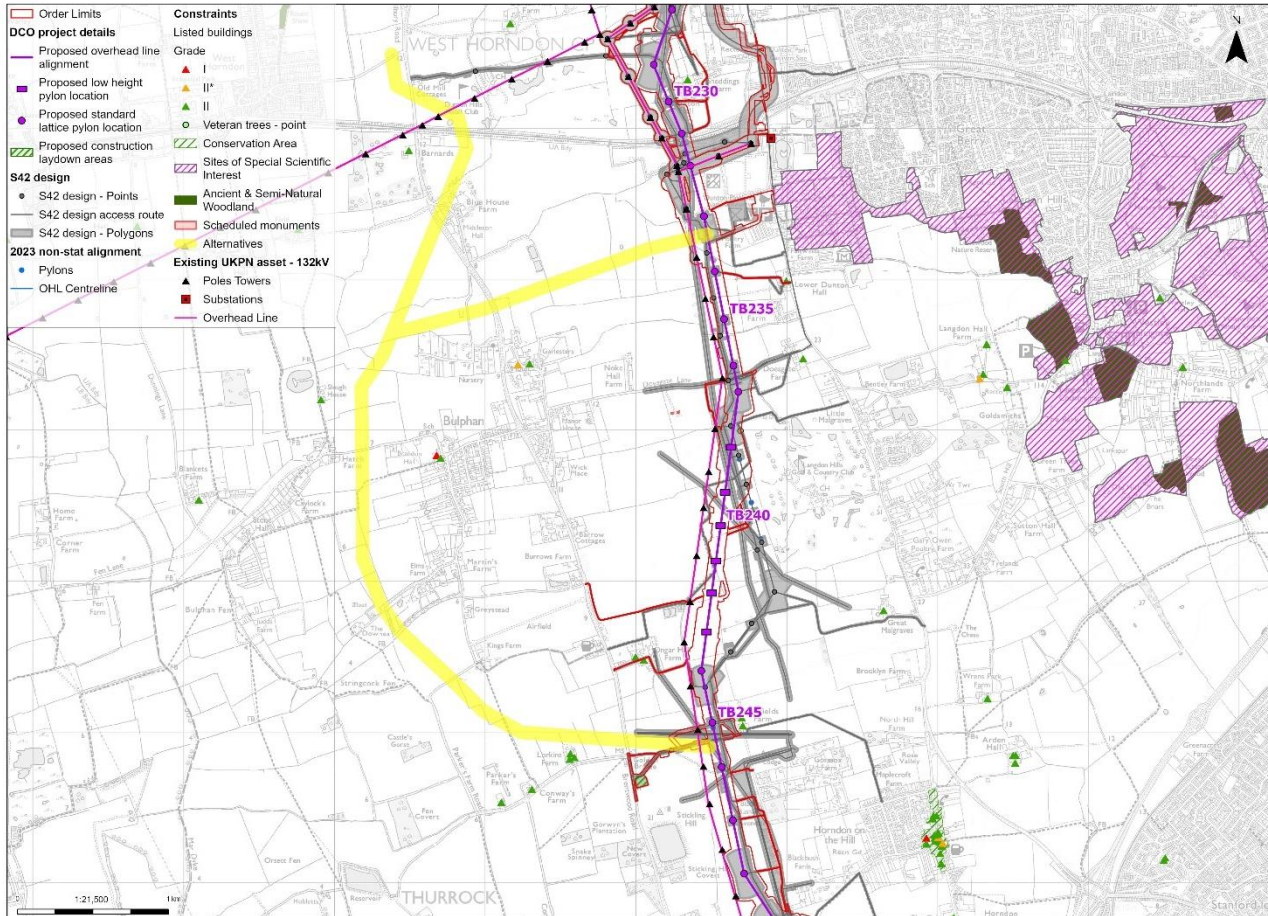
11. Section H Thurrock – Siting and Routeing Alternatives Considered

11.1 Thurrock Airfield

- 11.1.1 Some feedback restated a preference for a route passing to the west of Bulphan and also provided more general requests to follow alternative corridors further east via Rayleigh Substation. In the absence of new information or the identification of new factors the previous decisions that these were less preferred remain valid.
- 11.1.2 The CPRSS (document reference 7.18) considered that routes via Rayleigh would interact with both an SPA and SACs and would present challenging routeing on the approach to Tilbury Substation or to the Tilbury North Substation site. Given the legislative protection for SACs and SPAs, the CPRSS (document reference 7.18) concluded that other alternatives without those effects should be taken forward where available. On this basis no change to route via Rayleigh is made.
- 11.1.3 Routes west of Bulphan (see Figure 11.1) would increase effects on Thurrock Airfield and would only be achievable through a section of underground cable and with potential effects on a scheduled monument (WWII bombing decoy). National Grid is aware that Thurrock Airfield is the subject of plans to secure permission for housing that in mid-2025 are the subject of appeal proceedings. Even if the appeal was successful, such that the airfield is not a factor, a western deviation is still longer and less direct (with reduced consistency to Holford Rule 3) and transfers effects to other similar receptors. As such we do not consider the alternative route to be preferred and no change is made.
- 11.1.4 Previous Local Planning Authority feedback has requested a continuation of the close paralleling of the existing 132 kV network where the 2024 preferred draft alignment deviates in the vicinity of Langdon Hills Golf & Country Club. There was also feedback suggesting modifying the proposals to allow continued flight activities at Thurrock Airfield. Feedback from other infrastructure providers has also sought to ensure that crossings of existing metal infrastructure, such as pipelines, did not jeopardise the continued and safe operation of the infrastructure. Specific proposals for positioning of pylons and for access roads and rights were also made.
- 11.1.5 The design evolution initially emphasised achieving a design where standard pylons could be used as they provide more flexibility to direction changes, albeit this was as a consequence of a reduction in close paralleling (see Figure 11.1 and the 2024 statutory consultation alignment alongside the Longlands Golf Course). Following detailed engagement and discussions with Thurrock airfield, a change to adopt close paralleling, achieved by the use of and careful positioning of low height pylons, was the subject of targeted consultation. Engagement with the airfield identified that there was concern about the extent of the area that would be between the 132 kV and 400 kV overhead lines and the difficulties this may present for aircraft manoeuvring in the event of engine failure. Through discussion with the airfield operator, National Grid has confirmed that a change to the alignment to follow closely parallel to the east of the existing 132 kV overhead line, in conjunction with a change to the use of low height lattice pylons for TB238 to TB243, would address the concerns. In this

scenario the existing overhead line provides shielding for the amended alignment (that is an aircraft clearing the existing 132 kV overhead line would clear the alignment when continuing on the same ascent/descent rate) and, by placing the overhead lines more closely parallel, the concern about risk to manoeuvring, should an engine failure occur, is addressed. This change has therefore been taken forward as shown on Figure 11.1.

Figure 11.1 Routing near Thurrock airfield



11.1.6 National Grid has also considered the implications of this change in response to feedback from a food oil re-processing business. The request was to deviate from TB241 or TB242 to pass to the east of their farmland before reconnecting around TB245 to avoid restrictions on the farms irrigation of waste water with potential to incur additional cost of disposal. National Grid accepts that the suggested change would avoid the interaction but also considers that the addition of two additional angle pylons, to achieve the change, reduces consistency with the Holford Rules and has potential to reduce the effectiveness of the mitigation discussed above for Thurrock airfield. This is in the context that National Grid considers that the potential effects on water disposal (both short term and long term) can be minimised through simple measures set out below:

- Avoidance of any demarcation fencing will allow irrigation to continue largely unimpeded. Any limited impact would be expected to be within the normal range of variability dictated by weather conditions

- Careful routeing and design of any construction haul road to follow field boundaries; be parallel with irrigator tracking; and ensuring there are no barriers to irrigator tracking (such as allowing clear gaps between soil storage or use of sections of trackway) will allow for continued irrigation even during haul road use.

11.1.7 Any residual impact on irrigation capability may be able to be mitigated by compensate able measures such as: pre-emptive acquisition of additional land and modification to Environmental Permits; or securing alternative temporary means of disposal via an authorised waste treatment facility. On this basis no change is proposed.

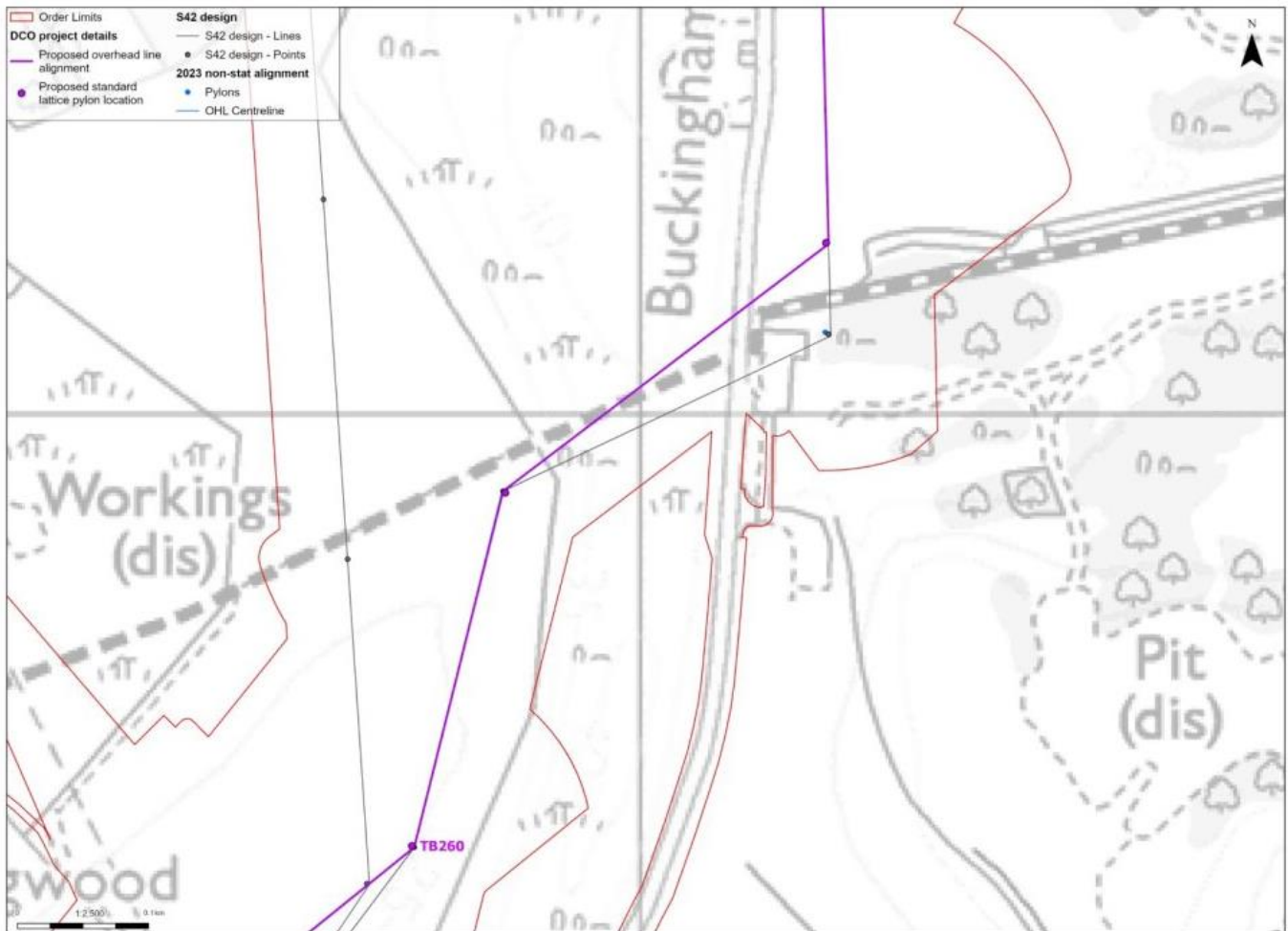
11.1.8 National Grid is of the view that an existing metal pipeline (operated by the British Pipeline Agency - BPA) can be safely crossed, albeit at an angle (rather than the operator's preferred right-angle crossing) and with certain protection measures implemented. It has been identified that such a right-angle crossing arrangement cannot be achieved at the same time as allowing flight activities at Thurrock Airfield to continue. A crossing close to a right angle could theoretically be made but would require the use of standard lattice pylons because the angle of direction change substantially exceeds the design limits for the low height lattice pylon (low height lattice pylons have a design limit of a maximum of a 30-degree angle change). A crossing with standard pylons would then conflict with continued safe use of the airfield. A balanced position has therefore been taken forward, crossing closer to right angles than previously published and retaining wider draft Order Limits to provide some flexibility to consider other alternatives as detailed ground conditions are confirmed and detailed design progressed.

11.2 A13 to Orsett Golf Course

11.2.1 Feedback proposed the position of pylons TB257 and TB258 be changed to a location on the west of Buckingham Hill Road. With adjustment of pylon positions and heights to north and south, a location with potentially suitable ground conditions (i.e. not made ground) is occupied by a household waste recycling site. The construction and required position for a pylon would however require the site to be closed and relocated. In the absence of any alternative site with the appropriate permissions being available, the reposition to the west of the road cannot be taken forwards.

11.2.2 Feedback from individual landowners has led to some localised adjustments to pylon positions. TB258 for example, whilst not moved to the west of the road, has been moved by around 70 m to the north to avoid the need to position a pylon within the main compound of an operational aggregates facility. This does move the pylon into the adjacent Maple Park (within which TB257 is also located), however the land use in the area the pylons would occupy is used for informal recreation which (given the scale of the park) would be largely unaffected by the proposals whereas leaving it unchanged would cause substantial business disruption or require a relatively high level of compensation for the effects on the business. In view of this business impact the move to the north is preferred and this change has therefore been taken forward. It is noted that there was feedback indicating potential plans to introduce viticulture onto the area under the alignment within Maple Park. However given the immature state of these proposals, that the majority of the site would be unaffected and the area of lost production relatively small, there would remain a preference for the move northwards of TB258.

Figure 11.2 Avoidance of aggregates facility



11.3 Crossing Orsett Golf Course

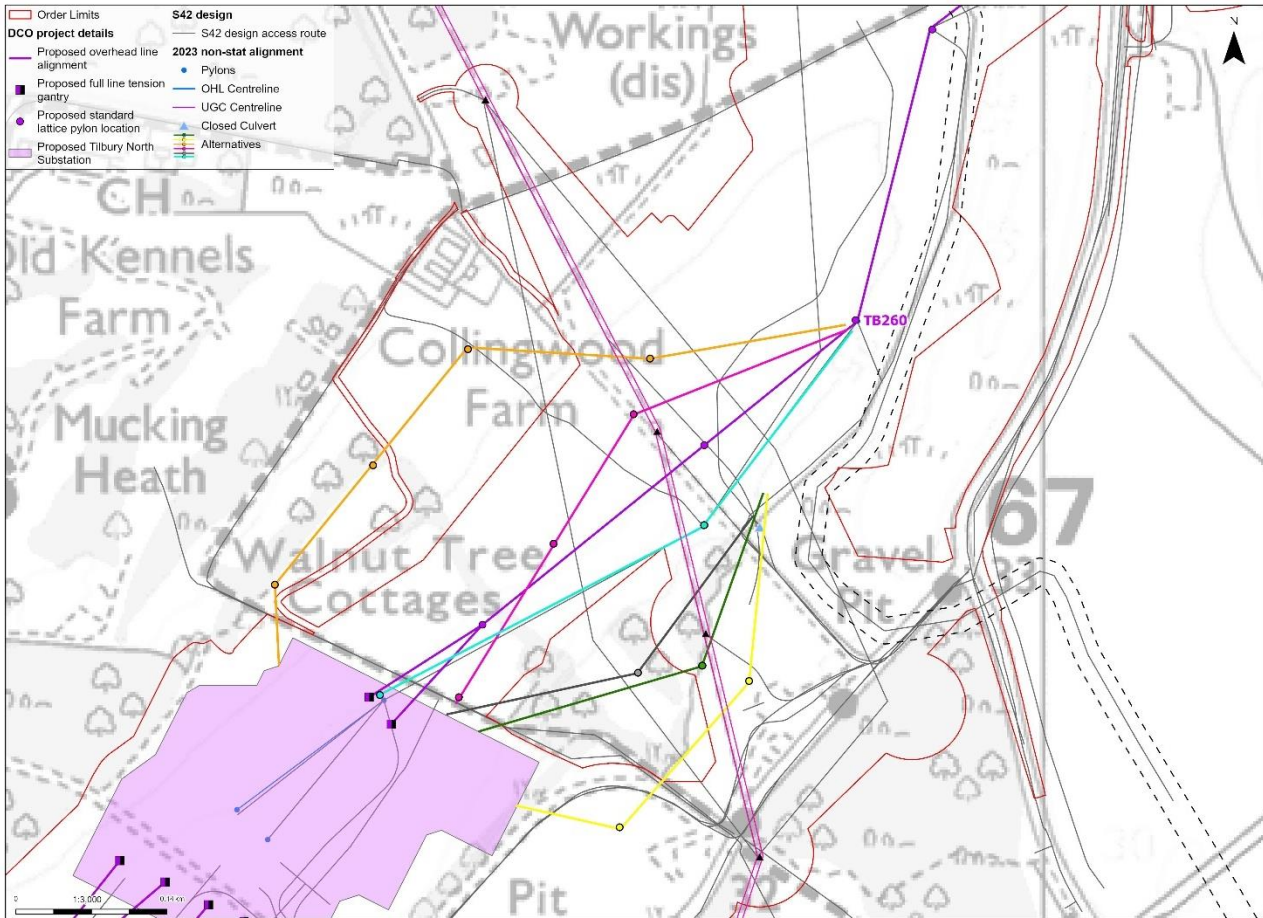
- 11.3.1 Feedback in this area also indicated a preference for alternative routes to avoid or reduce effects on Orsett Golf Course. There was particular concern about the 2024 preferred draft alignment relative to the position of the 17th tee boxes. The feedback preference was to avoid the golf course completely, adopt an underground cable arrangement so that it was not visible. If the connection had to be by overhead line, the preference was for the alignment to pass to the south of the golf course routing over the adjacent secondary aggregate processing facility. Other alternatives raised were to follow the boundary between the golf course and secondary aggregate site or, if these were not possible, to move the alignment to oversail a landing area further from the tee position.
- 11.3.2 In response to feedback the case for justifying underground cable across the golf course was considered. The site is not within an area subject to landscape designation so does not engage NPS EN-5 Paragraphs 2.9.20 (DESNZ, 2024b) so there is no reversal of the presumption that overhead line is the appropriate starting technology. Similarly the location is not within the setting of a designation so does not engage paragraph NPS EN-1 Paragraph 5.10.34 (DESNZ, 2024a). Finally, effects are not considered to be of a scale or extent to meet the thresholds in NPS EN-5 Paragraph 2.9.23. On this basis, and in view of the likely cost of several million pounds, National Grid does not consider that its duties and the policy context justify a change from the use of overhead line to route across Orsett Golf Course.

11.3.3 National Grid appointed an independent Golf Course Design specialist to provide advice on the consequences of different routeing arrangements for the golf course and to advise on development of an acceptable outcome. The result was consideration of various conceptual alternative alignments as shown in Figure 11.3 Crossing Orsett Golf Course. Several of the alternatives transfer impacts to the adjacent business who were also consulted to establish the effects of different levels of interface. The main reasons for selection of the preferred route alignment are summarised below:

- Pylon positions and route (bright magenta) being taken forwards. This crosses the course at a position where the risk of interference with ball flights is minimised by the design which achieves more than 25m clearance above fairway in combination with the positioning relative to tee positions on the 16th and 17th holes. It also allows continued use of the practice ground, subject to some mitigation and minimises impacts on adjacent businesses and development opportunities. Potential use of removable trackway and relatively limited durations of each element of pylon construction anticipated to minimise disruption to golf course albeit two holes will be unavailable for one or two week blocks on a small number of occasions
- Non-statutory consultation (light blue)
 - Less preferred as closer to the 17th tee and relatively lower clearance with greater risk of interfering with ball flights. Adjustment needed to align with Tilbury North Substation
- Statutory consultation alignments (dark purple)
 - Less prominent pylon positioning relative to 16th and 17th holes compared with current proposal, however whilst further from the tee than 2023 preferred draft alignment this is relatively closer to the 17th tee than the alignment. The main disadvantage is it is considered to lead to a very compromised use of the practice ground due to descending arrangement of the conductors to the gantries with potential to be considered unacceptable for competition standard practice
- Pylon by east side of 17th tee (green)
 - This has sought to re-use 132 kV pylon position to bring the overhead line closer to the 17th tee and oversail the approach to the 16th green. However positioning does not give the elevation sought and is shown to be relatively lower with greater risk of interfering with ball flights. Expected to lead to considerable tree removal along eastern side of the 17th, between 16th and 17th and to the rear of the practice ground (but noting none of the trees are ancient woodland nor considered to be veteran trees). Nonetheless extensive area required to provide replacement planting area
 - Substantial construction effect on adjacent aggregate facility due to likely intrusion of part of the pylon footprint as well as intrusion of required working area requiring clearance of equipment and materials over multiple periods with more extended clearance from large part of site for conductor installation. Considered (including direct feedback from the operator) that the extent, number and frequency of effects will lead to closure of the aggregate business

- Pylon(s) to east of golf course (yellow)
 - The most southerly pylon is not viable as the area is a closed landfill with unsuitable ground conditions. An alternative with a single pylon within the northern block of the aggregate facility could potentially be constructed, though the additional angle change makes it less consistent with Holford Rule 3 than the Project. Considerable tree removal along eastern side of the 17th, between 16th and 17th and to the rear of the practice ground (but noting none of the trees are ancient woodland nor considered to be veteran trees). Nonetheless extensive area required to provide replacement planting area
 - Construction effect on adjacent aggregate facility due to pylon intrusion and working area requiring clearance of equipment and materials over multiple periods with more extended clearance from large part of site for conductor installation. Considered (including direct feedback) that the extent, number and frequency of effects will lead to closure of the aggregate business
- Pylon within the course, far enough to the west from the aggregates facility so as not to restrict activities of the aggregates facility (grey)
 - This variant seeks to position the pylon far enough onto the golf course to ensure all works are within the golf course and none of the activity impacts on the aggregate facility. This requires adjustments to reduce potential effects from oversail of both the 16th and 17th. In both cases shortening of the holes by circa 100 m is considered by National Grid's appointed golfing advisor to change the character of these holes. It also presents an unresolved problem as it is not readily apparent which holes can be extended to offset the two specific losses
 - There is a similar amount of tree loss for this option as some others, notably along the eastern side of the 17th, between 16th and 17th and to the rear of the practice ground and within the stringing position. On balance this alternative is not preferred
- Cross by 17th green or 16th tee (orange)
 - Proximity to property near 17th Green is a negative factor as is the likely increased interaction with development proposals on land to the north of TB260. Increased interference with ball flights is expected where crossing close to the 17th green and where the alignment crosses the 15th fairway (noting variants to this variously cross the 17th and either the 15th or 16th). Overall less preferred to other options due to being a longer, less direct and less Holford Rule 3 consistent design with increased level of ball flight interference. This option would not substantially affect the practice ground, though that is subject to exact arrangement and crossing point of the 15th or 16th fairways.

Figure 11.3 Crossing Orsett Golf Course



11.3.4 The alignment (bright magenta) has been developed in response to feedback received and review by the golf course designer and through a number of collaborative meetings with representatives of the golf club which, along with the outcome, are to be captured within a Statement of Common Ground. In detail this requires the positioning of a pylon between the 16th and 17th fairways, approximately midway between the easternmost bunkers on each of the holes. It positions the crossing around 40 m further from the 17th tee than was shown in the targeted consultation in 2025. It also includes a repositioning of the pylon from the eastern side of the practice ground to a new position to the western edge where it has also been moved towards the south-eastern corner. This change, and with both pylons comprising tension pylons with extensions, increases the clearance above the practice ground. Together with the alignment change this further reduces the potential for interaction between overhead line and ball flights. Given that it also avoids the loss of vegetation associated with alternative diversions to the southern end of, or to the south of, the 16th green and 17th tee and avoids effects on the aggregate recycling facility. This alternative can be delivered within the scope of the Limits of Deviation and at this stage whilst this is emerging as the preferred design solution, National Grid is seeking to agree details with Orsett Golf Course. For the DCO submission the statutory consultation alignment design, is taken forward as the basis for the Project design.

11.3.5 Some mitigation of effects on the practice ground are considered to be required to maintain the attractiveness of the course as a competition venue (an important revenue stream for the club). Without mitigation, the proposed pylon position and alignment would impact the effectiveness of the range by reducing the width of the

teeing area. This would reduce the number of players able to practise at any time and would lead to an intensification of use that may exceed the tee recovery capability necessitating additional provision. Of the options available, National Grid considers that mitigation through provision of a more forward tee area may be most appropriate. The consequence of this shortening of the range length is compromise to the use of the range (restricting it to typically 6 iron or shorter club distance). Additional mitigation to meet appropriate standards would be to install ~15m netting to protect players on the 14th and 15th holes beyond the end of the range.

- 11.3.6 National Grid would also provide netting along the western edge (to~15m height) to reduce potential damage to pylon and substation infrastructure and provide safe environment for workforce on site.

11.4 The Means of Connecting at Tilbury

- 11.4.1 Informed by feedback and ongoing technical review, National Grid is taking forwards a change to the means of connection to Tilbury. This change still connects electrically to Tilbury substation but achieves this via a new substation (referred to as Tilbury North Substation) connected to the existing Tilbury Substation via a modification to the 400 kV YYJ line (an existing overhead line connection to Tilbury substation). This achieves the same system reinforcement outcome as if connecting directly to Tilbury Substation with some enhanced system performance in some demand conditions. It avoids the need for around 4.5 km of underground cable (from south of Orsett Golf Course to Tilbury Substation) presented at the 2024 statutory consultation, variously removes or reduces interaction with various existing and proposed developments (including the Regionally important Thames Freeport development) and removes interaction with elements of infrastructure at the existing Tilbury Substation. It does however have greater interface with a proposed area of housing allocation and has been considered as part of the decision making as set out below.
- 11.4.2 National Grid originally considered that the Project could have co-existed with the Thames Freeport (designated as a Freeport Zone on 15 December 2021), through engagement and detailed design work. The proposed 400 kV underground cables could potentially have followed the route of access roads, carparks, lorry parks and similar, albeit noting that the detailed layout proposals for the Freeport are not available at this stage. The specific requirements would be influenced by individual developers coming forwards and progressing individual planning applications within the Freeport area. As such there remains a high level of uncertainty about the detailed routing of the connection.
- 11.4.3 The Project could have progressed the identification of an appropriate route but, with no certainty over potential interaction with the Freeport, it would have been necessary to restrict future land use over the underground cable swathe to prevent the erection of buildings and to control land uses so that they would not affect cable performance or restrict access for occasional maintenance. Some constraint to Freeport development activities would therefore have been unavoidable. It is noted that route options to the north or west are not available due to other developments including Port of Tilbury land (including water vole mitigation channels as well as Thurrock Flexible Generations site with (we were advised) up to 24m deep foundations which submitted its planning application in 2020 and was approved in 2021).

- 11.4.4 Based on the proposed use of underground cables for the route into Tilbury Substation (as set out most recently in the statutory consultation) subject to any final design, it was estimated that use of between six and 10 acres of the 100-acre Freeport development area may have been subject to restrictions due to the underground cables. The impact on economic growth is difficult to estimate given the potential for co-existence with some land uses, however, in light of the feedback received and the implications of uncertainty, it is acknowledged that there is the potential for some level of impact. In its response to the statutory consultation, the Port of Tilbury (a statutory consultee) consider the potential for restriction to Freeport development, and its substantial potential to drive economic growth, to be unacceptable and consider that only the adoption of techniques such as a tunnel that avoid effects on Freeport should be a part of National Grid's preferred approach.
- 11.4.5 Using a tunnel for the entry to the existing Tilbury Substation to avoid the interactions with the Freeport area would have added considerable cost (based on other similar schemes the additional cost is conservatively estimated to add in excess of £100 million). It would have required a head house at the existing substation where space is restricted and is also likely to have required a head house to be sited within a flood storage area or adjacent to the Grade II* Listed Church of St James at West Tilbury. It would generate significant construction traffic movements at locations such as 'the Asda roundabout' that may be difficult to resolve without restrictions on movements that may impact construction programme. These factors, when considered together, led to a conclusion that a tunnel alternative was much less preferred and did not provide an appropriate basis for the Project to progress.
- 11.4.6 Given the challenges to taking a connection directly to Tilbury Substation an alternative arrangement to achieve the electrical connection required was identified. This is the establishment of a new substation connected into the existing YYJ 400 kV overhead line that connects to the existing Tilbury Substation. Establishing a new substation is not generally favoured in such close proximity to existing substations with rebuild or extension of sites the typically preferred solution. In this case various factors combine to make it difficult to achieve the successful delivery of a connection into the existing Tilbury Substation and the alternative is preferred.
- 11.4.7 The new arrangement achieves the necessary electrical connectivity to Tilbury Substation and provides the same system reinforcement outcome (in some circumstances it is actually enhanced) as if connecting directly to Tilbury Substation.
- 11.4.8 The identified option, to connect into the existing overhead line (known as the YYJ line), meets the network reinforcement requirements and would:
- Avoid the need for interactions with the Freeport area allowing the freeport to reach its full economic growth potential
 - Avoid the area more likely (based on working group discussions that National Grid was involved in during 2024) to be favoured for the potential Thames Estuary Marshes SSSI designation
 - Allow for the crossing of the proposed LTC project by overhead line rather than underground cable
 - It would also remove around 4.5 km of proposed 400 kV underground cable which includes multiple challenging construction sections requiring the use of trenchless techniques to cross under railways, pipelines, existing overhead lines. This reduces construction and programme risks and reduces the potential effects of

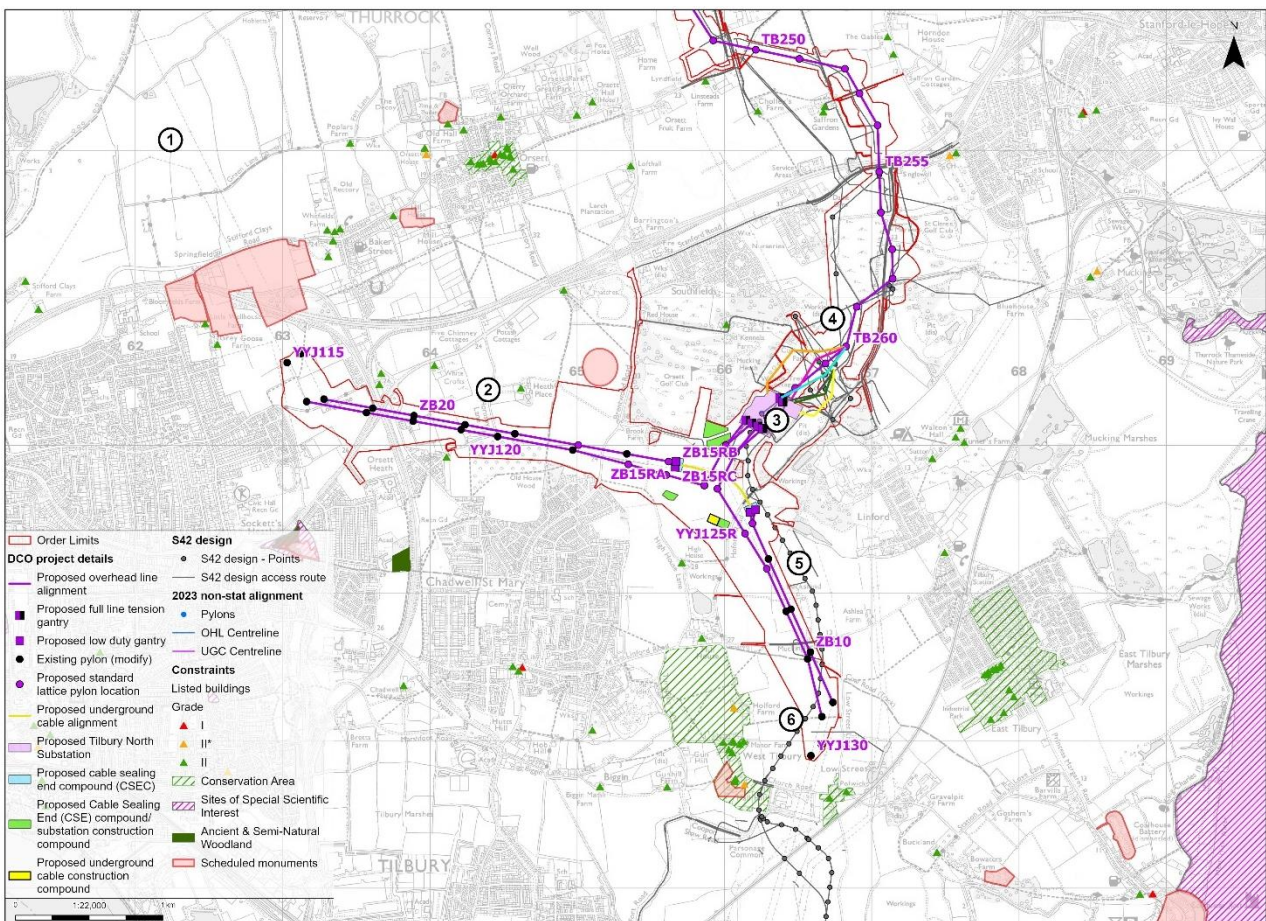
multiple deeper installations to cable performance and difficulties of future maintenance.

- 11.4.9 A Gas Insulated Switchgear (GIS), as opposed to an Air Insulated Switchgear (AIS), technological solution has been adopted for the new substation proposed at Tilbury North (see paragraph 11.4.22). Both AIS and GIS substations contain the same compartments and components as each other; the main difference lies with the means of insulation. An AIS system (such as is proposed for the EACN Substation) is the normal starting position (on the basis of being lower cost and with relatively greater flexibility for future expansion of sites) and largely uses air as an insulator between electrical conductors and earth. GIS substations are self-contained systems that largely use a gas with much better insulating properties than air as an insulator. This is particularly beneficial in locations where risk of contamination (which may include locations with strong marine influences) and its effects on maintenance have the potential to be higher and may be better managed with GIS solutions. The use of GIS solutions also allows the high voltage equipment to be much closer together, enabling the substation to have a much smaller footprint than an AIS solution, which may be beneficial where land use pressures and land costs are high. Key design features of GIS substations are the compact design, higher reliability, greater resilience and minimal maintenance although the cost is typically higher.
- 11.4.10 In this case whilst there is a higher potential for greater risk of contamination (closer to a more active and larger saline environment compared with more historic contaminative land uses including Pulverised Fuel Ash to the south) than the EACN this is not a determinative factor. The main driver for selection relates to the land area required.
- 11.4.11 The basis for identification and selection of a preferred change followed consideration of potential alternative arrangements. The new connection arrangement is the best performing through a balanced decision-making process in comparison to alternatives that were identified and considered.
- 11.4.12 A staged process was adopted covering the following:
- Identification of potential strategic sites within Study Area:
 - Based on a high-level review of available mapped data, potential sites of sufficient scale to accommodate the required substation are taken forward
 - Definition of key characteristics, risks and opportunities:
 - In identifying potential sites, recording characteristics and factors that have the potential for influence over the site selection process
 - Confirmation that site can meet the need case requirement:
 - The Project has been identified as a critical national priority project that must facilitate new connections by the end of 2030 (see footnote 13 of Clean Power 2030 <https://www.neso.energy/publications/clean-power-2030>). As such and as set out in NPS EN-1 Paragraphs 4.3.22 and 4.3.23 (DESNZ, 2024a), any alternative site not capable of meeting the power transfer requirement or supporting the delivery of the connection within the 2030 programme does not meet the Project need requirement and cannot be taken forwards

- Application of benefit review:
 - To aid efficiency an initial benefit review was completed to establish whether particular sites could be filtered out from subsequent more detailed comparisons. This was focussed on those alternative sites in a broadly similar location where a substantive disadvantage for one of the alternatives may allow it to be parked from detailed consideration
- Comparative appraisal:
 - Site selection and a comparative appraisal is informed by technical, environmental, socio-economic, programme and cost factors and evaluated in the context of guidance from the Holford and Horlock Rules.

11.4.13 Locations both to the north-west (up to where the existing YYJ and ZB overhead lines diverge just north of the A13), to the south (through to Tilbury Substation) or to the north along the Project alignment were identified and considered. The indicative location of the six sites are shown in the numbered blue circles on Figure 11.4 with initial filtering described in the following paragraphs.

Figure 11.4 Alternative sites considered for hosting the site of Tilbury North



11.4.14 Having identified, following feedback to the 2024 statutory consultation, that the original connection point may not be deliverable, it is reasonable (and in accordance with NPS EN-1 Paragraph 4.3.23) not to progress alternatives that are not capable of meeting the same need case (see 11.4.12).

11.4.15 On this basis, Site 1, which requires a major realignment of the overhead line connection, is scoped out of further consideration as the need to acquire survey data

on various environmental and technical topics to inform design and necessary environmental assessment leads to an expected programme delay estimated to be in the order of two years, leading to an in service date beyond 2030 that would trigger high constraint cost payments and is not consistent with National Grid duties to be economic and efficient. As it fails to meet the minimum need case requirement Site 1 is not progressed.

- 11.4.16 Site 2 has major transport infrastructure to the north and potentially LTC to the west. The location has residential properties, listed buildings and scheduled monuments (near to Heath Place) to all sides. Any connection route to the substation also having insufficient spacing between residential properties. These constraints alone may scope this site out as a preferred option, but even if less constrained this site would, like Site 1, be scoped out because of the additional programme implications of securing land rights and completing necessary surveys because of the distance from the surveyed corridor.
- 11.4.17 All other sites are considered capable of meeting the need case requirement but are also subject to benefit filter review.
- 11.4.18 Site 4 is assessed to lead to extra effects and costs compared with Site 3. These are expected to include similar effects on the housing allocation at Chadwell St Mary due to similar diversion requirements of the YYJ and ZB, but with additional effects, affecting a similar area of potential housing, on the Southfields opportunity area. The crossing of Orsett Golf Course would experience an increase in effects as a result of the crossing by two overhead lines. For these reasons Site 4 performs less well than Site 3, so Site 4 is not taken forwards.
- 11.4.19 Site 6, while potentially providing an alternative to Site 5, requires the additional cost of longer cables to reach the site including the additional complexity of an additional trenchless crossing under Muckingford Road. It potentially avoids effects on housing at Chadwell St Mary though does route through an area that may provide green space for that development. It is also considered to be a less economical solution than Site 5.
- 11.4.20 Following the above site identification and initial down-selection review, Sites 3 and 5 were taken forward for more detailed consideration.
- 11.4.21 Following this further consideration, the preferred Tilbury North Substation location was identified as being at Site 3. It presents some different technical risks due to the need for system outages, but these are within the scope of normal system management risks. In cost terms, compared with the design published in the 2024 statutory consultation, this change is expected to be broadly cost neutral. However, there is some uncertainty on such comparisons regarding the costs associated with securing necessary rights through the Freeport area (influencing the base case of the 2024 statutory consultation proposals) and Chadwell St Mary housing area if allocated (influencing the Site 3 costs). Additionally, the proposal does have technical benefit by virtue of the substation works being a substantially offline build (unlike the 2024 statutory consultation proposals which are within an existing substation and requiring some removal of operational assets) and overall presents less technical risk to delivery and to programme.
- 11.4.22 Whilst the main operational area of the aggregates site is not affected by the selection of substation technology, the change in ground level from the adjacent agricultural land is substantial. Whilst the potential for road access to be achieved remains, the level change makes it unlikely that the area will be suitable for

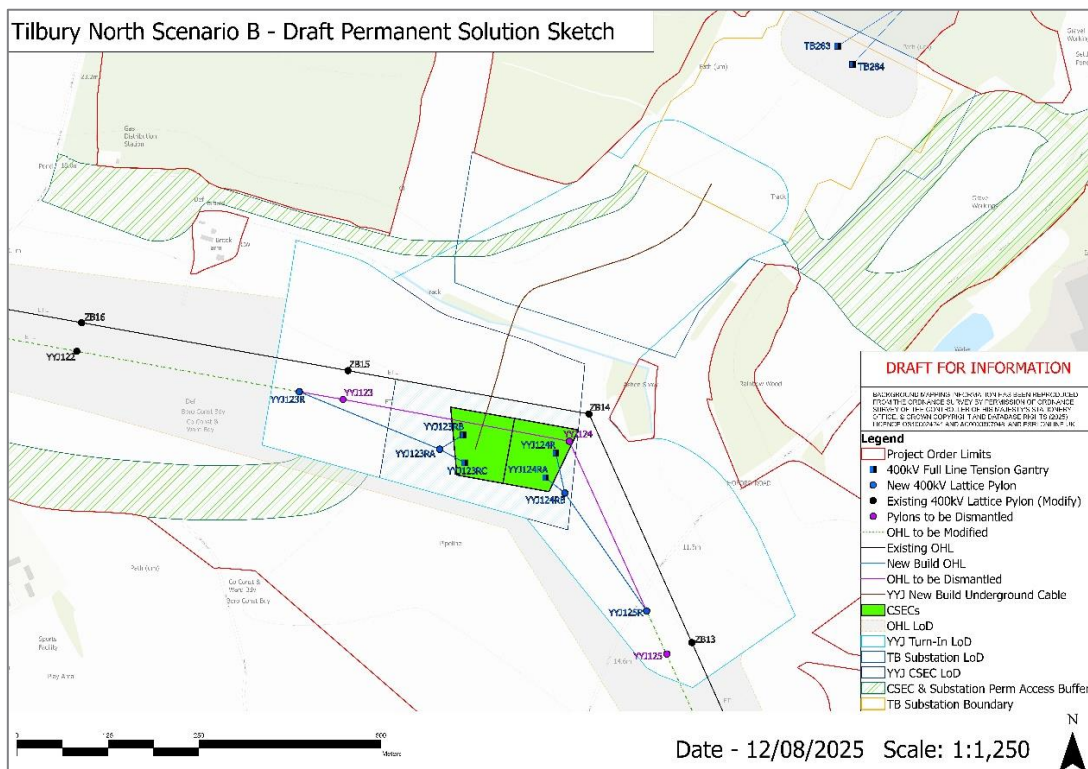
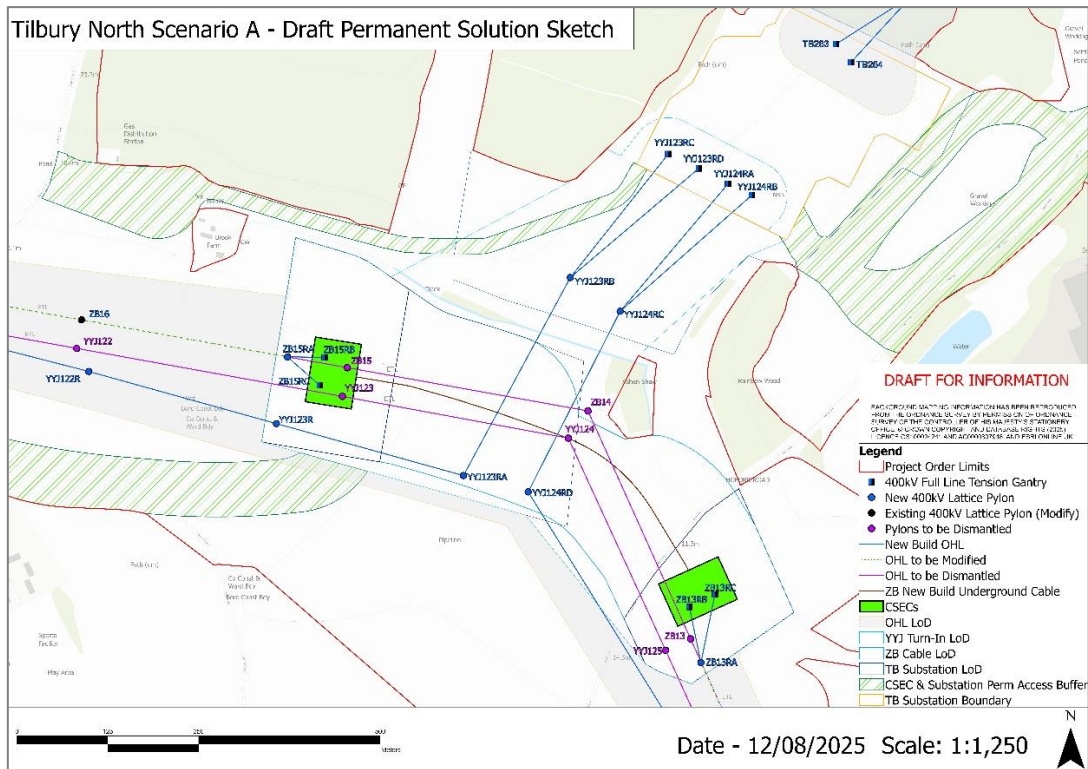
substation infrastructure. An AIS technology with future flexibility would have a land requirement that would extend to the northwest and potentially lead to the direct loss of a number of holes of the golf course and create multiple oversails. Some potential for redesign may be possible but it is also possible that course closure may be unavoidable. Orsett Golf Course was established in 1899 and holds regional qualifying rounds of the Open Championship. While some aspects of the potential effects may be capable of being addressed through compensation, it is recognised that the closure of a high-profile golf course would have a substantial community effect and is not considered acceptable in this case when an alternative technology is available. Mitigation by the adoption of a GIS substation solution minimises these interactions and is proposed as the preferred technology.

- 11.4.23 Site 3 offers other additional benefits in terms of a reduced extent of effects from temporary construction activities (through potential avoidance of the need for underground cabling – though this is dependent on the YYJ ZB diversion solution). These benefits are most notably during construction, as well as avoiding the long-term loss of trees which could not be replanted over the underground cables. The reduced extent of works would also remove the direct landscape effects on Landscape Character Areas Chadwell Escarpment Urban Fringe and Tilbury Marshes but would increase effects on other LCA around the new substation location.
- 11.4.24 Site 5 offers some of the same benefits as Site 3, though the removal of a reduced length of underground cable reduces them somewhat. The location at Site 5 would incur the additional cost and effects (over and above the substation cost) of a CSE compound (as per the statutory consultation proposal and located to the south of Orsett Golf Course) as well as the additional underground cable to follow the 2024 preferred draft alignment to the proposed location.
- 11.4.25 It is possible that the same interface with the potential housing allocation occurs for Site 5 as for Site 3. This arises from the challenge of limited space between the existing overhead lines and the proposed LTC infrastructure. Much depends on the extent of overlap of permanent and temporary works for LTC and is further influenced by the housing option that progresses. Diversion of the existing overhead lines to make the connection has potential to impact the potential housing allocation, to a similar extent for Site 5 as with Site 3. which may be further reduced if one of the allocation alternatives is progressed. For system resilience in the future, it is important to note that the Site 5 location has very restricted potential to support future connections given that there are no readily available connection paths for further generation capacity.
- 11.4.26 Site 5 also offers benefits in terms of reduced temporary construction effects through avoidance of the need for the underground cable to Tilbury Substation. It would also avoid the long-term loss of trees which could not be replanted over the underground cables. There would also be the removal of direct landscape effects on Landscape Character Areas Chadwell Escarpment Urban Fringe and Tilbury Marshes but would increase effects on other LCA around the new substation location.
- 11.4.27 The preferred Site 3 avoids the interactions around Tilbury Port, Thames Freeport and their environs. It does however have potential to reduce the area potentially available for housing on land to the east of Chadwell St Mary (as a result of how the connection to the YYJ line would need to be made) which is currently the subject of consultation for potential allocation in the local plan.

- 11.4.28 Initially a connection arrangement was devised that reduced the cost of the connection on the basis that there may be opportunities to mitigate for effects on housing numbers by the developer making revisions to their layout arrangements for the site. In this arrangement, and due to the layout of existing overhead lines, the ZB line (275 kV) needed to be replaced, in part, by an approximately 600 m section of cable between new CSE compounds. In the case of LTC progressing to construction, the space required for the CSE compounds, along with the constraints of the works associated with LTC, requires an approximately 1,500 m section of the YYJ to be diverted to the south and west deviating by up to approximately 100 m from the existing YYJ alignment to achieve necessary clearances. The scale of interface with the housing proposals may potentially reduce the development area by up to 8 hectares (within an estimated total allocation area of up to around 90 hectares) though this can only be confirmed once detailed design is completed and a reduced extent may well be achieved within Limits of Deviation.
- 11.4.29 Following the consideration of feedback received from the 2025 targeted statutory consultation it became apparent that the ability to reduce direct effects on the housing footprint through modifying the layout arrangements of green space, was more limited than had been expected. The focus for green space requirement for the development has been reported to be on the overhead line corridors and to an area east of Holford Road. On this basis a revised arrangement was sought by respondents which was predicated on seeking to reduce the extent to which any pylon movement may be required.
- 11.4.30 After careful review National Grid concluded that an alternative arrangement could comprise the ZB line being left in situ, with the CSE compounds being positioned close together to the immediate west of the angle pylon on the YYJ line to divert the YYJ line to the substation as underground cable installed under the LTC proposals. The alternative routing replaces the undergrounding of the ZB with a proposed undergrounding of the YYJ to both turn in and turn out of the substation. This substantially reduces the interface with the housing proposals and also retains more of the existing YYJ infrastructure reducing the incursion onto more elevated ground for both temporary diversions and permanent amendments. It also addresses construction risk raised by LTC which was considered greater for the overhead line crossing compared with the underground cable. It also provides a solution that substantially reduces engineering risk associated with outages, however this does require a longer total length of underground cable connection and is therefore at additional cost.
- 11.4.31 Different positioning and configuration of modifications to the existing overhead line transmission infrastructure as well as in the technology adopted (overhead line or underground cable) all present different combinations of implications for the Project, third party projects and in respect of National Grid's statutory duties. Given this uncertainty and pending the conclusion of ongoing discussions with landowners and developers (to be captured within Statements of Common Ground), flexibility in the proposals is being retained through appropriate Limits of Deviation and wider Order Limits than is the case elsewhere on the Project.
- 11.4.32 The LTC project has now secured consent, though it is uncertain whether funding is fully confirmed. If it does not progress there may be an opportunity to reduce the potential interface with the potential housing allocation south of the YYJ overhead line by completing the modifications to the existing ZB and YYJ overhead lines to the north and east, though this is only possible if the LTC route is not safeguarded. It is more appropriate to take forward an approach that has an initial design based on

diverting the YYJ line to the south and west but with flexibility to also retain wider Order Limits if LTC does not progress and its route is not safeguarded. In that case, the design change necessary to connect into the YYJ could be achieved with reduced effect on the housing allocation by undergrounding the ZB line to create space for the new CSE compounds and diversions to be positioned to the north of the YYJ line.

Figure 11.5 Alternative arrangements to connect Tilbury North Substation to the existing YYJ overhead line (scenario A Overhead Line, scenario B underground cable)



- 11.4.33 Illustrations of the works to meet these objectives are provided in Figure 11.5 by a Scenario A which comprises more extensive diversions and modifications of the existing overhead line infrastructure to facilitate a connection to Tilbury North Substation by overhead line and by a Scenario B which consists of more limited modifications to the existing overhead line network but which requires the connection to Tilbury North to be made by underground cable at additional cost, particularly noting that this requires a total of 36 cables to be installed with two circuits connecting southwards to Tilbury and two circuits northwards.
- 11.4.34 On balance, despite the additional cost, National Grid favours Scenario B which has the CSE compounds closer together and undergrounds the connection to Tilbury North Substation. This scenario addresses the concerns of LTC and does not present additional construction risk to that project. It reduces substantially the potential for reduced housing delivery and also reduces the effects on visual amenity through considerably less new tall infrastructure. It also reduces the engineering delivery risk by reducing the outage requirement for construction. Should such agreements not be reached from the discussions noted at paragraph 11.4.31 then we would progress with scenario A. Therefore pending the outcome of continuing discussions the Project is submitted with wider Order Limits to ensure sufficient flexibility to secure delivery.
- 11.4.35 In conclusion, the preferred site for the proposed Tilbury North Substation is Site 3. This avoids the interactions around Tilbury Port, Thames Freeport and their environs. It does however have potential to reduce the area potentially available for housing (as a result of how the connection to the YYJ line would need to be made) on land to the east of Chadwell St Mary being consulted upon for potential allocation in the local plan. However through engagement we are seeking to identify appropriate mitigation.
- 11.4.36 Depending on the orientation and scale of the Tilbury North Substation, affected land uses may include: a working aggregates processing/closed landfill site, Orsett Golf Course, areas of woodland including ancient woodland (an irreplaceable habitat), replacement ancient woodland mitigation areas associated with the LTC proposals, and a local wildlife site. It is also possible that the nature of some land uses may require the use of Special Parliamentary Procedures for some areas (leading to potential for up to two years delay) to secure the necessary land rights. If this cannot be avoided it would not meet the need case for connection date. However this risk is avoided by the selection of GIS technology and careful positioning.

Abbreviations

Abbreviation	Full Reference
~	~ Approximately (note 'c.' also used)
£m	£Million
<	Less than
>	Greater than
1 GW	1000 MW
1 GWh	1000 MWh
1 MW	1000 kW
1 MWh	1000 kWh
85%ile	85th percentile speed – the speed below which 85% of traffic travels
AC/DC	Alternating Current/Direct Current
AIA	Arboricultural Impact Assessment
AIL	Abnormal indivisible load
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AONB / NL	Area of Outstanding Natural Beauty now National Landscape
AW	Ancient Woodland
CAA and CAA AAT	Civil Aviation Authority & CAA Aviation Advisory Team
CEMP	Construction Environmental Management Plan
CNI	Critical National Infrastructure
CoCP	Code of Construction Practice
CPRSS	Corridor and Preliminary Routeing and Siting Study
CSE	Cable Sealing End (also CSEC - Cable Sealing End Compound)
CSEPP	Cable Sealing End Pylon Platform
CTMP	Construction Traffic Management Plan
CWS	County Wildlife Site
DAS	Design and Access Statement
DCO	Development Consent Order

Abbreviation	Full Reference
DDR	Design Development Report
DENZ	Department for Energy Security and Net Zero
DNO	Distribution Network Operator (e.g. UK Power Networks)
DHGV	Dunton Hills Garden Village
EACN	East Anglia Connection Node Substation
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Field
EN-1	Overarching National Policy Statement for Energy
EN-3	National Policy Statement for Renewable Energy
EN-5	National Policy Statement for Electricity Networks Infrastructure
ES	Environmental Statement
FES	Future Energy Scenarios
FLT	Full line tension gantry
FRA	Flood Risk Assessment
GIL	Gas Insulated Line
GIS	Geographical Information System or Gas Insulated Switchgear
GLVIA3	Guidelines for Landscape and Visual Assessment, Version 3
GW	Gigawatt (1,000 million Watts)
GWDTE	Groundwater dependent terrestrial ecosystem
H&S	Health and Safety
ha	Hectare
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HND	Holistic Network Design
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
HV	High Voltage
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current

Abbreviation	Full Reference
Hz Hertz	Hertz
IROPI	Imperative Reasons of Overriding Public Interest
km	Kilometre
kV	Kilovolt (1,000 Volts)
kW	Kilowatt
kWh	Kilowatt hour
LCA	Landscape Character Area
LoD	Limits of Deviation
LoWS	Local Wildlife Site
LPA	Local Planning Authority
LTC	Lower Thames Crossing
LURA	Levelling Up and Regeneration Act
LVIA	Landscape and Visual Impact Assessment
m	Metre/Million
m ³	Cubic Metre
MCA	Mineral Consultation Areas
MP	Member of Parliament
MPA	Mineral Planning Authority
MRA	Mineral Resource Assessment
MSA	Mineral Safeguarding Area
MW	Megawatt (1 million Watts)
MWMP	Materials and Waste Management Plan
NATS	National Air Traffic Service
NE	Natural England
NERL	Nats (En Route) Public Limited Company
NETS	National Electricity Transmission System
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NGESO	National Grid Energy System Operator
NGET	National Grid Electricity Transmission

Abbreviation	Full Reference
NGR	National Grid Reference
NNR	National Nature Reserve
NOA	Network Options Assessment
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
OFGEM	Office of Gas and Electricity Markets
OGV	Ordinary Goods Vehicle
OHL	Overhead Line
ONS	Office for National Statistics
OTNR	Offshore Transmission Network Review
PEI Report	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PPA	Planning Performance Agreement
PRoW	Public Right of Way
PWS	Private Water Supplies
SAC	Special Area of Conservation
SF ₆	Sulphur Hexafluoride
SGT	Super Grid Transformer
SINCs	Sites of Importance for Nature Conservation
SM	Scheduled Monument
SME	Small/Medium Enterprises
SNCI	Site of Nature Conservation Interest
SoCC	Statement of Community Consultation in accordance with s47 of the Planning Act 2008
SoCG	Statement of Common Ground
SoR	Statement of Reasons
SOR	Strategic Options Report

Abbreviation	Full Reference
SoS	Secretary of State
SPA	Special Protection Area
SPZ	Source Protection Zone
SQSS	Security and Quality of Supply Standards
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SuDS	Sustainable Drainage Systems
SVPA	Stour Valley Project Area
T	Tonnes
TCPA	Town and Country Planning Act 1990
TPO	Tree Preservation Order
UKPN	UK Power Networks
V	The unit of electrical voltage, symbol V
WaLOR	Waveney and Little Ouse Recovery project
WCA 1981	Wildlife and Countryside Act 1981 (as amended)
WCH	Walkers, Cyclists and Horse Riders
WVA	Waveney Valley Alternative
WwTW	Wastewater Treatment Works

Glossary

Term	Description
4YM	4YM refers to the existing 400 kV overhead line between Norwich Main Substation and Bramford Substation
Abnormal indivisible load	A vehicle that is used to transport very large equipment which by the nature of the equipment cannot be broken into smaller multiple deliveries, and has a weight of more than 44,000kg; or an axle load of more than 10,000kg for a single non-driving axle and 11,500kg for a single driving axle; or a width of more than 2.9m; or a rigid length of more than 18.65m
Above Ordnance Datum	Above Ordnance Datum (AOD) refers to the height above mean sea-level, taken from a reference point at Newlyn, Cornwall. This is the national height system for Britain.
Access Points	A location connecting a construction site to the public highway.
Access Routes	A route used by construction traffic within the Order Limits to access a working area from an access point.
Aggregate	Granular material (e.g. sand and gravel or crushed rock) that can be used for building and/or civil engineering purposes (e.g. for concrete production).
Alternating Current	The electrical current changes direction in a cycle. Mains electricity is an alternating current.
Amenity	A term used to describe the character or attractiveness of an area. The assessment of amenity considers landscape and visual, noise and vibration, and traffic and transport effects.
Ancient Woodland	Land that has been continually wooded since at least 1600 in England. Regarded as 'irreplaceable habitat' in national planning guidance. Ancient woodland greater than 2ha is recorded on the Natural England Ancient Woodland Inventory.
Angle / Tension Pylon	Pylon where a horizontal insulators string attaches the conductors. Tension or 'angle' pylons are used at points where the overhead line route changes direction.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Archaeological remains	Archaeological remains. The 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.

Term	Description
Archaeological Trial Trenching	Intrusive mechanical excavation to determine the presence, extent, level of survival and potential significance of buried archaeological remains.
Area of Outstanding Natural Beauty	Formally designated under the National Parks and Access to the Countryside Act of 1949 to protect areas of the countryside of high scenic quality that cannot be selected for National Park status due to their lack of opportunities for outdoor recreation (an essential objective of National Parks).
Aspect	A component of a topic considered within the assessment, for example water voles (aspect) covered within biodiversity (topic)
Backfeed	A replacement electrical supply provided from the 400 kV network to replace that previously provided by a now removed lower voltage connection. The removal for example to reduce wirescape effects or to efficiently rationalise the electricity network
Bellmouth	A flared vehicular access point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles.
Biodiversity	The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
Boundary capability	The capability of the transmission system to physically carry the amount of power required between areas whether that be thermal or stability capability.
Cable	An insulated conductor designed for underground installation.
Cable circuit (underground)	Discrete electrical connection between two points on an electricity network.
Cable Sealing End	Structures used to transfer transmission circuits between underground cables and overhead lines.
Cable Sealing End Compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Cable Sealing End Pylon Platform	Electrical infrastructure used as the transition point between overhead lines and underground cables. A platform on the pylon acts as the principal transition point.
Cable working area	Working area required to construct the underground cable systems including; haul road, soil storage and installation of cables.
Chainages	The distance of any point along a line (road, watercourse or utility route) is denoted by its chainage, being its distance, measured along the centre line, from a chosen origin or start point of the

Term	Description
	road. The name 'chainage' has historical connotations based on a technique of measurement where steel chains of 100 links were once used to measure distances.
Circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow. In AC transmission circuits, each consists of three phases.
Code of Construction Practice	A code of construction practice (CoCP) sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential impacts of construction works.
Commitments	Measures that a developer commits to delivering as part of the project, with the purpose of limiting, mitigating or compensating potential impacts of the project.
Committed development	A development that has full or outline planning permission, or is allocated in an adopted development plan.
Conductor	Conductor The overhead wire that carries electricity from one place to another. For example, the line between two pylons.
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance as defined in s69(1)(a) in the Planning (Listed Building and Conservation Areas) Act 1990.
Constraint Costs	Payments to generators where they are in a position to generate and supply power but where that cannot be accommodated for various reasons including a network reinforcement not being completed in time or not available for whatever reason.
Construction Compounds	Temporary compounds installed during the construction phase of the project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Construction Environmental Management Plan	A Construction Environmental Management Plan (CEMP) is a document which provides a consistent approach to the control of construction activities for the project. It would allocate responsible persons, indicators for completion and site-specific control measures for where and when the measures would apply for environmental actions and commitments.
Construction routes	These are the roads on the local road network that would be used by construction vehicles between the strategic road network and the access points within the Order Limits.
Construction Traffic Management Plan	Plan detailing the procedures, requirements and standards necessary for managing the traffic effects during construction of the project so that safe, adequate and convenient facilities for local movements by all transport modes are maintained throughout the construction process.

Term	Description
Converter Station	Part of an HVDC system which either converts AC electricity to DC or converts DC electricity to AC.
County Wildlife Site	Non-designated areas of land important for their wildlife and nature conservation value. Designation in Suffolk.
Culvert	A channel or pipe that carries water below the level of the ground.
Cumulative Effects	The assessment of the impact on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time.
Current	The flow of electricity. A voltage will always try to drive a current. The size current that is driven depends on the resistance of the circuit.
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Direct Current	Electricity that flows in one direction in a wire or cable and the voltage cannot be increased or decreased using transformers as it can with AC electricity. Converting from AC to DC and back takes place at a Converter Station.
Distribution Network Operator	Companies that own and operate the power lines and infrastructure that connect the National Grid network to individual properties
District Level Licence	District level licensing is an alternative approach to mitigation licensing for planning applications to develop sites which could affect a protected species, e.g., great crested newts.
Double circuit	This refers to the arrangement in which a total of six conductors are provided to make two different transmission circuit. Both the circuits in are mounted or run through the same transmission line.
Dust	Dust is defined as all particulate matter up to 75µm (millionths of a metre or thousandths of a millimetre) in diameter (according to BS6069) and is both suspended in air and deposited from air. Particles less than 1µm behave more like gases than solids and are generally termed 'fume'. The bulk of particulate matter generated by demolition and construction activity has a diameter greater than 30µm.
East Anglia Connection Node Substation	The new substation on the Tendring Peninsula providing the connection point for three customers, North Falls; Five Estuaries; and Tarchon.

Term	Description
Earth Wire	Wire strung between the tops of pylons used for lightning and system protection. May also be used to carry telecommunication signals.
Easement	A legal right in perpetuity granting National Grid the right to install, use, maintain, replace, renew and remove its equipment.
Easement	An easement is a right benefiting a piece of land (known as the dominant land) that is enjoyed over another piece of land owned by someone else (the servient land). Usually, an easement allows the owner of the dominant land to do something on the servient land, such as use a right of way, or run services over it.
Easement Strip	The strip of land over which the apparatus is installed.
Electric and Magnetic Fields	All equipment that generates, distributes or uses electricity produces Electric and Magnetic Fields (EMF), and EMFs also occur naturally. Electric fields are created by differences in voltage: the higher the voltage, the stronger the resultant field. Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field
Electric Field	An electric field is the region around a conductor where a force will be experienced by a charge. An electric field is produced by a voltage.
Electrical Safety Clearances	Specified minimum safety clearances that must be maintained between overhead lines and things such as the ground, obstacles, buildings, roads, railways and other power lines.
Electricity Act	The Electricity Act 1989 provided for the privatisation of the electricity supply industry. The act established a licensing regime and a regulator(OFGEM).
Electricity Lines	Either an overhead line or an underground cable used to transmit electricity.
Embedded design measures	Measures for the protection of the environment that are embedded (intrinsic) with the design.
Environmental Areas	These are locations identified for environmental embedded measures, mitigation and/ or biodiversity net gain/ environmental enhancement.
Environmental Clerk of Works (EnvCoW)	An environmental specialist with responsibility for monitoring compliance with planning consents, environmental permits, legislation and mitigation.
Environmental Impact Assessment (EIA)	An assessment of the likely effects of a development project on the environment, which is reported in an Environmental Statement that is publicised and consulted on and taken into account in the decision on whether a project should proceed.

Term	Description
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
European Protected Species	Animals and plants listed under the Habitats Directive and protected under the Conservation of Habitats and Species Regulations 2017, as amended.
European Protected Species Licence	The licence issued to permit an activity affecting European Protected Species that would otherwise be an offence under the Habitats Regulations.
Examining Authority	A panel of inspectors, appointed by the Planning Inspectorate, to examine the DCO application.
Fault	Electrical fault on a circuit or piece of transmission equipment for which the circuit/equipment switches out automatically.
Fauna	All of the animals in a given area.
Flood Risk Assessment	A flood risk assessment is an assessment of the risk of flooding, particularly in relation to residential, commercial and industrial land use. In England and Wales, the Environment Agency requires a Flood Risk Assessment (FRA) to be submitted alongside planning applications in areas that are known to be at risk of flooding.
Flood Zone 1	Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2	Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Flood Zone 3	Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Floodplain	Area adjacent to river, coast or estuary that is naturally susceptible to flooding.
Flora	The plants within a particular habitat or region.
Full line tension gantries	Types of gantries which allow conductors to connect into a substation or compound directly from a pylon, without requiring a bulky terminal pylon. This allows a larger span between the final pylon and the gantry.
Functional floodplain	This zone comprises land where water has to flow or be stored in times of flood. The land would flood with an annual probability of 1

Term	Description
	in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood.
Gantries	An overhead bridge-like structure supporting electrical equipment. A transition point from overhead line equipment to equipment in a compound.
Geographical Information System	GIS is a framework for gathering, managing and analysing data. It analyses spatial location data and organises layers of information into visualisations on maps.
Global Positioning System	Global navigation satellite system that provides geolocation and time information to the receiver anywhere in the world with an unobstructed line of sight to four or more GPS satellites.
Grantor	An owner or occupier of land where National Grid transmission equipment is sited.
Green Belt	An area of open land around a city, on which building is restricted by planning policy.
Grid supply point substation	Used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses. In this case it provides an alternative supply to the Distribution Network Operator, UK Power Networks to allow the existing 132 kV line to be removed.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Habitat	Habitat The natural home or environment of an animal, plant, or other organism.
Habitats Regulations Assessment	The process by which plans and projects are assessed as to whether they are likely to have a significant effect on a European site either alone or in combination with other plans or projects, under the Conservation of Habitats and Species Regulations 2017, as amended.
Haul Road	Haul Road Another term used for the temporary access route, which is a temporary route built to carry construction vehicles within the Order Limits.
Health and Safety Executive	The Health and Safety Executive (HSE) is the national independent watchdog for work-related health, safety and illness.
Heavy Goods Vehicle	Goods vehicles weighing more than 3500kg.
Heritage Asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).
High Pressure Pipeline	A pipeline operating at above 7 bar or approximately 102 psi.

Term	Description
High Voltage	275,000 volts and over. National Grid's transmission lines generally operate at 275,000 and 400,000 volts. Lower voltage line, such as 132,000 volts and 33,000 volts are generally owned by local distribution companies.
Historic buildings	Historic buildings Architectural, designed, or other structures with a significant historical value. These may include structures that have no aesthetic appeal or structures not usually thought of as buildings, such as milestones or bridges.
Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic Environment Record	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Historic Landscape	The current landscape, whose character is the result of the action and interaction of natural and/or human factors.
Historic/non-operational landfill	Locations where there are records of waste being received to be buried but are now closed or covered. The information held is collated from data held by Local Authorities, the former Department of the Environment, British Geological Society and Environment Agency suspended authorised landfill licences.
Holford Rules	The 'Holford Rules' are a series of overhead line routing guidelines first developed in 1959 by Lord Holford, adviser to the then Central Electricity Generating Board on amenity issues. They were reviewed in the 1990s by National Grid. The rules are not published as a single work but they are referred to in a number of planning publications including The National Policy Statement for Electricity Networks Infrastructure (EN-5),
Horlock Rules	The Horlock Rules complement the Holford Rules and provide guidelines for, the design and siting of substations (in addition to cable sealing end compounds and line entries). When considering new electricity infrastructure, National Grid has regard to the degree to which options comply or deviate from these rules
Horizontal Directional Drilling	Trenchless method for the installation of pipes, in a shallow arc using a surface-launched drilling rig. In particular, it applies to large-scale crossings in which a fluid filled pilot bore is drilled without rotating the drill string, and this is then enlarged by a washover pipe and back reamer to the size required for the product pipe.
Hydrogeology	The properties of groundwater in superficial and bedrock geology, especially occurrence and movement.

Term	Description
Impact Magnitude	This is the scale of change which a given impact may cause. This is compared to the baseline state and consideration is given to how the change relates to accepted thresholds and standards.
Impact Significance	The level of significance is defined by the magnitude of impact in relation to the sensitivity/value of the environmental receptor.
Infiltration	Incident rainfall that percolates into the ground, rather than evaporating or running off.
Insulator	Used to attach the conductors to the pylons preventing electrical discharge to the steelwork.
Interconnector	A high voltage connection between the electricity transmission systems of different countries.
Internal Drainage Board	A type of operating authority which is established in areas of special drainage need in England and Wales with permissive powers to undertake work to secure clean water drainage and water level management within drainage districts.
JC	JC refers to the proposed electricity transmission line between Bramford Substation and the East Anglia Connection Node Substation
Land use	What land is used for, based on broad categories of functional land cover such as urban and industrial use and the different types of agricultural and forestry.
Landform	The shape and form of the land surface resulting from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is the result of the action and integration of natural and/or human factors.
Lattice Pylon	Pylon type widely used on the national electricity transmission networks. The normal pylon has three cross arms and is often referred to as a standard lattice pylon (with a conductor bundle hung from an insulator carried at each end of each crossarm). There is a low height variant which has two crossarms with the lower crossarm carrying two conductor bundles to each side.
Lead Local Flood Authority	Responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.
Letter of No Impediment	Letter of No Impediment provide the Planning Inspectorate with confidence that Natural England, as the relevant licensing authority, has considered the issues relating to protected species.
Light Goods Vehicles	Goods vehicle weighing 3500kg or less.

Term	Description
Limits of Deviation	LoD allow for adjustment to the final positioning of the permanent infrastructure for example to avoid localised constraints or unknown or unforeseeable issues that may arise. This could include, previously unidentified poor ground conditions may require a pylon to be moved slightly for geotechnical reasons, such as ground stability. The horizontal LoD define the parameters within which the position on the ground of proposed permanent infrastructure may deviate from the position shown on the plans. This applies to both linear (for example overhead line and underground cables) and non-linear (for example the GSP substation and CSE compounds) proposed infrastructure. Vertical LoD limit the maximum vertical height, or the depth below ground, of any new infrastructure.
Listed Building	A measure of a building's special architectural and historic interest. There are three categories of listed buildings, Grade I, II* and II depending on the level of interest.
Local Nature Reserve	Sites dedicated by the local authority under s21 of the National Parks and Access to the Countryside Act 1949 for nature conservation which have wildlife or geological features that are of special interest locally.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Local Wildlife Site	Non-designated areas of land important for their wildlife and nature conservation value. Designation in Essex.
Long term	This is used to describe an impact of long duration or irreversible. It is assumed to be greater than 15 years post construction.
Low Height Pylon	See also lattice pylon. This is a low height variant which has two crossarms with the lower crossarm carrying two conductor bundles to each side. It reduces lattice pylon height by around 10m but has a bulkier and wider profile.
Magnitude of change	A term that combines judgements about the size and scale off the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Main river	A watercourse designated by the Environment Agency as a main river and marked as such on their main river map. A watercourse should be classified as a main river if it has a significant flood consequence to people and property, or could lead to significant flooding across the river catchment.
Medium term	This is used to describe an impact of medium duration or reversible within the medium term, which is assumed to be between five and 15 years post construction.

Term	Description
Microshock	Small discharges sometimes experienced when touching a metal object in an electric field, similar to touching a filing cabinet or doorknob after walking across a nylon carpet.
Mineral Planning Authority	The Minerals Planning Authority is part of the planning group or county development unit of the Local Authority.
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
National Electricity Transmission System Security and Quality of Supply Standard	The NETS SQSS sets out a coordinated set of criteria and methodologies that the Transmission Licensees shall use in the planning and operation of the national electricity transmission system.
National Energy System Operator	National Energy System Operator controls the movement of electricity around the country its role in the wholesale market is vital to ensure electricity is always where it is needed, and the transmission network remains stable and secure in its operation. As of 1 October 2024, NESO became a public body owned by the Department for Energy Security and Net Zero (DESNZ). It was formerly part of National Grid PLC and called the Electricity System Operator (ESO)
National Grid Electricity Transmission plc ('National Grid')	National Grid own and maintain the high-voltage electricity transmission network in England and Wales. providing electricity supplies from generating stations to local distribution companies. National Grid does not distribute electricity to individual premises.
National Landscape	The new name for Areas of Outstanding Natural Beauty introduced in late 2024
National Nature Reserve	Sites that are dedicated by the statutory country conservation agencies, under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, for nature conservation and which have wildlife or geological features that are of special interest nationally.
National Planning Policy Framework	The National Planning Policy Framework is a key part of the government's reforms to make the planning system less complex and more accessible. It vastly simplifies the number of policy pages about planning. The planning practice guidance to support the framework is published online and regularly updated.
Nationally Significant Infrastructure Project	Typically a large scale development of national importance that requires development consent from The Secretary of State, under the Planning Act 2008.
Noise	Unwanted sound.
One-way Movement	One vehicle movement, either to or from a work site, so for example a delivery to a site will consist of two one-way

Term	Description
	movements, one to the site carrying a load and one running empty away from the site.
Order Limits	The maximum extent of land within which the authorised development may take place.
Outage	A period of interruption to electricity supply.
Overhead Line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Overhead line refurbishment	Repair and renewal of conductors, earthwire, fittings and insulators and, where necessary, remedial works to the pylon and foundations.
Oversail	The term where some element of overhead line infrastructure passes above an area of land.
Preferred Corridor	The corridor that balances the technical, economic and environmental considerations and National Grid's duties, as identified through the assessment presented in the Route Corridor Study.
Preliminary Environmental Information Report	Information that has been compiled by the applicant to support statutory consultation held in advance of submitting an application for development consent. The Preliminary Environmental Information Report should contain information reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development and any associated development.
Proposed Alignment	This term is used to help communicate the potential alignment of the project within the application.
Protected lane	Country lanes and byways of historic and landscape value that make an important contribution to rural character, which have been designated as Protected lane Country having 'protected lane' status in development planning policy.
Public Right of Way	A footpath, bridleway or byway accessible to all members of the public.
Pulling Site	A site where the winching equipment that is used to pull through the new conductors is located.
Pylons	Structures that support the overhead line (conductors). There are two types of pylons; suspension (line), where the conductors are simply suspended from the tower and tension (angle).
RG	RG refers to the proposed electricity transmission line between Norwich Main Substation and Bramford Substation
Receptor	The physical resource or user group that would respond to an effect e.g. somebody or something adversely affected by a pollutant.

Term	Description
Reconductoring	The replacement of old conductors (wires) on an existing overhead line. Record of Condition Document detailing land condition before works begin.
Refurbishment	The replacement of old conductors (wires), insulators, earthwires, etc on an existing overhead line.
Registered Park and Garden	A park or garden included on Historic England's Register of Historic Parks and Gardens. Sites are graded I, II* or II like listed buildings.
Residual Effects	The consequence of an 'impact' of construction, operation and decommissioning of the Proposed Development after mitigation measures have been applied.
Route Corridor	A defined linear area identified on a map which may be of variable width and whose extent at any point is typically defined by constraints or differentiation from other route corridors.
Route Corridor Study	An appraisal of the high-level planning and environmental constraints to identify potential route corridor options within a defined study area.
Scheduled Monument	An historic building or site whose heritage interest is nationally important, that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. Covered by the Ancient Monuments and Archaeological Areas Act 1979.
Scoping	Scoping is the process of determining the content and extent of matters that should be covered in the environmental impact assessment.
Scoping Boundary	An area around the Indicative Alignment which is used for scoping purposes to define an area within which the final Order Limits are likely to lie. It is based on a buffer of 200m around the Indicative Alignment.
Scoping Report	Report determining the content and extent of matters that should be covered in the environmental impact assessment.
Section	Geographical 'sections' have been identified that break the project down into smaller units for ease of description within the documentation.
Section 42 (of the Planning Act 2008) (s42)	Section of the Planning Act 2008 requiring consultation of specifically identified groups
Section 42 consultees (s42 consultees)	Statutory stakeholders as defined by the Planning Act 2008.
Section 47 (of the Planning Act 2008) (s47)	Section of the Planning Act 2008 requiring consultation of the local community and preparation of a Statement of Community Consultation setting out how such consultation will be conducted.

Term	Description
Section 48 (of the Planning Act 2008) (s48)	Section of the Planning Act 2008 requiring publication of notices regarding statutory consultation.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptors to the specific type of change or development proposed and the value related to that receptor.
Sequential Views	Sequential views are views recorded along the length of public routes identified for assessment. A description records changes to views as the receptor travels along the identified route.
Setting	The surroundings in which a heritage asset or landscape designation is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Severance	The extent to which members of communities or habitats are able (or not able) to move around their community and access services/facilities.
Short term	This is used to describe an impact of short-term duration or reversible within the short term, which is assumed to be up to five years after construction.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Site of Special Scientific Interest	A statutory designation under the Wildlife and Countryside Act 1981 (as amended), protecting nationally important wildlife sites, habitats and geological sites.
Soil stockpiles	Mounds of soil created through the storage of soil materials which have Soil stockpiles been stripped from an area of construction.
Sound	Sound is vibrations travelling through a medium (usually air) that can be perceived by the hearing organs.
Source Protection Zone	A defined area around a drinking water source that carries statutory protection from damaging activities.
Span / Span Length	The distance between adjacent pylons.
Special Area of Conservation	Protected sites designated under the Habitats Directive, representing internationally important, high-quality conservation sites.
Special Parliamentary Procedure	The legal process to secure rights over Special Category Land such as commons and public open space
Special Protection Area	Site of European importance for bird conservation designated under the Birds Directive.

Term	Description
Species	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.
Statutory Consultation	The formal period of public consultation, prior to deciding a planning application.
Statutory Consultee	A national public organisation or body that must be consulted with on planning applications, depending on the nature of the development and its location.
Statutory Undertakers	Persons with regulatory powers and duties, such as gas, electricity, water and transport providers or transmitters.
Stringing positions	Areas used for stringing/installing new electrical equipment, such as wires and conductors on pylons.
Subsoil	Weathered soil layer extending between the natural topsoil and the unweathered basal layer (geological parent material, either solid or drift) below.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Suspension Pylon	Pylon where conductors are suspended by a vertical insulator string. Suspension pylons support the conductors on straight stretches of overhead line.
TB	TB refers to the proposed electricity transmission line between the East Anglia Connection Node Substation and Tilbury North Substation
Temporary access bellmouth	A flared vehicular access/egress point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles. It may involve creating visibility splays, which is a safety feature where vegetation may be removed from the bellmouth to enable a driver to see down the road and know when the road is clear.
Temporary construction access route	A temporary road constructed to convey construction vehicles through the working areas. These can be made of imported stone or using protective covering such as Trakmat. These would be removed at the end of construction.
Temporary construction area	The additional temporary construction space required to construct the project in a particular area, but which will not be required once construction has taken place.
Temporary overhead line diversions and pylons	Temporary diversions of existing overhead line may be required to ensure electricity flows are maintained at all times during construction of the project to limit the disruption to the electricity network. These typically comprise a short section of overhead line

Term	Description
	with temporary structures or pylons which electricity flows are diverted along.
Tensioning site	A site where the new conductor is fed out from during construction. This also includes a tensioning winch to keep the conductor off the ground.
Terminal pylon	Pylons erected at the end of the overhead line to terminate the line at substations or where overhead lines are connected to underground cables. Because of the uneven load on one side of the pylons, much deeper and heavier foundations are required on the unloaded side.
Tilbury North Substation	A new substation providing the means for connection to the YYJ line which provides the electrical connectivity to Tilbury Substation
Topic	A subject area covered within the EIA, for example landscape and visual or biodiversity.
Topsoil	The uppermost layer of soil, usually with the highest concentration of nutrients, organic matter and microorganisms.
T-pylon	An alternative type of pylon, has a single pole and T-shaped cross arms, which hold the wires in a diamond shape.
Track out	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.
Transmission line	A National Grid overhead line which transmits electricity between National Grid's substations. Power is transmitted at high voltages (275 kV or above) between power stations where it is generated and the local electricity supply networks of the regional distribution network operators where it is transformed to lower voltages (132 kV or below) for supply via distribution lines to local communities.
Transport Assessment	A TA is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport impacts of the scheme.
Transposed/Untransposed	<p>Each pylon contains two circuits, one on each side of the pylon. Each circuit has three 'phases' which are arranged vertically. If the circuits are 'transposed', the phase order on one side of the pylon is the reverse of that on the other side, (this is often referred to as optimal phasing). If the circuits are 'untransposed', the phase order is the same on both sides of the pylon.</p> <p>Transposition also used when referring to the creation of short parallel sections where existing circuits can be moved to a new temporary or permanent series of pylons with the original pylons then reconfigured for use by a new set of circuits.</p>

Term	Description
Trenchless crossing	A crossing installation method that has limited above ground disturbance which is used to avoid a sensitive feature such as an environmental feature.
UK Power Networks	UK Power Network means UK Power Networks (Operations) Limited (registered company number 03870728) and/or its affiliate Eastern Power Networks plc (registered company number 02366906) as applicable.
Underground cabling	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two cable sealing end compounds.
Up-rating	Changing the capacity of existing overhead line by replacing the existing conductors with larger capacity conductors
Viewpoint	They are points in space from where a view is obtained. These can be actual or virtual.
Visibility splays	Areas of tree/vegetation removing, typically where access points are to enable a driver to see down the road and know when the road is clear.
Visual Amenity	The value of a particular area or view in terms of what is seen.
Visual Receptor	Individuals and/or defined groups of people who could be affected by a project impacting on their views.
Visualisation	A computer simulation, photomontage or other technique illustrating the predicted appearance of a project to aid engagement with consultees.
Voltage	The electrical potential difference between two points.
Voltage Source Convertors	A type of HVDC converter which uses electronic switches which can be controlled on and off.
Working area	The working area refers to the area of land that is likely to form part of the construction site.
YYJ	YYJ refers to the existing electricity transmission line, one circuit connecting Tilbury Substation to West Thurrock Substation and the other connecting Littlebrook Substation to Tilbury Substation
ZB	ZB refers to the existing 275 kV electricity transmission line between Tilbury Substation and Warley Substation
Zone of Influence	The defined geographic area within which the project's environmental receptors are located.
Zone of Theoretical Visibility	The area of potential or theoretical visibility of the development based upon the height of the ridgelines applied to DTM (digital terrain model) data for a defined study area using a suitable software programme. The DTM does not take into account the influence of built development and vegetation such as tree cover and any local variations 'smoothed out' by using data aggregated by taking spot heights on a 50m grid. Also sometimes called a ZVI (Zone of Visual Influence).

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Appendix A. Guide to the Approach to Design

Guide to the approach on design

This Guide to the approach on design includes the key documents that form the project's design approach.

While there is no statutory requirement to produce design-related documents, paragraph 4.7.7 of EN-1 (2024) states that:

“Applicants must demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favored choice has been selected.”



This is not the interactive version of the Guide to the approach on design.

To view the interactive version of this guide please visit <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/norwich-to-tilbury/document-library>

Advice issued by the Planning Inspectorate also states that the applicant can submit any document that could help assist in meeting requirements of a National Policy Statement including a design and access statement among other supporting design documents.

Given the linear nature of the proposed electricity transmission project that comprises various components, the following documents have been prepared to capture the design process:

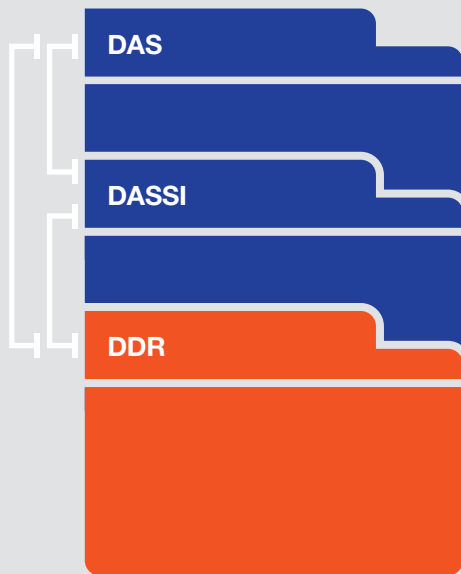
- **DAS** – Design and Access Statement (document reference 7.15)
- **DASSI** – Design Approach Site Specific Infrastructure (document reference 7.16)
- **DDR** – Design Development Report (document reference 5.15)

As you move to the main page of each design document by clicking on the centralised interactive folder to each report, the purpose behind the document and interactions between each report is explained.

The interactive folder therefore provides a central repository to help those interested in understanding where to find key information on design and linkages to other documents that have helped shape and inform the design approach. Access to each design related document and the contents of the report is set out to assist those wanting to access and understand more about the way in which the project design addresses the policy, advice note requirements, regulatory and statutory duties.

Guide to the approach on design

Document



THIS IS AN INTERACTIVE PDF

To explore one of our DCO documents, relating to design click on a folder. To return to the home screen, please click the home icon, top right.

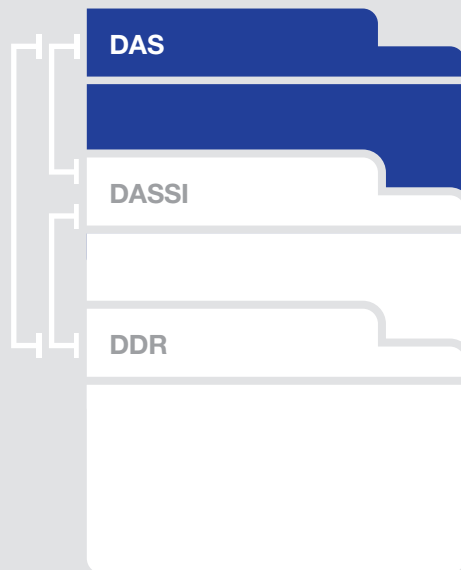
We've produced this interactive PDF to show the design documents that underpin our design approach.



Click on one of the folders on the left to view the document, read a summary and find out more information on our design approach.

Guide to the approach on design

Document



THIS IS AN INTERACTIVE PDF

To explore one of our DCO documents, relating to design click on a folder. To return to the home screen, please click the home icon, top right.

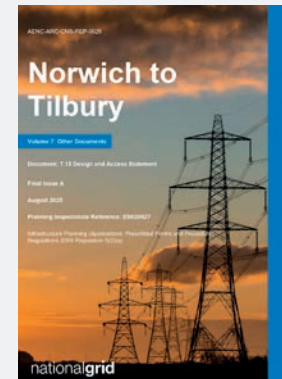
Summary

The Design and Access Statement (DAS) describes the factors that influence design in relation to the permanent linear elements of the Project. The DAS sets out the background to the Project, the design principles applied by National Grid and summarises the approach to and development of good design. It also provides details on the permanent access for both the substations and Cable Sealing End Compounds.

The DAS provides an evaluation and review of the Good Design Process summarising how the design and location have been informed by the Design Principles with reference to the 'Planning Inspectorates Nationally Significant Infrastructure Projects: Advice on Good Design' and the National Infrastructure 'Commission Design Guidance'. It also includes an Internal Design Review Note.

The report acts as the 'central' design Document that links closely with the DDR and DASSI.

Overview



The report is structured as follows:

- **Chapter 1** – Introduction
- **Chapter 2** – Overview of the Project
- **Chapter 3** – Legislation, Policy and Guidance Context
- **Chapter 4** – Physical Context
- **Chapter 5** – Good Design Process
- **Chapter 6** – Conclusions

Guide to the approach on design

Document



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To explore one of our DCO documents, relating to design click on a folder. To return to the home screen, please click the home icon, top right.

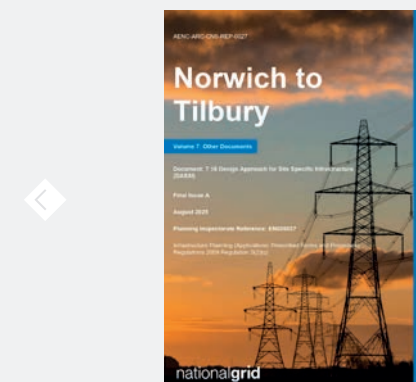
Summary

The Design Approach to Site Specific Infrastructure (DASSI) relates to the details of the site specific infrastructure of the nonlinear works included in the Project, such as the substations and Cable Sealing End Compounds (CSEC's).

This document outlines the design principles that can be taken forward into the detailed design stage, sets out an approach to the design of site specific infrastructure of non-linear works, and details those elements of the design which have some flexibility in their appearance. The document links closely with the DAS and DDR. The DASSI differs from the DDR in that it provides site specific details for non-linear infrastructure.

The document is closely linked with the 'detailed design' Requirement in the draft Development Consent Order (dDCO) and is a "certified" document under Schedule 18.

Overview

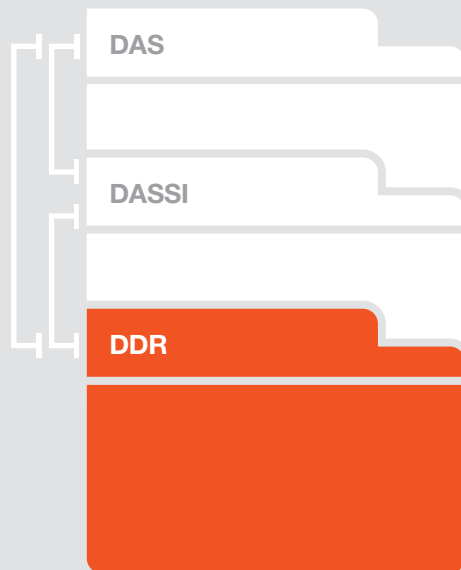


The report is structured as follows:

- **Chapter 1** – Introduction
- **Chapter 2** – Site Location and Context
- **Chapter 3** – Examples of Existing Infrastructure
- **Chapter 4** – DCO Design and Operational Function
- **Chapter 5** – Design Principles and Scope for Variation in Developing the Detailed Design
- **Chapter 6** – Approach to Detailed Design and Approval Process

Guide to the approach on design

Document



If you wish to view previous versions of the DDR or a copy of the Consultation Report you can view them in the documents section of the [Planning Inspectorate's website](#).

THIS IS AN INTERACTIVE PDF

To explore one of our DCO documents, relating to design click on a folder. To return to the home screen, please click the home icon, top right.

Summary

The Design Development Report (DDR) provides an overview of the main changes in route alignment, infrastructure siting, and technology for the Norwich to Tilbury Project, based on feedback from the 2024 statutory consultation and targeted consultations in 2025.

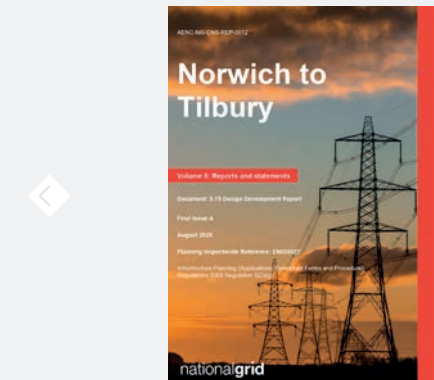
This report highlights the key changes requested in feedback received from consultations, taking into account various factors to ensure balanced decision-making.

It is important to note that the DDR does not encompass all changes, particularly smaller adjustments such as minor pylon relocations, which are addressed in the Consultation Report.

The DDR details the changes being sought, outlines the National Grid's responses, and explains the rationale behind decisions to either proceed with or forgo specific changes.

The DDR provides the details on the linear route and siting with close links to the Consultation Report.

Overview



The report is structured as follows:

- **Chapter 1** – Introduction
- **Chapter 2** – Project wide considerations relevant to the design development
- **Chapter 3** – Overview and Summary of Changes Taken Forwards
- **Chapter 4** – Section A South Norfolk
- **Chapter 5** – Section B Suffolk
- **Chapter 6** – Section C Babergh and Tendring
- **Chapter 7** – Section D Colchester
- **Chapter 8** – Section E Braintree
- **Chapter 9** – Section F Chelmsford
- **Chapter 10** – Section G Brentwood and Basildon

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