The Great Grid Upgrade

Sea Link

Preliminary Environmental Information Report

Volume: 1

Part 3 Kent Onshore Scheme

Chapter 1 Evolution of the Kent Onshore Scheme

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3.1 Evolution of the Kent Onshore Scheme

3.1.1 Introduction

3.1.1.1 The current stage of Sea Link (hereafter referred to as the Proposed Project) design is the result of an iterative process that commenced at project inception when the initial need to reinforce the network in the South East of England was identified in 2019.

3.1.1.2 **Volume 1, Part 1, Chapter 3, Main Alternatives Considered** describes National Grid Electricity Transmission plc (National Grid's) approach to options appraisal and summarises both the strategic options that have been considered for the Proposed Project and the routeing and siting process. This chapter provides a more detailed summary of the routeing and siting appraisal and design evolution relevant to the evolution of the Kent Onshore Scheme, from the point at which a preferred strategic option was selected to definition of the Kent Onshore Scheme Boundary as illustrated on **Figure 1.1.3 Kent Onshore Scheme Boundary**.

3.1.1.3 This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 3, Main Alternatives Considered**;
- **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**;
- **Volume 1, Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme**; and
- **Volume 1, Part 4, Chapter 1, Evolution of the Offshore Scheme**.

3.1.1.4 This chapter is supported by the following figures:

- **Volume 3, Part 3, Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage**;
- **Volume 3, Part 3, Figure 3.1.2 Kent Onshore Scheme at Non-Statutory Consultation and EIA Scoping**;
- **Volume 3, Part 3, Figure 3.1.3 Evolution of the Kent Onshore Scheme HVAC Connection**;
- **Volume 3, Part 3, Figure 3.1.4 Evolution of the Kent Onshore Scheme Minster Substation and Minster Converter Station**; and
- **Volume 3, Part 3, Figure 3.1.5 Evolution of the Kent Onshore Scheme Underground HVDC Cables and Landfall**.

3.1.2 Summary of the Corridor and Preliminary Routeing and Siting Study relevant to the Kent Onshore Scheme

3.1.2.1 The following sections provide a summary of the Corridor and Preliminary Routeing and Siting Study (CPRSS) (Ref 3.1.1) that is relevant to the evolution of the Kent Onshore Scheme.

Network Connection Point

3.1.2.2 The preferred strategic option identified Richborough substation as the network connection point in Kent as described in **Volume 1, Part 1, Chapter 3, Main Alternatives Considered**. This was used as the basis for defining the routeing and siting study area and the identification of landfall areas of search, converter station site option areas and terrestrial route corridors in Kent.

Routeing and Siting Study Area

3.1.2.3 The routeing and siting study area in Kent extended from Herne Bay on the north Kent coast to Kingsdown on the east Kent coast and, inland, to the settlement of Wingham. The routeing and siting study area is illustrated on **Figure 1.3.1 Routeing and Siting Study Area**.

Landfall Areas of Search

Areas of Search

3.1.2.4 Six landfall areas of search were identified in Kent, which were split geographically across Pegwell Bay, Broadstairs, and the north Kent coast. These are illustrated on **Figure 1.3.3 Kent Landfall Areas of Search**. 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.

Summary of Appraisal Outcomes

Terrestrial constraints

Landfall area of search K1 (Pegwell Bay)

3.1.2.5 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.

3.1.2.6 The whole of the landfall area of search is designated as the Thanet Coast and Sandwich Bay Ramsar and Special Protection Area (SPA), Sandwich Bay Special Area of Conservation (SAC) and Sandwich Bay to Hacklinge Marshes Site of Special Scientific Interest (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 National Nature Reserve (NNR) is located within this landfall area but could be avoided by landing the cable to the south of the River Stour.

3.1.2.7 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.

3.1.2.8 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)

3.1.2.9 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 Marine Conservation Zone (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.

3.1.2.10 North Foreland Golf Course is located within this landfall area of search and was unavoidable.

3.1.2.11 Joss Bay which is a recreational beach is located within this landfall area of search but could be avoided.

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

3.1.2.12 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.

3.1.2.13 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 across the railway.

3.1.2.14 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.

3.1.2.15 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

3.1.2.16 **Volume 1, Part 4, Chapter 1, Evolution of the Offshore Scheme** explains the constraints to routeing and siting of the marine cables. This section provides a high level summary of the relevant marine alignments.

3.1.2.17 It was considered likely that marine alignments to landfall area of search K1 would potentially need to be routed within Goodwin Sands SAC 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 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).

3.1.2.18 The marine approach to landfall area K1a was relatively unconstrainted, 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.

3.1.2.19 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.

3.1.2.20 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.

Overall summary of appraisal outcomes

3.1.2.21 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.

3.1.2.22 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.

3.1.2.23 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.

Converter Station Areas Considered

Areas

3.1.2.24 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 **Figure 1.3.6 Kent Converter Site Option Areas**.

Summary of appraisal outcomes

Converter site Area A

3.1.2.25 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

3.1.2.26 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.

Route Corridors Considered

Route corridors

3.1.2.27 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 **Figure 1.3.10 Kent Terrestrial Route Corridors**.

Summary of appraisal outcomes

3.1.2.28 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.

3.1.2.29 All three of these corridors interacted with several coastal nature conservation designations at the landfall as described in Section 3.1.2 with the blue corridor having the potential for the smallest direct interaction.

3.1.2.30 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).

3.1.2.31 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.

3.1.2.32 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.

3.1.2.33 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.

3.1.2.34 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.

3.1.2.35 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.

Identification of the Initial Preferred Option

3.1.2.36 The evolution of the Kent Onshore Scheme at the routeing and siting stage is illustrated on **Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage, Sheets 1 to 4**.

3.1.2.37 The landfall areas of search, converter site option areas, route corridors and nearshore marine alignments considered at the routeing and siting stage are shown on **Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage, Sheet 1 of 4**.

3.1.2.38 The marine alignments to the north Kent coast were significantly constrained due to exposure risks to the cable and the potential for permanent habitat loss within Margate and Long Sands SAC. This is shown on **Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage, Sheet 2 of 4**.

3.1.2.39 The terrestrial green corridor from landfall K1a was significantly constrained due to the linear belt of settlement which would require the cables to be installed within the public highway for a section and the planning allocations within this corridor. All three corridors from the landfalls along the north Kent coast (green, red and blue) were considered to be significantly constrained due to traffic and access and needing to cross the railway to obtain access to the landfall. This is shown on **Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage, Sheet 3 of 4**.

3.1.2.40 All three corridors that connected with the Pegwell Bay landfall area of search K1 interact with sites designated for their nature conservation value; whilst the blue corridor would reduce that interaction, it was the longest corridor of the three and would require a crossing of the River Stour at a point where is it designated as a Ramsar, SAC, SPA and SSSI. Access to the red corridor was limited and this corridor would also require a crossing of the River Stour. Both the red and green corridors would require a crossing of a golf course. Whilst the green corridor interacted with a larger area of the designated sites for nature conservation this would be temporary and short term and this corridor represented the most direct connection to either of the converter site Areas and had fewer river and road crossings. Converter site Area A facilitated the siting of a converter station close to existing similar infrastructure and reduced the lengths of both High Voltage Direct Current (HVDC) cable from a landfall in Pegwell Bay and the HVAC connection back to the network at Richborough Substation compared to Area B. This is illustrated on **Figure 3.1.1 Evolution of the Kent Onshore Scheme – Routeing and Siting Stage, Sheet 4 of 4**.

3.1.2.41 Landfall K1, Pegwell Bay green corridor to converter site Area A was identified as the initial preferred solution for the Kent Onshore Scheme.

Stakeholder Feedback and Option Refinement

3.1.2.42 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, a new substation and an alternative HVAC connection (either by overhead line or underground cables) was identified. This directly connected onto the existing Richborough to Canterbury 400 kV overhead line. A review was undertaken of the routeing and siting options in Kent based on this revised connection point and, following this review, the conclusions on the landfall Area, cable corridors and converter site Area all remained unchanged.

3.1.3 Kent Onshore Scheme Description at Non-statutory Consultation

3.1.3.1 The Kent Onshore Scheme consulted on during non-statutory consultation is illustrated on **Figure 3.1.2 Kent Onshore Scheme at Non-Statutory Consultation and EIA Scoping** and comprised of:

- HVAC connection, either by overhead line or underground cable, from the existing Richborough to Canterbury 400 kV overhead line to a converter station site;
- A new converter station and substation; and
- A HVDC underground cable from the new converter station to a landfall in Pegwell Bay.

3.1.3.2 The graduated swathes shown on **Figure 3.1.2 Kent Onshore Scheme at Non-Statutory Consultation and EIA Scoping** illustrated the area within the preferred corridors, where, based on the understanding of baseline conditions at the time the HVAC connection, converter station site and underground HVDC cables were likely to be routed/sited.

3.1.4 Kent Onshore Scheme Evolution from Non-statutory Consultation to the Proposed Project

Selection of the HVAC Connection Technology

3.1.4.1 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.

3.1.4.2 Many respondents to non-statutory consultation expressed the view that cables should be underground so as not to impact bird safety or landscape and visual receptors. Respondents also suggested that cables should be routed within, or as close to as possible, to existing cable corridors, and have minimal impacts on ecology, using techniques such as “moling”.

3.1.4.3 The following sections summarise the principal considerations in determining the preferred technology choice.

Landscape and visual

3.1.4.4 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 routeing. 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.

Historic environment

3.1.4.5 There are a number of designated assets within the settlement of Minster to the north as well as Richborough Fort scheduled monument to the south. The overhead line option would therefore have more potential for setting impacts than the underground option however these could be reduced through routeing. The underground option would have more potential for direct physical impacts on non-designated recorded and unrecorded archaeology.

Biological environment

3.1.4.6 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 and 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 routeing of both options or if it cannot be avoided by routeing, 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 are 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

3.1.4.7 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.

3.1.4.8 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.

3.1.4.9 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

3.1.4.10 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.

3.1.4.11 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

3.1.4.12 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.

3.1.4.13 As set out above the ground conditions and soil types present could make soil handing for the underground cable option and the associated trenchless crossings technically challenging.

Selection of the Proposed Project: Kent Onshore Scheme

3.1.4.14 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.

3.1.4.15 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.

3.1.4.16 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 are recognised and have been, and will continue to be, considered and reduced as much as possible through the development of the design of the Proposed Project and the inclusion of mitigation such as bird diverters where required.

3.1.4.17 The Kent Onshore Scheme preferred option is illustrated on **Figure 3.1.2 Kent Onshore Scheme at Non-Statutory Consultation and EIA Scoping**. The Kent converter and substation station are referred to as the proposed Minster 400 kV Substation and Converter Station in subsequent sections.

Evolution of the Design of the Kent Onshore Scheme

Proposed HVAC connection

3.1.4.18 Following the selection of an overhead line as the technology choice for the HVAC connection, the location of the overhead line connection within the non-statutory consultation corridor has been refined through stakeholder feedback to non-statutory consultation and scoping as well as further environmental and technical studies.

3.1.4.19 Stakeholder feedback relating to the routeing and design of HVAC connection included:

- Concerns about the visual impact of the Proposed Project on Kent's natural landscape, especially regarding the implementation of overhead cables on the Minster Marshes.
- Concerns about the impacts of the Proposed Project on local wildlife, particularly in ecologically sensitive areas such as Minster Marshes. Concerns were raised that overhead cables could disrupt bird migration and cause bird fatalities, should they fly into the cables.
- Areas in the Kent area deemed ecologically sensitive by respondents included the Minster Marshes, citing concerns for special terrain and rare bird species that could be disturbed by infrastructure development.
- Some respondents raised concerns about the impacts of the Proposed Project on areas of cultural heritage and archaeology, particularly, World War Two related historical sites, listed buildings and farms, and Roman and medieval sites.
- Concerns were raised regarding the impacts of new infrastructure on Kent's local tourism, citing its natural landscape as a significant attraction.

3.1.4.20 The graduated swathe within the Kent Onshore Scheme Emerging Preference corridor at non-statutory consultation was shown to the north of the River Stour. However, taking account of that feedback and further environmental and technical studies the HVAC connection in combination with the proposed Minster 400 kV substation and Minster Converter Station (proposed to be located within the same compound) has been routed within the south of the non-statutory consultation corridor to reduce the length of overhead line as far as possible. The proposed overhead line is therefore routed from Minster substation to the existing Richborough to Canterbury 400 kV overhead line to the south of the River Stour. This has taken into account the potential for views from the settlement of Minster to the north and potential setting effects on the historic statutory designated sites within the settlement of Minster as well and from Richborough Fort scheduled monument to the south. Reducing the length of the HVAC connection also reduces both temporary habitat loss during construction and any permanent habitat loss associated with the pylon footprints. The location of the draft Order Limits within the within the Kent Onshore Scheme Emerging Preference corridor is shown on **Figure 3.1.3 Evolution of the Kent Onshore Scheme HVAC Connection**.

3.1.4.21 The draft Order Limits extend approximately 600 m beyond the scoping boundary in the southeast in order to facilitate the replacement of an existing pylon on the existing Richborough to Canterbury 400 kV overhead line and along Whitehouse Drove to facilitate a mobilisation access in order to install a temporary bridge crossing of the River Stour, this is explained further in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**. These extensions are not considered to be a material change to the scoping boundary or the proposed scope of the assessments as submitted to the Planning Inspectorate in October 2022 (Ref 3.1.2). The proposed pylon type has not been selected; this will be determined through further environmental considerations, including ornithological surveys and landscape and heritage surveys, as well as stakeholder engagement and consultation. The potential pylon types under consideration are a steel lattice low height pylon and a steel lattice standard height pylon, as explained further in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**.

Proposed Minster 400 kV Substation and Minster Converter Station

3.1.4.22 The location of Minster substation and Minster Converter Station within the non-statutory consultation corridor has been refined through stakeholder feedback to non-statutory consultation and scoping as well and further environmental and technical studies.

3.1.4.23 Stakeholder feedback relating to the siting and the design of Minster substation and Minster Converter Station included:

- Design suggestions regarding the converter station included reducing the scale, being built in cylindrical form to appear as Oast Houses (a form of architecture historical to Kent) and painting it green to blend in with the rural landscape.
- The appearance of any infrastructure associated with the Proposed Project was requested to be designed in accordance with the location's landscape.
- Some respondents raised concerns about the impacts of the Proposed Project on areas of cultural heritage and archaeology, particularly, World War Two related historical sites, listed buildings and farms, and Roman and medieval sites.
- Concerns were raised regarding the impacts of new infrastructure on Kent's local tourism, citing its natural landscape as a significant attraction.

3.1.4.24 At non-statutory consultation the graduated swathe for the converter station was shown in the south of the site Area within the Kent Onshore Scheme Emerging Preference corridor.

3.1.4.25 Taking account of feedback received and further environmental and technical studies the proposed location of Minster substation and Minster Converter Station within the draft Order Limits is in the far south of the of the site option area, to the south of Minster Stream and as illustrated on **Figure 3.1.4 Evolution of the Kent Onshore Scheme Minster Substation and Minster Converter Station**.

3.1.4.26 The proposed location of Minster 400 kV substation and Minster Converter Station has been identified to keep the infrastructure as close as possible to existing energy infrastructure within Richborough Energy Park and the sewage works to the south. This means that it would be seen in the context of this other energy infrastructure in views from the settlement of Minster to the north rather than being seen within the more open marsh landscape and in proximity to the settlement of Minster. This has also taken account of potential setting effects on the historic statutory designated sites within the settlement of Minster as well and from Richborough Fort scheduled monument to the south. Siting within the south of the non-statutory consultation corridor and option area does bring the proposed infrastructure closer to a section of Sandwich Bay to Hacklinge Marshes SSSI, however a buffer would be maintained between the Proposed Project and this designated site.

3.1.4.27 An indicative arrangement for the proposed Minster 400 kV substation is illustrated on **Design Drawing S42_K/TDD/SS/2001** and would comprise a 400 kV substation, anticipated to contain primarily gas insulated switchgear (GIS) within a GIS building, but also including air insulated elements.

3.1.4.28 A typical arrangement for the proposed Minster converter station is illustrated on **Design Drawing S42_K/TDD/SS/2002**.The proposed Minster Converter Station would comprise of a DC hall within which the converter transformers would be housed, valve hall, reactor hall, AC switchyard, control building, strategic spare parts building, Low Voltage (LV) electricity supply, fire deluge pump house, car parking, a permanent access road and landscaping.

3.1.4.29 The proposed Minster 400 kV Substation and Minster Converter Station site would be up to 9 ha in area (excluding landscaping) and the valve halls of the Converter Station could be up to 26 m in height (excluding lightning protection, aerials, walkways, fall arrest equipment and potential architectural treatments (such as soft landscaping)).

3.1.4.30 The design of this structure, in terms of the building form and the external materials, will be developed alongside consultation and stakeholder feedback. A Design Code for the building will be provided with the application for development consent. The Design Code will provide guidance regarding the design intent and design principles that will be adopted and embedded into the detail proposals of this structure.

Proposed underground HVDC Cables and Kent Landfall

3.1.4.31 The location of underground HVDC cables and landfall within the non-statutory consultation corridor has been refined through stakeholder feedback to non-statutory consultation and scoping as well and further environmental and technical studies.

3.1.4.32 Stakeholder feedback relating to the siting and the design of the HVDC underground cables and landfall included:

- Respondents suggested cables should be routed within, or as close to as possible, existing cable corridors, and have minimal impacts on ecology, using techniques such as 'moling'.
- Concerns were raised about the impacts of the Proposed Project on local wildlife, particularly in ecologically sensitive areas such as Pegwell Bay. The protection of badgers, grass snakes, and most notably, birds, including swans, geese, owls, raptors, cranes, falcons and turtle doves, were a priority for many.
- Some respondents raised concerns about the impacts of the Proposed Project on areas of cultural heritage and archaeology, particularly World War Two related historical sites, listed buildings and farms, and Roman and medieval sites.
- Concerns were raised regarding the impacts of new infrastructure on Kent's local tourism, citing its natural landscape as a significant attraction.
- Many respondents questioned whether recreational activities such as walking, fishing and bird watching would be affected by the development, particularly around the Pegwell Bay area. The protection of St. Augustine's Golf Club was also a priority for some respondents.

3.1.4.33 The graduated swathe for the underground HVDC cables at non-statutory consultation was shown through the centre of the corridor. The draft Order Limits broadly follows the graduated swathe as shown on **Figure 3.1.5 Evolution of the Kent Onshore Scheme Underground HVDC Cables and Landfall**.

3.1.4.34 The draft Order Limits remain wide to the west of the A256 Richborough Way due to the potential for unrecorded archaeology within this area. Further surveys including a geophysical survey will be undertaken as the Proposed Project develops to enable micro-routeing through this area to reduce the potential for effects on any unrecorded archaeology.

3.1.4.35 The draft Order Limits also remain wide to the east of the A256 Richborough Way in order to facilitate access off Ebbsfleet Lane into the field to the west of St Augustine's Golf Course to install the underground HVDC cable and provide access the Transition Joint Bay (TJB) which is proposed within this same field, and explained further in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**.

3.1.4.36 The approach to the landfall has been refined following the analysis of the marine survey data collected in summer 2021, avoidance of Cliffsend historical landfill site, and an offset required from the existing Nemo Link cables within Pegwell Bay.

3.1.4.37 The landfall would be a committed trenchless crossing under the sensitive salt marsh habitat within the Pegwell Bay designated sites and this trenchless crossing will also include St Augustine's and Stonelees Golf Course. Further information on trenchless crossing techniques is provided in **Volume 1, Chapter 4, Description of the Proposed Project**.

3.1.4.38 The draft Order Limits extend beyond the scoping boundary to the south by approximately 300 m and the north by approximately 60 m in a number of locations, these are to facilitate mobilisation and maintenance accesses by small vehicles or on foot. These extensions are not considered to be a material change to the scoping boundary or the proposed scope of the assessments as submitted to the Planning Inspectorate in October 2022 (Ref 3.1.2).

3.1.5 The Kent Onshore Scheme

3.1.5.1 The draft Order Limits for the Suffolk Onshore Scheme are shown on **Figure 1.1.3 Suffolk Onshore Scheme Boundary** and **Volume 1, Part 1, Chapter 4 Description of the Proposed Project** provides a description of the proposed Kent Onshore Scheme.

3.1.6 References

Ref 3.1.1 Sea Link Corridor and Preliminary Routeing and Siting Study, National Grid, October 2022 (available at https://www.nationalgrid.com/electricity-transmission/document/146256/download)

Ref 3.1.2 National Grid Electricity Transmission plc, Sea Link Environmental Impact Assessment Scoping Report, October 2022 [online] available at https://infrastructure.planninginspectorate.gov.uk/projects/south-east/sea-link/?ipcsection=docs

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