

Sea Link

Volume 6: Environmental Statement

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Part 1 Introduction
Chapter 3
Main Alternatives Considered

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3. Main Alternatives Considered

3.1 Introduction

3.1.1 This chapter documents the main alternatives considered by National Grid Electricity Transmission plc (National Grid) in the development of the Sea Link Project (hereafter referred to as the 'Proposed Project') and provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.1.2 The following sections of this chapter set out:

- the legal and policy requirements for considering alternatives within the Environmental Statement (ES);
- the approach National Grid follows when developing projects;
- the supporting documents which should be read in conjunction with this chapter;
- the alternatives that were considered at the strategic proposal stage and the main reasons for selecting the chosen option;
- the alternatives that were considered at the option identification and selection stage and the main reason for selecting the chosen options;
- the alternatives that were considered at the defined proposal and statutory consultation stage and the main reason for selecting the chosen options; and
- the alternatives that were considered at the assessment and land rights stage and the main reason for selecting the chosen options.

3.1.3 This chapter is supported by the following Figures:

- **Application Document 6.4.1.3.1 Main Alternatives Considered.**

3.2 Legal and Policy Background

3.2.1 There is both a legal and policy requirement to report the main alternatives considered during the development of a Nationally Significant Infrastructure Project (NSIP). These requirements are summarised in the following sub-sections. This section also provides information about the Holford Rules and Horlock Rules, which are guidelines setting out the basis for siting overhead transmission lines and substations respectively.

3.2.2 More general details about the planning context of the Proposed Project (including National Grid's duties under the Electricity Act 1989 (the Electricity Act) (HM Government, 1989)) are provided in **Application Document 6.2.1.2 Part 1 Introduction Chapter 2 Regulatory and Planning Policy Context** and **Application Document 7.1 Planning Statement**.

The EIA Regulations 2017

3.2.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) (HM Government, 2017) require applicants to document alternative

development options considered as part of the application for development consent. Regulation 14(2) states that an ES should include *‘a description of the proposed development comprising information on the site, design, size and other relevant features of the development’*.

- 3.2.4 Part 2 of Schedule 4 of the EIA Regulations 2017 requires that the ES includes *‘A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects’*.

National Policy

- 3.2.5 Where a relevant National Policy Statement (NPS) has effect in relation to an NSIP, the Secretary of State must have regard to that NPS and must determine the application in accordance with the relevant NPS unless certain exceptions apply. In the case of the Proposed Project, the relevant NPSs are:

- the Overarching NPS for Energy (NPS EN-1) (Department for Energy Security and Net Zero, 2023);
- the NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security and Net Zero, 2023); and
- the NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security and Net Zero, 2023).

- 3.2.6 Paragraph 4.3.15 of NPS EN-1 states *‘Applicants are obliged to include in their ES information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility’*. Paragraph 4.3.22 recommends *‘the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner’* and that *‘only alternatives that can meet the objectives of the proposed development need to be considered’*.

- 3.2.7 Of specific relevance to the Proposed Project, paragraph 2.8.119 of NPS EN-3 states *‘assessment of the effects of installing offshore transmission infrastructure across the intertidal/coastal zone should ... include information, where relevant, about: any alternative landfall sites that have been considered by the applicant during the design phase and an explanation for the final choice; [and] any alternative cable installation methods that have been considered by the applicant during the design phase and an explanation for the final choice’*.

Holford Rules

- 3.2.8 Referenced by NPS EN-5, the Holford Rules (National Grid, 1959) are guidelines which form the basis for decisions of siting overhead transmission lines. They were originally set out in 1959 but later updated and remain a valuable tool in selecting and assessing potential route options as part of the environmental assessment process. Whilst the Proposed Project is a High Voltage Direct Current (HVDC) Link, these Rules have been an important consideration during the development of the overhead line sections of the Proposed Project.

- 3.2.9 A summary of the Holford Rules and how these have been considered in relation to the Proposed Project can be found in **Application Document 7.1 Planning Statement**.

Horlock Rules

- 3.2.10 NPS EN-5 also gives consideration to the Horlock Rules (National Grid, 2009), devised by National Grid in 2003 and updated in 2009. The Horlock Rules provide guidelines for the siting and design of new substations and substation extensions to avoid or reduce the environmental effects of such developments. In summary, like the Holford Rules, they facilitate consideration of environmental and amenity factors within the design and siting of new substation infrastructure. These were considered during the identification of potential locations for the proposed Saxmundham Converter Station and the proposed Minster 400 kV Substation and Minster Converter Station, acknowledging the absence of similar guidance specific to converter stations. Further details on how the project has considered the Horlock Rules can be found in **Application Document 7.1 Planning Statement**.

3.3 Approach to the Development of the Proposed Project

- 3.3.1 National Grid undertakes options appraisal on each new project. There are often several different ways that a project could be developed, perhaps involving different locations, technologies or designs. Each project requires judgements and decisions regarding the best way to achieve the required outcome. The options appraisal process provides information to help inform those judgements.
- 3.3.2 Options appraisal is a robust and transparent process that is used to compare options and to assess the beneficial (positive) and adverse (negative) effects they may have, across a wide range of criteria including environmental, socio-economic, technical and cost factors, as set out in '*Our Approach to Consenting*' (National Grid, 2022). The aim is to find a balanced outcome, taking account of the range of National Grid's statutory duties under the Electricity Act 1989. The assessment is documented to provide, in a transparent manner, the information upon which decisions are based. Plate 3.1 illustrates where the options appraisal process sits within National Grid's wider approach to project development and delivery.



Plate 3.1 National Grid's approach to project development and delivery

- 3.3.3 At each stage in the options appraisal process, transparent methods have been used to inform decision-making. This has included technical inputs from engineers and environmental consultants to inform the decisions and design. The appraisal has drawn on data and evidence collected from both desk-based studies and site visits. Decision-making has also taken account of feedback from both prescribed bodies and the local community through an extensive programme of engagement and consultation.
- 3.3.4 Throughout the development of the Proposed Project, decisions and assumptions made previously have been subject to periodic challenge and review as part of the iterative design and engagement process. **Application Document 7.3 Design Development Report** identifies and explains key design decisions that have been considered in light of new or additional information received during the design evolution of the Proposed Project.
- 3.3.5 The following sections describe the main alternatives considered at each stage of the Proposed Project's development, and the environmental, socio-economic, technical, and cost factors that have been taken into account.

3.4 Supporting Documents

- 3.4.1 The evolution of the Proposed Project is set out in **Application Document 7.3 Design Development Report**. Throughout the evolution of the Proposed Project a number of documents have been prepared to provide the basis for consultation and to demonstrate that National Grid have taken into account the consideration of various alternatives to achieve the network reinforcement, in deciding upon the Proposed Project. This chapter summarises the main alternatives that were considered in reaching those decisions and the documents listed in
- 3.4.2 Table 3.1 should be referred to for more detailed information on the approach to and evolution of the Proposed Project.

Table 3.1 Supporting documents

Document	Description
Application Document 7.2 Strategic Options Report Backcheck Report	Explains why the Proposed Project is needed and the strategic options considered.
Application Document 8.1 Corridor Preliminary Routeing and Substation Siting Study (October 2022)	Explains how the routeing and siting of the Proposed Project was undertaken and the reasons for the selection of the emerging preferences, which were consulted upon during non-statutory consultation.
Application Document 8.2 Options Selection and Design Evolution Report (October 2023)	Explains how the preferred options were selected and how the design of the Proposed Project evolved from non-statutory consultation to the Proposed Project as consulted upon at statutory consultation.
Application Document 7.3 Design Development Report	Explains how the design process was conducted and how the design evolved from the selection of the preferred strategic proposal to the Proposed Project as applied for.

3.5 Alternatives Considered at the Strategic Proposal Stage

- 3.5.1 A range of strategic options that might address the network reinforcement needs were identified and appraised at a high level. These appraisals considered the likely environmental and socio-economic effects, technical issues, and costs that would be associated with each strategic option. The network performance of each strategic option was also modelled to determine the benefits. The appraisal and modelling results informed judgements regarding the relative merits of the options and ensured that the final strategic proposal would meet National Grid's statutory duties under the Electricity Act (HM Government, 1989), including the requirement to bring forward proposals that are efficient, coordinated and economical, and which have regard to the desirability of preserving amenity and which would balance all relevant considerations including compliance with the relevant planning policies.

Identifying the Need for the Proposed Project

- 3.5.2 The needs case for the Proposed Project is summarised below and provided in more detail in **Application Document 7.2 Strategic Options Backcheck Report**.
- 3.5.3 The Proposed Project is needed because the existing electricity transmission network does not have enough capability to reliably and securely transport all the new energy expected to be connected to the network in the future, while working to the required standards.
- 3.5.4 The way electricity is generated in the UK is changing rapidly, with the country transitioning to more secure, cheaper, and cleaner forms of energy such as new offshore windfarms. This is a result of the UK Government's commitment to net zero by 2050 and the delivery of up to 50 GW of offshore wind energy by 2030.

- 3.5.5 The energy industry is key to this transition, from developing renewable energy generation, to upgrading the existing electricity transmission network, enabling other sectors to decarbonise, and enabling communities across the country to benefit from clean energy.
- 3.5.6 As part of this, the electricity transmission network is undergoing its largest overhaul in generations, with more than five times the amount of transmission infrastructure built in the last 30 years in the UK needed to be delivered in the next seven years. National Grid has a key part to play in this work, which is known as The Great Grid Upgrade. The Proposed Project is one of the projects being delivered to make sure the network is ready for the anticipated increase in supply and demand of electricity.
- 3.5.7 The existing transmission network infrastructure in East Anglia and the south-east of England was not originally designed to accommodate the large volumes of generation capacity that is planned to connect to the network in these areas. The network in and between East Anglia and the south-east of England therefore needs reinforcing for four main reasons:
- the existing transmission network was not designed to transport electricity from where it is increasingly being generated (largely offshore);
 - the growth in offshore wind, interconnectors and nuclear power means that more electricity will be generated in the years ahead than the current network is able to reliably transport;
 - as a country, electricity demand is forecast to at least double by 2050, increasing the amount of energy needed to be transported to homes and businesses; and
 - upgrading the existing network as it is today (such as through replacing cables to carry more power) will not be enough to meet the increasing need for electricity whilst operating to required standards.
- 3.5.8 The Proposed Project is just one of several electricity network reinforcements that are needed to ensure the electricity transmission network is fit for the future.

Strategic Options Considered for the Proposed Project

- 3.5.9 Following the identification of the need for the network reinforcement to connect into the Sizewell area in East Anglia and into the South East of England, four alternative strategic options were appraised:
- SL1 – Sizewell Area to Sellindge area subsea, approximately 180 km;
 - SL2 – Sizewell Area to Richborough area subsea. approximately 120 km;
 - SL3 – Sizewell Area to Canterbury area subsea, approximately 120 km; and
 - LL 1 – Sizewell Area to Canterbury area onshore, approximately 220 km.
- 3.5.10 The location of each Strategic Option is illustrated on Plate 3.2.
- 3.5.11 As part of the strategic optioneering for the Proposed Project, National Grid considered the: technology options available for each potential Strategic Option for transmission system reinforcement, environmental and socio-economic constraints relevant to each option, and the lifetime costs of each technology option as well as the initial capital cost.
- 3.5.12 Two alternative technology options were considered for the three offshore options: high-voltage direct current (HVDC) subsea cable and alternating current (AC) subsea cable.

- 3.5.13 For the onshore option, four alternative technology options were considered: overhead line (OHL), underground AC cables, Gas Insulated Lines (GIL), and onshore HVDC.
- 3.5.14 The Strategic Options were also assessed as to whether they offer any material additional system benefits for the transmission system beyond meeting the identified reinforcement need. Such additional benefits are considered because some degree of futureproofing may negate the need for further network reinforcement works in the near future.

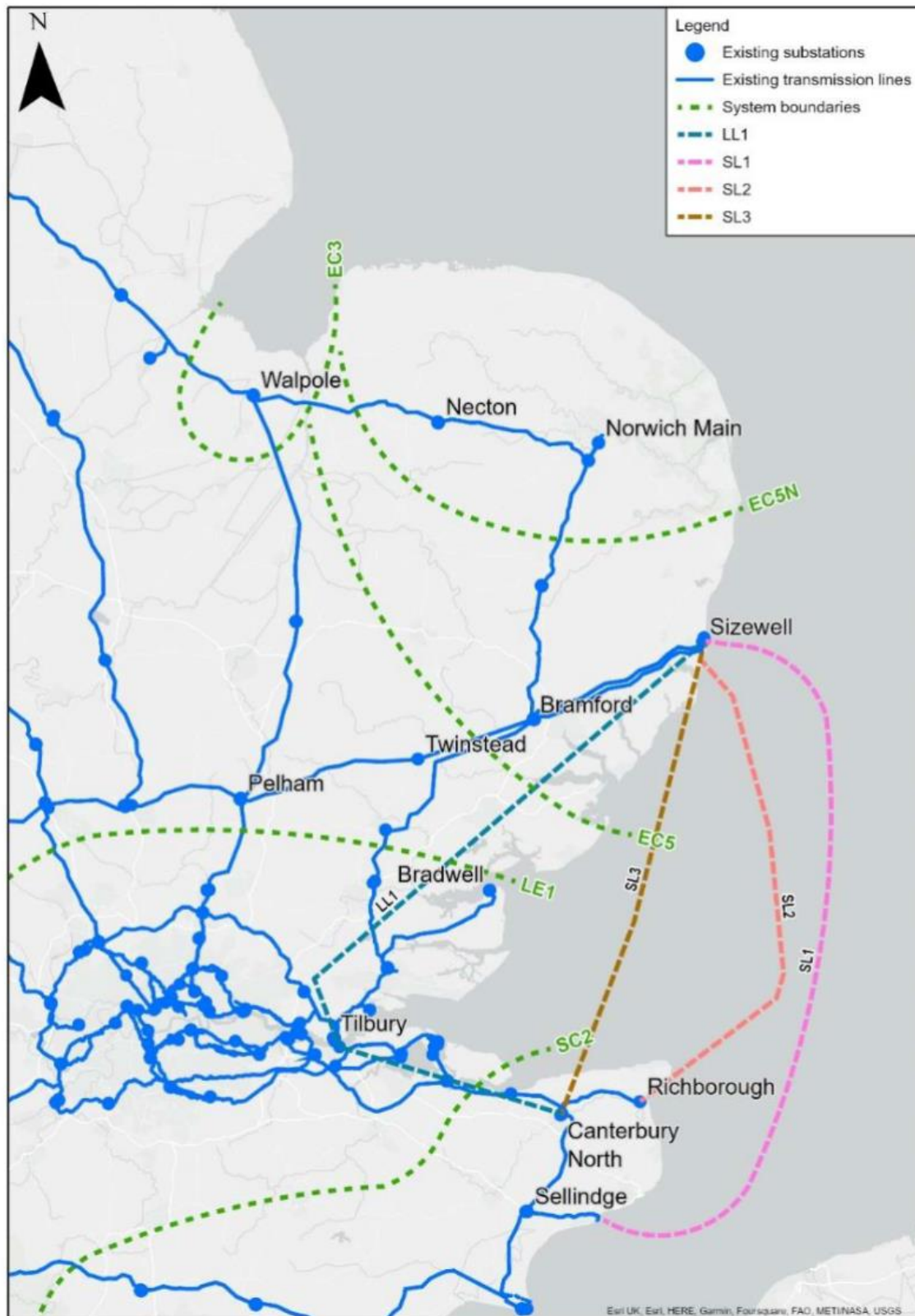


Plate 3.2 Location of Strategic Options considered for the Proposed Project

3.5.15 The assessment of the options concluded that option SL2 (Sizewell area to Richborough area subsea) would best balance overall technical, cost, environmental,

and socio-economic considerations. The key factors that influenced this decision included:

- Option LL1 (Sizewell to Canterbury area onshore) would have the lowest capital cost connection, but with a higher lifetime cost than the offshore HVDC solutions. Option LL1 would be subject to increased costs for crossing of the River Thames (likely by tunnel) and for any underground cable sections.
- None of the environmental and socio-economic impacts of the remaining offshore options (SL1, SL2 and SL3) were considered to be issues that could not be mitigated with careful consideration of routeing and use of appropriate technologies to overcome specific constraints, as is consistent with the National Policy Statements (NPSs).
- The lowest cost subsea option was equal between options SL2 and SL3 (a connection from Sizewell Area to Richborough area or Canterbury area over a distance of 145 km via a 2000 MW Voltage Source Converter (VSC) HVDC connection).
- From an environmental and socio-economic perspective, option SL2 was preferred over option SL3 due to the marine constraints off the north Kent coast and onshore siting opportunities close to existing overhead line at Richborough.

3.5.16 The following sections summarise the environmental and socio-economic appraisal outcomes that were considered for alternative strategic options.

Sizewell Area

3.5.17 The coastal areas are part of the Suffolk Coasts and Heaths AONB/National Landscape, and the Suffolk Heritage Coast extends along the whole coastline within the Sizewell area. The existing Sizewell substation is within both designations.

3.5.18 Onshore at Sizewell, the Sandlings Special Protection Area (SPA), Leiston to Aldeburgh Site of Special Scientific Interest (SSSI), the Alde-Ore and Butley Estuaries Ramsar, SPA and Special Area of Conservation (SAC) are located to the south. The Minsmere-Walberswick Ramsar, SPA and SAC, Minsmere – Walberswick Heaths and Marshes SSSI and Sizewell Marshes SSSI are located to the north, a large proportion of which is also designated as a Royal Society for the Protection of Birds (RSPB) reserve. Orford Ness National Nature Reserve (NNR) which is owned by the National Trust is located further to the south.

3.5.19 There are a number of proposed developments in the Sizewell area including the proposed Sizewell C nuclear power station, the East Anglia ONE North Offshore Wind Farm and the East Anglia TWO Offshore Wind Farm proposed by Scottish Power Renewables (SPR), which included a proposed new substation at Friston, and two National Grid Ventures (NGV) Interconnector projects, LionLink (formally known as EuroLink) and Nautilus (though noting this project is now more likely to connect into the Isle of Grain).

3.5.20 The area is populated with the small settlements of, Aldeburgh, Saxmundham, Leiston, Knodishall, Friston, Blaxhall, Tunstall, Chillesford and Sudbourne.

3.5.21 It was considered likely that significant effects on the designated sites for nature conservation could be avoided or mitigated through construction techniques. Due to the extent of the National Landscape (at the time referred to as an Area of Outstanding

Natura Beauty, or AONB), setting effects of a converter station or substation were considered likely to be a principal consideration.

- 3.5.22 In addition, as there are several proposed developments in the vicinity of Sizewell and the settlements of Leiston and Friston it was considered that cumulative effects would be a key consideration.

Sellindge Area

- 3.5.23 Thanet Coast and Sandwich Bay SPA, Ramsar and SAC are located along the north and east coasts of Kent with the Swale SPA and Ramsar sites to the far northwest. Dungeness, Romney Marsh and Rye Bay SPA and Ramsar and Dungeness SAC sites are present along the south Kent coast, though all could be avoided except the Romney Marsh and Rye Bay SPA which is unlikely to be avoidable.
- 3.5.24 Overall, the area is relatively sparsely populated but there are areas of higher population density around the settlements of Canterbury and Ashford and along the coastal strip including Herne Bay, Margate, Ramsgate, Deal, Dover, and Folkstone.
- 3.5.25 Sellindge substation is located adjacent to the M20 and the High Speed 1 (HS1) corridor. The siting of a converter station and substation close to the existing substation would be in keeping with existing infrastructure in this locality. The existing substation is located within Flood Zone 3 however there are areas of Flood Zone 1 away from the East River Stour Valley where a new substation and converter station could be located.
- 3.5.26 Making landfall anywhere other than the south Kent coast would likely require a long section of cable route through the Kent Downs AONB/National Landscape.
- 3.5.27 There is designated Heritage Coast within this area at Dover and Folkstone which was considered to be avoidable, and the Royal Military Canal Scheduled Monument is located in this area. This latter designation would need to be crossed with a landfall on the south Kent coast; however, should standard trenchless construction techniques be used it was considered likely that any impacts on this designation could be avoided.

Canterbury Area

- 3.5.28 This area includes the settlement of Canterbury which includes the World Heritage Site of Canterbury Cathedral, St. Augustine's Abbey, and St. Martin's. There is a large area of Ancient Woodland to the west and north of Canterbury, which is contiguous with Blean complex SAC and West Blean and Thornden Woods Site of Special Scientific Interest (SSSI), with very limited opportunity to avoid all three if a landfall on the north Kent coast were made, in particular when considered in conjunction with other constraints. The Stodmarsh Complex of protected sites is located to the east of Canterbury and together with the existing settlement pattern in this locality could constrain potential route options.
- 3.5.29 Although Canterbury Substation falls within Flood 3, within the Canterbury area, there are areas of Flood Zone 1, away from the Great Stour River Valley where a new substation and converter station would need to be located. Due to the extent of development around Canterbury Substation there are limited opportunities to site a converter station and substation close by.
- 3.5.30 Coastal designated sites include The Swale SPA/Ramsar/SSSI and Thanet Coast and Sandwich Bay SPA/Ramsar and Thanet Coast SAC. When considered individually these designations are avoidable, however, when considered in-combination with other constraints avoidance would be unlikely. The former of these designations is designated

for both breeding and over wintering populations of bird species, therefore the timing of cable installation was considered to be a principal consideration. Saltwater Levels and Blean Woods RSPB Reserves are located to the northwest of Canterbury and, in combination with other constraints, were considered to be a principal consideration.

- 3.5.31 The main settlements in this area include Canterbury, Whitstable, and Herne Bay. The Kent Downs National Landscape is located to the south of Canterbury but was considered likely to be avoidable. The area at Canterbury has a large amount of the Best and Most Versatile (BMV) agricultural land and in addition to this a large amount of high value agricultural land including orchards and vineyards.

Richborough Area

- 3.5.32 This area is located close to the east Kent coast. The existing Richborough substation is located within Richborough Energy Park which contains similar infrastructure and the immediate area around the substation and existing overhead line is sparsely populated.
- 3.5.33 The majority of the coastline at Richborough is designated as Thanet Coast and Sandwich Bay SPA and Sandwich Bay SAC and where there are gaps in these designations there is a denser settlement pattern at Deal and Ramsgate. The Stodmarsh designated sites are located to the west of Richborough, though likely to be avoidable.
- 3.5.34 A large proportion of the area is sparsely populated; however there is a denser network of settlements around the coast including Herne Bay, Birchington, Margate, Broadstairs, Ramsgate, Sandwich, and Deal. Less developed sections of coast include areas to the west of Birchington-on-Sea and to the south of Cliffsend, including Pegwell Bay and Sandwich Bay.
- 3.5.35 There are large areas of Flood Zone 2 and 3 within the study area associated with the low-lying coastal marshes and the River Stour. However, the north-eastern part of the study area (the historic Isle of Thanet) has more extensive areas of Flood Zone 1.
- 3.5.36 There is a large proportion of high value agricultural land within the area associated with vineyards and orchards.

Offshore Environment

- 3.5.37 Offshore there are a number of designated sites including the Outer Thames Estuary SPA, Margate and Long Sands SAC, the Southern North Sea SAC and the Goodwin Sands, Kentish Knock East, and Orford Inshore Marine Conservation Zones (MCZs). Whilst the Outer Thames Estuary SPA is likely to be unavoidable, it is likely that impacts could be managed through timing or construction practices and therefore this site was not considered to be a barrier to future development. Likewise, the Southern North Sea SAC is designated for harbour porpoise (*Phocoena phocoena*), and it is expected that any potential effects could be managed through timing or construction practices. Margate and Long Sands SAC was a principal consideration due to the potential for permanent habitat loss associated with cable crossings and protection; however, this site is avoidable. The offshore MCZs are avoidable when considered in isolation. Coastal designations include the Thanet Coast MCZ/SAC, Thanet Coast and Sandwich Bay SPA/Ramsar, Sandwich Bay SAC, Orford Ness – Shingle Street SAC, Alde-Ore Estuary SPA/Ramsar, Minsmere-Walberswick SPA/Ramsar and Minsmere to Walberswick Heaths and Marshes SAC/SSSI, and Leiston to Aldeburgh SSSI. Whilst it was considered unlikely that some degree of interaction with one or more of these sites

would be avoidable, through appropriate routeing and mitigation it was considered likely that significant effects could be avoided.

- 3.5.38 The Outer Thames Estuary is a highly mobile environment. Mobile sediment is an important consideration as cable-spanning or over burial could result in damage or potential operational performance issues. Within the area in the outer Thames there are extensive areas outside of the main shipping channels which are very shallow, principally Kentish Flats, Goodwin Sands, and Sunk Sand. These shallow waters, whilst not precluding placement of transmission infrastructure, are a consideration for installation methods, and particularly any rock placement required for crossings of other infrastructure. This was considered likely to be a determining factor as any rock placement that would result in a reduction of water depth of 5% or more is generally considered to be unacceptable. Within the area it is unlikely that cable crossings could be avoided within the shallow waters of Kentish Flats with a north Kent landfall; however, it was considered possible to avoid shallow water crossings at Goodwin Sands, should an east Kent coast landfall be made.
- 3.5.39 The primary marine users within the area include shipping and navigation and fishing, with the most significant port area being the Port of London Authority (PLA). However, the Port of Ramsgate is also present and the dredged channel for the Ports of Harwich and Felixstowe extend into the area. The main shipping channels into the Port of London include Princes, Black, and Borrow Deep which converge into the Yantlet Channel that extends up the inner Thames. Due to the shallow and mobile nature of the seabed within the Thames Estuary a number of these channels are dredged to facilitate access for the larger vessels along with channels into both Ramsgate, Harwich and Felixstowe. Shipping channels, in particular those that are dredged, are considered to be a primary determining factor as dredging could result in the exposure and potential damage to a transmission cable.
- 3.5.40 Within the area other marine infrastructure is present including the Kentish Flats, Thanet, London Array, Greater Gabbard and Galloper offshore wind farms and export cables, BritNed and Nemo Link interconnectors and the proposed NeuConnect and GridLink interconnectors. Whilst the offshore wind farms are avoidable, it was considered unlikely that crossings of cables, could be avoided entirely. As discussed above, where these crossings cannot be avoided in shallow waters, such as Kentish Flats, this is a principal consideration due to the potential reduction in water depth. With the exception of the Outer Thames Estuary SPA, Southern North Sea SAC and cable crossings, most constraints in the marine area were considered avoidable in isolation; however, when considered in combination avoidance may not be possible.

Onshore Environment

- 3.5.41 There are a number international and nationally designated sites for nature conservation within the study area that extends across Suffolk, Essex and Kent, these include, Sandlings, Deban Estuary, Stour and Orwell Estuaries, Colne Estuary, Blackwater Estuary, Crouch & Roach Estuaries, Benfleet and Southend Marshes, Thames Estuary & Marshes, Medway Estuary & Marshes and The Swale SPAs and Alde-Ore & Butley Estuaries and Blean Complex SACs.
- 3.5.42 Canterbury Cathedral, St. Augustine's Abbey and St. Martin's Church word heritage site is located within Canterbury and there are concentrations of scheduled monuments throughout the study area including within Colchester and within settlements along the Thames Estuary.
- 3.5.43 The Dedham Vale National Landscape is unlikely to be avoidable.

- 3.5.44 There are a number of large settlements within this study area, including Ipswich, Colchester, Felixstowe; Grays/Tilbury; Gravesend, Greater London Urban Area; Basildon, Rochester, Whitstable, Maidstone, Canterbury.
- 3.5.45 BMV land is scattered throughout the study area with concentrations to the northeast of Colchester, to the north of Southend-on-Sea and within Kent. It is unlikely that BMV land could be avoided.
- 3.5.46 There are areas of Flood Zone 3 that are largely contiguous with the estuaries including Deben, Stour and Orwell, Colne, Blackwater, Crouch & Roach, Thames, Medway and The Swale. It is unlikely flood zone 3 could be avoided.

3.6 Alternatives Considered at the Options Identification and Selection Stage

- 3.6.1 Having identified the preferred Strategic Option, National Grid undertook a Corridor Preliminary Routeing and Substation Siting Study (CPRSS). How National Grid approached routeing and siting of the Proposed Project is set out in detail in **Application Document 8.1 Corridor Preliminary Routeing and Substation Siting Study (October 2022)**.
- 3.6.2 The following sections set out the preferred landfall areas of search, converter site option areas and terrestrial and marine route corridors that were selected for the Proposed Project. The reasons for the selection and the alternatives considered are also set out.

Suffolk Onshore Scheme

Landfall areas of search

- 3.6.3 On the East Anglian coast in Suffolk, five broad landfall areas of search were identified, which are illustrated on **Application Document 6.4.1.3.1 Suffolk Landfall Areas of Search**. The southernmost area of search (S1) was identified to the south of Aldeburgh, north of the Rivers Alde and Ore. A second area of search was identified between Aldeburgh and Thorpeness (S2). A third area of search was identified between Thorpeness and Sizewell (S3) and this area was further split down into two sub areas; south (S3) and north (S3N). A fourth area was identified at Sizewell (S4) and the northernmost area of search was identified north of Sizewell, to the south of Minsmere (S5).
- 3.6.4 The option identification and selection stage identified landfall area of search S2 as the preferred landfall. The key factors that influenced this decision included:
- Fewer constraints and cable crossings on the marine approach compared to those of landfall areas of search S3, S3N, and S4.
 - Fewer technical constraints for the onward terrestrial cable corridor associated with watercourse crossings, interactions with other proposed developments, and construction access, than were present for landfall areas of search S1, S3, S3N, and S4.
 - Whilst all landfall areas of search except for S3N would cross sites designated for nature conservation, the use of trenchless construction techniques was identified as

a method that could be adopted to avoid direct effects, subject to confirmation through further studies and ground investigations.

- 3.6.5 The following sections summarise the appraisal outcomes and the alternative landfall areas of search that were considered.
- 3.6.6 All five landfall areas of search are within a National Landscape, hereafter referred to as the Suffolk Coasts and Heaths Area of Outstanding Natural Beauty (AONB)/National Landscape which was unavoidable within the routeing and siting study area.

Landfall area of search S1

- 3.6.7 Landfall area of search S1 is located to the south of Aldeburgh and the north of the Alde and Ore River. The Alde and Ore River is located adjacent to the south of this landfall area of search and is designated as the Alde-Ore Estuary Ramsar, SPA and SSSI and the Alde-Ore & Butley Estuaries SAC. These designations were avoidable within this landfall area of search; however, they would need to be crossed by any onward terrestrial route from this landfall. The whole of this landfall area of search is within Flood Zones 2 and 3 and construction within the flood zone could not be avoided. Access to this landfall area of search was also limited and would likely need to be taken through Aldeburgh.

Landfall area of search S2

- 3.6.8 Landfall area of search S2 is located to the north of Aldeburgh and south of Thorpeness. The majority of the landfall area of search is designated as Leiston – Aldeburgh SSSI and North Warren RSPB Reserve. These designations were unavoidable within this area of search, but the use of trenchless construction techniques (subject to confirmation through further studies and ground investigations) could be used to reduce potential significant effects. The majority of the landfall area of search is within Flood Zone 2 and 3; however, depending on the installation technique, these zones were considered potentially avoidable as trenchless techniques could be used to avoid working directly within Flood Zone 2 and 3.

Landfall area of search S3

- 3.6.9 Landfall area of search S3 stretches from Thorpeness in the south to Sizewell in the north and was broadly split into two: S3 in the south from Thorpeness to Beach View Holiday Park and S3N to the north of Beach View Holiday Park to Sizewell Gap Road. The whole of the intertidal area within S3 is designated as Leiston – Aldeburgh SSSI, however within this landfall area of search this designation is very narrow and likely to be avoidable with the use of trenchless construction techniques (subject to confirmation through further studies and ground investigations). A section of North Warren RSPB Reserve is located in the south of this landfall area of search but was likely to be avoidable. S3N is wholly outside of the Leiston – Aldeburgh SSSI. There are small areas of Flood Zone 2 and 3 across both S3 and S3N but these areas are localised and were considered likely to be avoidable.

Landfall area of search S4

- 3.6.10 Landfall area of search S4 is located to the north of Sizewell Gap Road at Sizewell. There are no terrestrial designations for ecological conservation within the intertidal

area; however, the landfall area of search was significantly constrained by the existing Sizewell B Nuclear Power Station.

Landfall area of search S5

- 3.6.11 Landfall area of search S5 is located to the north of existing Sizewell Nuclear Power Station and south of Minsmere New Cut drainage channel. The whole of the intertidal area and immediate terrestrial area is designated as Minsmere-Walberswick Ramsar and SPA, Minsmere to Walberswick Heath & Marshes SAC and SSSI and Minsmere RSPB Reserve. These designated sites were unavoidable within this area of search, but the use of trenchless construction techniques (subject to confirmation through further studies and ground investigations) could be used to reduce potential significant effects. A second crossing of the Minsmere to Walberswick Heath & Marshes SSSI and Minsmere RSPB Reserve would also be required for any onward terrestrial routing. The majority of this landfall area of search is within Flood Zones 2 and 3 and construction within the flood zone could not be avoided. Access to this landfall area of search was also very limited and likely to require a long temporary access road.

Summary of relevant marine alignments

- 3.6.12 Whilst the immediate offshore landfall area of search at S1 and S2 is outside of the Southern North Sea SAC all marine alignments to the landfall areas of search in Suffolk would need to cross both the Southern North Sea SAC and the Outer Thames Estuary SPA.
- 3.6.13 The marine approaches to both landfall area of search S1 and S2 were relatively unconstrained.
- 3.6.14 The marine alignment to landfall area of search S3 was significantly constrained due to the presence of rocky reefs comprised of cemented limestone rich shells in the immediate offshore environment. This constraint is reduced at landfall S3N.
- 3.6.15 The marine alignments to landfall areas of search S4 and S5 were more constrained than the other options due to the additional number of offshore crossings that would be required and the potential for interaction with the proposed Sizewell C development.

Summary of appraisal outcomes

- 3.6.16 Landfall area of search S1 was relatively unconstrained from a marine approach perspective but terrestrially had access and flood risk constraints and constraints associated with the onward terrestrial routing.
- 3.6.17 Landfall area of search S2 was relatively unconstrained from a marine approach perspective but terrestrially crosses a wide area designated as SSSI and RSPB reserve.
- 3.6.18 Landfall area S3 was significantly constrained from a marine approach perspective due to the presence of rocky reefs and, in the immediate offshore, by the proposed export cable route from the proposed East Anglia One North and Two Offshore Wind Farm Projects. Onshore it was considered likely that the effects on the SSSI and RSPB reserve could be reduced through the use of trenchless installation techniques (subject to confirmation through further studies and ground investigations). Offshore the approach to landfall S3N was less constrained by the rocky reef but other existing and

proposed offshore infrastructure on the approach still posed a constraint. Terrestrially, S3N was relatively unconstrained environmentally.

- 3.6.19 Landfall area of search S4 was significantly constrained both on the offshore approach and terrestrially by the presence of the existing Sizewell B Nuclear Power Station and the proposed Sizewell C Nuclear Power Station development.
- 3.6.20 Landfall area of search S5 was constrained on the marine approach by the large number of offshore cable crossings and the potential interaction with the proposed Sizewell C Nuclear Power Station development and onshore by both European and nationally designated sites for nature conservation.
- 3.6.21 These factors were considered when selecting landfall area of search S2 as the preferred option to take forward.

Converter Station Site Option Areas

- 3.6.22 The main search parameter for the converter station site option areas was that they should be within approximately 5 km of the network connection point, as a distance greater than this would trigger the need for reactive compensation equipment on the network resulting in additional land take and cost. This search parameter was, however, used as a guide, so as not to discount potentially suitable sites at a slightly greater distance where the benefits might outweigh the additional land take and cost.
- 3.6.23 Within Suffolk, the needs case identified that the network connection point needed to be in the Sizewell area, so all four strategic options were based on this. Three potential points of connection were identified and appraised as part of the routeing and siting appraisal. These connection points were: the existing Sizewell B substation or the new Sizewell C substation (part of the proposed Sizewell C Nuclear Power Station Project) the proposed Friston substation (forms part of the proposed SPR East Anglia One North and East Anglia Two Offshore Wind Farm Projects) or a new connection point directly onto the existing 400 kV overhead lines close to Sizewell. These connection points are illustrated on **Application Document 6.4.1.3.2 Suffolk Network Connection Points**.
- 3.6.24 Nine converter station site option areas were identified several of which were in the search parameters (5 km) for more than one connection point. There were four site option areas within the 5 km search parameter for a connection to the Sizewell substations (option areas A, B, C and D), seven within the 5 km search parameter for the proposed Friston substation (option areas B, C, D, E, G and H) and six within the 5 km search parameter for a new connection onto the existing 400 kV overhead lines (option areas B, D, E, F, H and I). These option areas are illustrated on **Application Document 6.4.1.3.3 Suffolk Converter Site Option Areas**.
- 3.6.25 Converter site option Area E, was initially identified as preferred in the preliminary findings. The key factors that influenced this decision included:
- the option area was outside of designated sites;
 - a shorter length of onshore HVDC and HVAC cable route would be required compared to some of the other areas considered;
 - the availability of access to the public highway and avoidance of routeing construction traffic through settlements;
 - reducing impacts on future development plans on the eastern side of the A12;
 - the need to connect to the existing network at the proposed Friston substation; and

- opportunities to utilise and build on existing natural screening within the option area.

3.6.26 The following sections summarise the appraisal outcomes and the alternative converter site option areas that were considered.

Converter site option Area A

3.6.27 Area A is located to the north of Kenton and Goose Hill, to the southeast of Eastbridge. The Area is wholly within the Suffolk Coast and Heaths AONB; however it was identified as a potential Area, as it is close to the existing Sizewell B Nuclear Power Station and adjacent to the proposed Sizewell C Nuclear Power Station, therefore, providing an opportunity to keep energy infrastructure close together. The Area is adjacent to the Minsmere-Walberswick Ramsar and SPA, Minsmere to Walberswick Heaths & Marshes SAC and SSSI and Minsmere RSPB Reserve.

Converter site option Area B

3.6.28 Area B is located to the east of Leiston and west of the existing Sizewell B Nuclear Power Station. The Area is wholly within the Suffolk Coast and Heaths AONB; however, it was identified as a potential Area as it is adjacent to the existing Sizewell B Nuclear Power Station and existing overhead lines, therefore, providing an opportunity to keep energy infrastructure close together. Sandlings SPA, Leiston – Aldeburgh SSSI and North Warren RSPB Reserve border this Area to the south.

Converter site option Area C

3.6.29 Area C is located on the site of the former Leiston Airfield and is bordered to the south by Harrow Lane to the northwest by Theberton Woods. Moat Road runs west to east through the northern half of the Area.

Converter site option Area D

3.6.30 Area D is located to the west of Leiston and is bordered to the northwest by the B1119 and Abbey Road and to the west by the Hundred River. There is a small parcel of Ancient Woodland (Buckles Wood) located within the north of this Area adjacent to Buckleswood Road. There is an area of Flood Zone 2 and 3 on the far western boundary of the Area associated with the Hundred River.

Converter site option Area E

3.6.31 Area E is located to the south of Knodishall and is bounded to the east by the Suffolk Coasts and Heaths AONB, to the south by the A1094 Aldeburgh Road, and the B1069 (Snape Road) runs southwest to northeast through the centre of the Area. There is a small area of Ancient Woodland at Great Wood located on the eastern edge of the Area and Grove Wood Ancient Woodland is located adjacent to the northwest corner of the Area.

Converter site option Area F

3.6.32 Area F is located to the southeast of Sternfield and west of Friston. An unnamed road linking Church Hill in the north to the A1094 in the south borders the west of the option area and the B1121 borders the Area to the north and northeast. Red Lane and Kiln

Lane run west to east through the northern half of this Area. The existing 400 kV overhead lines run southwest to northeast through the centre of this Area. The Suffolk Coast and Heaths AONB is located to the south of the Area, south of the A1094.

Converter site option Area G

- 3.6.33 Area G is located the southwest of Saxmundham and is bordered to the east by the A12 and the west by Deadmans Lane.

Converter site option Area H

- 3.6.34 Area H is located to the west of Gromford and is bounded to the south and east by a railway line the west by Langham Road, Racewalk Covert is located to the north of the site. Snape RSPB Reserve is located to the south of the Area, south of the railway line.

Converter site option Area I

- 3.6.35 Area I is located to the east of Lower Hacheston and is bounded to the north by the A12. The existing 400 kV overhead lines and railway line cross the far southeastern boundary of the Area. A small area of Flood Zone 2 and 3 is located in the northeastern corner of option the Area, associated with the River Ore.

Summary of appraisal outcomes

Network connection point

- 3.6.36 Of the possible connection points in the Sizewell area, only the Sizewell B substation is currently in existence; all the other proposed connection points would require the installation of a new substation, either proposed through another project in the area, or installed as part of this Proposed Project. Connecting into the existing Sizewell B or consented Sizewell C substation would require taking over two of the super grid transformer (SGT) circuits feeding the existing Leiston 132 kV substation by connecting into the 400 kV circuits feeding the SGTs. This would require the installation of two new 400/132 kV SGTs in the converter station site with new 400 kV cables connecting into the existing Sizewell B or consented Sizewell C substation and new 132 kV cables connecting the SGTs in the converter station with the Leiston 132 kV substation. The 400 kV cable route to the substation would require either using the corridor allocated to the existing 132 kV connection or routeing through Sizewell Marshes SSSI. A connection into either the existing or proposed Sizewell substation would also need to consider the works to construct the proposed Sizewell C Nuclear Power Station as the programme of works would overlap. This could have programme implications for the delivery of this Proposed Project in line with the needs case and to meet the required connection date.
- 3.6.37 At the time of the routeing and siting appraisal the Development Consent Order (DCO) that would deliver Friston substation (which forms part of the Proposed SPR East Anglia One North and East Anglia Two Offshore Wind Farm Projects) was advanced in the consenting process and it has subsequently received development consent.
- 3.6.38 A connection into the existing 400 kV overhead lines would require a new substation to be built. This was assessed on the basis that it would be combined within the converter station site Areas and would also require either the existing overhead lines to be

diverted into and out of the new substation or a cable route (where economic and efficient) from a new substation to the existing overhead lines with a cable sealing end compound located adjacent to the overhead lines.

- 3.6.39 The significant engineering and environmental constraints associated with a connection into either the existing or proposed Sizewell substations meant that these options were not preferred. Connecting to a new connection point in the area, with an associated additional substation, was also not preferred as there would be no environmental or socio-economic, technical, or economic benefit over connecting into an existing (where possible) or proposed substation. The proposed Friston Substation (which is now consented) was therefore identified as the preferred connection point.

Converter Site Option Areas

- 3.6.40 Converter site Areas A and B are both within the Suffolk Coasts and Heaths AONB but offered opportunities to keep existing and proposed energy infrastructure together. Both areas are also within land which is being used as part of ecological mitigation areas for the proposed Sizewell C Nuclear Power Station. As set out above a connection from either of these sites into either the existing or proposed Sizewell substation was significantly constrained and a connection into either the proposed Friston substation or a new connection into the existing 400 kV overhead lines would likely be required. Site Area A was not identified as a site suitable for either a connection into the proposed Friston substation or the existing 400 kV overhead lines due to the distance from this Area to these connection points.
- 3.6.41 Converter site Area C was constrained by the existing access, however the development of the proposed Theberton bypass as part of the proposed Sizewell C development, would alleviate some of these constraints if developed in time.
- 3.6.42 Converter site Area D was considered constrained by planned future development plans to the north including the proposed Sizewell C rail head and poor site access along the existing road network that would require routeing of traffic through the settlement of Leiston.
- 3.6.43 Converter site Areas E and F both had good access from the A1094 but were considered constrained by the proximity to the Suffolk Coasts and Heaths AONB in terms of the potential for setting impacts.
- 3.6.44 Converter site option areas G and H were considered highly constrained by future development plans on the eastern side of the A12 constraining the ability to connect into either the proposed Friston substation and, in the case of Area H, a new connection point on the existing 400 kV overhead lines.
- 3.6.45 Converter site option area I was not identified for a Sizewell or a Friston connection due to the distance from this proposed connection point so the site would require a new connection point to be established. This option area was also constrained by the length of onshore cable that would be required to connect to any of the landfall areas of search, increasing the spread of potential temporary disturbance during construction.
- 3.6.46 Due to the existing and proposed energy development within the study area coupled with the proximity of the Suffolk Coast and Heaths AONB in this locality the environmental and socio-economic appraisal concluded that an underground HVAC connection would be preferred to an overhead line HVAC connection between the converter site options areas and any of the connection points.

- 3.6.47 These factors were considered when selecting converter site option Area E as the preliminary preferred option to take forward.

Route Corridors

- 3.6.48 Once the landfall areas of search and converter station site option areas had been identified, terrestrial route corridors between the two were developed. Corridors were developed that could connect each of the landfall areas of search to each of the converter station site option areas.
- 3.6.49 Within Suffolk this process resulted in 15 corridors being identified, some of which could be used for multiple landfall/converter station site option area permutations:
- five corridors from each of the five landfall areas of search to the four converter station site option areas that could connect into the existing and proposed Sizewell substations, these are illustrated on **Application Document 6.4.1.3.4 Suffolk Terrestrial Route Corridors – Sizewell Connection**;
 - five corridors from each of the five landfall areas of search to the seven converter site option areas that could connect into the proposed Friston substation, these are illustrated on **Application Document 6.4.1.3.5 Suffolk Terrestrial Route Corridors Friston Connection**; and
 - five corridors from each of the five landfall areas of search to the six converter station site options that could connect into the existing 400 kV overhead lines, these are illustrated on **Application Document 6.4.1.3.6 Suffolk Terrestrial Route Corridors – New Connection**.
- 3.6.50 The red corridor to converter site option Area E, was initially identified as preferred in the preliminary findings. The key factors that influenced this decision included:
- Fewer technical constraints for the onward terrestrial cable corridor associated with watercourse crossings, interactions with other proposed developments, and better construction access than the green, blue, purple, or orange corridors.
 - Avoiding a crossing of Alde-Ore Estuary Ramsar, SPA, and SSSI and the Alde-Ore & Butley Estuaries SAC on the green corridor, Sandlings SPA on the blue corridor, and the Minsmere-Walberswick Ramsar and SPA and Minsmere to Walberswick SAC on the orange corridor.
 - Whilst designated sites for nature conservation were potentially avoidable on the purple corridor the preference for landfall area of search S2, which connected with the red corridor, coupled with fewer overall constraints on the red corridor than the purple corridor, meant that, overall, the red corridor was identified as the emerging preference.
- 3.6.51 The following sections summarise the appraisal outcomes and alternative corridors considered.
- 3.6.52 Within Suffolk none of the corridors avoided designated sites. The Suffolk Coasts and Heaths AONB extends across the full extent of the routeing and siting study area and was therefore unavoidable for any of the 15 corridors that were identified and appraised. Whilst the routeing and siting study area was drawn to provide opportunities to avoid designated sites and constraints, the Suffolk Coast and Heaths AONB extends unbroken from Felixstowe and Harwich in the south to Kessingland in the north. It was not therefore possible to avoid this designation and meet the need case without a

significantly longer and indirect route that would not be in accordance with National Grid's statutory duties.

Green corridors

- 3.6.53 All three green corridors that connected with the southernmost of the five landfall areas of search S1, south of Aldeburgh, would require an extensive crossing of the Alde-Ore Estuary, which is designated as the Alde-Ore Estuary Ramsar, SPA and SSSI and the Alde-Ore & Butley Estuaries SAC. These corridors would also interact with the same designated sites around the settlements of Iken and Snape. A large proportion of the green corridors are also within Flood Zone 2 and 3 and would require the longest cable route within the Suffolk Coasts and Heaths AONB of all the corridors.

Red corridors

- 3.6.54 The three red corridors that connect to the landfall area of search S2, between Aldeburgh and Thorpeness would need to cross a section of the Leiston Aldeburgh SSSI as well as part of the North Warren RSPB Reserve. It was considered likely that trenchless construction techniques (subject to confirmation through further studies and ground investigations) could be used to avoid significant effects.

Blue corridors

- 3.6.55 The three blue corridors that connect into the southern part of the landfall area of search S3 between Thorpeness and Sizewell would need to cross a section of Sandlings SPA and the Leiston Aldeburgh SSSI and would likely require interaction with the proposed cable routes for the East Anglia One North and East Anglia Two Offshore Wind Farms Projects.

Purple corridors

- 3.6.56 The three purple corridors connecting into the northern part of this landfall area of search S3N, when considered in isolation, provided an opportunity to avoid sites designated for nature conservation but would entail interaction with the proposed Sizewell C Nuclear Power Station project.

Orange corridors

- 3.6.57 The three orange corridors connecting to the most northern landfall area of search S5, to the north of Sizewell would need to cross Minsmere-Walberswick Ramsar and SPA, Minsmere to Walberswick Heaths & Marshes SAC and SSSI, and Minsmere RSPB Reserve, and would entail significant interaction with the proposed Sizewell C Nuclear Power Station project.

Pinch points

- 3.6.58 Four pinch points were identified within the route corridors:
- The first was at a crossing of Leiston Road close to Aldeburgh Golf Course, which would be crossed by all three red corridors connecting to the landfall area of search S2.

- The second of these was located between the B1353 and Leiston Road and would require cable routes to cross the Sandlings SPA, the Leiston – Aldeburgh SSSI, and a section of the golf course, as well as having a pinch point at the crossing of Leiston Road. This pinch point would affect the three blue corridors connecting to landfall area of search S3.
- The third pinch point was to the south of Aldringham at the crossing of the Hundred River. This area is constrained by the Hundred River itself, the crossing of the B1353 and the B1122, and an area of woodland and properties. In addition, the cables for the East Anglia One North and Two Offshore Wind Farms are proposed to be routed through this same pinch point. This area would need to be routed through (depending on which converter station site Area was selected) by the three purple corridors connecting to landfall area of search S3N or by all three blue corridors connecting to landfall area of search S3 to avoid the second pinch point.
- The fourth pinch point was to the northwest of Leiston and is associated with the offsite works for the proposed Sizewell C Nuclear Power Station including an area that has recently been established for ecological mitigation measures related to the project. This area would need to be routed through (depending on which converter station Area is selected) by the three purple corridors connecting to landfall area of search S3N.

Suffolk Onshore Scheme Initial Preference

- 3.6.59 Significant engineering and environmental constraints associated with a connection into either the existing or proposed Sizewell substations meant that these options were not preferred. Connecting to a new connection point in the area, with an associated additional substation, was also not preferred as there would be no environmental or socio-economic, technical, or economic benefit over connecting into an existing (where possible) or proposed substation. The proposed Friston substation (which is now consented) was therefore identified as the preferred connection point.
- 3.6.60 Whilst a connection into the network at the proposed Friston Substation, with a converter site in option Area E, and the red corridor to landfall area of search S2, was initially identified as preferred, due to presence of terrestrial nature conservation sites it was identified that trenchless installation methods would be required to reduce potential impacts. As further survey work was required to confirm the feasibility of using trenchless techniques at this landfall it was considered prudent to also progress an alternative. This alternative was landfall area of search S3N and a connection to converter site Area E via the purple corridor with a connection back to the network through the proposed Friston substation.

Stakeholder Feedback and Option Refinement

- 3.6.61 Through engagement, Suffolk County Council and East Suffolk District Council encouraged National Grid to explore opportunities to coordinate with the interconnector projects being proposed by National Grid Ventures (NGV) in the area, namely the Nautilus Interconnector and the LionLink (formally known as EuroLink) Interconnector, which would require similar onshore infrastructure.
- 3.6.62 Coordination may mean a variety of things, from sharing of data and site survey information, sharing construction materials such as stone for temporary access tracks (if projects are constructed in sequence) through to physical co-location or even sharing of infrastructure. Whilst it is possible to share certain types of infrastructure, for example

car parks, accesses, and landscaping, the sharing of large-scale infrastructure would not necessarily realise benefits as there would be no reduction in the size of development or its footprint. National Grid has explored the concept of co-locating converter stations, sharing cable corridors and consolidating landfalls as part of the exploration of coordination. These elements of coordination are considered to reduce the potential spread of infrastructure through a rural environment, concentrating development in a single area. It could also allow for sharing some elements of infrastructure, such as temporary and permanent access, and allows for shared mitigation. This is explained in the following sections.

- 3.6.63 National Grid backchecked and reviewed all potential converter station site option areas that were identified independently through both NGV's non-statutory consultation for the Nautilus Project¹ and the routeing and siting option appraisal for the Proposed Project described above. This backcheck and review considered whether it was feasible for any of the converter Areas to accommodate up to three co-located converter stations and whether there were any additional sites that should be investigated/appraised further for co-location opportunities.
- 3.6.64 The landfall areas of search S2, between Aldeburgh and Thorpeness and S3 and S3N, between Thorpeness and Sizewell were revisited, along with the red, blue and purple cable corridors, to understand the feasibility of co-located landfalls and corridors.
- 3.6.65 Seven sites were identified as potentially offering opportunities for co-location, some of which aligned with the original converter station option Areas identified for the Proposed Project, and some that had not been previously considered. These are illustrated on **Application Document 6.4.1.3.7 Potential Coordinated Converter Station Sites – Routeing and Siting Stage**. An appraisal was undertaken of these sites in accordance with the National Grid options appraisal methodology described above. The sites were considered for their suitability to accommodate up to three converter stations projects developed in a coordinated, co-located manner, and also for their suitability to accommodate a single converter station project in a Sea Link-only scenario.
- 3.6.66 Following this backcheck Converter Site 1 and Site 3, were identified as the preferred options for the Proposed Project. Site 1 was within the original converter option Area E, whereas Site 3 was a new site for the Proposed Project, having originally been identified by NGV as part of the Nautilus site selection process. The key factors that influenced the selection of Site 1 remained unchanged from those set out above in relation to option Area E. The key factors that influenced the selection of Site 3 included:
- the site is outside of any designated sites and likely to be outside of the setting of the Suffolk Coasts and Heaths AONB;
 - good existing screening along the western and southern edges of the site which would limit intervisibility with the settlement of Saxmundham; and
 - both sites were well balanced in terms of the appraisal outcomes, therefore it was decided to consult on both options as part of non-statutory consultation to invite feedback that may help differentiate between the two options.

¹ At the time of routeing and siting, potential converter station sites for LionLink were not know only those for the proposed Nautilus Project. The outputs of the exploration of coordination and co-location with NGV fed into the routeing and siting that was subsequently undertaken for LionLink which they consulted upon in October 2022.

- 3.6.67 The following sections summarise the backcheck appraisal outcomes and alternative sites that were considered.

Site 1

- 3.6.68 Site 1 was contiguous with part of converter site Area E and offered good existing screening to the north of the site and good construction access to the strategic road network. It is close to the Suffolk Coast and Heaths AONB so setting was a consideration for this site. However, the site offered good opportunities for mitigation in keeping with the existing landscape character. This site also offered the shortest overall onshore cable route.

Site 2

- 3.6.69 Site 2 was contiguous with part of converter site Area F and whilst being located close to the strategic road network in terms of access, in terms of landscape character it is a very open landscape and development of a coordinated solution on this site would likely require substantial mitigation. Suffolk Coast and Heaths AONB is adjacent to the southern boundary of this site. The settlement of Sternfield is located to the northwest of the site, Church Common to the southwest of the site, and Friston to the east of the site.

Site 3

- 3.6.70 Site 3 was located further from the Suffolk Coast and Heaths AONB but in close proximity to the settlement of Saxmundham. There was good existing screening along the western and southern edges of the site, this along with the topography of the local area would limit the intervisibility between the settlement and the site. Access to this site is constrained and would need to be routed through the settlement of Saxmundham if taken off the B1119. An alternative opportunity does exist to take permanent construction access from the B1121. This would require construction of a permanent access route and a potential crossing of the River Fromus or the railway line.

Site 4

- 3.6.71 Site 4 was contiguous with part of converter site Area C and was located further away from the AONB and offers good existing screening and additional screen planting could be developed in keeping with the existing landscape character. Access to this site was challenging as it is accessed via small country roads; however, Site 4 did have the benefit of the proposed new link road being developed as part of the proposed Sizewell C Nuclear Power Station albeit the cumulative impact with this development would be a consideration. The site contains the former RAF Leiston Airfield, therefore this non-designated asset would need to be considered further if taken forward for development.

Site 5

- 3.6.72 Site 5 was located approximately 2.5 km from the Suffolk Coast and Heaths AONB at its closest point. There are smaller settlements that surround the site on the west, south and east, although intervening vegetation, particularly in the southern part of the site, would provide a degree of existing screening. The existing overhead lines are routed to the south of the site, and this was the closest of the proposed sites to the proposed Friston substation development. There are a number of non-designated assets within

the site which include potential extensive remains of a roman settlement and villa within the north of the site. Physical impacts to these assets could potentially be avoided if development were to take place in the southern part of the site. A small section of Flood Zones 2 and 3 are located along the eastern boundary of the site associated with the Hundred River although it was considered likely that these areas could be avoided. This site is located further from the strategic road network and routing construction traffic through settlements was considered unlikely to be avoidable.

Site 6

- 3.6.73 Site 6 was contiguous with converter site Area D and located approximately 1.5 km from the AONB at its closet point. The site is located to the west of the settlement of Leiston and north of the settlement of Knodishall. There are a number of woodland blocks and shelterbelts which did offer some opportunity for existing screening and integration of mitigation planting. There are a number of historical designated assets within the settlements of Leiston and Knodishall but these are well screened by existing vegetation surrounding the assets. Like Site 5 this site is located further from the strategic road network and routing construction traffic through settlements was considered unlikely to be avoidable.

Site 7

- 3.6.74 Site 7 was contiguous with part of converter site Area D and located within the Suffolk Coast and Heaths AONB adjacent to the existing nuclear power stations and the Galloper and Gabbard Offshore Windfarm substations as well as the proposed Sizewell C Nuclear Power Station. Whilst within the designated site, this site did offer the opportunity to keep energy development close together. The settlement of Leiston is located to the west of this site although it is the industrial edge of this settlement closest to the site. Existing planting along the southern boundary of the site also provided good existing screening. Sandlings SPA is adjacent to the southern boundary of this site and Sizewell Marshes SSSI to the northern and western boundaries. The site is currently being used as a reptile mitigation area for the proposed Sizewell C Nuclear Power Station, therefore should this site be developed, this would need to be considered. This is the furthest of the sites from the strategic road network and like Site 4 access was constrained based on the existing road network. The proposed bypass as part of the proposed Sizewell C Nuclear Power Station would reduce potential impacts if in place for the start of construction but the cumulative impacts with the Sizewell C development would need to be considered. A connection back into Friston from Site 7 was also technically challenging (due to being constrained by a pinch point at Aldringham and at the crossing of the Hundred River) and an alternative solution would likely be required in terms of connecting into the existing network on the site.

Potential for coordinated (co-located) landfalls

- 3.6.75 As set out above, landfall area of search S2 interacts with the Leiston – Aldeburgh SSSI and North Warren RSPB reserve but had fewer constraints on the marine approach and was not constrained by the presence of any other existing or proposed infrastructure.
- 3.6.76 As set out above, the majority of landfall S3 was considered significantly constrained in the immediate offshore environment due to the presence of a bedrock reef of the Coralline Cragg formation which is an important feature when considering coastal processes. Opportunities to reduce interaction with this feature were identified to the

northern and southern ends of the landfall area of search; however, the southern extent of the landfall is spatially constrained by the proposed East Anglia One North and East Anglia Two Offshore Windfarm developments.

- 3.6.77 Whilst reducing interaction with the bedrock reef of the Coralline Cragg compared to S3, the routing and siting process identified that landfall S3N had constraints associated with existing and proposed onshore and offshore infrastructure. When appraised as a landfall for the Proposed Project and as described in the sections above this landfall was identified as alternative to take forward. When considered as co-located landfall it was identified that whilst landfall maybe achieved with two sets of cables but with significant technical complexity it was considered unlikely/impossible that landfall could be made with three sets of cables due to the space available.
- 3.6.78 The appraisal identified that only landfall area of search S2 could potentially deliver a co-located landfall solution for three sets of cables.

Potential for coordinated (co-located) terrestrial route corridors

- 3.6.79 The assessment of the co-located terrestrial route corridors identified the same constraints as those identified for the red, blue, and purple corridors appraised for the Proposed Project.
- 3.6.80 With regards to the four pinch points that were identified and are unavoidable on either the red, blue or purple corridors the third pinch point was identified as not being able to accommodate a co-located solution. This would affect routes within the blue or purple corridors from landfall S3N depending on the location of the converter station.
- 3.6.81 Landfall S2 and the associated red corridor was the only landfall area of search/terrestrial corridor combination that could provide a co-located solution for three projects. It was however identified that the pinch point crossing within this corridor at Leiston Road may require the separation of the circuits over a short length including routing some of the cables through the Aldeburgh Golf Course.

Suffolk Onshore Scheme Emerging Preference

- 3.6.82 Following a backcheck of the initial preferred option for the Proposed Project and taking account of the appraisal findings of potential co-located options, Converter Site 1 and Site 3 were identified as emerging preferences for the Proposed Project and sites which could also accommodate co-location with other projects. Site 1 was in the originally preferred converter Area E, whereas Site 3 was a new site for the Proposed Project, having originally been identified by National Grid Ventures as part of the Nautilus site selection process.
- 3.6.83 Landfall S2 and the red corridor remained the emerging preference, and this option was also identified as potentially providing for a co-located landfall and cable route with other projects.
- 3.6.84 Landfall S3N and the purple corridor remained an alternative option until further studies and survey work had been undertaken to determine the installation technique. However, this option could not facilitate a co-located landfall or terrestrial cable route to either Converter Site 1 or Site 3.
- 3.6.85 Taking account of the two emerging preference converter station sites, the emerging preference landfall and alternative landfall, five options were consulted upon as part of

Non-Statutory Consultation undertaken between October 2022 and December 2022. These were:

- Suffolk Site 1 Emerging Preference – this is illustrated on **Application Document 6.4.1.3.8 Suffolk Site 1 Emerging Preference at Non-Statutory Consultation and EIA Scoping**;
- Suffolk Site 3 Emerging Preference – this is illustrated on **Application Document 6.4.1.3.9 Suffolk Site 3 Emerging Preference at Non-Statutory Consultation and EIA Scoping**;
- Suffolk Site 1 Alternative – this is illustrated on **Application Document 6.4.1.3.10 Suffolk Site 1 Alternative at Non-Statutory Consultation and EIA Scoping**;
- Suffolk Site 3 Alternative (Option 1) – this is illustrated on **Application Document 6.4.1.3.11 Suffolk Site 3 Alternative (Option 1) at Non-Statutory Consultation and EIA Scoping**; and
- Suffolk Site 3 Alternative (Option 2) – this is illustrated on **Application Document 6.4.1.3.12 Suffolk Site 3 Alternative (Option 2) at Non-Statutory Consultation and EIA Scoping**.

Kent Onshore Scheme

Landfall areas of search

- 3.6.86 On the Kent coast six landfall areas of search were initially identified. These were grouped geographically across Pegwell Bay, Broadstairs, and the north Kent coast. One area of search (K1) was identified within Pegwell Bay, which stretched from the settlement of Ramsgate to the settlement of Deal. One area (K1a) was identified at Broadstairs at North Foreland, between the settlements of Margate and Broadstairs. Four areas of search (K2, K3, K4, and K5) were identified along the north Kent coast between the settlements of Herne Bay and Birchington. These areas of search are illustrated on **Application Document 6.4.1.3.13 Kent Landfall Areas of Search**.
- 3.6.87 Landfall area of search K1, was initially identified as preferred in the preliminary findings. The key factors that influenced this decision included:
- Avoiding routeing through Margate and Long Sands SAC which was unavoidable for all North Kent coast options and would likely result in permanent habitat loss.
 - Avoiding an area of mobile sandbanks off the North Kent coast which would present cable exposure and engineering risk.
 - Whilst the Thanet Coast and Sandwich Bay Ramsar and SPA, Sandwich Bay SAC, and Sandwich Bay to Hacklinge Marshes SSSI designations were unavoidable on landfall K1 it was identified that the use of trenchless installation methods (subject to confirmation through further studies and ground investigations) could be used to avoid permanent habitat loss within these sites.
 - Whilst landfall K1a was not considered to be any more constrained than K1 and was slightly preferred to K1 in terms of its marine approach, the onward terrestrial cable route was significantly constrained; this is discussed in the relevant section below.
- 3.6.88 The following sections summarise the appraisal outcomes and alternative landfall areas of search that were considered.

Landfall area of search K1 (Pegwell Bay)

- 3.6.89 Landfall area of search K1 in Pegwell Bay was broadly split into two. The area to the north of the mouth of the River Stour, where the intertidal area is wide (approximately 2 km) and the area to the south of the mouth of the River Stour where the intertidal area gradually narrows towards the south.
- 3.6.90 The whole of the landfall area of search is designated as the Thanet Coast and Sandwich Bay Ramsar and SPA, Sandwich Bay SAC and Sandwich Bay to Hacklinge Marshes SSSI. These designations were unavoidable within this landfall area, albeit the width of the designations narrows towards the south due to the narrowing of the intertidal area. There would therefore potentially be more opportunity to avoid direct impacts on the designated sites through the use of trenchless installation methods (subject to confirmation through further studies and ground investigations) towards the south of the area of search. Sandwich Bay and Pegwell Bay NNR is located within this landfall area but could be avoided by landing the cable to the south of the River Stour.
- 3.6.91 Five Golf courses are present within this landfall area. From north to south these are: St Augustine's, Stonelees, Princes, Royal St George's, and Royal Cinque Ports.
- 3.6.92 To the south of the River Stour there are extensive areas of terrestrial flood zone which were not avoidable. Access to this same area was also limited due to the existing road network.

Landfall area of search K1a (Broadstairs)

- 3.6.93 Landfall K1a is located at North Foreland to the north of Broadstairs. The whole of the landfall area falls within the following designated sites; Thanet Coast and Sandwich Bay Ramsar and SPA, and Thanet Coast SAC, SSSI, and MCZ. Whilst all these designated sites would be unavoidable, trenchless installation methods could be used to avoid direct effects (subject to confirmation through further studies and ground investigations). Due to the width of both the SAC and MCZ designations, potential direct effects on these sites were considered unlikely to be avoidable with the use of trenchless installation methods.
- 3.6.94 North Foreland Golf Course is located within this landfall area of search and was unavoidable. Joss Bay, which is a recreational beach, is located within this landfall area of search but could be avoided.
- 3.6.95 There are nonetheless significant constraints in the onwards terrestrial cable corridor that affect the consideration of this landfall. This is discussed further in the Terrestrial Route Corridor section below.

Landfall areas of search K2, K3, K4 & K5 (North Kent Coast)

- 3.6.96 Landfalls K2 and K3 are located on the north Kent coast between the settlements of Birchington and Reculver. Thanet Coast and Sandwich Bay Ramsar and SPA and Thanet Coast SSSI and MCZ are unavoidable across both landfall areas of search, but Thanet Coast SAC is avoidable within K3.
- 3.6.97 Both areas are within extensive areas of Flood Zone 2 and 3 and access to both landfall areas of search was limited and constrained by the presence of the railway line with suitable access for construction traffic needing to cross the railway.

- 3.6.98 Landfall areas of search K4 and K5 are located between the settlements of Reculver and Herne Bay. Thanet Coast and Sandwich Bay Ramsar and SPA and Thanet Coast SSSI were unavoidable across both areas of search. Thanet Coast MCZ was unavoidable within K4 but could be avoided within K5. Other than at the Thanet Coast MCZ, trenchless installation methods (subject to confirmation through further studies and ground investigations) could potentially be used to avoid directly impacting on these designated sites.
- 3.6.99 Reculver Country Park was unavoidable within K4, and K5 was considered to be significantly constrained by the settlement of Herne Bay.

Summary of Relevant Marine Alignments

- 3.6.100 It was considered likely that marine alignments to landfall area of search K1 would potentially need to be routed within Goodwin Sands MCZ due to the requirement to cross other marine cables within sufficient water depth for navigational safety. A landfall to the north of the River Stour in Kent would result in direct impacts on the Pegwell Bay designated sites, however it was considered likely that this would be limited to a short-term temporary impact and that the more sensitive saltmarsh habitats could be avoided by using trenchless installation methods (subject to confirmation through further studies and ground investigations).
- 3.6.101 The marine approach to landfall area K1a was relatively unconstrained, although the landfall area of search overlapped with Joss Bay, which is a recreational beach location, meaning there could be a greater temporary recreational impact during construction at this landfall location.
- 3.6.102 All marine approaches to landfall areas of search K2 to K5 would need to be routed through the Outer Thames Estuary SPA. Due to shipping and navigation constraints, in conjunction with the bathymetry of the area, it was not possible to identify feasible marine corridors and subsequent alignments to the west of Margate and Long Sands SAC. All marine alignments that approached the landfall areas of search K2 to K5 would need to cross Margate and Long Sands SAC. Due to the benthic interest features that support the designation of this site there was the potential for marine alignments to landfall areas of search K2 to K5 to result in permanent habitat loss within this site.
- 3.6.103 Significant constraints were also identified on the marine route alignments approaching landfalls on the north Kent coast from a physical environment perspective, as it was considered unlikely that an area of mobile sandbank could be avoided. This would present an exposure and engineering risk. It was also likely that routes through this area would interact with key anchorage areas offshore at Margate.

Summary of appraisal outcomes

- 3.6.104 Landfall area of search K1 was constrained by the marine approach associated with the potential interaction with Goodwin Sands MCZ, however it was considered likely that potential effects at the landfall on the designated sites for nature conservation would be limited to short-term temporary impacts. Landfall areas to both the north and the south of the mouth of the River Stour would be constrained by the golf courses. Construction access would be constrained for landfalls to the south of the river and there would also be more interaction with the Flood Zone.
- 3.6.105 The marine approach to landfall area of search K1a was relatively unconstrained, and it was also considered likely that any impacts on the designated sites for nature

conservation would be temporary and short term. The North Foreland golf course would be unavoidable. Joss Bay was considered avoidable within this search area.

- 3.6.106 The marine approaches to the landfalls on the north Kent Coast (K2 to K5) were significantly constrained by the potential for permanent habitat loss within Margate and Long Sands SAC and the technical and engineering risks associated with potential cable exposure. Terrestrially K5 was significantly constrained by the settlement with Herne Bay and areas K2, K3 and K4 by access.
- 3.6.107 These factors were considered when selecting landfall area of search K1 as the initial preference preferred option to take forward.

Converter Station Site Option Areas

- 3.6.108 Two converter site Areas were identified within the routeing and siting study area. Area A is located adjacent to and encompassed by Richborough Energy Park and Area B is located to the north and south of the A299 and adjacent to Manston Business Park. These are illustrated on **Application Document 6.4.1.3.14 Kent Converter Site Option Areas**.
- 3.6.109 Converter site option Area A was initially identified as preferred in the preliminary findings. The key factors that influenced this decision included:
- The option area provided the opportunity to site the converter station in an area adjacent to similar infrastructure or industrial land uses.
 - The option area provided opportunity to avoid designated sites and areas at greater risk of flooding.
 - Whilst both option areas were in provisional Best and Most Versatile (BMV) agricultural land, converter site option Area A was in provisional Agricultural Land Classification (ALC) Grade 2 and 3 whereas the whole of converter site option Area B was within ALC Grade 1.
 - The option Area A provided opportunity for a shorter HVDC route (noting that Pegwell Bay (K1) was the preferred landfall for the Kent Onshore Scheme) and a shorter HVAC connection compared with converter site option Area B.
- 3.6.110 The following sections summarise the appraisal outcomes and the alternative converter site option areas that were considered.

Converter site Area A

- 3.6.111 Richborough Energy Park and Richborough Port are located within Area A which provided an opportunity to site the converter station within an area adjacent to similar infrastructure or industrial land uses. Part of the Sandwich Bay to Hacklinge Marshes SSSI extends into this area, but converter station siting could avoid this designation. Part of this area is within the Flood Zones 2 and 3 but there were opportunities to site a converter station outside of these zones. The network connection point (Richborough substation) was located within this area therefore reducing the length of High Voltage Alternating current (HVAC) connection back to the network.

Converter site Area B

- 3.6.112 There is one designated site within Area B, an Anglo-Saxon cemetery and associated remains at Monkton Scheduled Monument; this is located immediately adjacent to the

south of the A299, to the north of Monkton. The area contains Manston Business Park, Columbus Avenue Industrial Estate, and an area with larger scale agricultural buildings. Manston Airport is located to the southeast. Whilst the existing development in this area is not related to energy there were opportunities to site a converter station adjacent to these other industries. Area B is located further from the network connection point at Richborough substation and development of a converter station site in this area would require approximately 5 km of HVAC connection.

Terrestrial route corridors

- 3.6.113 Seven route corridors were identified, three corridors (green, red, and blue) from landfall area of search K1, one corridor (green) from landfall area of search K1a and three corridors from the landfall areas of search on the north Kent coast (blue corridor from K2, red corridor from K3 and a green corridor from K4). No corridor was identified from landfall area of search K5 due to the terrestrial constraints present. These corridors are illustrated on **Application Document 6.4.1.3.15 Kent Terrestrial Route Corridors**.
- 3.6.114 The green corridor from landfall area of search K1, was initially identified as preferred in the preliminary findings. The key factors that influenced this decision included:
- The marine approach to all landfall areas of search along the north Kent coast was significantly constrained due to the potential for permanent habitat loss within Margate and Long Sands SAC and an area of mobile sandbanks which would present cable exposure and engineering risk. There were also terrestrial constraints on all three corridors that connected to the north Kent coast associated with traffic and access, flood risk, and a proposed planning allocation to the south of Birchington on the blue corridor.
 - Significant constraints on the green corridor that connected with landfall area of search K1a (Broadstairs) due to a linear belt of development between the settlements of Margate and Ramsgate. This would require routing the cable along either Star Lane or Farley Road, both of which are heavily constrained by several connected planning allocations for housing as well as a proposed extension to the cemetery. These constraints spanned the entire corridor west of the Westwood Industrial Estate.
 - Constraints on the red and blue corridors that connected to the landfall area of search K1 (Pegwell Bay) associated with traffic and access, including access to the east of the River Stour, flood risk, and Royal St George and Royal Cinque Ports golf courses.
 - Whilst the red and blue corridors to landfall area of search K1 would potentially result in a smaller interaction with the coastal nature conservation designated sites than the green corridor, the potential to cross the sensitive habitats using a trenchless construction technique, coupled with the green corridor being less constrained overall than the blue and red corridors, resulted in the green corridor to landfall area of search K1 being preferred.
- 3.6.115 The following sections summarise the appraisal outcomes and alternative corridors were considered.

Pegwell Bay green, red, and blue corridors

- 3.6.116 Of the three corridors that connected with the Pegwell Bay K1 landfall area of search, the red and blue corridors were significantly constrained from a traffic and access

perspective, with key issues including access to the east of the River Stour and weight restrictions on local roads around the Sandwich Bay Estate and Royal St George and Royal Cinque Ports golf courses.

- 3.6.117 All three of these corridors interacted with several coastal nature conservation designations at the landfall, as described in paragraph 3.6.114 with the blue corridor having the potential for the smallest direct interaction.
- 3.6.118 Both the red and the blue corridors extended across a large area of Flood Zone 2 and 3 and would require several watercourses associated with the River Stour to be crossed. The blue corridor would require crossing the River Stour at a point where it is designated as a Ramsar, SAC, SPA and SSSI; although, if feasible, the river could potentially be crossed using trenchless techniques (subject to confirmation through further studies and ground investigations).
- 3.6.119 Both the green and red corridors intersected with golf courses; however, it was proposed that a trenchless technique, if feasible (subject to confirmation through further studies and ground investigations) would be used at these locations to reduce disturbance.

Broadstairs green corridor

- 3.6.120 The green corridor which connects to the landfall area of search K1a at Broadstairs crossed a linear belt of development between the settlements of Margate and Ramsgate. This would require routeing the cable along either Star Lane or Farley Road, both of which are heavily constrained by several connected planning allocations for housing as well as a proposed extension to the cemetery. These constraints span the entire corridor west of the Westwood Industrial Estate and these factors significantly constrained this corridor.

North Kent Coast green, red and blue corridors

- 3.6.121 The three corridors connecting the landfall areas of search located on the north Kent coast (K2, K3 and K4) were all significantly constrained from a traffic and access perspective, due to a weight restricted bridge, sensitive receptors, and carriageway widths that were inadequate to allow two-way Heavy Goods Vehicle (HGV) movements. It was likely that extensive mitigation would be required, even during temporary construction work to facilitate safe access and to reduce other environmental effects (congestion, delays) that could arise because of additional HGV construction traffic on poorly suited roads. Careful routeing of the cables could have avoided access issues around the Minster Marshes.
- 3.6.122 The green and red corridors interacted extensively with areas of Flood Zones 2 and 3 and both had a high number of watercourse crossings in comparison to the blue corridor.
- 3.6.123 There are several scheduled monuments located within each of these three corridors, however the blue corridor was considered the most constrained, with a combination of scheduled monuments and a proposed planning allocation in the south of Birchington, creating a pinch point that reduced the ability to route away from and around these sites.

Kent Onshore Scheme Initial Preference

- 3.6.124 The network correction point in Kent was initially identified as Richborough substation, converter site option Area A to Pegwell bay, via the green corridor, was initially identified as the preference for the Kent Onshore Scheme for the reasons explained above.

Stakeholder Feedback and Option Refinement

- 3.6.125 Following engagement with other developers who subsequently submitted planning applications (and obtained consent) for other energy developments within Richborough Energy Park, a backcheck and review was undertaken, as the proposed developments significantly constrained the Proposed Project being able to connect into the existing network at Richborough substation. As a result of this backcheck, the need for a new substation and an alternative HVAC connection (either by overhead line or underground cables) was identified. This alternative HVAC connection directly connected onto the existing Richborough to Canterbury 400 kV overhead line. A review was undertaken of the routing and siting options in Kent based on this revised connection point and, following this review, the conclusions on the landfall area of search, cable corridors and converter site option Area all remained unchanged.

Kent Onshore Scheme Emerging Preference

- 3.6.126 The Kent Onshore Scheme consulted upon during non-statutory consultation is illustrated on **Application Document 6.4.1.3.16 Kent Onshore Scheme at Non-Statutory Consultation and EIA Scoping**.

Offshore Scheme

- 3.6.127 The marine alignments were divided into three main sections, the approach to landfalls in Suffolk (landfalls and alignments with prefix S), the central section (alignments with prefix C) and the approach to the Kent landfalls (landfalls and alignments with prefix K). These are illustrated on **Application Document 6.4.1.3.17 Marine Alignments**.
- 3.6.128 The alternative marine alignment approaches to landfalls are considered under the Suffolk Onshore and Kent Onshore Schemes above.
- 3.6.129 With regards to the central sections the option identification and selection stage identified the central section marine alignments C8B, and C4A as preferred. The key factors that influenced this decision included:
- Avoiding a cable crossing with the proposed NeuConnect cable within Margate and Long Sands SAC as the material required for the crossing would introduce hard substrate into a naturally sandy environment, which could permanently change the protected features in this site.
 - Avoiding the potential for a reduction in navigable depths because of rock protection at the potential crossing with the proposed NeuConnect cable.
 - Avoiding an area of high shipping density in the Long Sands Head Deep shipping channel.
 - Minimising the interaction with existing Area 510/2 aggregate production agreement area to minimise interaction with their operations.

- Avoiding the higher shipping density areas in the Sunk Traffic Separation Scheme (TSS).
- Keeping the crossings of proposed NeuConnect cable and North Falls and Five Estuaries offshore windfarms export cables in deeper water and out of the busy shipping lanes.
- Crossing of the proposed GridLink Interconnector at a suitable water depth so as not to affect shipping.

Offshore Scheme Emerging Preference

- 3.6.130 Marine alignment sections S2 or S3N, C8B, C4A and K1c were preferred.
- 3.6.131 As described in Section 3.4.6 above, landfall area of search S2 was identified as the emerging preference landfall and S3N was identified as an alternative option. Therefore, in addition to the Offshore Scheme Emerging Preference an alternative marine route to landfall area of search S3N was consulted upon as part of non-statutory consultation.
- 3.6.132 The Offshore Scheme as consulted upon at non-statutory consultation is shown on **Application Document 6.4.1.3.18 Offshore Scheme at Non-Statutory Consultation and EIA Scoping**.

3.7 Alternatives Considered at the Defined Proposal and Statutory Consultation Stage

- 3.7.1 How National Grid evolved the Proposed Project from that which was consulted upon during Non-Statutory Consultation to the defined proposal that was consulted upon at Statutory Consultation, is set out in **Application Document 8.2 Options Selection and Design Evolution Report (October 2023)**.
- 3.7.2 At Non-Statutory Consultation a number of alternative options were consulted upon. The following sections set out the reasons for the selection of the preferred options (which were then developed into the defined proposal) and the reasons for the selection over the alternatives that were considered.

Suffolk Onshore Scheme

- 3.7.3 As described above as part of the Suffolk Onshore Scheme, five options were consulted upon as part of non-statutory consultation. Site 3 emerging preference was identified as the preferred option for the Suffolk Onshore Scheme. The following sections summarise the appraisal outcomes and the reasons for the selection of this option over the alternatives that were considered.

Emerging preferences vs alternative options

- 3.7.4 As set out in paragraph 3.6.85, five options were consulted on. These comprised two emerging preference options from landfall area of search S2 through to converter station sites 1 or 3, and three alternative options from landfall area of search S3N as illustrated on **Application Document 6.4.1.3.8 Suffolk Site 1 Emerging Preference at Non-Statutory Consultation and EIA Scoping** through to **Application Document 6.4.1.3.12 Suffolk Site 3 Alternative (Option 2) at Non-Statutory Consultation and EIA Scoping**.

- 3.7.5 Landfall area of search S2 was identified as the emerging preference as it avoided both nearshore constraints and a number of terrestrial pinch points as explained in section 3.6.58 as well as being able to facilitate co-location with other projects. It was however acknowledged that landfall area of search S2 was constrained by the Leiston – Aldeburgh SSSI and the North Warren RSPB Reserve which are designated for their nature conservation value. Whilst feedback was received as part of non-statutory consultation with regards to the presence and the sensitivities of the designated sites at the landfall area of search S2, no different or additional information was received.
- 3.7.6 The emerging preference options (Site 1 emerging preference and Site 3 emerging preference) could provide opportunity for the co-location of up to three projects within the same corridor. Further technical studies undertaken since non-statutory consultation which, whilst still subject to the results of ground investigations at the time of selection, confirmed that a trenchless crossing beneath the designated sites, in order to avoid direct effects was achievable. This, coupled with feedback relating to the opportunity to coordinate with other proposed projects, meant that landfall area of search S2 remains the emerging preference.
- 3.7.7 Having regard to feedback received through non-statutory consultation and National Grid's ongoing work no different or additional information altered the preliminary conclusions in respect of the two emerging preference options being preferred to the three alternative options.

Site 1 Emerging Preference vs Site 3 Emerging Preference – converter station sites

Landscape and visual

- 3.7.8 Whilst both sites are located outside of the Suffolk Coast and Heaths AONB, Site 1 is closer to this designation and therefore there is more potential for impacts upon its setting.
- 3.7.9 Whilst Site 1 is closer to the Suffolk Coast and Heaths AONB the site is surrounded by a number of areas of mature planting including Great Wood, Foxburrow Covert and Ten Acre Covert all of which provide opportunity for existing screening and to integrate additional screen planting into the existing landscape character. It is noted that Great Wood is designated as Ancient Woodland and therefore a standoff with this designation would be required.
- 3.7.10 There is limited intervisibility between Site 1 and nearby settlements and the local road network because of intervening mature vegetation, however there are some properties and farmsteads interspersed in the local landscape that would be likely to experience close proximity views.
- 3.7.11 Site 1 is located close to the Sandlings Walk recreational route; however, there is limited intervisibility due to the existing intervening mature coverts. Views would also likely be experienced from road users travelling along the A1094 although mature roadside hedgerow planting would provide a degree of screening to views.
- 3.7.12 The local Public Right of Way (PRoW) network crosses Site 1 therefore there is likely to be a need to temporarily and/or permanently divert the PRoW network. The site would also result in close proximity views from visual receptors on such routes.
- 3.7.13 Site 3 is further from the Suffolk Coast and Heaths AONB and the potential for an impact on the setting of this designation is therefore considered unlikely.

- 3.7.14 The site is in close proximity to Bloomfields's Covert and other mature tree belts and copses providing opportunity to integrate additional screening into the wider green infrastructure network and potentially providing opportunity to reinstate historical pockets of woodland.
- 3.7.15 Site 3 has landscape value in terms of function and distinctiveness as it forms part of the open gateway into the settlement of Saxmundham, therefore development of this site would increase the likelihood of adverse landscape effects and impacts on the setting of the settlement.
- 3.7.16 There is potential intervisibility with residential receptors on the edge of Saxmundham and residential properties in immediate proximity and farmsteads interspersed in the local landscape.
- 3.7.17 The local PRow network crosses Site 3 therefore there is likely to be a need to temporarily and/or permanently divert the PRow network. The site would also result in close proximity views from visual receptors on such routes. There are likely to be open views from the B1119, which represents a key vehicular route on the approach to Saxmundham, noting opportunities for landscape mitigation.

Historic environment

- 3.7.18 The closest designated asset to Site 1 is Grade II Listed Billeford Hall which is located adjacent to the northern boundary of the site. The closest designated asset to Site 3 is the Grade II Listed Wood Farmhouse which is located adjacent to the western boundary of the site and a second Grade II Listed Building, Hurts Hall which is also located to the west. There are a number of other designated assets to the west and south of Site 3 although existing woodland blocks and topography provide limited intervisibility with the site. Whilst there are designated assets adjacent to both sites it is likely that screening could be incorporated more easily into the existing landscape character at Site 1 due to the existing woodland network and the existing screening around the asset itself.

Biological environment

- 3.7.19 Site 1 is located adjacent to Great Wood which is listed on the Ancient Woodland inventory and designated as a County Wildlife Site.
- 3.7.20 Whilst Site 1 is adjacent to Ancient Woodland it is likely an appropriate 15 m buffer (standoff) could be maintained between the development and the designation thereby avoiding loss or deterioration of the woodland. Opportunities may also exist to strengthen the green infrastructure network around the site.
- 3.7.21 Site 3 is not adjacent to any designated sites although an area of woodland (Bloomfield's Covert) and other mature tree belts and copses are located adjacent to the site. It is likely that appropriate buffers could be maintained between development on this site and the mature woodland blocks. Opportunities may also exist to strengthen the green infrastructure network around the site.
- 3.7.22 Protected species surveys have not yet been undertaken to confirm presence or absence but due to the habitats present within and surrounding each site it is likely there is a greater potential for protected species to be present within Site 1. This will continue to be back checked as more survey data is gathered.

Physical environment

- 3.7.23 Both sites are located within Flood Zone 1 and Source Protection Zone 3 and both sites are located on agricultural land which is anticipated to have a very low potential for significant contamination to be present. Both sites are relatively flat with Site 1 gently sloping from northeast to southwest and Site 3 gently sloping from west to east.
- 3.7.24 Site 1 is located on freely draining slightly acid but base rich sandy soils, there is a lower risk of soil compaction or plastic deformation of these soil types during stripping and handling. Site 3 is located on slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. These soils can be difficult to handle or traffic without the risk of compaction and negative impacts to their structure.

Socio-economics

- 3.7.25 Site 1 is located in close proximity to the Sandlings Walk recreational route, however there is limited intervisibility with users of this walk due to the existing intervening mature coverts. The local PRoW network crosses both Sites 1 and 3 therefore there is likely to be a need to temporarily and/or permanently divert the PRoW network should either site be developed. The sites would also result in close proximity views from receptors on such routes. There are some properties and farmsteads interspersed in the local landscape around both Site 1 and Site 3 some of which would be likely to experience close proximity views. There are a number of visitor accommodation units close to the southwest and south of Site 1, which may experience views of the site and to the northeast of Site 3. Site 3 is adjacent to the settlement of Saxmundham; however, it is unlikely the development would lead to the severance of community facilities. Site 1 is located adjacent to the A1094 and B1069 both of which would facilitate good access into the site. However, it has been noted through consultation that Blackheath Corner, which is the T junction between B1069 Snape Road and A1094 Aldeburgh Road, is an accident blackspot that would need to be considered in any access strategy for this site.
- 3.7.26 Feedback from consultation also indicated that the rail bridge on the A1094 to the east of the junction with the A12 is potentially unsuitable to Abnormal Indivisible Loads therefore an alternative route for AIL deliveries to Site 1 may need to be identified.
- 3.7.27 Site 3 is located adjacent to the B1119 however taking construction access off this road would require construction traffic to be routed through the centre of the settlement of Saxmundham. To avoid this, it is likely that a new access would need to be created off the B1121 either to the south of Saxmundham, crossing the River Fromus, or off the B1121 to the north of Saxmundham, crossing the railway.
- 3.7.28 All the land within Site 1 is currently provisionally graded as a mixture of Agriculture Land Classification (ALC) Grade 3 and 4, therefore it is unlikely there will be large areas of Best and Most Versatile (BMV) land present. The whole of Site 1 is within Countryside Stewardship (middle tier) agreement. The land within Site 3 is provisionally mapped at ALC grades 3 and 2, therefore there is a greater potential for the presence of BMV land within this site. A section of Site 3 is currently under entry level plus Higher Level Stewardship (environmental stewardship agreement).
- 3.7.29 Site 1 is located entirely within a minerals consultation area, whereas Site 3 is partly located within a minerals consultation area.

Technical considerations

- 3.7.30 Site 1 has a slightly steeper gradient than Site 3 therefore there is the potential that more earthworks would be required in order to construct the converter station. Site 3 is less spatially constrained than Site 1 therefore potentially providing more ability to microsite both permanent and temporary infrastructure within the site to avoid other constraints.
- 3.7.31 As set out above there is good access to Site 1 off the A1094 and B1069 noting the constraints associated with Blackheath Corner and the rail bridge. Site 3 would require an off-network access to be able to facilitate construction traffic accessing the site without passing through the centre of the settlement of Saxmundham.

Cable corridors

- 3.7.32 The cable corridors for both options are contiguous from the landfall through to Site 1. Both options would require a trenchless crossing beneath the Leiston – Aldeburgh SSSI and North Warren RSPB Reserve in order to reduce direct impacts and whilst avoidable both options would require temporary construction in proximity to the Sandlings SPA.
- 3.7.33 Both options would either need to cross the pinch point at the B1122 Leiston Road and to the north of Aldeburgh Golf Course - for which there is a planning application to extend north - or cross Leiston Road further south and route through the golf course.
- 3.7.34 Whilst Site 1 emerging preference has an overall shorter cable route than Site 3 emerging preference (6.5 km compared to 11 km), the HVAC cable is longer for Site 1 than it is for Site 3, being 3.5 km and 1.5 km respectively. Due to the greater number of cables required for underground HVAC, this section has a greater working width typically 60 m compared with 40 m for a HVDC cable. Therefore, whilst the overall cable route is longer for Site 3 the additional temporary land take is not proportionate to the additional length. Overall, however, there is more potential for temporary effects on more receptors for Site 3 than Site 1, and more potential for physical impacts on unknown or unrecorded archaeology due to the additional length.

Appraisal outcomes

- 3.7.35 As set out above landfall area of search S2 was consulted upon as the emerging preference. Whilst feedback was received regarding the designated nature consideration sites within landfall area of search S2, having regard to non-statutory consultation feedback and National Grid's ongoing work, no different or additional information emerged that altered the preliminary conclusions of the two emerging preference options being preferred to the three alternative options. The emerging preference options (Site 1 emerging preference and Site 3 emerging preference) which utilise landfall area of search S2 could provide an opportunity for co-location of up to three projects within the same corridor. In addition, further technical studies have been undertaken since non-statutory consultation which have confirmed that, subject to the results of ground investigations, a trenchless crossing beneath the designated sites in order to avoid direct effects is achievable. Therefore, landfall area of search S2 remains the emerging preference. This landfall could also accommodate co-location with the NGV projects.
- 3.7.36 With regards to Site 1 emerging preference and Site 3 emerging preference, the Site 1 converter station is closer to the Suffolk Coasts and Heaths AONB which could potentially result in an impact on the setting of this designation, which is unlikely for Site 3. There is direct access to Site 1 from the existing road network whereas Site 3 would

require an off network access to be created in order to avoid routing construction traffic through the settlement of Saxmundham. Site 1 is more spatially constrained due to the location of existing woodland blocks within the site, therefore Site 3 would provide more potential to microsite the converter station and if co-located with other projects. Site 1 would also likely require more earthworks due to the slightly steeper gradient on the site.

- 3.7.37 Overall Site 3 would require a longer cable route and temporary land take. There would be more potential for temporary effects on more receptors for Site 3 than Site 1 and more potential for physical impacts on unknown or unrecorded archaeology due to the additional length. Site 1 however would require a longer length of HVAC cable than Site 3 which has a wider construction swathe.
- 3.7.38 On balance, overall Site 3 emerging preference has been identified as the preferred option for the Suffolk Onshore Scheme. This was identified as being suitable for up to three converter stations projects developed in a coordinated, co-located manner, and also for a single converter station project in a Sea Link-only scenario.

Access

- 3.7.39 As part of the defined proposal at Statutory Consultation, three potential permanent accesses were identified from the south (to the east of Sternfield), west (from the B1121 to the south of Saxmundham), and north (from the B1121 to the north of Saxmundham). The western and northern access were also shown as potential construction accesses. These are illustrated in **Application Document 6.4.1.3.19 Saxmundham Converter Station Access Options at Statutory Consultation**. Following consultation feedback and further environmental, socio-economic and technical studies the western access was selected as both the permanent and construction access; this access was illustrated in **Application Document 5.1.10 Appendix I Targeted Consultation**.
- 3.7.40 All three access options required a crossing of the River Fromus or its tributary. The western access was initially selected as preferred as this access provided the shortest access to the site from the A12, had fewer technical constraints than the northern access (which were associated with the crossing of railway and branch line) and facilitated a permanent means of access for maintenance vehicles which the southern option could not.

Kent Onshore Scheme

HVAC technology

- 3.7.41 As described above as part of the Kent Onshore Scheme the technology choice of making the HVAC connection via either an overhead HVAC line or an underground HVAC cable was left open for feedback through non-statutory consultation process. The following sections summarise the appraisal outcomes and the reasons for the selection of this option over the alternative technology that was considered.

Landscape and visual

- 3.7.42 The Kent Onshore Scheme is not within any nationally designated landscapes. Both, overhead and underground options would require the installation of above ground infrastructure, pylons for the overhead line option and a cable sealing end compound for the underground option in order to make the connection to the existing Richborough to

Canterbury 400 kV overhead line. The overhead line option would result in greater operational landscape and visual impacts; however, these could be reduced through routing. The soil conditions of the low-lying marshland within the fluvial floodplain of the River Stour may also make reinstatement of any underground cable route more challenging, therefore temporary construction effects of the underground option may endure longer than in other soil types.

Biological environment

- 3.7.43 Sandwich Bay to Hacklinge Marshes SSSI is partly located within the HVAC connection option area. The railway and adjacent habitats are designated as a local wildlife site "TH12 Woods and Grassland, Minster Marshes". Immediately north, land to the south of the River Stour is also designated as "DO21 Ash Level and South Richborough Pasture" local wildlife site. Depending on the location of the converter station, and the connection point to the existing overhead line, the section of SSSI could either be avoided by routing of both options or if it cannot be avoided by routing, either oversailed with an overhead line or crossed using a trenchless technique with an underground cable, thereby avoiding the potential for direct effects. It is unlikely that the local wildlife sites could be avoided by either option. The underground option would result in greater temporary land take and habitat loss. Permanent habitat loss for the overhead line option would be limited to the pylon foundations and, for the underground cable, the area of the cable sealing end compound, which is typically 116 m x 63 m. Water vole is known to be present in the Minster Marshes. Due to the construction footprint for the underground option, there is more potential for temporary impacts on water vole habitat compared with the overhead line option. The overhead line potentially introduces the potential for collision risk with certain bird species, therefore mitigation in the form of bird diverters may be required if this option is progressed.

Physical environment

- 3.7.44 The existing Richborough to Canterbury 400 kV overhead line within the HVAC Area is wholly located within Flood Zones 2 and 3; therefore, the underground cable option would require a cable sealing end compound to be located within these flood zones. Whilst the overhead line option would also be located within Flood Zone 2 and 3, flood water could ingress around the pylon feet.
- 3.7.45 The geology comprises tidal flat deposits (superficial) overlying the Thanet Formation (bedrock), with the Thanet classified as a Secondary A aquifer. At depth below the Thanet is the Chalk, classified as a Principal aquifer. The tidal flat deposits may include layers of peat which is characterised by very high moisture contents, high compressibility and low shear strength and can present a significant constraint to development. The ground conditions are anticipated to be characterised by soft and compressible materials with shallow groundwater, and therefore are unlikely to stay open unsupported during excavations. Therefore, underground cable open trenches may require trench support and also dewatering.
- 3.7.46 The soil types present are loamy and clayey soils (fine textured) of the coastal flats, with naturally high groundwater. These soils will be difficult to handle or traffic without the risk of compaction and potentially negative impacts to their structure and could be wet and plastic for long periods. The overhead line option would require a smaller construction area and less handling of soils compared with the underground cable option.

Socio-economics

- 3.7.47 There are limited socio-economic receptors within or adjacent to the HVAC connection Area to differentiate between the options. The Saxon Shore Way is located along the south bank of the River Stour. There is the potential for temporary and permanent impacts on the users of this trail during the construction and operation of both options.
- 3.7.48 It is likely the construction traffic would use the same accesses regardless of the option although there is a potential for construction traffic figures to differ between options.

Technical considerations

- 3.7.49 The underground cable option would require a trenchless crossing beneath the railway and, depending on where the connection is made to the existing Richborough to Canterbury 400 kV overhead line, a trenchless crossing of the River Stour. Access to the south of the River Stour within the HVAC option area is limited; therefore, should the connection be made to the south of the River Stour either by overhead line or underground cable, construction traffic would require a temporary bridge crossing of the River Stour.
- 3.7.50 As set out above the ground conditions and soil types present could make soil handling for the underground cable option and the associated trenchless crossings technically challenging.

Appraisal outcomes

- 3.7.51 There are environmental and technical constraints and opportunities associated with both options. Due to the ground conditions and requirement for trenchless crossings it is likely that the underground cable option would have greater temporary impacts during construction than the overhead line option.
- 3.7.52 Both options would require permanent above ground infrastructure, the overhead line option has a greater potential for permanent impacts on landscape character, setting of historical assets and bird collision risk. The underground option would require a permanent compound within Flood Zones 2 and 3 and more potential for physical impacts on non-designated heritage assets and a greater amount of permanent habitat loss.
- 3.7.53 On balance the overhead line option has been identified as the preferred option for the Kent Onshore Scheme as it avoids the need to site a permanent compound within Flood Zones 2 and 3, technical constraints associated with construction and reducing impacts in relation to the potential for physical impacts on non-designated heritage assets and a greater amount of permanent habitat loss. The potential for greater landscape and visual, setting and bird collision risk from the overhead line option have been recognised and have been, and will continue to be, considered and reduced as much as possible through the design of the Proposed Project and the inclusion of mitigation such as bird diverters, where required.

Offshore Scheme

- 3.7.54 As set out under the Suffolk Onshore Scheme above, two emerging preference options from landfall area of search S2 through to converter station sites 1 or 3 and three alternative options from landfall area of search S3N were consulted upon at Non-Statutory Consultation. The emerging preference landfall S2 was selected as preferred

to the alternative S3N for the reasons explained under the Suffolk Onshore Scheme above.

3.8 Alternatives Considered at the Assessment and Land Rights Stage

- 3.8.1 How National Grid evolved the Proposed Project from defined proposal consulted upon during Statutory Consultation to the Proposed Project as applied for is set out in **Application Document 7.3 Design Development Report**.
- 3.8.2 At Statutory Consultation a number of alternative design options were consulted upon. The following sections set out the reasons for the selection of the preferred options (which were then developed into the application as applied for) and the reasons for the selection over the alternatives that were considered.

Suffolk Onshore Scheme

Saxmundham Converter Station access options

- 3.8.3 As part of the defined proposal at statutory consultation, three potential permanent accesses to Site 3, hereafter referred to as the Saxmundham Converter Station, were identified; one access from the south (to the east of Sternfield) one access from the west (from the B1121 to the south of Saxmundham) and one access from the north (from the B1121 to the north of Saxmundham). These are illustrated on **Application Document 6.4.1.3.19 Saxmundham Converter Station Access Options at Statutory Consultation**. The western and northern access were also identified as potential construction accesses. All three access options required a crossing of the River Fromus or its tributary. The western access was initially selected as preferred as this access provided the shortest access to the site from the A12, had fewer technical constraints than the northern access, which were associated with the crossing of railway and branch line, and facilitated a permanent means of access for maintenance vehicles which the southern option could not. Following stakeholder engagement, a potential need to increase the size of the proposed bridge crossing of the River Fromus to mitigate potential effects on invertebrate populations within with waterbody was identified. Site surveys identified veteran and ancient trees along the River Fromus corridor that would need to be avoided, and further environmental and technical studies also identified the need to site the proposed bridge abutments outside of Flood Zone 3. These factors moved the proposed access further north from where it was illustrated on **Application Document 6.4.1.3.19 Saxmundham Converter Station Access Options at Statutory Consultation** and closer to a Grade II Listed Building and residential property. The access options were revisited to confirm whether this access was still preferred or whether there was a preferred alternative.
- 3.8.4 Five access options were appraised: the western and northern accesses as described above, an alternative southern access from the A1094 that would also serve as a construction access, an eastern access from the B1069 contiguous with the temporary haul road for the cable, and an access from the proposed Theberton bypass/B1122. These accesses are illustrated on **Application Document 6.4.1.3.20 Saxmundham Converter Station Access Options**.

- 3.8.5 Following this appraisal the western access was identified as the preferred access. The following sections summarise the appraisal outcomes and the reasons for the selection of this access over the alternatives that were considered.
- 3.8.6 With regards to maintenance activities, any planned maintenance and undertaking of any emergency maintenance during the operational stage of the Proposed Project has fewer complications if there is a dedicated purpose-built access into the site. In undertaking the appraisal, the permanence of the access was taken into account as this would avoid routing maintenance vehicles through settlements. As a minimum permanent land rights would be required over a suitable access for any AILs required during maintenance/repair/replacement.

Western access

- 3.8.7 This access would introduce a new 1.2 km access road into the landscape which would be visible in views from the B1121. The western access crosses an area of short rotation woodland, a section of which would need to be removed. The access would require a bridge crossing of the River Fromus, the scale of which would need to take into account potential effects on the invertebrate populations within the watercourse. The access is within the setting of a Grade II Listed Building and approximately 250 m from a residential receptor. The access provides the shortest route from the A12 but would route construction traffic through Benhall Green. This access would facilitate AIL movements during construction and maintenance.

Northern access

- 3.8.8 This access would introduce a new 1.9 km access road into the landscape and would be visible in views from the B1122 and views along the western edge of Saxmundham. The access would require a crossing of the River Fromus, the railway line and potentially the branch line, as well as construction and maintenance traffic crossing the B1119. The access is in proximity to a Grade II Listed Building and would require the removal of trees either side of the railway and potentially within Rookery Wood to facilitate the bridge crossing of the railways. There is the potential for ancient and veteran trees to be present. The access would need to cross a PRoW along the railway and the access off the B1121 would be close to a primary school. Construction and maintenance traffic would need to use the Curlew Green junction off the A12 to avoid routing traffic through Saxmundham. This access would facilitate AIL movements during construction and maintenance.

Southern access

- 3.8.9 This access could introduce a new 2.7 km access road into the landscape and would likely be visible in views from Sternfield. The access would require a crossing of a tributary of the River Fromus and associated Flood Zone 3, and crossings of Sternfield Road, Red Lane and the B1121. The access would cross two PRoW and a permanent right of way across the access road would need to be maintained or permanent diversion required. The access would be in close proximity to residential receptors where this access would be taken off the A1094 and the crossing of the B1121 and a number of Grade II Listed Buildings. The access would also pass through an area of potential archaeology. This option would put all construction traffic through the Friday Street junction off the A12. This access would not be suitable for AILs due to restrictions on the A1094 bridge over the railway, therefore AIL movements during construction and

maintenance would either need to be routed through Leiston or one of the alternative accesses that could accommodate AILs.

Eastern access

- 3.8.10 This access would introduce a new 4.6 km access road into the landscape. This would be continuous with the proposed temporary haul road for the cable route, therefore during construction there would be no additional effects associated with land take. The access is close to a number of Grade II Listed Buildings so there is the potential for enduring setting effects beyond the construction period associated with a permanent access road. The access would cross eight PRoW, and a permanent right of way across the access road would therefore need to be maintained or permanent diversion required. This access would put all construction traffic through the Friday Street junction off the A12 and onto the A1094/B1069. The Friday Street junction and the A1094 is not suitable for AILs due to restrictions on the A1094 bridge over the railway, therefore AIL movements during construction and maintenance would either need to be routed through Leiston or one of the alternative accesses that could accommodate AILs.

Sizewell Relief Road /B1122

- 3.8.11 The proposed Sizewell Relief Road promoted by Sizewell C is anticipated to open in June 2027. Construction works for Sea Link would be expected to start in 2026, subject to gaining development consent, therefore the use of the bypass would not deliver the Proposed Project on time. An alternative access off the B1122 has therefore been appraised, noting the potential to move to an access off the Sizewell Relief Road once open.
- 3.8.12 This access would introduce a new 2.65 km haul road from the B1122 to the B1119, this would be routed close to a holiday park and have the potential for visual and amenity effects. Access taken off the B1122 would be directly opposite a group of Grade II Listed Buildings, albeit with substantial intervening vegetation; the access would be in proximity of Grade II Listed Buildings where it would connect into the B1119. The access would pass through the side of the former RAF Leiston and a number of areas of that have the potential for archaeology.
- 3.8.13 The access crosses a level crossing close to where it joins the B1119. Improvement works to the level crossing proposed by Sizewell C benefit from planning permission. The Proposed Project would require additional work at the level crossing beyond what is already consented and there is a risk that the level crossing works proposed by Sizewell are either not implemented in time for the commencement of the Proposed Project or clash with the construction of the Proposed Project.
- 3.8.14 This access would require road widening and realignment of the B1119. Vegetation and trees, some of which have the potential to be ancient or veteran, would need to be removed to facilitate this widening.
- 3.8.15 This access would route construction and maintenance traffic on an additional 8 km of the A12 assuming an 85% to 15% split of construction traffic approaching the site from the south and the north respectively. The traffic would also be routed along 6 km of the B1122 routing traffic through Middleton Moor and Theberton (in the absence of the Sizewell Relief Road being in place). This access would also route construction traffic along a 3 km section of the B1119.
- 3.8.16 This access would facilitate AIL movements during construction and maintenance.

Summary of appraisal outcomes

- 3.8.17 The western access was identified as preferred, the reasons for this are summarised below.
- 3.8.18 The western access provides the shortest access off the A12 and minimises the amount of construction traffic on the rest of the local road network. All options would introduce an off-highway access road into the landscape which would be required permanently (or land rights as a minimum to reinstall the access during maintenance). The longer the off-highway section the potential for greater programme implication associated with the time taken to build the access and vehicles travelling along the access. More construction vehicles are also likely to be required to construct the access as more material would be required. The western option has the shortest section of off-highway access road. All options are in proximity to heritage assets. The northern, southern and eastern options all cross RRoW. The northern access is closest to settlement and is technically constrained due to the crossing of the railway and potentially the branch line. The A1094, which would be required to be used for the southern and eastern accesses, is not suitable for AILs, so an alternative AIL route either through Leiston or one of the alternative accesses that are suitable, would be required. The Sizewell Relief Road /B1122 option increases the overall length of the construction access route (8 km additional on the A12 for vehicles from the south), 6 km on B1122, 2.65 km haul road, 3 km on the B1119), approximately 17 km in total. This would result in additional (approximately 30 minutes each way) travel time and associated emissions, noting that this would be reduced for any vehicle approaching from the north. Works associated with the bypass and the level crossing would also introduce third party risks.

Kent Onshore Scheme

Pylon type

- 3.8.19 A decision on the proposed pylon type for the HVAC connection was not made prior to statutory consultation as it was felt further environmental considerations, including ornithological surveys and landscape and heritage surveys, as well as stakeholder engagement and consultation feedback, was required to inform the decision. Making the connection via both full height steel lattice and low height steel lattice was included within the statutory consultation materials.
- 3.8.20 The use of full height standard lattice pylons was identified as preferred. The reason for this is that environmental surveys and assessments concluded that by using full height pylons there was a low collision risk in relation to birds. The use of full height pylons over low height also reduced the total number of new pylons required which, whilst taller, had landscape and visual benefits in relation to reducing the wirescape.

Offshore Scheme

- 3.8.21 No further alternatives were considered at this stage, the evolution of the Offshore Scheme from the defined proposal at Statutory Consultation to that as applied for is set out in **Application Document 7.3 Design Development Report**.

3.9 Conclusion

- 3.9.1 This chapter has set out how the environment and socio-economic considerations of the reasonable alternatives have been considered as part of the development of the Proposed Project. A wide range of alternatives have been considered during the evolution of the Proposed Project design, influenced by the environmental impact assessment process, ground investigations, various consultation stages and feedback received from consultees both through formal consultation feedback and through project meetings. The appraisal has taken into account technical, economic and environmental factors, which have been balanced alongside National Grid's duties.
- 3.9.2 National Grid has undertaken back check and review of the assessments of alternatives throughout the project development, to ensure that decision-making remained valid and to identify any options to further optimise the proposals, as presented within this chapter. This process has enabled National Grid to be confident that the design presented within the application is optimum taking into account the feedback from the assessments and consultation undertaken on the Proposed Project. Further details can be found in the **Application Document 7.3 Design Development Report**.
- 3.9.3 **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project** sets out the description of the project that emerged from the alternatives process.

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