The Great Grid Upgrade

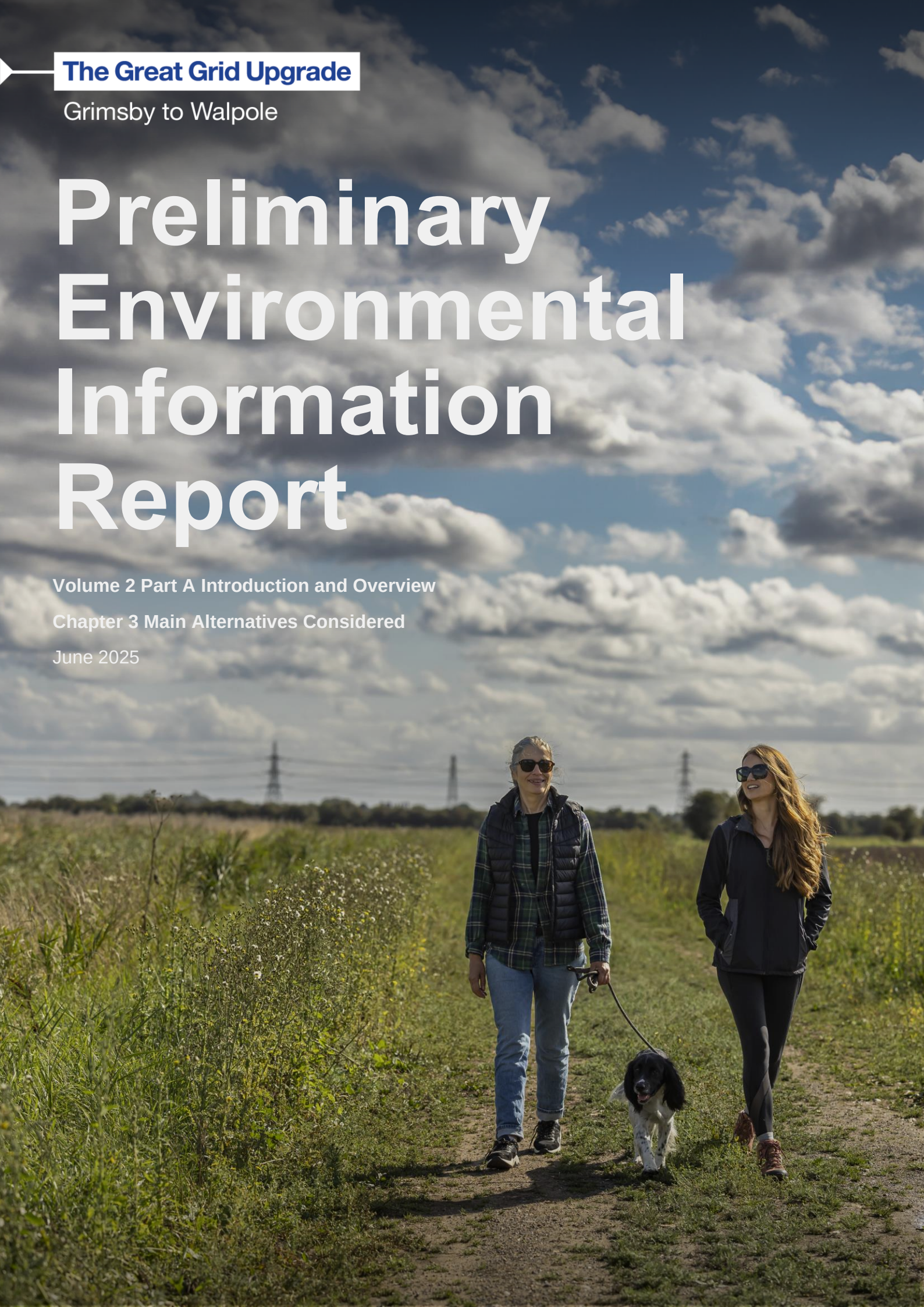
Grimsby to Walpole

Preliminary Environmental Information Report

Volume 2 Part A Introduction and Overview

Chapter 3 Main Alternatives Considered

June 2025



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3. Main Alternatives Considered

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3.1 Consideration of Alternatives

3.1.1 Regulation 14(d) in conjunction with Schedule 4, paragraph 2 of The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (Ref 1) states that an Environmental Statement should include "*a description of reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*."

3.1.2 While there is no statutory requirement to include an assessment of alternatives in the Preliminary Environment Information (PEI) Report, the consideration of alternatives is an integral part of the ongoing development of the Grimsby to Walpole Project (the Project), and so relevant information to allow the reader to understand how the Project has evolved having regard to environmental considerations is included in this chapter.

3.1.3 In agreeing the scope of the EIA with the Planning Inspectorate, the Scoping Report for the Project presented the main alternatives considered from the Corridor Preliminary Routeing and Substation Siting Study (CPRSS) 2024 (Ref 9). Upon providing their scoping opinion, the Planning Inspectorate commented that "*further explanation is to be provided as to why an underground cable was discounted*". The use of underground cables has been addressed in paragraph 3.3.7.

3.1.4 National Grid Electricity Transmission plc (National Grid) undertakes options appraisal for their individual projects. There are often several different ways that a project can be developed, involving different locations, technologies, or designs. Each project requires judgements and decisions about the most appropriate way to achieve the required outcome. The options appraisal process provides information to help inform those judgements.

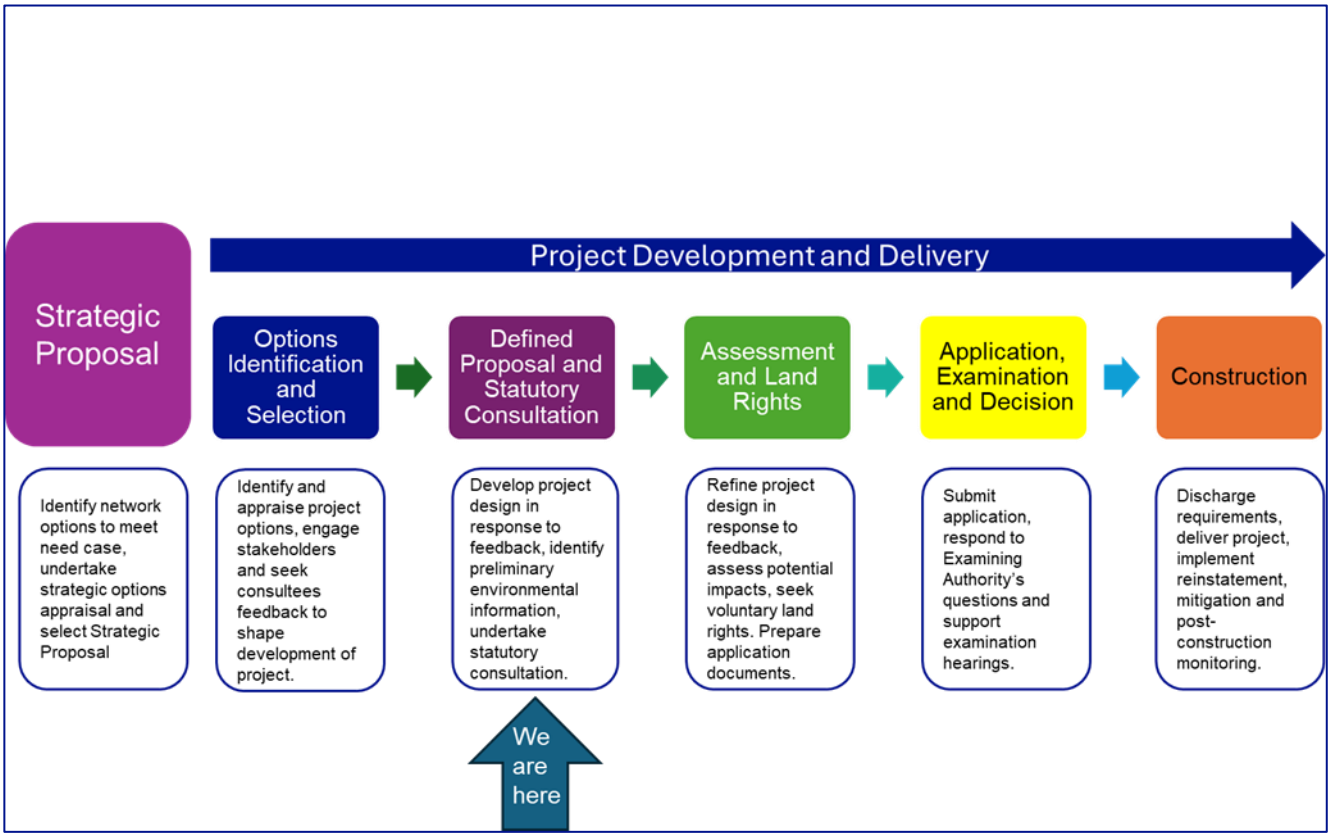
3.1.5 National Grid has been through an iterative options appraisal process to determine the preferred option, which comprises the Project presented on **PEI Report Volume 2 Part A Figure 5.1 Proposed Project Design**.

3.2 National Grid Approach to Options Identification and Selection

3.2.1 Options appraisal is a robust and transparent process that is used to compare options and to assess the positive and negative effects they may have, across a wide range of criteria including environmental, socio-economic, technical, and cost factors. The aim is to determine a preferred option or options that can be consulted upon, taking into account National Grid's statutory duties, established policy and principles, and any other relevant information. Further details on the options identification and selection process can be found in Our Approach to Consenting (Ref 2).

3.2.2 At each stage in the options identification and selection process, transparent methods are used to inform the iterative decision-making and design development processes, including inputs from engineers and environmental consultants. Interim decision making takes into account feedback from prescribed bodies, as defined in the Planning Act 2008 (Ref 3), other stakeholders and the local community through an extensive programme of engagement and consultation. Such feedback continues to be taken into account throughout the process. In addition, the Project has been subject to periodic internal challenge and review to ensure the robustness of the decisions are made in the light of a changing environmental baseline related to technical, physical and economic matters. An Options appraisal has been undertaken for the Project. **Image 3.1** presents where the options appraisal sits in the overall National Grid consenting process and where statutory consultation fits in with the process.

Image 3.1 National Grid's Consenting Process (Ref 2)



3.2.3 Project decisions have considered National Grid's statutory obligations set out in Sections 9 and 38 of the Electricity Act 1989, its licence requirements, policy and guidance including the relevant National Planning Statements (NPS) EN-1 (Ref 4) and EN-5 (Ref 5) and the Holford and Horlock Rules (Ref 6 and Ref 7), which provide industry-guidance on the routeing and siting of electricity transmission infrastructure, and all other relevant considerations.

3.2.4 The following sections of this PEI Report chapter provide a background to the Project and a summary of the alternatives that have been considered at each stage to date. These sections consist of the following:

i. Section 3.3 which summarises the strategic optioneering, as presented in the Strategic Options Report (SOR) (Ref 8).

ii. Section 3.4 which sets out the options identification and selection, as outlined in the Corridor and Preliminary Routeing and Siting Study (CPRSS) (Ref 9).

iii. Section 3.5 sets out the work undertaken to develop the Project from the graduated swathe which was consulted on at Stage 1 consultation and sets out how the proposed route design has been developed.

3.3 Strategic Proposal

3.3.1 Every year the National Energy System Operator (ESO) looks at how much energy needs to be carried on the network in the future and where network capability needs to be improved to accommodate. This starts with identifying a range of Future Energy Scenarios (Ref 10) which inform the analysis in the Electricity Ten Year Statement (Ref 11) which sets out ESO's view of future transmission requirements and where the capability of the transmission network might need to be addressed over the next decade. Transmission owners then respond with solutions to address the requirements identified in the Electricity Ten Year Statement. The NESO assesses and publishes its recommendations as to which proposals should proceed in a NOA report each year. See NOA 2021/2022 (Ref 12) and NOA 2021/2022 Refresh (Ref 13) for further details.

3.3.2 National Grid has also had regard to government targets for offshore wind and the outcomes of the Offshore Transmission Network Review and Holistic Network Design (HND) ensuring that the options identified and selected are future proofed and able to facilitate net zero targets. The HND was published in summer 2022 in parallel with the NOA 2021/2022 Refresh and sets out a blueprint for the connection of the offshore wind needed to meet the Government's 2030 targets, also referred to as the 'Pathway to 2030'.

3.3.3 National Grid Electricity Transmission (NGET) undertook a Strategic Options Review at the Strategic Proposal Stage which identified the most advantageous strategic solution to bring forward. The Strategic Options Review is reported in the SOR (Ref 8) which describes the future network requirements, and the options appraised to meet these requirements. This report addressed two projects in particular, the North Humber to High Marnham and Grimsby to Walpole projects. The consideration of strategic options was part of an iterative process in response to the interaction of a range of emerging energy projects and customer requirements. This report also considered how the projects interact with other proposals, which would connect power flows from the north of England and Scotland, with strategic options for the projects.

3.3.4 As detailed in the SOR the Project is needed to:

i. Connect the growth in the volume of renewable and zero carbon generation to the electricity transmission system in the Humber/Trent and Lincolnshire regions.

ii. To enable the connection of new offshore wind developments, mainly around Scotland and the East Coast of England, with connections at a number of sites along the East Coasts of both Scotland and England.

iii. To accommodate increased power flows from the north and east of Great Britain to the Midlands and south.

iv. To reinforce two 'boundaries' within the transmission system. A 'boundary' in this context splits the system into two parts, crossing critical circuit paths that carry

power between areas and where power flow limitations may be encountered. These boundaries include the north of England to Midlands Boundary and the Midlands to south of England Boundary.

3.3.5 The strategic options review process responds to the need case described in the SOR. The SOR identified a long list of options which were capable of meeting the need case.

3.3.6 A focussed list of strategic options were then taken forward for appraisal and evaluated across a range of environmental, socio-economic, and technical factors. Capital costs were identified for each option based on NGET's recent market knowledge.

3.3.7 Strategic options considered included onshore options as well as offshore options. Technical, environmental and socio-economic factors were not considered to differentiate between onshore and offshore options. However, the offshore options were substantially more expensive than any of the onshore options and onshore options were therefore preferred. The assessment of onshore options was based on overhead lines as the preferred technology choice. This is consistent with National Policy Statement (NPS) EN-5, which states in paragraph 2.9.20 that overhead lines should be the strong starting presumption for electricity networks developments in general. National Grid will, however, consider localised undergrounding where justified. This is discussed further in Section 3.8 in relation to alternatives that have been considered.

3.3.8 The SOR identified a new primarily overhead line connection between a new Grimsby West Substation to a new substation at Walpole via Lincolnshire Connection Substation(s) (LCS) as the emerging preference.

3.3.9 Since the publication of the SOR, further work was undertaken on developing and evolving the strategic option for the East Coast generation group. This concluded that establishment of a new substation at Weston Marsh was necessary. Further information on this can be found in the Addendum to the SOR (Ref 14).

3.3.10 In addition, further work was undertaken to consider potential electrical configuration options in the Walpole area, including looking at options for use of the existing Walpole Substation and potential areas where a new substation could be connected to the network to narrow down the area of search for the routeing and siting stage. This is summarised in the New Walpole Substation Location Options Report (Ref 15) which concluded that the preference for the new Walpole Substation (herein after referred to as Walpole B Substation since the publication of the CPRSS)) was for it to be situated on the Burwell-Walpole circuits.

3.4 Strategic Proposal Review

3.4.1 The Strategic Options Report Update (Ref 16) was prepared by National Grid to present the review of the conclusions of the Strategic Options Report and Grimsby to Walpole – Addendum to Strategic Options Report 2024 (Ref 14), undertaken as part of the ongoing strategic options assessment and decision-making process involved in promoting new transmission projects. The Strategic Options Report Update was prepared after close of the Stage 1 consultation for the Project.

3.4.2 The Strategic Options Report Update considered the revised need case (set out in Chapter 4), and the strategic options for meeting this revised need case. To inform the Strategic Options Report Update, the strategic options were re-assessed to

determine the most appropriate strategic option that meets the updated need case for both the North Humber to High Marnham and Grimsby to Walpole projects.

3.4.3 The Strategic Options Report Update outlined that, without reinforcement, the transmission system between the North and South of England in the B8 and B9 system boundaries, will have insufficient capacity to accommodate contracted and predicted generation connections in the area.

3.4.4 Following the consideration of options to meet system need, the Strategic Options Report Update proposed to continue to take forward the following options:

i. A new primarily overhead line connection between a new Creyke Beck substation to a new High Marnham substation. This Option forms the North Humber to High Marnham project. This Option forms a separate project to Grimsby to Walpole, which will be consented under a separate DCO application.

ii. A new primarily overhead line connection between a new Grimsby West substation to a new Walpole B substation via Lincolnshire Connection substation(s) and new Weston Marsh substation(s) (the Project).

3.4.5 The Strategic Options Report Update also included an update for up to two 400 kV substation(s) at Weston Marsh.

3.5 Options Identification and Selection

3.5.1 Following identification of the Strategic Proposal, National Grid undertook a CPRSS (Ref 9). This presents the findings of the Option Identification and Selection Stage which identified and assessed preliminary route corridors, siting zones and siting areas, and concluded with the identification of an emerging preferred corridor, preferred siting zones and siting areas, forming an end-to-end solution. This section summarises the approach to this stage and the key considerations in the identification and assessment of alternatives. For further detail, please refer to the CPRSS (Ref 9).

Overview of Approach to Routeing and Siting

3.5.2 The routeing and siting approach is a phased process which enables National Grid to make informed and proportionate decisions on the selection of corridors, and allows possible route alignments to be further refined. This process allows for options to be appraised on a comparable basis, so that a preferred option can be identified and progressed.

3.5.3 The methodologies employed for the nine steps, as defined for this Project, of the Options Identification and Selection Stage are summarised in **Image 3.2.**

Image 3.2 CPRSS Methodology (Grimsby to Walpole Corridor Preliminary Routeing and Siting Study, National Grid, 2024)

3.5.4 Once the corridors, siting zones and siting areas had been identified an options appraisal process was undertaken which considered the following four main factors:

i. environmental constraints;

ii. socio-economic factors;

iii. technical considerations; and

iv. cost.

3.5.5 The approach to developing the Study Area for the Project was based on balancing NGET's duty to develop an efficient, co-ordinated and economical system of transmission (Section 9 of the Electricity Act 1989), NGET's environmental duties under Section 38 and Schedule 9 of the Electricity Act 1989, Holford Rule 1 (which is to *"avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence"*) (Ref 6) and Horlock Rule 2 (which is to *"as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections"*) (Ref 7).

Study Area

3.5.6 Given the large geographical extent of the Project, distinct but interrelated Study Areas were defined further to the SOR (Ref 8) and SOR Addendum (Ref 14) for each component of the Project. Five distinct Study Areas were identified, one for each component of the Project (new 400 kV overhead line connection, New Grimsby West Substation, the New LCS A and the New LCS B, New Weston Marsh Substation A and B, and the New Walpole B Substation) through a five-phase process which is detailed in the CPRSS (Ref 9) and illustrated on **PEI Report Volume 2 Part A Figure 3.1 Routeing and Siting Study Area**.

Identification of Siting Zones and Siting Areas

3.5.7 A siting area is an area which has the capacity to accommodate the siting of a single substation. A siting zone is an area which has the capacity to accommodate multiple siting areas.

3.5.8 The identification of the siting zones and siting areas takes into consideration the key drivers for each substation, the technical parameters and the relevant environmental and technical constraints identified.

3.5.9 In siting substations, areas that benefit from the below factors were identified:

i. the availability of existing screening elements and the potential to introduce additional screening elements;

ii. proximity to major roads, to minimise the extent of required new access roads; and

iii. outside of flood zones of a medium risk (Flood Zone 2) and high risk (Flood Zone 3), in line with the policy tests (sequential and exception tests) as set out in Section 5 of NPS EN-1 (Ref 4).

3.5.10 Where the identified Study Area for siting zones resulted in the identification of one zone, then preliminary siting areas were identified. Identification of the siting zones

and siting areas was informed by the Horlock Rules (Ref 7) and Holford Rules (Ref 6) to take account of the combined effects of both the substations and the overhead line connections. The following guiding principles informed identification:

i. Using or adapting existing infrastructure will generally be of benefit/advantage compared with creating new infrastructure.

ii. Using available brownfield land will generally be of benefit/advantage compared with utilising greenfield land.

iii. Shorter routes (for overhead line or underground connections) will generally be of benefit/advantage compared with longer routes, as smaller scale infrastructure projects are generally likely to have lower environmental, safety, sustainability, and cost implications (for comparable technology options).

iv. Financially less-expensive options, both in terms of capital and lifetime cost, will generally be of benefit/advantage, as these support NGET's statutory duty under Section 9 of the Electricity Act 1989 to develop and maintain an 'efficient, co-ordinated and economical' transmission network.

v. Options which avoid or minimise and mitigate impacts on environmental or socio-economic features will generally be of benefit/advantage compared with those which have likely significant effects, as less environmentally damaging or socially disruptive sites support NGET's statutory duty under Schedule 9 of the Electricity Act 1989 to 'have regard to the desirability of preserving amenity', and will more readily achieve consent.

3.5.11 The identification of siting zones and siting areas was then taken into consideration when identifying corridors for overhead lines and, where required, underground cables.

New Grimsby West Substation

3.5.12 Due to the size of the Grimsby West Study Area, it was considered that it effectively constituted a siting zone. Therefore, it was considered appropriate to instead identify potential siting areas within this siting zone (referred to as the 'Grimsby West Zone'). The identification of potential Grimsby West siting areas was undertaken taking into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.13 The appraisal at CPRSS stage assumed a functional footprint of the substation, assuming an Air Insulated Switchgear (AIS) substation, of up to 600 m by 200 m (approximately 12 ha) dependent upon the number of connections required. Based on this broad technical parameter, landscape specialists, using Geographic Information Systems mapping software, identified potential siting areas within the Grimsby West Zone. The siting areas identified were sufficient in size for siting of the New Grimsby West Substation.

3.5.14 Key drivers for the location of a New Grimsby West Substation include:

i. Seek to minimise the length of connections between the new substation and the existing 400 kV overhead line between Grimsby and Keadby, for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

ii. Seek to minimise the length and technical complexity of connections between the new substation and the existing Northern Power Grid (NPG) 132 kV

substation, for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

iii. Seek to utilise land owned by NGET, to minimise the extent of development which would be required on third-party land, and therefore socio-economic impacts and costs.

3.5.15 The Grimsby West Siting Zone has avoided most environmental features. Therefore, the identification of potential siting areas was driven by the proximity to existing transmission infrastructure and the presence of existing wind turbines, the proposed Aura Power Solar Farm, the residential property at Pyewipe Farm and blocks of woodland. Taking these into consideration, five siting areas were identified, from west to east these are:

i. Siting area GW1 – an area approximately 800 m by 1,200 m, located north-west of Aylesby and existing wind turbines which encompasses the existing 400 kV overhead line to the north.

ii. Siting area GW2 – an area approximately 800 m by 600 m, located immediately north of Aylesby and south of existing wind turbines.

iii. Siting area GW3 – an area approximately 800 m by 700 m, located east of Aylesby and north-east of Laceby. Aylesby Road travels through the centre of the site.

iv. Siting area GW4 – an area, approximately 600 m by 500 m, located west of Wybers Wood and immediately north of Laceby Beck, Aylesby Road travels through the north-west.

v. Siting area GW5 – an area approximately 900 m by 600 m, located west of Wybers Wood which encompasses the existing 400 kV overhead line, the National Grid and NPG substations at Grimsby West.

3.5.16 The identified siting areas were then subject to a back-check and review and further analysis by the project team. The review resulted in the removal of siting area GW4 as it was identified that the siting area was wholly covered by a local plan housing allocation for the Grimsby West Urban Extension (GWUE).

3.5.17 The Grimsby West siting zones are illustrated in **PEI Report Volume 2 Part A Figure 3.3 Grimsby West Siting Zones**.

Selection of the preferred option

3.5.18 As identified in the CPRSS (Ref 9), environmentally there were few factors to differentiate between each of the siting areas for the New Grimsby West Substation. Siting area GW3 had comparatively less interaction with the identified socio-economic and environmental features than other siting areas. However, siting area GW3 also had comparatively less existing screening to limit visual intrusion, was located closest to Laceby Beck and its associated flood zone and was in proximity to residential receptors at Pyewipe Farm. Although, siting areas GW1 and GW2 were located furthest from Laceby Beck and residential receptors, they both had a considerable overlap with the Grimbsy Solar Farm (previously referred to as the Aura Farm Solar Farm) and siting area GW1 overlapped with the Viking Carbon Capture Storage (CCS) Nationally Significant Infrastructure Project (NSIP) and was within 250 m of Lindens Farm Airstrip. Siting area GW5 overlapped with the Grimsby Solar Farm (previously referred to as the Aura Farm Solar Farm) and the GWUE allocation,

however it also offered the greatest opportunity to reuse existing infrastructure and to limit the spread of development (and associated impacts) by the opportunity to take advantage of existing screening provided by vegetation.

3.5.19 From a technical perspective, there were notable factors to differentiate the siting areas for the New Grimsby West Substation. The presence of the Grimbsy Solar Farm (previously referred to as the Aura Farm Solar Farm) overlapped with siting areas GW1, GW2 and GW5, and Viking CCS NSIP overlapped with siting area GW1 which would have increased the technical complexity of substation design to avoid these proposed assets. Additionally, siting areas GW2, and GW3 would have required more complex connections to the existing NPG 132 kV substation. The presence of major existing buried statutory undertaker assets would have also substantially constrained the flexibility for siting within siting area GW1 and, to a lesser extent, constrained siting flexibility within siting areas GW2 and GW3. Siting area GW5 offered the comparatively better location for siting the new Grimsby West Substation from a technical perspective due to its proximity to the existing 400 kV 4 KG overhead line and NPG 132 kV substation. It also offered the opportunity for reduced civil infrastructure associated with permanent access and would have therefore been less complex to deliver. An additional benefit of the siting area GW5 was that it provided the opportunity to utilise existing land within NGET ownership.

3.5.20 Overall, when considering all features within the Study Area, siting area GW5 offers the best opportunity for flexible siting. The opportunity to reuse existing infrastructure and land within NGET ownership, combined with the presence of existing screening vegetation allows the footprint of any substation in the area to be limited and well screened (limiting intrusion in the surrounding area in line with the Horlock Rules) from nearby sensitive receptors, respectively. Additionally, the proximity of GW5 to the existing 400 kV 4 KG overhead line and NPG 132 kV substation alongside opportunities to reduce additional civil infrastructure and permanent access requirements means that it would be less technically complex to construct. Therefore, from the assessment of the siting area options, siting area GW5 was identified as the emerging preference for the New Grimsby West Substation.

New Lincolnshire Connection Substations

3.5.21 The Project proposes the construction of two New Lincolnshire Connection Substations (LCS) which are required to provide new connection points on the network. The northernmost LCS is referred to as the New LCS A, whilst the southernmost LCS is referred to as the New LCS B. The substations will be connected by the new 400 kV overhead line. The appraisal at CPRSS stage assumed a functional footprint of the substations, assuming that they are both AIS substations, of up to 700 m by 200 m (approximately 14 ha). This excluded related development including access arrangements, drainage, landscaping and other environmental works.

3.5.22 The identification of potential siting zones for the LCS (the New LCS A and the New LCS B), was undertaken, taking into consideration the required land take of each new LCS, assumptions around the location and extent of other customer or planned transmission connection infrastructure, environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.23 Key drivers for the location of two new LCS include:

i. Seek to identify locations which provide the potential for infrastructure (required to facilitate a connection to the two new LCS and into the electricity transmission

network) for contracted and planned projects, to be in reasonable proximity to the two new LCS as part of a co-ordinated approach to transmission applications outlined in NPS EN-1 (Ref 4). The connection of these projects to the two new LCS is a key project driver.

ii. Balance the distance from the coast (to minimise the length of connections from potential landfall locations for contracted and planned projects) against the potential need for considerable overhead line deviations.

iii. Consider the pattern of development and/or environmental features between the two new LCS and the coast to avoid locating where these may significantly constrain connections by contracted and planned projects.

3.5.24 Review of a long-list of 19 relatively unconstrained areas identified that some were contiguous and some very close to each other. Where this was the case, the relatively unconstrained areas were grouped, resulting in 12 LCS siting zones which were considered in the Options Appraisal. From north to south these were:

i. Siting zone LCS1 – an area, approximately 2 km by 2 km, located north-east of South Cockerington and generally east of (partially overlapping) North Cockerington.

ii. Siting zone LCS2 - an area, approximately 2.9 km by 2 km, located east of Grimoldby and Manby, it encompasses the B1200 which routes east to west across the siting zone.

iii. Siting zone LCS3 - an area, approximately 2.5 km by 1.9 km, located east of Great Carlton and north of Gayton le Marsh.

iv. Siting zone LCS4 – an area, approximately 1.6 km by 1.4 km, located south of Little Carlton, south-west of Great Carlton, north-east of Castle Carlton and north of South Reston.

v. Siting zone LCS5 - an area, approximately 2 km by 1.1 km, located south-west of Woodthorpe, north-west of Galley Hill and north of Greenfield Wood/Mother Wood.

vi. Siting zone LCS6 - an area, approximately 2.7 km by 2.1 km, located south of Beesby, north of Thoresthorpe and immediately east of Saleby (Saleby is encompassed within the siting zone), it encompasses the A1120 which routes along the western edge of the siting zone.

vii. Siting zone LCS7 – an area, approximately 3.3 km by 2 km, located south of Galley Hill, west of Saleby, north of Tothby (encompassed within the siting zone) and Alford) and east of Greenfield Wood/Mothers Wood, it encompasses the A1120 which routes along the eastern edge of the siting zone.

viii. Siting zone LCS8 - an area, approximately 3.6 km by 2.6 km, located south of Markby, encompasses Asserby, east of Huttoft and north of Thurlby, it encompasses the A1111 which routes north to south along the western edge of the siting zone.

ix. Siting zone LCS9 - an area, approximately 2.4 km by 1.5 km, located south of Alford, east of Farlesthorpe and west of Mawthorpe, it encompasses the B1196 which routes north to south long the western edge of the siting zone.

x. Siting zone LCS10 – an area, approximately 3.1 km by 2.1 km, located south-east of Willoughby, encompasses Sloothby, north of Boothby and east of Welton Low Wood.

xi. Siting zone LCS11 – an area, approximately 2.2 km by 1.4 km, located directly west of Manby and north-east of Little Carlton, it encompasses Manby Showground and the B1200 routes from west to east along the northern edge of the siting zone.

xii. Siting zone LCS12 – an area, approximately 2.8 km by 1.7 km, located south-west of Strubby, south-west of Maltby le Marsh, north-west of Beesby, north-east of Woodthorpe, it encompasses the B1373 which routes south-east to north-west in the west of the siting zone.

3.5.25 The LCS siting zones are illustrated in **PEI Report Volume 2 Part A Figure 3.4 LCS Siting Zones**.

Selection of the preferred option

3.5.26 As identified in the CPRSS (Ref 9), from an environmental perspective, there were different preferences for each topic (for example, siting zones LCS5, LCS6, LCS8, LCS11 were more preferred from a landscape and visual perspective but may not be preferred when considering other environmental topics) such that no one LCS siting zone emerged as the clearly preferred option. However, considering the scale of the infrastructure to be sited for the LCS (including the potential implications of overhead line entries), those impacts related to landscape and visual were considered to carry the most weight in decision making. Therefore, the least preferred siting zones were LCS9 and LCS10.

3.5.27 Consideration of environmental and technical matters as well as the Holford and Horlock Rules informed the identification of a preferred siting zone. From a technical standpoint, those siting zones which performed the worst and were least preferred were Siting Zones LCS1, LCS3, LCS4, LCS9, and LCS10. Of the remaining siting zones (LCS2, LCS5, LCS6, LCS7, LCS8, LCS11 and LCS12), there were constraints still present meaning technical complexity was still a consideration. In considering these constraints, no one siting zone was considered preferred.

3.5.28 A comparative appraisal was then undertaken which considered the potential environmental, socio-economic, technical, Holford and Horlock Rules implications of siting the New LCS A and the New LCS B in the various combinations of these identified LCS siting zones. The LCS siting zones looked at for this included LCS5, LCS6, LCS7, LCS8, LCS11 and LCS12. The combinations of siting zones were:

i. LCS5 – this LCS siting zone could be combined with either LCS6, LCS7, LCS8, LCS11 or LCS12.

ii. LCS6 – this LCS siting zone could be combined with either LCS5, LCS7, LCS8, LCS11 or LCS12.

iii. LCS7 – this LCS siting zone could be combined with either LCS5, LCS6, LCS8, LCS11 or LCS12.

iv. LCS8 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS11 or LCS12.

v. LCS11 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS8 or LCS12.

vi. LCS12 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS8 or LCS11.

3.5.29 Overall, after considering the emerging preferences for the overhead line Corridor and the LCS siting zones in combination, the CPRSS (Ref 9) identified a hybrid zone of LCS6 and LCS8 (resulting in LCS6/8) and an amended LCS5 siting zone as the preferred siting zones. The amended LCS5 siting zone includes two areas immediately adjacent to the south-east and south-west of the original LCS5 siting zone, providing additional flexibility for siting without significantly increasing the potential for significant environmental effects. LCS6/8 is a combination of LCS6 and LCS8 and includes the area between the two zones. This combination will help to limit the technical complexity of siting, and potentially limit the impacts upon the water environment and designated heritage assets.

New Weston Marsh Substation

3.5.30 At CPRSS stage it was identified that the New Weston Marsh Substation will connect a new 400 kV transmission line to the New Walpole B Substation. In addition, the new Weston Marsh Substation will connect to the existing 400 kV 4ZM transmission line that runs south east of Sleaford towards King's Lynn, and the existing 400 kV 2WS transmission line that runs east of Spalding towards a Tee-Point with the 400 kV 4ZM transmission line between Sleaford and King's Lynn. Due to the proposed location of the New Weston Marsh Substation, it will also enable flexibility as the design evolves in relation to the connection of the New LCS B circuit to the rest of the transmission network.

3.5.31 The appraisal at CPRSS stage assumed a functional footprint of the substation, assuming that it is an AIS substation, of up to 700 m by 200 m (approximately 14 ha). This excluded related development including access arrangements, drainage, landscaping and other environmental works.

3.5.32 The identification of potential Weston Marsh siting zones took into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.33 Key drivers for the location of the New Weston Marsh Substation include:

i. The existing 400 kV 2WS overhead line currently has lower capacity conductors compared to the remainder of the circuits between Bicker Fen and Walpole. This is currently limiting the amount of power which can safely flow on the 400 kV 4ZM overhead line. By turning in both the 400 kV 4ZM and 2WS overhead line routes into a new Weston Marsh Substation this issue is resolved, as north-south power flows between the Bicker Fen Substation and Walpole B Substation can bypass the 400 kV 2WS overhead line via the New Weston Marsh Substation. Seeking to locate close to the Spalding Tee-Point will minimise the extent of required diversions to the existing overhead lines to facilitate the turn-in of the circuits to the new Weston Marsh Substation.

ii. Seek to identify locations which provide the potential for infrastructure (required to facilitate a connection to the new Weston Marsh Substation and into the electricity transmission network) for contracted projects to be in reasonable proximity to the new Weston Marsh Substation. The connection of these projects to the New Weston Marsh Substation is a key driver for the substation.

iii. Seek to have two separate circuits heading south from the Spalding Tee-Point to the existing Walpole Substation and a New Walpole B Substation to improve overall resilience of the energy network.

iv. Seek to locate close to the Spalding Tee-Point to minimise the length of circuit reconfiguration of the existing 400 kV 4ZM overhead line between Sleaford and the New Walpole B Substation, and the 400 kV overhead lines into the new substation, for reasons of operational efficiency and resilience and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

3.5.34 The identification of potential siting zones was driven by the presence of scattered residential properties, blocks of woodland, a dense drainage network, and proximity to the Spalding Tee-Point. Taking these factors into consideration four siting zones were identified. From west to east these were:

i. Siting zone WMZ1 - an area, approximately 3.8 km by 1.7 km, located north of the River Welland. The Risegate Eau waterbody crosses from north-west to south-east, and the A16 and 400 kV 4ZM overhead line crosses the west of the siting zone.

ii. Siting zone WMZ2 – an area, approximately 5.2 km by 2.1 km, located east of the River Welland (which is at the west of WMZ1) and at the Spalding Tee-Point. The 400 kV 4ZM and 2WS overhead lines cross the centre and east (respectively) of the siting zone.

iii. Siting zone WMZ3 – an area, approximately 3.4 km by 2.3 km, located adjacent to the Spalding Tee-point. The 400 kV 4ZM overhead line crosses the centre of the WMZ3 and the 400 kV 2WS overhead line is adjacent to the east of the siting zone.

iv. Siting zone WMZ4 – an area, approximately 3.2 km by 3.7 km, located north-east of the Spalding Tee-Point. The B1357 and A17 cross the centre of the WMZ4 from north to south.

3.5.35 The Weston Marsh siting zones are illustrated in **PEI Report Volume 2 Part A Figure 3.5 Weston Marsh Siting Zones**.

Selection of the preferred option

3.5.36 As identified in the CPRSS (3.9.1Ref 9), Siting zone WMZ4 was overall the least environmentally preferred due to its proximity to The Wash designated sites and length of the diversions required to connect the existing 400 kV overhead lines (2WS and 4ZM). Siting in WMZ4 would have resulted in greater intrusion of infrastructure into the surrounding environment. When comparing the other siting zones there was less to differentiate between them. WMZ1 was more distant from heritage assets but would have required a longer diversion of the 2WS 400 kV overhead line (over the River Welland which may have required taller pylons) and may have interacted with siting of the Outer Dowsing Offshore Wind Farm. Therefore, siting in WMZ1 was less preferred. Siting zones WMZ2 and WMZ3 were closest to the Spalding Tee-Point and, if siting near it, were generally distant from surrounding receptors which would help to limit the spread of infrastructure into the surrounding area. From a technical perspective, there were notable factors to differentiate between the Weston Marsh siting zones. Siting zones WMZ2 and WMZ3 would limit the construction works and

complexity for overhead line diversions (2WS and 4ZM) given their proximity to the Spalding Tee-Point, whereas these would be increased at WMZ1 and WMZ4.

3.5.37 Overall, when considering all features and constraints relevant to the siting of the new Weston Marsh Substation, there was little to choose between WMZ2 and WMZ3 (assuming careful siting). WMZ2 was marginally preferred from an environmental perspective and WMZ3 was marginally preferred from a technical perspective. Both siting zones offered the best opportunities for flexible siting whilst reducing the intrusion of infrastructure, and therefore environmental impacts (in line with the Horlock Rules), into the surrounding area.

3.5.38 After considering the emerging preferences of the Corridor and Weston Marsh siting zones in combination, siting zone WMZ2 was identified as the emerging preference.

New Walpole B Substation

3.5.39 The New Walpole B Substation will connect to the existing 400 kV 4ZM transmission line that runs north from Burwell towards the existing 400 kV Walpole Substation. The appraisal at CPRSS stage assumed a functional footprint of the substation, assuming that it is an AIS substation, of up to 800 m by 200 m (approximately 16 ha). This excluded related development including access arrangements, drainage, landscaping and other environmental works.

3.5.40 The identification of potential Walpole siting zones took into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.41 Key drivers for the location of the New Walpole B Substation include:

i. Seek to identify locations to provide the required reinforcement of the electricity transmission system to provide additional north-south power flows per the SOR Addendum (3.9.1Ref 14).

ii. Seek to identify locations which provide the potential for EGL3 and EGL4 infrastructure (required to facilitate a connection to the New Walpole B Substation and into the electricity transmission network) to be in reasonable proximity to the new Walpole B Substation as part of a co-ordinated approach to transmission applications outlined in NPS EN-1 (3.9.1Ref 4). The connection of these future projects to the New Walpole B Substation is one of the key drivers for the substation.

iii. Seek to locate close to the existing 400 kV 4ZM overhead line between Burwell and the existing Walpole Substation to minimise the length of circuit reconfiguration and 400 kV overhead lines into the new substation for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

3.5.42 The identified siting zones for the New Walpole B Substation for consideration at Options Appraisal from north to south were:

i. Siting zone WLP1 – an area, approximately 1.8 km by 1.4 km, located west of the A1101, south-east of the North Level Main Drain and north of Newton–in–the-Isles.

ii. Siting zone WLP2 - an area, approximately 1.3 km by 1.1 km, located west of the River Nene, east of the A1101, north-west of the Wisbech Compressor Gas (Wisbech Compressor) Station and south-west of Foul Anchor.

iii. Siting zone WLP3 - an area, approximately 1.7 km by 0.9 km, located west of the River Nene, east of the A1101 and Newton, north-west of the Wisbech Compressor Station and south-west of Foul Anchor.

iv. Siting zone WLP4 – an area, approximately 2.5 km by 0.9 km, located east of the River Nene, south-east of the existing Walpole Substation and north-west of West Walton.

v. Siting zone WLP5 - an area, approximately 2.7 km by 1.5 km, located directly south of the Rose and Crown Farm Solar Farm, north of Walton Highway and West Walton.

vi. Siting zone WLP6 - an area, approximately 2.5 km by 1.6 km, located south-west of Emneth, north-east of Outwell and east of Friday Bridge.

3.5.43 The Walpole B siting zones are illustrated in **PEI Report Volume 2 Part A Figure 3.6 Walpole B Siting Zones**.

Selection of the preferred option

3.5.44 As identified in the CPRSS (Ref 9), environmentally there were few factors to differentiate between each of the siting zones when considering the siting of the Walpole B Substation in isolation. However, when also considering the required diversions of the 4ZM (Burwell to Walpole) 400 kV overhead line to the siting zones, there was a strong preference for siting zones that avoided multiple overhead line crossings of the River Nene. Therefore, WLP4, WLP5 and WLP6 were more preferred. Each of these siting zones presented different opportunities for siting; WLP5 and WLP4 would reduce the length of diversions of the 4ZM 400 kV overhead line and limit the spread of impacts into the surrounding areas, whereas WLP6 was likely to result in a spread of impacts into the surrounding areas but was wholly located outside of Flood Zone 3 (albeit upon a denser drainage network).

3.5.45 From a technical perspective, there were notable factors to differentiate between the siting zones. Most notably, the closer proximity of WLP4 and WLP5 to the 400 kV 4ZM (Burwell to Walpole) overhead line would necessitate significantly less connection infrastructure compared with the other siting zones. Though it is noted that more infrastructure would have been required to develop permanent accesses (or upgrade existing roads) to these siting zones compared to others given their distance from nearby A-roads. The concentration of existing infrastructure within WLP1, WLP2, and WLP3 would have limited the flexibility for siting (such as orientations), increased the complexity of construction and, in the case of WLP2, would have likely resulted in outages being required during construction. It was recognised that the Rose and Crown Solar Farm may have posed a slight technical challenge for siting within WLP5 and that the proposed Grantham to Bexwell pipeline NSIP may have conflicted with siting in WLP6.

3.5.46 When considered in isolation, siting zones WLP4, WLP5 and WLP6 were the emerging preferences for the New Walpole B Substation. Following consideration of the emerging preferences of the Corridor and Walpole siting zones in combination, a combination of siting zones WLP4 and WLP5 (resulting in WLP4/5) was identified in the CPRSS (3.9.1Ref 9) as the emerging preference for the Walpole siting zone.

Route Corridor Options

3.5.47 The preliminary route corridor options were identified in the CPRSS (Ref 9) between the start and end points for the Project, as illustrated on **PEI Report Volume 2 Part A Figure 3.2 Corridors (Overhead lines)**. The complex network of corridors were divided into 'Sections,' with a series of connection links. This allowed an emerging preference to be identified using a series of sections of one corridor, via connection links where relevant, to a series of sections of another, to bypass areas of greater constraint and create an 'end-to-end' solution taking account of the siting of substations.

3.5.48 As noted above, because complex, overlapping permutations of preliminary corridors were identified, they were divided into discrete parts called 'sections,' so that each individual section could be appraised without duplication. The individual sections of the corridor are as follows:

i. Western Corridor options have the prefix 'W' e.g., western option Section 1 is known as Section W1;

ii. Eastern Corridor options have the prefix 'E';

iii. Central Corridor options have the prefix 'C';

iv. Southern Corridor options have the prefix 'S'; and

v. Northern Corridor options have the prefix 'N'.

3.5.49 The links are named according to the Section they join, e.g. E4-C4 provides a link from section E4 of the Eastern Corridor to section C4 to the Central Corridor.

3.5.50 The CPRSS (3.9.1Ref 9) identified a network of potential corridors and links which are shown in **PEI Report Volume 2 Part A Figure 3.2 Corridors (Overhead lines)**. The Corridor options emerging as preferred from the CPRSS are listed below.

Grimsby West to Burgh le Marsh

Selection of the preferred route

3.5.51 Within the CPRSS (3.9.1Ref 9), Sections and Links were considered in different stages. Stage 1 considered the best performing Sections between the 4ZM 400 kV overhead line and the A46. The result of this was progression of Sections W1, E1 and C1.

3.5.52 Stage 2 considered the best performing Sections and Links between the A46, North Thoresby and North Cotes. As a result, an overhead line using the Sections C2 to C6 was preferred to limit impacts on the Area of Outstanding Natural Beauty (AONB) (its setting and views/from the AONB) and visual receptors (at the more populated urban fringes of Grimsby and Cleethorpes) and reduce technical complexity and environmental impacts associated with narrower areas or underground cabling. This is followed by Link C4-W4/W4-C4 and Link W4-C4, which were progressed to increase the routeing flexibility for overcoming the narrower area in Section C4 between Brigsley and Waltham.

3.5.53 Stage 3 considered the best performing Sections and Links between North Cotes and Burgh le Marsh. As part of this, Sections W7 to W13 were preferred as they avoided constrained areas of reservoir flooding, Flood Zone 2 and 3, the Louth Canal, ecologically designated sites along the Lincolnshire Coast and cumulative

visual impacts with existing wind farms and formed a more direct route. This is followed by Sections E12 to E14 which were preferred as they reduced the potential for impacts on the setting of the AONB, receptors at Alford, the grade II Well Hall Registered Park and Garden and avoided the Branch Line Local Nature Reserve and peaty soils through the avoidance of Section W14. Finally, Link E12-W13/W13-E12 was progressed as use of this Link is comparatively free of constraints and would allow the convergence of the two component routes outlined above.

3.5.54 Overall, after considering the emerging preferences of the Corridor in combination with substation siting zones, Section E1, Sections C1 to C6, Sections W7 to W13, Link W13-E12, Sections E12 to E14 and Section C7 emerged as the preferred option in the CPRSS (3.9.1Ref 9).

Burgh le Marsh to Weston Marsh

Selection of the preferred route

3.5.55 Within the CPRSS (3.9.1Ref 9), Sections and Links were considered at different stages. Stage 1 considered the best performing Sections and Links between Burgh le Marsh and Frithville. As a result, using Sections C8 to C13 was preferred provided that the route through Sections C8 and C9 routed further from the National Grid Electricity Distribution 132 kV overhead line (seeking to limit potential landscape and visual impacts), as they avoided a route in proximity to the AONB and denser settlement pattern further north and the National Site Networks and Ramsar sites and expansive views further south. These Sections were considered to connect well to the previous emerging preference of Section C7. Furthermore, use of Sections N6 and N7 was preferred as they have few material constraints to routeing an overhead line and allow for a more direct route (in line with Holford Rule 3).

3.5.56 Stage 2 considered the best performing Sections and Links between Frithville and the B1397 Spalding Road. A route using Sections C14 to C16 were preferred as they provide a more direct route and contain few features that significantly constrain the routeing of an overhead line. This is followed by routeing through Section S8 into Section S9 which would allow an overhead line route to be more direct (and therefore in greater compliance with Holford Rule 3). Routeing via the western leg of Section S9 and into Sections S10A and S11 was preferred and was considered less likely to create a wirescape with the 4ZM 400 kV overhead line or result in encircling settlements. Furthermore, use of Link C16-S8 allowed the most direct route to be taken between the preferred Sections C16 and S8.

3.5.57 Stage 3 considered the best performing Sections and Links between the B1397 Spalding Road and Weston Marsh. There are few material constraints to routeing within Section C20 and use of Section C21A was preferred as it would avoid crossing the 4ZM 400 kV overhead line.

3.5.58 Overall, the emerging preferred overhead line route between Burgh le Marsh and Weston Marsh (in order from north to south) was Sections C8 to C13, Sections N6 to N7, Sections C14 to C16, Link C16-S8, Sections S8 to S10A, Section S11, Section C20 and Section C21A.

Weston Marsh to Walpole

Selection of the preferred route

3.5.59 Within the CPRSS (3.9.1Ref 9), a number of Sections and Links were considered in the area. Sections C22 to C28A were identified as the preferred Sections and while technical complexities and environmental challenges exist within the Central Corridor (Sections C22 to C28A), it is considered that these can be mitigated through careful routeing. A route using this Corridor (compared to the Northern Corridor) is also unlikely to require acquisition or direct oversail of residences.

Option Selection

3.5.60 The Option Selection process is presented in Chapter 13 of the CPRSS. In summary, the preferred end-to-end solution comprises the following:

i. Grimsby West Substation – GW5;

ii. Grimsby West to the LCS – Section W1 or E1, Sections C2 to C6, Sections W7 to W12, Link W12-E12, Sections E12 to E14 and Section C7;

iii. LCS – LCS5 and LCS6/8;

iv. LCS to Weston Marsh – Sections C8 to C13, Sections N6 to N7, Sections C14 to C16, Link C16-S8, Sections S8 to S10A, Section S11, Section C20 and Section C21A;

v. Weston Marsh – WMZ2;

vi. Weston Marsh to Walpole – Section C22 to C28A; and

vii. Walpole – WLP4/5.

3.5.61 An overview of the preferred end-to-end solution including the preferred substation siting zones can be found in **PEI Report Volume 2 Part A Figure 3.9 End to End Solution**.

3.5.62 Within the CPRSS, a graduated swathe was also developed. The graduated swathe was both preliminary and indicative of where infrastructure is more or less likely to be located. The following figures present the graduated swathe:

i. **PEI Report Volume 2 Part A Figure 3.7 Overhead Line Graduated Swathe**;

ii. **PEI Report Volume 2 Part A Figure 3.8 Grimsby West Substation Graduated Swathe**;

iii. **PEI Report Volume 2 Part A Figure 3.8 LCS5 Graduated Swathe**;

iv. **PEI Report Volume 2 Part A Figure 3.8 LCS Hybrid Zone (LCS6 and LCS8) Graduated Swathe**;

v. **PEI Report Volume 2 Part A Figure 3.8 Weston Marsh Substation Graduated Swathe**; and

vi. **PEI Report Volume 2 Part A Figure 3.8 Walpole B Substation Graduated Swathe**.

Stage 1 Consultation

3.5.63 As part of the Stage 1 consultation, the graduated swathe was consulted on, and feedback was also sought for the emerging preferred corridor, emerging preferred siting zones and emerging preferred siting areas.

3.5.64 A total of 7,694 feedback submissions were received during the non-statutory consultation period from January to March 2024, all of which underwent analysis. This includes some feedback that prompted consideration of alternatives and was considered through the design review process. Further details of the feedback received during non-statutory consultation can be found in the **Stage 1 Consultation Feedback Report** and how informed the evolution of the Project's design in the **Grimsby to Walpole Design Development Report**.

Review of the Emerging Preferred Corridor

3.5.65 Following Stage 1 consultation a review was undertaken of a section of the emerging preferred route corridor adjacent to the Lincolnshire Wolds National Landscape (Area of Outstanding National Beauty). The review focused on two options; firstly a 'western option' which forms part of the emerging preferred route corridor that was identified in the CPRSS, and secondly an alternative 'eastern option' which was previously appraised in the CPRSS. These corridors comprise sections extending from just south of North Thoresby and Tetney to just north of Burgh le Marsh. The results of this work are reported in **PEI Report Volume 3 Part A Appendix 3A Western Corridor Backcheck.**

3.5.66 The review considered the findings of the original appraisal reported in the CPRSS as well as consideration of any new information that would have the potential to change the conclusions reached in identifying the preferred route corridor. The corridor sections originally identified in the CPRSS within the western option and eastern option were reviewed considering environmental, socio-economic and engineering factors while taking account of relevant new information, for example from further environmental baseline studies or feedback from consultation.

3.5.67 The review highlighted that distinguishing factors in the selection of the preferred option remain finely balanced and largely relate to the increased potential for impacts on the Lincolnshire Wolds associated with the western corridor being partly within the setting of the designated landscape and the increased potential for potential impacts on the coastal ecological designations and flood risk issues associated with the eastern corridor. The review concluded that the new information does not significantly alter the previous conclusions reported in the CPRSS and the preference for the western corridor.

3.6 Design Development

3.6.1 Since the Stage 1 consultation, there have been two core activities that have influenced design development, these include:

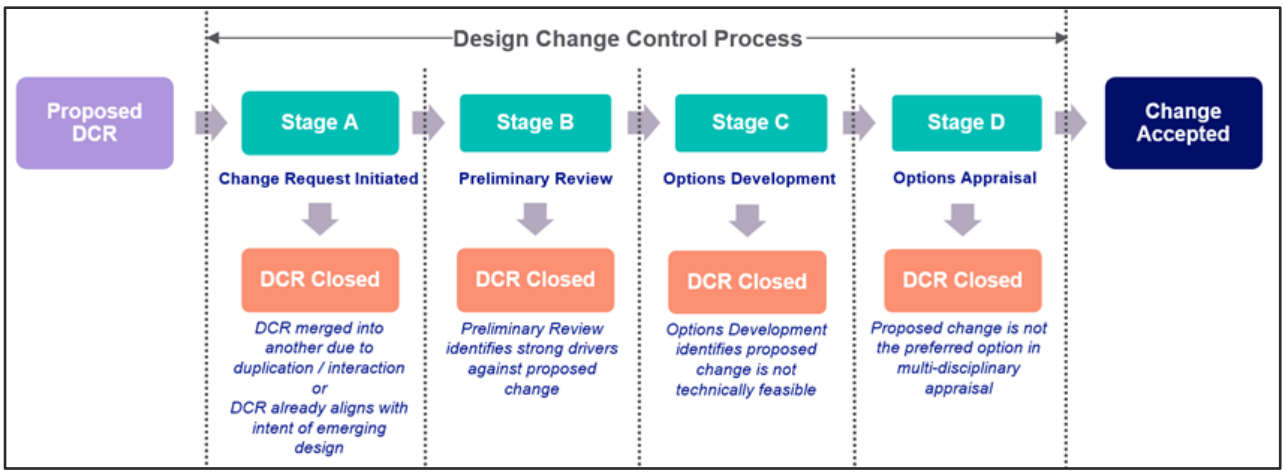
i. Review of feedback from the Stage 1 consultation in 2024; and

ii. Findings from environmental and other technical studies.

3.6.2 Where the review of Stage 1 consultation feedback or the emerging results of environmental and technical studies has identified a potential design change this

been assessed through a formal design change control (DCC) process. The DCC process is a multi-stage assessment as shown in **Image 3.3** that considers each identified Design Change Request (DCR) and records the reasons for the changes to the design being made or alternatively the reasons as to why the DCR was not considered further. Each DCR is reviewed by a multi-disciplinary team.

Image 3.3 Design Change Control Process



3.6.3 As presented in **Image 3.3,** the DCC is a four stage process consisting of the following appraisal stages:

i. **Stage A (*Initiation of DCR*)** – Proposed DCRs are formally initiated in the DCC Process, ensuring sufficient information is recorded to support subsequent reviews. DCRs may be merged with others where duplicate, overlapping or conflicting requests are identified.

ii. **Stage B (*Preliminary Review*)** – A multi-disciplinary Stage B workshop is held to carry out a preliminary review of the DCR. Discipline representatives for engineering, environment, lands and consents discuss the DCR to agree whether it should be rejected at this stage or progressed for further appraisal at Stages C and D.

iii. **Stage C (*Options Development*)** – A detailed appraisal of the DCR is carried out by the engineering team, considering technical complexity, construction issues, technology issues, capacity issues, network efficiencies and cost, to develop design options for consideration at Stage D.

iv. **Stage D (*Options Appraisal*)** – A detailed appraisal of the DCR is carried out by environment, consents and lands. Once the Stage C and D appraisals have both been completed, a multi-disciplinary workshop is held to carry out full impact review of the DCR and agree whether it should be rejected or accepted for implementation. A DCR that is accepted at Stage D is then carried through into the design.

3.6.4 The DCC process covers elements of the design relevant to the stage of design development in the project programme. For example, DCRs raised in response to the Stage 1 consultation will relate to the graduated swathe and siting zones and have informed the design developed for Stage 2 consultation; while DCRs raised in response to ongoing baseline studies typically relate to the emerging alignment of the overhead line route and detailed siting of substations with regards to avoiding a sensitive receptor.

3.7 Design Development Report

3.7.1 The **Grimsby to Walpole Design Development Report** describes how the Project has evolved since the Stage 1 consultation undertaken between January and March 2024. In conjunction with the **Stage 1 Consultation Feedback Report** the **Grimsby to Walpole Design Development Report** details the design evolution between the Stage 1 consultation and the Stage 2 consultation periods based on feedback and more detailed engineering work and environmental studies.

3.8 Alternatives considered since Stage 1 consultation

3.8.1 The feedback obtained at the Stage 1 consultation has helped to shape and guide the development of the Project's permanent works and the temporary works associated with the draft Order Limits and Refined Weston Marsh Substation Siting Zone presented within this PEI Report. All feedback provided was considered and taken into account in the context of environmental and socio-economic constraints and opportunities, engineering feasibility and cost, and planning policy considerations.

3.8.2 This section provides a summary of the reasonable alternatives considered to the darker shaded areas of the graduated swathe presented at Stage 1 consultation and summarises the main reasons for selecting the preferred option in accordance with the EIA Regulations (3.9.1Ref 1). Detailed information on how the Project has evolved is contained within the **Grimsby to Walpole Design Development Report.**

Section 1 – New Grimsby West Substation

3.8.3 This section presents the main alternatives considered within Section 1 and outlines the reasons for the selection of the proposed site.

New Grimsby West Substation

3.8.4 Having taken account of Stage 1 consultation feedback, there was no change to the location of the New Grimsby West Substation. The siting of the new Grimsby West Substation remains within the darker area of the graduated swathe presented at Stage 1 consultation. The siting area remains the preferred location due to close proximity to existing infrastructure (400 kV overhead line, known as the 4KG route, and the existing Grimsby West Substation), therefore minimising the need for new overhead line infrastructure and utilising land within National Grid's ownership. In addition, siting of the new substation adjacent to the existing Grimsby West Substation allows the new substation to benefit from screening provided by the woodland around the existing substation.

Alternative options considered for the overhead line from the New Grimsby West Substation

3.8.5 Alternative options to route the proposed overhead line from the New Grimsby West Substation to avoid playing fields associated with the proposed Grimsby West Sustainable Urban Extension housing development were considered within the corridor presented at Stage 1 consultation. The three alternative options considered were:

i. Option A was to underground approximately 640 m of the proposed overhead line beneath the playing field requiring a terminal tower and Cable Sealing End (CSE) compound outside of the substation;

ii. Option B involved adjusting the bay positions further to the south west of the substation and siting a terminal tower and CSE compound with associated cables in the same location; and

iii. Option C was to route approximately 590 m of the proposed overhead line to connect to the substation on the southern side.

3.8.6 Option A was considered to have some visual and land take benefits, however, such benefits of undergrounding would be marginal and therefore would not justify the additional costs associated with undergrounding. Option B was not technically feasible as this would require the bay positions to be moved further to the south west of the New Grimsby West Substation and a terminal tower or a cable sealing end compound would be required in a very limited space. This option would also require a more substantial oversail of the Grimsby Solar Farm (formerly known as Aura Solar Farm). Option C avoided interactions between the proposed new overhead line and the realigned 4KG route and avoids routeing the proposed new overhead line within the proposed Grimsby Solar Farm, the proposed Grimsby West Sustainable Urban Extension or the woodland to the east of the existing Grimsby West Substation, therefore Option C was the preferred option.

Section 2 – New Grimsby West Substation to New Lincolnshire Connection Substation A

3.8.7 This section presents the main alternatives considered within Section 2 and outlines the reasons for the selection of the proposed overhead alignment.

Consideration of alternative pylon types in Section 2

3.8.8 The starting assumption for the overhead line design for the Project was standard height steel lattice pylons, however during the design development and in response to feedback, a review of pylon options was undertaken and included low height steel lattice and T-pylon. Further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**.

3.8.9 In Section 2, it was considered that in views to and from the Lincolnshire Wolds National Landscape (AONB) would not benefit from the use of T-pylons as these would be a more solid structure that would benefit less from any backclothing and would draw the eye to the proposed overhead line. Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6 of the **Design Development Report**, there was not considered to be a justification for T-pylons to be used in Section 2.

3.8.10 The review of alternative pylon types in this section concluded that several sections should be considered for the use of low height lattice pylons; these are set out as individual considerations below.

Consideration of the proposed Bradley Road Solar Farm and the proposed overhead alignment

3.8.11 Since the Stage 1 consultation, National Grid has received new information regarding the proposed Bradley Road Solar Farm and has commenced early engagement with the developers to identify opportunities to reduce the impact of the proposed overhead line routeing. As a result, the routeing of the proposed overhead line between GL16 and GL22 deviates away from the darkest shading of the graduated swathe as presented at Stage 1 consultation, to route more centrally within the corridor presented at Stage 1 consultation.

3.8.12 Between the A46 Grimsby Road and the villages of Barnoldby le Beck and Waltham, there is extensive existing and proposed solar farm development across the full width of the corridor presented at Stage 1 consultation. While the Project seeks to avoid impacts on such developments where possible to do so, routeing through solar developments cannot be avoided in this area due to their extents across the preferred corridor and other constraints. The Project has worked to minimise impacts of temporary and permanent infrastructure on these developments where possible, for instance through routeing to facilitate the shortest possible crossings and seeking to minimise the siting of pylons within areas where solar panels are proposed wherever practicable.

Alternative options between Bradley and Barnoldby le Beck

3.8.13 Two alternative options to route the proposed overhead line between Bradley and Barnoldby le Beck to reduce impacts on the recently consented Bradley Road Solar Farm and an area of proposed skylark mitigation as part of the Bradley Road Solar Farm development were considered. These were:

i. Option A: the proposed overhead line would be routed towards the eastern side of the graduated swathe in line with the preferred routeing indicated by the darkest shading at Stage 1 consultation; and

ii. Option B: this option would route the overhead line centrally within the corridor presented at Stage 1 consultation.

3.8.14 Option B was the preferred option as this option avoided the siting of pylons within the planned solar arrays associated with the Bradley Road Solar Farm development, avoided the siting of pylons within skylark mitigation areas proposed as part of the Bradley Road Solar Farm development; and routed the proposed overhead line further from residential receptors on Waltham Road, in comparison to Option A. Therefore, Option B was taken forward.

Alternative options for the routeing of the overhead line around Brigsley

3.8.15 At the Stage 1 consultation, the graduated swathe presented two alternative routes around Brigsley, to the north and south, with the darkest shading of the graduated swathe indicating most likely routeing to the north of Brigsley. Consultation feedback was received indicating preferences for both routes, therefore, to address this feedback, the two alternative alignments were reviewed, and the northern route was chosen as the preferred option. The northern alignment was preferred as this route was a greater distance from the Lincolnshire Wolds National Landscape (AONB), from the listed buildings within Brigsley (including the grade II* listed Church of St Peter) and grade II listed buildings within Ashby cum Fenby. In addition, the northern route provided greater flexibility in comparison to the southern route; as the southern

route would require the proposed overhead line to be routed through narrow gaps between properties and would be constrained by the presence of the approved Viking Carbon Capture and Storage (CCS) Pipeline.

Alternative option considered for the overhead line route near Grainsby

3.8.16 An alternative option to route the overhead line further north east near Grainsby was considered due to feedback received from the Stage 1 consultation. The feedback suggested a route to reduce impacts on The Grainsby Estate and surrounding community. An alternative option was therefore considered which would route the overhead line further north in the graduated swathe between Waithe Grange and the grade I listed Church of St Martin at Waithe. The alternative option was not preferred as the option would increase the length over which the proposed alignment would route in close proximity to the Hornsea Project One and Two cables, increasing technical complexity. The alternative option would route the overhead line through a pattern of small fields and equestrian paddocks and would increase the proximity to properties at Cheapside and Station Lane as well as designated assets, including Round Barrow Cemetery and Waithe Water Mill. Therefore, the preference was for the Stage 1 consultation corridor and the alternative option was not considered further.

Alternatives options considered for construction access across the Waithe Beck East Local Wildlife Site (LWS)

3.8.17 The proposed alignment places a single pylon, GL33, to the west of Waithe Beck, a Chalk Stream Priority Habitat, necessitating two overhead line crossings of the chalk stream. Pylon GL33 forms part of a long straight section of overhead line extending from GL29 to GL34, and is then followed by a further straight line from GL34 to GL45. GL33 is positioned on the west of Waithe Beck so as not to introduce unnecessary angles, and to enable GL34 to be positioned at a viable location for pylon stringing. Relocation GL33 to avoid overhead line crossings of the Waithe Beck would result in more angle pylons and would provide technical complexities, which are discussed further in Chapter 7 of the **Grimsby to Walpole Design Development Report**.

3.8.18 As part of the development of the design, consideration was given to alternative temporary construction access arrangements in order to limit multiple haul road crossings of the Waithe Beck East Local Wildlife Site (LWS), a Chalk River Priority Habitat Site. The Waithe Beck East LWS is also known to support water voles and is a potential otter breeding/resting site. The two alternative options considered were:

i. Option A: this option provided a continuous haul road with a crossover bellmouth on Waithe Lane and would cross the Waithe Beck at three locations; and

ii. Option B: this option would route the construction haul route off the B1203 in Brigsley running parallel to the south of Waithe Beck. This option would not involve any crossings of Waithe Beck.

3.8.19 Although Option A would provide a continuous temporary construction haul road, this option would require three crossings of the Waithe Beck, which is a Priority Habitat, a LWS and is known to support protected species including water voles, otters and fish. The Waithe Beck is a non-designated heritage asset with potential for buried prehistoric and palaeoenvironmental remains along its length. The crossing of the Waithe Beck, would have the potential to impact on heritage, including unknown buried archaeological deposits and the remains of a medieval ridge and furrow.

Option B would be longer and would not be a continuous temporary construction haul road and although would not require a crossing of the Waithe Beck, Option B would introduce additional environmental impacts including visual impacts within the village of Brigsley, impacts on heritage assets including a grade II* and two grade II listed buildings in Brigsley and Ashby Cum Fenby. Taking into consideration the multiple crossings of the Waithe Beck for Option A, this option was further modified to reduce the number of crossings of the Waithe Beck from three to two, by avoiding the main haul road crossing once between GL32 and GL33 and then back again between GL33 and GL34. The haul road between GL32 and GL34 was aligned to the east of the Waithe Beck with a spur to GL33 crossing the Waithe Beck. The haul road would then cross Waithe Beck between GL34 and GL35.

3.8.20 Option A was therefore the preferred option with the modification in the area of Waithe Beck due to being the shortest and having less visual and heritage impacts.

Consideration of alternative pylon types between Barnoldby le Beck and Waithe

3.8.21 The starting assumption for overhead line design between Barnoldby le Beck and Waithe was standard height steel lattice pylons, in line with the approach to overhead line design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**). However, a review of low height lattice pylons as an alternative in this area was undertaken to reduce impacts on views from Lincolnshire Wolds National Landscape (AONB) including views towards Grimsby Dock Tower and to reduce impacts on the setting of the grade II* listed Waltham Windmill. The alternative of introducing low height lattice pylons for this section of overhead line between Barnoldby le Beck and Waithe would have a benefit for both for landscape and visual, by reducing the proportion of the pylons which would be seen against the sky, or skylined, in views from the Lincolnshire Wolds National Landscape (AONB) and for heritage, by reducing the effects on Waltham Windmill and its setting. Although the change to low height brings the alignment closer to some visual receptors which are located nearby to the Project (as a result of the more limited angle deviations possible with this pylon type), this was outweighed by the need to mitigate effects on the Lincolnshire Wolds National Landscape (AONB) which is nationally designated and afforded statutory protection. Therefore, this section of low height pylons has been adopted into the design.

Alternative options considered between North Thoresby and Keddington to minimise impact on the Thomas Centre

3.8.22 Alternative options to route the overhead line between North Thoresby and Keddington were considered to minimise impacts on the Thomas Centre, an important family run holiday park catering for individuals affected by autism, epilepsy and other special needs, and their families. The options that were considered included:

i. one option which would route the overhead line through the western-most gaps in the graduated swathe at Station Road and Pear Tree Lane, then continuing along the western edge of the graduated swathe between Utterby and Keddington;

ii. two options which would take alternative central routes through gaps in the graduated swathe at Station Road and Pear Tree Lane, heading south-west past

Covenham Saint Bartholomew, before both converging just north of Little Grimsby and continuing south along a central route through the graduated swathe;

iii. three options would route the overhead line through gaps in the graduated swathe at Station Road and Pear Tree Lane and heading south-west through the graduated swathe, then turning to head south-east just as the route passes Covenham Saint Bartholomew and converging just south of Covenham Saint Mary to continue south along the eastern extent of the graduated swathe; and

iv. one option which routed the overhead line along the eastern extent of the graduated swathe, then turning to head south-west at Little Grimsby and continuing south along a central route through the graduated swathe.

3.8.23 Upon review of the seven options, a central route was taken past Covenham Saint Bartholemew moving the proposed overhead line alignment further west within the route corridor presented at State 1 consultation. The central route was the preferred option, in comparison to the other options presented above as this option was considered to reduce potential amenity impacts to users of The Thomas Centre during construction relating to noise and vibration, air quality and visual, as well as visual impacts during operation; would reduce potential interactions where the proposed overhead alignment crosses the Viking CCS Pipeline compared to the other options; and would have no greater landscape and visual impacts to the Lincolnshire Wolds National Landscape (AONB) than the most likely routeing of the proposed overhead line within the darkest shading of the graduated swathe presented at Stage 1 consultation.

Consideration of alternative pylon types between Covenham St Bartholomew and Manby

3.8.24 The starting assumption for overhead line design between Covenham St Bartholomew and Manby was standard height steel lattice pylons, in line with the approach to overhead line design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**). However, a review of low height lattice pylons as an alternative in this area was undertaken to reduce impacts on views to and from the Lincolnshire Wolds National Landscape (AONB) and to reduce impacts on heritage assets including Louth Abbey ruins. For this section, although there would be some localised benefits for heritage assets using low height pylons, it was considered that combining different pylon types along the route of the new overhead line would give an incoherent appearance and would also add technical complexity to the Project, both during the construction and operational phases. The use of low height pylons in would also not reduce the effects on the view to or from the Lincolnshire Wolds National Landscape (AONB). From a biodiversity perspective, the use of low height pylons is not justified because the use of low height pylons may require additional vegetation removal from the wider swathe required for conductors and because, based on information from other National Grid projects, there is a lack of evidence to demonstrate that low height pylons would reduce bird collision risk. Therefore, for this section, the use of low height pylons was not taken forward.

Consideration of alternative pylon types between Castle Carlton and Tothill

3.8.25 The starting assumption for overhead line design between Castle Carlton and Tothill was standard height steel lattice pylons, in line with the approach to overhead line

design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the DDR). However, a review of low height lattice pylons as an alternative in this area was undertaken to minimise impacts on the setting of the scheduled monuments between Castle Carlton and Tothill. Low height lattice pylons were slightly preferred for both heritage and landscape. However, the impacts on the heritage assets would remain and there would not be any notable change to the impacts on the Lincolnshire Wolds National Landscape Area (AONB). Although there would be some localised benefits for heritage assets using low height pylons, it was considered that combining different pylon types along the route of the new overhead line would give an incoherent appearance in wider views and would also add technical complexity to the Project, both during the construction and operational phases. Low height pylons would also introduce a wider swathe of required vegetation removal because of their wider arrangement of conductors on the bottom cross arm. Therefore, across all the factors considered in this area, the use of low height pylons was not taken forward.

Alternative option considered for the routeing of the overhead line near Mother Wood, east of Claythorpe

3.8.26 An alternative option to route the overhead line further to the west of the graduated swathe, east of Claythorpe near Mother Wood, to help reduce impacts on Strubby Airfield was considered in response to feedback received from the Stage 1 consultation. To address this feedback, four alternative options were considered which included:

i. one option routed along the eastern edge of the graduated swathe;

ii. one option routed more centrally through the graduated swathe, passing the eastern edges of the cut-outs from the graduated swathe for the Flax Mill Cottages and Mother/Greenfield Woods;

iii. one option routed along the western extent of the graduated swathe as it passes Toot Hill, then turning in a south-easterly direction to pass through a small gap between the Flax Mill Cottages and Aby Grange Farm, before continuing along the eastern edge of the cutouts for Mother/Greenfield Woods to the New LCS A; and

iv. one option routed along the western extent of the graduated swathe as it passes Toot Hill down to the Aby Barn Farm, then turning in a south-easterly direction to pass through the top of the cut-outs for Mother/Greenfield Woods, before continuing down along the eastern edge of the cut-outs for Mother/Greenfield Woods to the New LCS A.

3.8.27 After consideration of the four options, a central routeing option through the graduated swathe passing the eastern edges of the cut-outs for the Flax Mill Cottages and Mother/Greenfield Woods was preferred. This option routes the overhead line further west within the corridor presented at Stage 1 consultation than the darkest shading of the graduated swathe as it passes Strubby Airfield, and has resulted in the need to site one pylon just beyond the extent of the graduated swathe near Mother Wood. This alternative option was preferred as it minimises potential impacts to the operations at Strubby Airfield associated with the positioning of the overhead line in relation to aircraft movements; and minimises impacts to the important environmental features such as the Great Eau Local Wildlife Site, Toot Hill Motte and Bailey Castle scheduled monument and grade II listed Aby Grange

Cottage and Manor House, which are variously located adjacent to the western edge of the corridor presented at Stage 1 consultation or in a corridor cut-out.

Consideration of alternative pylon types near Strubby Airfield

3.8.28 The starting assumption for overhead line design as it routes past Strubby Airfield was standard height steel lattice pylons, in line with the approach to overhead line design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**). However, a review of low height lattice pylons as an alternative in this area was undertaken to due to the proximity of Strubby Airfield to understand if this would provide any benefit to flight operations. This review included a preliminary analysis of potential impacts to aviation at Strubby Airfield with support from a specialist aviation consultant. At this stage, the preliminary analysis undertaken for Strubby Airfield does not suggest that low height pylons will provide any significant benefit to flight operations compared to standard height pylons. Based on the proposed overhead line alignment, it is considered that both departing aircraft from Runway 26 and approaching aircraft to Runway 08 would be able to safely overfly the overhead line with sufficient clearance if using standard height pylons. The short section of low height pylons with transitions to standard height at each end which was appraised was also considered to have an overall negative visual impact with an incoherent appearance in wider views and would likely result in increased vegetation clearance to accommodate a wider cross arm and conductor arrangement. Low height pylons were therefore not taken forward in this area. However, this decision will be kept under review as the Project design progresses and as more thorough assessments are undertaken, as well as through ongoing engagement with the airfields at Strubby.

Section 3 – New Lincolnshire Connection Substations A and B

3.8.29 This section presents the main alternatives considered for Section 3 and outlines the reasons for the selection of the proposed sites for the New Lincolnshire Connection Substation A (LCS A) and the New Lincolnshire Connection Substation B (LCS B).

New Lincolnshire Connection Substation A

3.8.30 The siting of the New LCS A substation remains within the darker area of the substation siting zone presented at Stage 1 consultation. The siting area remains the preferred location due to the existing screening provided by the existing woodland to screen view from the Lincolnshire Wolds National Landscape (AONB) and heritage assets such as the scheduled monument of St. Mary's Priory. On this basis, National Grid refined out the portion of the Stage 1 consultation substation siting zone to the west of Mother Wood and Greenfield Wood when considering the proposed siting of the New LCS A. Based on this decision, the area of the overhead line graduated swathe to the west of Mother Wood and Greenfield Wood was not considered further, as there would be no basis to route the proposed overhead line to the west of the woodland area when it needs to connect into the substation to the east.

3.8.31 National Grid also refined out the portion of the substation siting zone to the north of Rye Lane, where the screening benefit from Mother Wood and Greenfield Wood would be less than to the south of Rye Lane. The north eastern most part of the substation siting zone is also not preferred because it could limit the options for routeing the proposed overhead line to avoid impacts on aviation activity at Strubby Airfield.

3.8.32 Within the portion of the siting zone to the south of Rye Lane and the east of Mother Wood and Greenfield Wood, the New LCS A has been positioned in consideration of the proposed siting of the New LCS B, so that the overall routeing of the overhead line through Section 3 can remain the shortest and straightest routeing.

Consideration of alternative pylon types in Section 3

3.8.33 The starting assumption for the overhead line design for the Project was standard height steel lattice pylons, however during the design development and in response to feedback, a review of pylon options was undertaken and included low height steel lattice and T-pylon. Further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**.

3.8.34 In Section 3, it was considered that in views to and from the Lincolnshire Wolds National Landscape (AONB) would not benefit from the use of T-pylons as these would be a more solid structure that would benefit less from any backclothing and would draw the eye to the proposed overhead line. Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6 of the **Grimsby to Walpole Design Development Report**, there was not considered to be a justification for T-pylons to be used in Section 3.

Alternative options considered for the siting area of the New Lincolnshire Connection Substation B

3.8.35 Feedback received from residents on the edge of Bilsby and Asserby expressed a preference for the siting area of the New LCS B to be moved to the less dark area of the substation siting zone on the western side of the A1111 (Sutton Road). The residents considered that this siting area would have less visual impact. To address this feedback, two alternative options were considered against the option presented at Stage 1 consultation, these were:

i. Option A: this option would locate the substation to the west of Sutton Road (A1111), north of Bilsby; and

ii. Option B: this option would locate the New LCS B substation to the west of the Sutton Road and to the east of Wold Grift Drain, north of Thoresthorpe.

3.8.36 The alternative locations for both Option A and Option B are in areas at risk from surface water flooding (Flood Zone 1) and areas of medieval field systems. Option A would have limited impacts on ecology, would be sited on lower grade agricultural land (Grade 3) and would be sited slightly further from residential receptors and would also be surrounded by Flood Zone 3 associated with Wold Grift Drain and other watercourses. Although Option B would be located further from Bilsby, the option would locate the substation in close proximity to Viking Link, which would present technical complexities. Option B would not be surrounded by Flood Zone 3, and similar to Option A would be sited on lower grade agricultural land in comparison to the siting area presented at Stage 1 consultation. Both Options would present additional heritage impacts, in that Option A would be located to close to the non designated deserted medieval village of Bilsby and Option B would be located closer to listed buildings at Thoresthorpe. Therefore, both alternative options were not taken forward due to the increased flood risk and interactions with the Viking Link which would provide technical complexities with regards to the position and orientation of

customer connections. The preferred siting area for the New LCS-B is the same as the darker area of the siting zone presented at Stage 1 consultation.

3.8.37 During design development for the New LCS B, geophysical surveys undertaken by the Project identified archaeological anomalies indicative of late prehistoric or Romano-British settlement at the north eastern end of the proposed position of the substation. The Project has refined the positioning of the substation to slightly south west in response to the geophysical survey findings to ensure the substation can be constructed without disturbance of these archaeological remains at this location. The new LCS B substation is located to the immediate east of the A1111 Sutton Road and approximately 0.5 km north of the B1449 Thurby Road, near Bilsby.

Section 4 – New Lincolnshire Connection Substation B to Refined Weston Marsh Substation Siting Zone

3.8.38 This section presents the main alternatives considered for Section 4 and outlines the reasons for the selection of the preferred route corridor.

Consideration of alternative pylon types in Section 4

3.8.39 The starting assumption for the overhead line design for the Project was standard height steel lattice pylons, however during the design development and in response to feedback, a review of pylon options was undertaken and included low height steel lattice and T-pylon. Further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**.

3.8.40 In the northern parts of Section 4, it was considered that in views to and from the Lincolnshire Wolds National Landscape (AONB) would not benefit from the use of T-pylons as these would be a more solid structure that would benefit less from any backclothing and would draw the eye to the proposed overhead line. Moving away from the Lincolnshire Wolds and towards the south of Section 4, the presence of existing 132 kV and 400 kV lattice overhead lines within the landscape meant introducing T-pylons in this area would be inconsistent with existing infrastructure. Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6 of the **Grimsby to Walpole Design Development Report**, there was not considered to be a justification for T-pylons to be used in Section 4.

3.8.41 The review of alternative pylon types in this section concluded that several sections should be considered for the use of low height lattice pylons; these are set out as individual considerations below.

Consideration of alterative pylon types near Ashley's Field airstrip

3.8.42 The starting assumption for overhead line design as it routes past Ashley's Field airstrip was standard height steel lattice pylons, in line with the approach to overhead line design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**). However, a review of low height lattice pylons as an alternative in this area was undertaken to due to the proximity of Ashley's Field airstrip to understand if this would provide any benefit to flight operations. Based on the overhead line alignment being proposed at Stage 2 Consultation, it is considered that both departing aircraft from Runway 25 and approaching aircraft to Runway 07 would be able to safely overfly the overhead line with sufficient clearance above standard height pylons. Low

height pylons would slightly increase this clearance, however based on preliminary analysis it is not expected that the increase in clearance would provide significant benefit which would outweigh the negative impacts of a short stretch of alternative pylon design on nearby receptors including an increase in vegetation loss due to wider cross arms and inconsistent appearance in longer distance views. It is also noted that Ashley's Field Airstrip has a second, longer runway (Runway 18/36) which is orientated at an angle closer to parallel with the overhead line alignment in this area, providing significantly greater distance between the runway and the overhead line for straight-ahead approaches and departures. On balance, low height pylons have therefore not been implemented in this area, noting that such a short section of alternative pylon design with transitions to standard height at each end would have other negative impacts for biodiversity and visual, and that a second runway is available which is not considered to be impacted. However, this decision will be kept under review as the Project design progresses and as more thorough assessments are undertaken, as well as through ongoing engagement directly with Ashley's Field Airstrip.

Alternative option considered to route the overhead line east to avoid impacts a farm near Burgh Le Marsh

3.8.43 An alternative overhead line route was proposed from feedback received from the Stage 1 consultation to avoid impacts on a farm near Burgh Le Marsh. The alternative option would route the overhead line to the east of the graduated swathe within the corridor presented at the Stage 1 consultation and slightly outside of the preferred route corridor by Younger's Lane and the A158. The alternative option would increase the length of the overhead line, would require sharper angle pylons and crossings of both the Triton Knoll Offshore Wind Farm and Outer Dowsing Offshore Wind Farm underground cables, which would have technical complexities. The alternative option would also be closer to Skegness Airfield but would be unlikely to interfere with flight operations. Although the alternative option would be further from the Lincolnshire Wolds National Landscape (AONB), the alternative option would be closer to ecological designated sites (including The Wash SPA/SAC/Ramsar and the Ramsar Gibralter Point SPA/Ramsar and Saltfleetby-Theedlethorpe Dunes and Gibralter Pint SAC) and residential receptors on Younger's Lane and Middlemarsh Road. Therefore, the alternative option was not taken forward and overall preference was given to a route following the darkest shading of the graduated swathe.

Alternative options considered for the route of the overhead line between Burgh Le Marsh and Thorpe Saint Peter to avoid impacts on The Hollies Renewable Energy Development

3.8.44 Feedback was received from the Stage 1 consultation regarding concerns of potential impacts to The Hollies Renewable Energy Development (which includes both The Hollies Wind Farm and The Hollies Solar Park), located south of Burgh Le Marsh. To address the feedback, six alternative options were developed as part of the design development to consider the route of the overhead line between Burgh Le Marsh and Thorpe Saint Peter. These included:

i. Option A: this option would route centrally through the graduated swathe from south of Billgate Lane, passing through a gap between properties on Croft Lane, and converges with Option C south of Lincoln Farm Solar Park;

ii. Option B: this option would diverge north from Option A before Croft Lane, routeing through a gap between Croft Lakes Caravan Park and Homelands Farm, then rejoining Option A shortly after;

iii. Option C: this option would be routed parallel and slightly south of Option A, passing through a gap on Croft Lane approximately 200 m south of Option A's crossing, then converges with Option A south of Lincoln Farm Solar Park;

iv. Option D: this option would route through the Hollies Solar Park and north of existing wind turbines before turning south-west and converging with Options A and C south east of Lincoln Farm Solar Park;

v. Option E: this option would route further south than the Stage 1 consultation route corridor, skirting the northern edge of Croft village and crossing the 132kV OHL between properties on Church Lane, then turns northwest to connect with Option C before it merges with Option A; and

vi. Option F: this option would diverge from the point where Options A and C converge near the B1195, routeing southwest before turning west to pass through a gap between properties approximately 400 m south of the Option A or C convergence point.

3.8.45 All options would be technically feasible and would route the overhead line away from the wind farm, but Option D would require a pylon to be located within the solar farm boundary and Option B would potentially oversail a commercial property. Options A and C would potentially introduce "wirescape" due to the presence of the existing 132 kV overhead line in comparison to the other options, although Option F would potentially require the removal of the 132 kV which would be technically challenging and expensive. Environmentally, Option A, B, C, E and F would be routed close to Croft, with options A, B, C and E being routed to pass between properties on Croft Lane and Option D would introduce visual impacts for residential properties on Burgle Lane. Options A, B C, E and F would be located closer to the Wash SPA, SAC and Ramsar Site; and the Gibralter Point which would potentially increase the risk of bird collision. Option D would be closer to the Bratoft Meadows SSSI, however, this is not considered significant as this is designated for meadow habitat and would also be closer to the grade II listed Bland's Farmhouse. After consideration of the six options, a central routeing option through the graduated swathe was preferred. This was chosen as the preferred option as it would avoid impacts on to the wind farm and solar park operations; would avoid the oversailing of residential and commercial properties and would minimise impacts to farmland as far as appropriate; and would avoid interactions with the existing 132 kV overhead line, located to the south of the proposed new overhead alignment to avoid a "wirescape".

Alternative options considered regarding the potential impacts to heritage assets and residential properties at Wigtoft

3.8.46 Feedback received from Stage 1 consultation was to consider routeing the overhead line as far west as possible within the graduated swathe at Wigtoft, away from residents and heritage assets. Relevant heritage assets include the Wigtoft conservation area, including the grade I listed Church of St Peter and St Paul, and several other grade II listed buildings, and grade II listed buildings at Casterton House and its associated non-designated former parkland. To address this feedback, four alternative options were considered which included:

i. one option routeing along the northern/western extent of the graduated swathe, to the north of the two cut-outs in the graduated swathe at Asperton and west of the cut-outs at Five Bells Lodge and along Hipper Lane;

ii. one option routeing along the southern/eastern extent of the graduated swathe, to the south of the two cut-outs at Asperton and to the east of the cut-outs at Five Bells Lodge and along Hipper Lane, representing the most likely routeing indicated by the darkest shading within the graduated swathe shown at Stage 1 consultation;

iii. one option which follows the southern extent of the graduated swathe to the north east of Asperton but then routes centrally through the graduated swathe between the two-cut outs on Asperton Road to continue past Wigtoft at the western extent of the swathe; and

iv. one option which also switches from the southern extent of the swathe to the western extent of the swathe near Asperton, but routes to the south of the two cut-outs on Asperton Road.

3.8.47 After consideration of the four options, a refined central/western alignment was chosen as the preferred option. This alignment routes centrally within the graduated swathe to the north east of Asperton, routes between the cut-outs on Asperton Road, and then follows the western extent of the graduated swathe southwards past Wigtoft. This option was chosen as the preferred option as it reduced potential setting impacts to heritage assets at Wigtoft and Casterton House; increased the distance of the overhead line alignment from Wigtoft which would reduce impacts on residential properties; would maintain a relatively straight alignment, thus reducing impacts on the landscape, and also would minimise interactions with a poultry farm near Asperton and an equestrian paddock to the north of Asperton.

Alternative option considered for routeing the overhead line north between Thorpe Fendykes and Northlands

3.8.48 Feedback received from the Stage 1 consultation was to consider routeing the overhead line further north within the graduated swathe between Thorpe Fendykes and Northlands. One alternative option was considered, which, compared with the darkest shading of the graduated swathe, routed the overhead line further north between Thorpe Fendykes and Stickford, further west where it passes between Stickney and Midville, and further north where it routes around to the south of Stickney towards Northlands. The alternative option in comparison to the options presented at Stage 1 consultation would introduce additional visual impacts for properties at Stickney and along Thorpe Bank and would be marginally closer to the Lincolnshire Wolds National Landscape (AONB). The alternative option would have technical complexities as it would be closely routed in parallel to a high pressure gas main. Therefore, the alternative option was not preferred.

3.8.49 An alternative option to route the overhead line more centrally through the graduated swathe just north of Thorpe Culvert was also considered. This was to avoid impacts to holiday cottages located on the bank of Steeping River in Little Sleeping. The alternative option to route the overhead line centrally and away from the darkest shading of the graduated swathe was preferred as the overhead line would avoid oversailing the holiday cottages and would avoid the introduction of additional angle pylons to the overhead line in this area.

Alternative option considered to route the overhead line north of Stickney

3.8.50 Feedback received from Stage 1 consultation proposed an alternative route outside of the corridor presented at Stage 1 consultation that would be routed north and west of Stickney, rather than east and south of Stickney. The feedback received stated concern regarding impacts to residential, agricultural and industrial land use in the vicinity of Northlands village, as well as potential impacts on ornithology and an overlap with underground cables associated with Triton Knoll Offshore Wind Farm and Viking Link Interconnector.

3.8.51 One alternative option to route in a corridor north of Stickney, outside of the corridor presented at Stage 1 consultation, was considered. The alternative option was longer than the preferred route corridor; and introduced additional environmental impacts including the route corridor being closer to listed buildings (grade II* Church of St Luke, listed buildings at Carrington House and its non designated parkland), as well as visual and noise and vibration impacts due to the alternative route corridor being closer to residential receptors in Stickney. Although the alternative option was preferred from an ecological perspective, in that the alternative route corridor would be located away from a pond habituated by swans and would avoid a Priority Habitat (Coast and Floodplain Grazing Marsh), it was considered that the overall risk of bird strike would not be significantly different from the preferred route corridor presented at the Stage 1 consultation. Therefore, the preferred route corridor was selected as the preferred option.

Alternative options considered for the overhead line alignment between Northlands and Gipsey Bridge to avoid impacts on the Sibsey Lancaster Memorial Site

3.8.52 Alternative options to route the overhead line were considered between Northlands and Gipsey Bridge. This was due to the proximity of the graduated swathe presented at the Stage 1 consultation to the Sibsey Lancaster Memorial site (a memorial to the crew of the crew of the Avro Lancaster which crashed at Northlands in 1943), as well as ornithological impacts due to the close proximity of the graduated swathe to a pond habituated by a large number of swans on Carrington Road. Three alternative options considered within the corridor presented at Stage 1 consultation were:

i. Option A: this option would route the overhead line further to the west of the graduated swathe and west of Westville Road;

ii. Option B: this option would route the overhead line in the centre of the graduated swathe north and south of Westhouses; and

iii. Option C: this option would route the overhead line outside of the graduated swathe and to the west of Frithville.

3.8.53 Although all alternative options were technically feasible, Option A would be the longest route and would comprise the greatest number of angles. While Option A would route the overhead line furthest from the Sibsey Lancaster Memorial site and the pond inhabited by swans, this option would have greater visual impacts for Carrington and the overhead line would be located within a Mineral Safeguarding Area. Option B and Option C would route the overhead line away from the Sibsey Lancaster Memorial site, in comparison to the darkest shading of the graduated swathe, but the overhead line for these options would be closer to residential receptors on Canister Road and therefore would introduce visual and amenity impacts. Overall, all three options were not taken forward, as they would have

additional impacts in comparison to the Stage 1 consultation corridor. It was also considered that the Stage 1 consultation corridor was at a sufficient distance to avoid physical impacts on the Sibsey Lancaster Memorial site.

Alternative option considered to route the overhead line alignment away from Orchard Holiday Park, at Hubbert's Bridge, Boston

3.8.54 Feedback received from Stage 1 consultation was to consider routeing the overhead line as far east as possible away from Orchard Holiday Park at Hubbert's Bridge, near Boston. This was to reduce noise and visual impacts on Orchard Holiday Park. To address this feedback, consideration was given to routeing the overhead line alignment to the east and west of the cut-out from the corridor presented at Stage 1 consultation along the B1192 Holmes Road. The option to route west was preferred, as the eastern option would bring the overhead line closer to the Boston Aerodrome, which would increase the impacts on the aviation activities. The eastern option would also have visual impacts due to the overhead line alignment being closer to residential receptors along the A52 Swineshead Road and the community of Kirkton End, as well as an addition angle pylon being required which would have visual impacts for residential receptors along Holmes Road and Frampton Bank, and the eastern option would likely result in wirescape with the existing 132 kV overhead line.

Consideration of alternative pylon types near Boston Aerodrome

3.8.55 The starting assumption for overhead line design as it routes past Boston Aerodrome was standard height steel lattice pylons, in line with the approach to overhead line design across the Project (further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**). However, a review of low height lattice pylons as an alternative in this area was undertaken to due to the proximity of Boston Aerodrome to understand if this would provide any benefit to flight operations. Based on preliminary analysis, it is considered that both departing aircraft from Runway 27 and approaching aircraft to Runway 09 would be able to safely overfly the overhead line with sufficient clearance above standard height pylons. This includes an assessment of the extended height of pylons in this area, which is required due to the crossing of South Forty Foot Drain and the Grantham and Skegness Railway in this span. Low height pylons at this location were assessed, but due to the increased clearances required above the aforementioned navigable waterway and railway, were not considered technically feasible for use in this area from an engineering perspective. However, it is not considered that any reduction to the height of pylons LW152 and LW153 would provide any material benefit will provide to Boston Aerodrome given that clearances have been assessed to be sufficient in any case with the use of extended standard height lattice pylons. This conclusion will be kept under review as the Project design progresses and as more thorough assessments are undertaken, as well as through ongoing engagement directly with Boston Aerodrome.

Alternative option considered to route the overhead line further from Boston to avoid impacts on the Grade I listed St Botolph's Church

3.8.56 Feedback received from the Stage 1 consultation was an alternative option to route the overhead line to the west of the corridor presented at Stage 1 consultation, further from Boston. This was to avoid setting impacts on the grade I listed St Botolph's Church, also known as the "Boston Stump.". The alternative option to route the corridor further west of Boston would present technical complexities due to

interactions with Triton Knoll Offshore Windfarm and the crossing of the River Witham at the same location. The alternative option would require additional angles in comparison to the Stage 1 consultation corridor. The alternative option would have additional visual impacts for residential receptors on Kirton Drove, North Fortyl Foot Bank and Ferry Lane. The alternative option would also result in additional heritage impacts on Swinshead Abby Scheduled Monument, Manwar Ings Scheduled Monument, Kirton Holme Conservation Area and Kirton Conservation Area which includes a grade I listed church. Therefore, the alternative option was not taken forward due technical complexities and additional visual and heritage impacts.

Alternative option to route the overhead line west between Kirton Holme and Kirton End

3.8.57 An alternative option to route the overhead line further west within the graduated swathe presented at Stage 1 consultation as it passes between Kirton Holme and Kirton End was considered, to reduce visual, heritage and ecological impacts. The alternative option would route the overhead line equidistant between scattered properties in this area and also approximately midway between the communities of Kirton Holme and Kirton End, balancing as far as possible the potential impacts on residential receptors, while also seeking to minimise the number of angle pylons required in the area; thus reducing visual impacts. The alternative option would also avoid an area of Coastal and Floodplain Grazing Marsh Priority Habitat located along Holme Road between Jubilee Farm and Kirton End; and would be routed further from the grade II listed Holmes Farmhouse, thus reducing heritage impacts. Therefore, this alternative option was taken forward.

Alternative options considered between Sutterton and Kirton

3.8.58 Feedback from the Stage 1 consultation was received to route the overhead line north of Sutterton, between Sutterton and Kirton following the A16 to the Refined Weston Marsh Siting Zone. This was requested to avoid routeing the overhead line close to Wigtoft. Three alternative options were considered with part of the overhead line being routed outside of the corridor presented at Stage 1 consultation, these were:

i. Option A: this option would start south-west of Kirton End, diverting south-east between farm buildings and south of Kirton. It follows the eastern boundary of the corridor presented at Stage 1 consultation near Wash Road (south-west of Skeldyke), then continues over open farmland. After crossing the A17, it remains to the east of the corridor before aligning to parallel the existing 4ZM route into Weston Marsh.

ii. .Option B: this option would start south-west of Kirton End, sharing the initial south-easterly alignment with Option A near Kirton and Wash Road. After crossing the A17, it routes centrally through the corridor presented at Stage 1 consultation, acting as an interlinking alignment between Options A and C. It converges with Option C near Spalding Marsh in order to turn to parallel the existing 4ZM into Weston Marsh.

iii. Option C: this option would continue directly south after A and B diverge, staying to the western side of the corridor presented at Stage 1 consultation and routeing south-east near Sutterton. It passes north of Algarkirk and follows the western edge of the corridor. After crossing the A17, it routes south-west before merging

with Option B near Spalding Marsh to follow the existing 4ZM alignment into Weston Marsh.

3.8.59 All alternative options would have technical complexities in that they would all require a crossing of the River Welland, the A46 and the Gosberton to Tydd St. Giles Gas Pipeline and would all be in closer proximity to the Wash, which is designated as Special Protection Area, a Special Area of Conservation and a Ramsar site.

3.8.60 Option A would be less compliant with the Holford Rules as it extends farthest east from the Refined Weston Marsh Substation Siting Zone. It would also have additional visual impacts due to the overhead line being closer to Fosdyke, which has open views across the A17, and would potentially increase collision risk to birds due to close proximity to a waterbody. Option B would be closer to heritage assets (including two grade II listed building at Wraggmarsh; a Scheduled Monument and the grade I listed Church of St Peter and St Paul in Algarkirk; alongside the non-designated Algarkirk Hall and parkland and a grade II listed Manor House) as well as resulting in visual impacts on residential and community receptors in Sutterton and Algarkirk. Option C, although the shortest length, would as with Option B be located closer to residential and community receptors. As with Option A, it would also be located in close proximity to a large waterbody, potentially increasing collision risk to birds.

3.8.61 Due to the technical complexities of the alternative options and there being no significant environmental benefits of the three alternative options, the preferred route corridor as presented at Stage 1 consultation remains the preferred option.

Section 5 – Refined Weston Marsh Substation Siting Zone

3.8.62 Since the Stage 1 consultation National Grid have been engaging with generators who are contracted to connect in this area, alongside reviewing the technical specifications required. As a result, further design work is being undertaken including consideration of whether there is a need for up to two new substations. National Grid will undertake further targeted statutory consultation on Section 5 (including publication of preliminary environmental information) at a future date when this design work has been completed.

Section 6 – Refined Weston Marsh Substation Siting Zone to Walpole B Substation

3.8.63 This section presents the main alternatives considered for Section 6 and outlines the reasons for the selection of the proposed alignment.

Consideration of alternative pylon types in Section 6

3.8.64 The starting assumption for the overhead line design for the Project was standard height steel lattice pylons, however during the design development and in response to feedback, a review of pylon options was undertaken and included low height steel lattice and T-pylon. Further detail on the approach to pylon type selection can be found in Chapters 6 and 7 of the **Grimsby to Walpole Design Development Report**.

3.8.65 In Section 6, it was considered that due to the presence of numerous existing overhead lines in this section, and consideration of notes on Holford Rule 6 to minimise confusing appearance, T-pylons in this area would be inconsistent with

existing infrastructure. Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6 of the **Grimsby to Walpole Design Development Report**, there was not considered to be a justification for T-pylons to be used in Section 6.

3.8.66 The review of alternative pylon types in this section concluded that one section should be considered for the use of low height lattice pylons; this is set out individually below.

Alternative options considered for residential properties on Delgate Bank in Weston Hills

3.8.67 Feedback received from the Stage 1 consultation was to consider an alternative routeing of the overhead line at Weston Hills, due to potential impacts on residential properties on Delgate Bank in Weston Hills and New England Farm. Five alternative options were developed for consideration between the A151 High Road in Weston and the B1357 Hall Gate in Moulton, as follows:

i. two options routeing through the northern extent of the graduated swathe, north of Broadgate House and north of the residential properties on Delgate Bank;

ii. one option routeing centrally in the graduated swathe, between the properties on Delgate Bank, representing the preferred routeing indicated by the darkest shading within the graduated swathe shown at the Stage 1 consultation; and

iii. two options routeing through the southern extent of the graduated swathe, south of New England Farm.

3.8.68 Following detailed appraisal, a refined southerly alignment route was chosen as the preferred option. Although the alternative option was a longer route, it was chosen as the preferred route as it would reduce potential impacts to receptors located in the settlements at Weston and Spalding, as well as avoid the narrow gap between the residential properties located on Delgate Bank. It would also reduce potential impacts relating to various environmental features including trees, priority habitats and designated heritage assets.

Alternative option considered near King's Hall Moated Site, Moulton

3.8.69 Feedback received from Stage 1 consultation was to consider undergrounding in the area near King's Hall Moated Site (near Broadwater House Farm, Moulton), which is a scheduled monument, in order to avoid setting impacts on this asset. One option to underground within the corridor presented at Stage 1 consultation was considered. Although undergrounding in this area was considered to be technically feasible, the alternative option to underground was rejected as there would be greater environmental impacts, including a larger area of landtake, due to the width of trenches required for the installation of the underground cables and the position of two cable sealing end compounds which would also be required in comparison to an overhead line option, resulting in a greater loss of Grade 1 best and most versatile land. In addition, three drains (Moulton Mere Drain North, Moulton River and Neals Drain) would need to be culverted during construction to accommodate a haul road and there would be greater traffic impacts on local roads which would have impacts on residential receptors in the area of Hall Gate, Hurdletree Bank and Hog's Gate. Therefore, the option of an overhead line remains the preferred option.

3.8.70 Further to the above alternative option, a design refinement to route the overhead line at a further distance from the Kings's Hall Moated Site at pylon SW19 within the graduated swathe was considered. Although this would introduce a sharper angle at SW19, the benefit of the overhead line being routed further from the Kings Hall Moated Site was preferred, and therefore, this option was taken forward.

Alternative Option considered near Whaplode St Catherine

3.8.71 An alternative option to route the overhead line further north near Whaplode St Catherine, away from properties on Cransgate North, was requested in feedback received during the Stage 1 consultation. One alternative option routeing the overhead line to the east of the graduated swathe, from north west of Sparkes Lane to just south of Neal's Gate, was considered. Part of the alternative option would also be outside of the preferred route corridor presented at Stage 1 Consultation. The alternative option would have additional visual impacts, as the overhead line would be routed in closer proximity to the existing 4ZM 400 kV overhead line and to Holbeach Fen. The alternative option would also require a complex crossing of Neal's Gate and would be slightly longer, in comparison to the darker area of the graduated swathe presented at the Stage 1 consultation. Therefore, the alternative option was not taken forward.

Alternative option considered at Holbeach St Johns

3.8.72 An alternative option was to consider routeing the overhead line around the cut-outs at Holbeach St Johns, along the east and west of the graduated swathe within the corridor presented at Stage 1 consultation. Feedback received from the Stage 1 consultation regarding this alternative stated that it was proposed due to concerns about noise and close proximity to residential receptors. To address this, two alternative options considered were:

i. Option A: this option would route the overhead line to the east of the graduated swathe, to the east of Rookery Farm at Joy's Bank; and

ii. Option B: this option would route the overhead line along the western edge of the graduated swathe at Neal's Gate.

3.8.73 Although both options were technically feasible, they would introduce additional visual impacts and would deviate from the Holford Rules, in that both alternative options would be longer. Both alternative options would require additional angles due to properties on Joy's Bank. In addition, it was identified that there would be no adverse noise impacts in respect of routeing in line with the darkest shading of the graduated swathe presented at the Stage 1 consultation, due to the choice of conductors for the Project which is a measure embedded in the design. Therefore, neither alternative option was taken forward and the graduated swathe presented at the Stage 1 Consultation remained the preferred option.

Alternative option considered west of New Fen Dike due to proposed solar farms

3.8.74 Feedback received from Integrum Renewable Energy from the Stage 1 Consultation was to route the overhead line to the west of New Fen Dike, along the western side of the graduated swathe, in order to avoid interactions with a proposed solar farm (referred to as Fendyke Solar Farm). To address this, an alternative option routeing the overhead line to the west of the cutout adjacent to New Fen Dike was considered.

However, both sides of the corridor presented at Stage 1 consultation are intersected by proposed solar farm developments, the western side by the proposed Meridian Solar Farm between Langary Gate Road and Gedney Hill Gate, and the eastern side by the proposed Fendyke Solar Farm between SW42 and SW45. Therefore, it is not possible to route through this area without interacting with one of these developments. An alignment on the eastern side would be shorter than an alignment on the western side and would also require one less pylon. At the time of developing the proposed alignment, the Meridian Solar Farm was more advanced in its consenting process having undertaken pre-application submissions to the Planning Inspectorate. Based on these factors, a decision was therefore taken to route the proposed alignment on the eastern side across the proposed Fendyke Solar Farm. Subsequent to the proposed alignment being finalised for the purposes of Stage 2 consultation, National Grid became aware of a planning application submitted for the proposed Fendyke Solar Farm. National Grid has commenced early engagement with the developers of the solar farm to identify opportunities to reduce the impact of the proposed overhead line routeing and this will be considered following Stage 2 consultation.

Alternative options to avoid an area of Priority Habitat to the south of South Holland Main Drain and to the west of Sutton St James

3.8.75 An alternative option was considered to relocate pylon SW43 to outside of an area of Coastal and Floodplain Grazing Marsh Priority Habitat, to the south of South Holland Main Drain and to the west of Sutton St James. Alternative options considered within the corridor presented at Stage 1 consultation were:

i. Option A: this option would location pylon SW43 to the edge of the Coastal and Floodplain Grazing Marsh Priority Habitat; and

ii. Option B: this option was similar to Option A, but sited pylon SW43 outside of the Coastal and Floodplain Grazing Marsh Priority Habitat.

3.8.76 Both alternative options followed a similar alignment, but Option B avoids the placement of pylons in the Coastal and Floodplain Grazing Marsh Priority Habitat and is slightly further from residential receptors. Therefore, Option B was taken forward.

Alternative options considered between Sutton St James and Tydd St Giles

3.8.77 Feedback received from the Stage 1 Consultation was to route the overhead line south between Sutton St James and Tydd St Giles, to avoid visual and amenity impacts on residential receptors, impacts on ecological receptors and agricultural operations. To address this feedback, six alternative options were considered within the corridor presented at Stage 1 consultation which were:

i. Option A: this option would start near Holbeach St Johns in the western swathe, diverging near South Holland Drain and routeing south-east across the corridor. It passes north of Sutton St James, routeing between properties near Middle Broad Drove, and then routes to the north-east to rejoin near Black Lane, south of Tydd St Giles. All alignments then route east, crossing Black Dyke.

ii. Option B: this option would start near Holbeach St Johns and routes south toward Sutton St James, then turns east, north of Sutton St Edmund, before continuing north-east through the central area of the graduated swathe, crossing Cross Drove and then would rejoin all other alignment options near Black Lane. All alignments then route east, crossing Black Dyke.

iii. Option C: this option would follows a similar southern route near Sutton St James, diverging slightly near Sutton St Edmund before making a sharper north-easterly turn and then would rejoin all other alignments near Black Lane after a closer parallel to the Lowland Drain. All alignments then route east, crossing Black Dyke.

iv. Option D: this option would route south past Sutton St James, tracking slightly further east than Option B. It turns east then north-east through the central corridor at Broad Drove West, routeing on a similar alignment as Options E and B. This option would then merges with all other alignments near Black Lane. All alignments the route east, crossing Black Dyke.

v. Option E: this option would start further east near Broadgate in the centre of the swathe, routeing southward and roughly parallel, approximately 500m east of Options B, C, D, and F. This option would be routed in the middle of the corridor before converging with Option B north of Broad Drove West, following the same alignment to link with the other options near Black Lane. All alignments would then route east, crossing Black Dyke.

vi. Option F: this option would start near Holbeach St Johns and would be routed south near Sutton St James before gradually curving north-east after the crossing of Broad Drove West. This option would follow the outer eastern edge of the graduated swathe, running parallel to the Lowland and North Level Main Drain, and rejoins the alignment near Black Lane. All alignments then route east, crossing Black Dyke.

3.8.78 Although all alternative options were considered to be technically feasible, they would have technical complexities regarding an additional crossing of a high pressure gas pipeline, but Option C would also be routed in close proximity to the high pressure pipeline. All alternative options would also require a crossing of the North Level Main Drain, with more complex crossing for alternative options C, D, E and F. Options C and F would be the longest of the alternative options and therefore would not be compliant with the Holford Rules. Options A and B would be routed closer to agriculture buildings (use unknown); therefore, consideration would need to be given to pylon heights and Options C and D would be routed closer to the existing 132 kV overhead line, which has the potential to introduce wirescape and therefore would have visual impacts. Environmentally, all alternative options would cross the River Nene and the North Level Main Drain, although Option A and B would both result in a larger area of priority habitat loss in comparison to the other options. Option A in comparison to the other alternative options would be routed further away from several grade II listed building but would be closer to the Scheduled Romano-British settlement south of Shell Bridgegrade and the grade II listed Guanock House. All alternative options would be routed close to residential receptors and option C would potentially interact with the proposed Treading Bank Solar Farm.

3.8.79 All individual six options to route south between Sutton St James and Tydd St Giles presented technical complexities and did not identify any significant environmental benefits. Therefore, a hybrid option of Option A and Option E was the preferred option, with the section of Option E to route to the east of the New Fen Dike being taken forward in combination with Option A. This was the preferred option as this would be compliant with the Holford Rules, would reduce impacts on heritage assets and would minimise the impacts on residential receptors as far as practicable.

Alternative option considered in the area of Tydd St Giles

3.8.80 Feedback received from the Stage 1 Consultation was to route the overhead line south of the graduated swathe to avoid residential properties south of Tydd St Giles. An alternative option which routed the overhead line to the south of the A1101 and south west of the B1165 outside of the graduated swathe was considered. The alternative option for the overhead line would require more angles, would not be compliant with the Holford Rules and would be routed closer to the existing 132 kV overhead line in the south, introducing visual impacts. The alternative option would also have technical complexities during construction due the overhead line being routed in close proximity to a high pressure gas pipeline. Therefore, the alternative option was not taken forward. An alternative option to route the overhead line further north than the darker shading of the graduated swathe by in comparison to that presented at Stage 1 consultation between Tydd St Giles and Ingleborough was developed to avoid to interactions with the high-pressure gas pipeline located in the southern portion of the graduated swathe (just north of Newton in the Isle) and to avoid potential clashes with emerging proposals for the Eastern Green Link 3 and 4 Projects.

Section 7 – New Walpole B Substation

3.8.81 This section presents the main alternatives considered for Section 7 and outlines the reasons for the selection of the preferred route corridor and the siting of the New Walpole B substation.

Alternative option considered near West Walton

3.8.82 An alternative option to consider routeing the overhead line further south near West Walton to pass close to the sewage works adjacent to the River Nene was received from feedback during the Stage 1 consultation. The feedback referred to concerns regarding the overhead line being in close proximity to residential properties and impacts on wildlife at a Norfolk Wildlife Trust reserve that borders the River Nene as West Walton. An alternative option was considered which routed part of the overhead line to the outside and to the west of the corridor presented at Stage 1 consultation with an oblique crossing of the River Nene. The alternative option would require six crossings of high pressure gas pipeline, an additional two in comparison to the graduated swathe presented at Stage 1 consultation. Although the alternative option was preferred from an ecological perspective, the alternative introduced additional visual impacts, was not compliant with the Holford Rules and introduced technical complexities with regards to the presence of high pressure pipelines, oversailing a reservoir and crossing the River Nene. Therefore, the alternative option was not taken forward.

Alternative option considered for the New Walpole B Substation

3.8.83 Feedback received from Stage 1 consultation was to position the new Walpole B substation to the north east of the substation siting zone and further away from residential receptors. To address this feedback, an alternative option was considered to locate the New Walpole B Substation to the north of the substation siting area presented at Stage 1 consultation. The alternative option was not preferred due to interactions with the adjacent Rose and Crown Solar Farm and the existing 132 kV overhead line which would have impact on the solar farm. The alternative option

would sever field patterns and would be closer to visual receptors including residential properties along West Drove North.

3.8.84 The location of the New Walpole B Substation within the siting zone has been considered alongside the proposed Eastern Green Link 3 and Eastern Green Link 4 project, which is proposed to connect into the New Walpole B Substation. The two projects have worked closely together to ensure a co-ordinated approach to the siting of the proposed substation and associated infrastructure, including the proposed overhead line for the Project and the proposed underground cable and converter stations for the Eastern Green Link 3 and Eastern Green Link 4 project.

3.8.85 The preferred location for the New Walpole B Substation remains within the darker area of the siting zone presented at Stage 1 consultation. The siting area for the new Walpole B Substation is still preferred as it minimises as far as possible the technical complexities resulting from interactions of infrastructure for the Project and the proposed Eastern Green Link 3 and Eastern Green Link 3 with the National Gas high pressure gas pipeline, the UKPN 132 kV overhead line and the Rose and Crown Solar Farm, which helps facilitate the shortest and straightest route for the proposed new overhead line and the existing 4ZM route to the substation and to maintain flexibility for future connection routes to the substation.

3.9 Design Evolution and Next Steps

3.9.1 Consultation on the information provided in this PEI Report and the feedback received from statutory consultation will be used to review and refine the design of the Project, where appropriate. This will then form the basis of the DCO application documents. The current Project design which is being consulted on during Stage 2 consultation is described in further detail in **PEI Report Volume 2 Part A Chapter 5 Project Description** and in **PEI Report Volume 2 Sections 1 to 7 Chapter 1 Overview of the Section and Description of the Project.**

References

Ref 1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents [Accessed 30 August 2024].

Ref 2 National Grid (2022). Our Approach to Consenting [online]. Available at: https://www.nationalgrid.com/document/342336/download. [Accessed 09 May 2025].

Ref 3 The Planning Act 2008 [online]. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents [Accessed 30 August 2024].

Ref 4 Department for Energy Security & Net Zero (2024). Overarching National Policy Statement for Energy (EN-1) [online]. Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 [Accessed 30 August 2024].

Ref 5 Department for Energy Security & Net Zero (2024). National Policy Statement for Electricity Networks Infrastructure (EN-5) [online]. Available at: https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf [Accessed 30 August 2024].

Ref 6 National Grid (no date). Holford Rules [online]. Available at: https://www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf. [Accessed 30 August 2024].

Ref 7 National Grid (no date). Horlock Rules [online]. Available at: https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf. [Accessed 30 August 2024].

Ref 8 National Grid (2023). Strategic Options Report [online]. Available at: https://www.nationalgrid.com/document/352606/download [Accessed 30 August 2024].

Ref 9 National Grid (2024). Grimsby to Walpole Corridor Preliminary Routeing and Siting Study [online]. Available at: https://www.nationalgrid.com/document/352621/download [Accessed 30 August 2024].

Ref 10 National Grid Electricity Systems Operator (2023). Future Energy Scenarios [online] Available at: https://www.nationalgrideso.com/document/283101/download [Accessed 30 August 2024].

Ref 11 National Grid Electricity Systems Operator (2022). Electricity Ten Year Statement [online] Available at: https://www.nationalgrideso.com/document/275611/download. [Accessed 30 August 2024].

Ref 12 National Grid (2022). Network Options Assessment [online]. Available at: https://www.nationalgrideso.com/document/262981/download [Accessed 30 August 2024].

Ref 13 National Grid Electricity Systems Operator (2022). Network Options Assessment 2021/22 Refresh [online]. Available at:

https://www.nationalgrideso.com/document/262981/download [Accessed 30 August 2024].

Ref 14 National Grid (2024). Grimsby to Walpole Addendum to the Strategic Options Report [online]. Available at: https://www.nationalgrid.com/document/352611/download [Accessed 30 August 2024].

Ref 15 National Grid (2024). Grimsby to Walpole New Walpole Substation Location Options Report [online]. Available at: https://www.nationalgrid.com/document/352616/download [Accessed 30 August 2024].

Ref 16 National Grid (2025). Strategic Options Report Update. North Humber to High Marnham and Grimsby to Walpole. Available at: https://www.nationalgrid.com/document/154026/download [Accessed 5 March 2025]

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