

Supplementary Preliminary Environmental Information Report: Section 5 New Weston Marsh Substations A and B

Volume 2 Part A Introduction and Overview

Chapter 3 Main Alternatives Considered

November 2025

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Grimsby to Walpole

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3. Main Alternatives Considered

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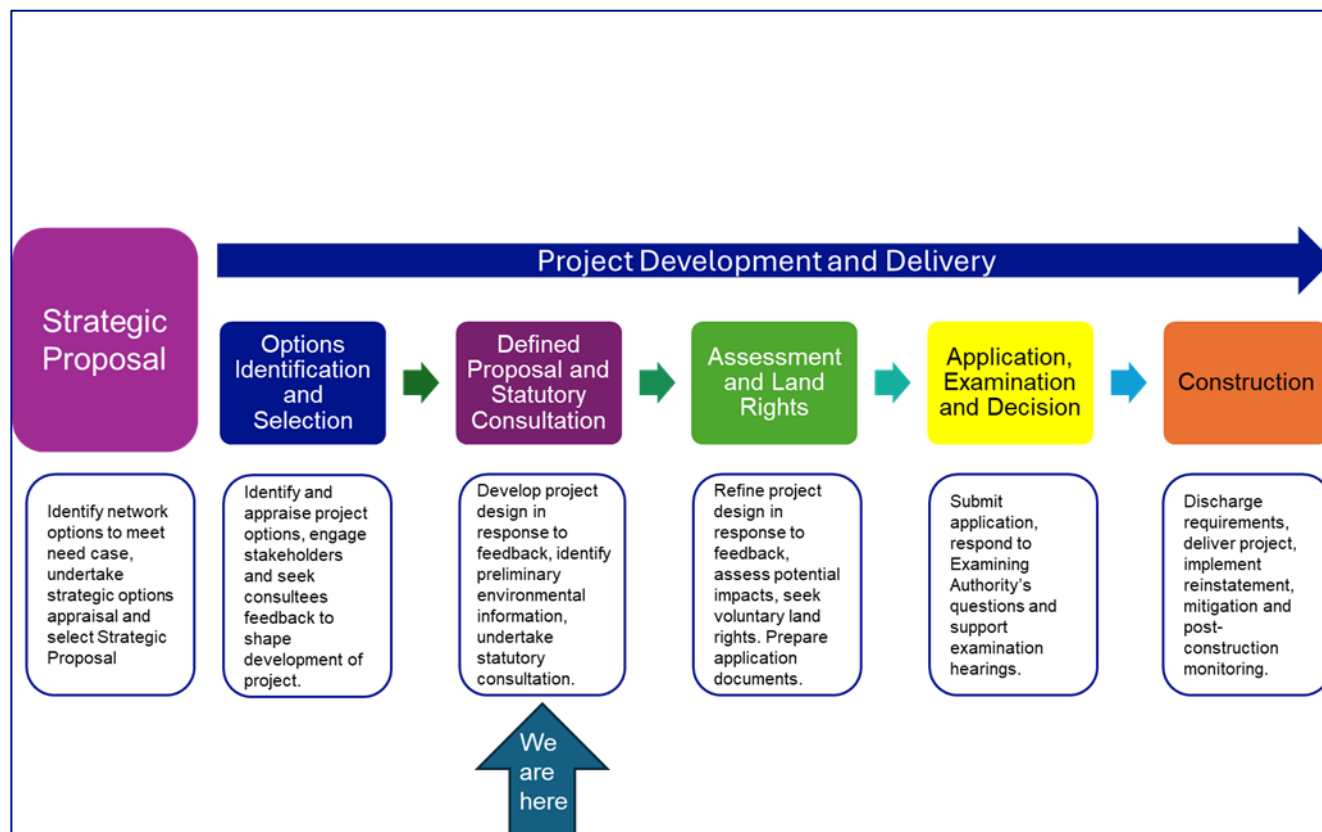
3.1 Consideration of Alternatives

- 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 2). 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 within the previously published June 2025 PEI Report (Ref 3) and described within **Supplementary PEI Report Volume 2 Part A Chapter 5 Project Description** and illustrated on **Supplementary PEI Report Volume 2 Part A Figure 5.1 Proposed Project Design**.
- 3.1.6 This chapter presents the consideration of alternatives for the Project which are specifically relevant to Section 5 New Weston Marsh Substations A and B (Section 5). As a result, it presents some of the same information as that set out in the previously published June 2025 PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered, as well as providing more detail with regard to the consideration of alternatives within Section 5 since publication of the June 2025 PEI Report.

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 4).
- 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 5), 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 4)



- 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 6) and EN-5 (Ref 7) and the Holford and Horlock Rules (Ref 8 and Ref 9), 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 Supplementary PEI Report chapter provide a background to the Project and a summary of the alternatives that have been considered at each stage of the Project to date, before discussing the alternative considered in determining the design for Section 5 as presented within this Supplementary PEI Report. The sections within this chapter consist of the following:
- i. Section 3.3 which summarises the strategic optioneering, as presented in the Strategic Options Report (SOR) (Ref 10);
 - ii. Section 3.4 which sets out the Strategic Options Report Update (Ref 11), which considered the strategic options for meeting the revised need case for the Project;
 - iii. Section 3.5 sets out the Options Identification and Selection undertaken within the CPRSS;
 - iv. Section 3.6 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 design has been developed for Section 5 of the Project;
 - v. Section 3.7 details the proposed design for Section 5 that was consulted on at Stage 2 Consultation;
 - vi. Section 3.8 details the Design Development Report that was produced for Stage 2 Consultation; and
 - vii. Section 3.9 provides a summary of the reasonable alternatives considered post Stage 2 Consultation and summarises the main reasons for selecting the preferred option for the Section 5 design.

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. This starts with identifying a range of Future Energy Scenarios (Ref 12) which inform the analysis in the Electricity Ten Year Statement (Ref 13) 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 ESO assesses and publishes its recommendations as to which proposals should proceed in a Network Options Assessment (NOA) report each year. See NOA 2021/2022 (Ref 14) and NOA 2021/2022 Refresh (Ref 15) 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 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 3.9 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 16).
- 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 17) 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 11) was prepared by National Grid to present the review of the conclusions of the Strategic Options Report and the Grimsby to Walpole – Addendum to Strategic Options Report 2024 (Ref 16), 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 consultation¹ 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.

¹ A period of non-statutory consultation on the Project conducted by NGET which aimed to introduce the Project and why it was needed, outline the work undertaken to identify the preferred emerging preferred overhead line route corridor and substation Siting Areas, as well as the graduated swathe, and provide the public and stakeholders the opportunity to provide feedback.

3.5 Options Identification and Selection

- 3.5.1 Following identification of the Strategic Proposal, National Grid undertook a CPRSS. 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.

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 8) 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 9).

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 10) and SOR Addendum (Ref 16) 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 Substations A and B, and the New Walpole B Substation) through a five-phase process which is detailed in the CPRSS and illustrated on **Supplementary 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 6).
- 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 9) and Holford Rules (Ref 8) 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 **Supplementary 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, 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 Grimsby 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 Grimsby 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 6). 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 Farlesthorne 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 **Supplementary 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, 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 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 a 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 **Supplementary 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, 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.
- 3.5.39 Within this emerging preference, the Weston Marsh siting zone, four siting areas were identified (WM1, WM2, WM3 and WM4), as shown in **Supplementary PEI Report Figure 3.6 Weston Marsh Siting Areas**. Ecology and Biodiversity, Water Environment, Socio-economics, Noise and Vibration and Air Quality were not considered to be differentiating factors between the siting areas.
- 3.5.40 From a Landscape and Visual perspective, siting areas WM2 and WM3 were preferred as infrastructure would be sited closer to the existing 4ZM and 2WS overhead lines therefore reducing the spread of infrastructure and limiting the length of permanent realignments to the existing overhead lines. From a Historic Environment perspective, siting areas WM2 and WM3 were also preferred as these areas were more distant from designated heritage assets and therefore limited the spread of infrastructure (and therefore impacts upon setting) to surrounding areas. As there was little to choose between siting areas WM2 and WM3 from an environmental and technical perspective, an area primarily encompassing WM2 and WM3 was identified as the emerging preference.

New Walpole B Substation

- 3.5.41 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.
- 3.5.42 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.
- 3.5.43 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 (Ref 16).
 - 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 (Ref 6). 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.

3.5.44 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.

3.5.45 The Walpole B siting zones are illustrated in **Supplementary PEI Report Volume 2 Part A Figure 3.7 Walpole B Siting Zones**.

Selection of the preferred option

3.5.46 As identified in the CPRSS, 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).

3.5.47 From a technical perspective, there were material 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.

- 3.5.48 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 as the emerging preference for the Walpole siting zone.

Route Corridor Options

- 3.5.49 The preliminary route corridor options were identified in the CPRSS between the start and end points for the Project, as illustrated on **Supplementary PEI Report Volume 2 Part A Figure 3.2 Corridors (Overhead line)**. 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.
- 3.5.50 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'.
- 3.5.51 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.
- 3.5.52 The CPRSS identified a network of potential corridors and links which are shown in **Supplementary PEI Report Volume 2 Part A Figure 3.2 Corridors (Overhead line)**. The Corridor options emerging as preferred from the CPRSS are listed below.

Grimsby West to Burgh le Marsh

Selection of the preferred route

- 3.5.53 Within the CPRSS, 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.

- 3.5.54 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.
- 3.5.55 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.
- 3.5.56 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.

Burgh le Marsh to Weston Marsh

Selection of the preferred route

- 3.5.57 Within the CPRSS, 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).
- 3.5.58 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.

- 3.5.59 Stage 3 considered the best performing Sections and Links between the B1397 Spalding Road and Weston Marsh. There are few material constraints to routing within Section C20 and use of Section C21A was preferred as it would avoid crossing the 4ZM 400 kV overhead line.
- 3.5.60 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

- 3.5.61 Within the CPRSS, 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 routing. A route using this Corridor (compared to the Northern Corridor) is also unlikely to require acquisition or direct oversail of residences.

Option Selection

- 3.5.62 The Option Selection process is presented in Chapter 13 of the CPRSS. In summary, the preferred end-to-end solution comprises the following:
- Grimsby West Substation – GW5;
 - 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;
 - LCS – LCS5 and LCS6/8;
 - 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;
 - Weston Marsh – WMZ2;
 - Weston Marsh to Walpole – Section C22 to C28A; and
 - Walpole – WLP4/5.
- 3.5.63 An overview of the preferred end-to-end solution including the preferred substation siting zones can be found in **Supplementary PEI Report Volume 2 Part A Figure 3.10 End to End Solution**.
- 3.5.64 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:
- Supplementary PEI Report Volume 2 Part A Figure 3.8 Overhead Line Graduated Swathe;**
 - Supplementary PEI Report Volume 2 Part A Figure 3.9 Grimsby West Substation Graduated Swathe;**

- iii. **Supplementary PEI Report Volume 2 Part A Figure 3.9 LCS5 Graduated Swathe;**
- iv. **Supplementary PEI Report Volume 2 Part A Figure 3.9 LCS Hybrid Zone (LCS6 and LCS8) Graduated Swathe;**
- v. **Supplementary PEI Report Volume 2 Part A Figure 3.9 Weston Marsh Substation Graduated Swathe;** and
- vi. **Supplementary PEI Report Volume 2 Part A Figure 3.9 Walpole B Substation Graduated Swathe.**

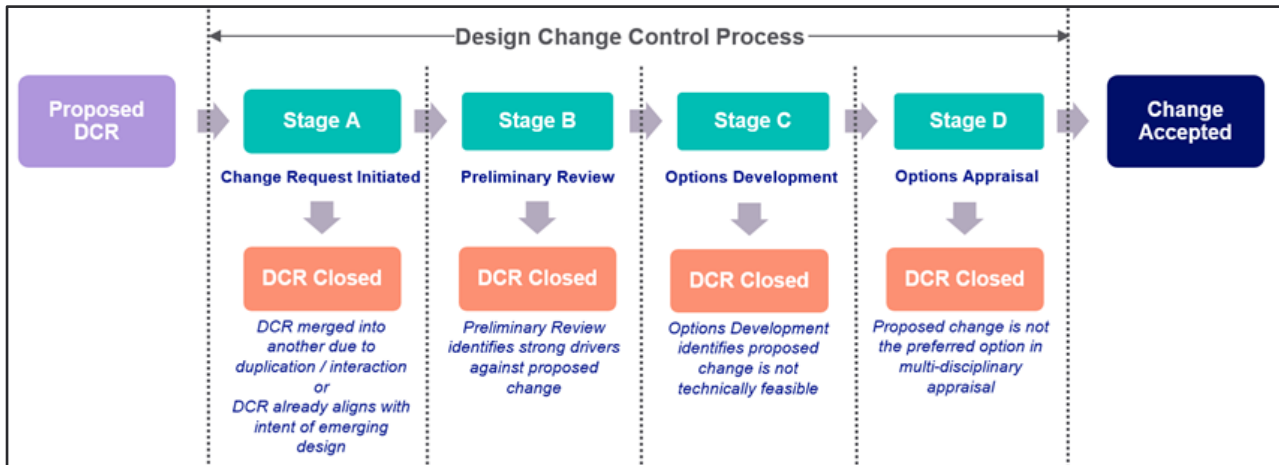
Stage 1 Consultation

- 3.5.65 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.
- 3.5.66 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 (Ref 18) and how this informed the evolution of the Project's design in the Grimsby to Walpole Design Development Report (Ref 19).
- 3.5.67 The feedback obtained at the Stage 1 consultation helped to shape and guide the development of the Project's permanent works and the temporary works associated with the draft Order Limits within this Supplementary PEI Report. All feedback provided was considered and taken into account.

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 has 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 the purposes of 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 Stage 2 Consultation

3.7.1 Stage 2 Consultation, a period of statutory consultation required for Nationally Significant Infrastructure Projects (NSIPs) was conducted in June – August 2025 and provided those with an interest in the Project, including local authorities, statutory

consultees, parties with land interests and the local community, the opportunity to provide feedback to influence the design of the developing Project.

- 3.7.2 For the purposes of the Stage 2 Consultation, for Section 5, a wider Refined Weston Marsh Substation Siting Zone was presented, as opposed to the draft Order Limits presented for other sections of the Project. At the time of the Stage 2 Consultation, Section 5 comprised less design information compared to other sections, and further design work was being undertaken, including consideration of the need for up to two new substations in the Weston Marsh area.

3.8 Design Development Report

- 3.8.1 The Grimsby to Walpole Design Development Report (Ref 19), published in June 2025 for the Stage 2 Consultation, describes how the Project had evolved since the Stage 1 consultation undertaken between January and March 2024, taking into account the Design Development process described in section 3.6. A summary of the alternatives that were considered for the Project as a whole is also provided in the June 2025 PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered (Ref 3).
- 3.8.2 In conjunction with the **Section 5 Consultation Feedback Report**, a **Supplementary Design Development Report for Section 5** has been produced for the purposes of the Localised Statutory Consultation for Section 5. It details the design evolution of Section 5 since the Stage 2 Consultation period, based on feedback and more detailed engineering work and environmental studies.

3.9 Alternatives considered within the Refined Weston Marsh Substation Siting Zone

- 3.9.1 This section provides a summary of the reasonable alternatives within the Refined Weston Marsh Substation Siting Zone presented at Stage 2 Consultation and summarises the main reasons for selecting the preferred option in accordance with the EIA Regulations. Detailed information on how Section 5 of the Project has evolved up to now, is contained within the **Supplementary Grimsby to Walpole Design Development Report for Section 5**.

Section 5 – New Weston Marsh Substations A and B

- 3.9.2 As noted in the June 2025 PEI Report published at Stage 2 Consultation, since the Stage 1 Consultation, National Grid has been engaging with generators who are contracted to connect in the Weston Marsh area, as well as reviewing the technical specifications. This engagement and review has continued since Stage 2 Consultation, including consideration of the need case and whether the identified need requires the provision of two separate substations.
- 3.9.3 This review and the subsequent design work has been undertaken in the context of the statutory duties placed on National Grid as licence holder. National Grid must develop and maintain an efficient, co-ordinated and economical system of electricity transmission. This requires the reliability, security and resilience of the existing transmission network to be maintained when developing proposals for new substations, ensuring that the network is resilient by design in relation to incidents arising as a result of internal and external causes.

- 3.9.4 With the significant amount of generation planned to connect into the Weston Marsh area, network analysis was carried out to determine the optimal configuration for the network and the substations within this region, taking into account the need to ensure the resilience of the network. This analysis identified the need for there to be two separate substations at Weston Marsh.
- 3.9.5 The requirement for two substations at Weston Marsh is influenced by the national and regional power demand, and the amount of generation planned to connect in the Weston Marsh area, of which there is a particularly large amount. By providing two substations at Weston Marsh the design establishes resilience on the transmission network given the number of new connections. Furthermore, with two substations it is much more straightforward to provide for maintenance on the network where outages are required and to reduce the impact of faults in the area. This mitigates against the risk of the network becoming reliant on a single 'node' connecting substantial amounts of power generation and ensuring the network's safety and reliability.
- 3.9.6 A separation distance of at least 1 km between the new Weston Marsh Substation A and new Weston Marsh Substation B was considered appropriate. Although other separation distances could be appropriate and were considered, a lesser separation distance reduces the risk management benefit of separating the facilities. Similarly, in order to manage risk and exposed single points of failure, it was determined that an underground cable connection between the two substations was appropriate.

Consideration of substation options in Section 5

- 3.9.7 Following the confirmation that two substations (the 'new Weston Marsh Substation A' and 'new Weston Marsh Substation B') would be required at Weston Marsh, a **Weston Marsh Siting Study Report** was prepared to identify the preferred Siting Areas for the substations and associated overhead line and underground cable connections required at Weston Marsh as part of the Project. As part of this study, previous alternative siting zones originally identified within the CPRSS were reviewed to ensure the area remained the most preferable option for two substations within the Weston Marsh area, taking account of environmental and technical factors. Both substations were appraised from an environmental, socio-economic and technical perspective, with different approaches adopted for each as explained in further detail below.

New Weston Marsh Substation A

- 3.9.8 For the new Weston Marsh Substation A, a Siting Area was defined based on the darkest area of graduated swathe presented within the CPRSS. This Siting Area was re-appraised from an environmental, socio-economic and technical perspective, building on previous siting work undertaken within the CPRSS. This re-appraisal took into account surveys and environmental studies that have been conducted since the publishing of the CPRSS, to ensure the darkest part of the graduated swathe remained the preferred area and that the original conclusions reached in the CPRSS remained valid.
- 3.9.9 The **Weston Marsh Siting Study Report** concluded that no further constraints were identified at the time the appraisal was conducted which would alter the original conclusions presented in the CPRSS.

New Weston Marsh Substation B

- 3.9.10 For the new Weston Marsh Substation B, three Siting Areas were defined and appraised in turn from environmental, socio-economic and technical perspectives, shown on **Supplementary PEI Report Volume 2 Part A Figure 3.11 Weston Marsh Siting Study Siting Areas**. The Option 2 Siting Area was discounted from an environmental perspective This was due to the proximity of this Siting Area to a group of designated heritage assets at Wykeham Chapel, and the potential for setting impacts on this receptor group as a result.
- 3.9.11 The Options 1 and 3 Siting Areas were both considered similarly favourable from an environmental perspective. Option 3 was slightly more favourable in terms of air quality and noise, owing to its greater distance from identified sensitive receptors. However, it was considered all potential impacts identified during the appraisal would be adequately controlled through the implementation of best practice measures, secured and implemented within a Code of Construction Practice (CoCP) submitted with the DCO Application.
- 3.9.12 From a water environment perspective, Option 3 was less favourable. Its development would require the diversion of a high priority Internal Drainage Board (IDB) watercourse, which led to Option 1 emerging as the preferred option in this regard.
- 3.9.13 Option 1 was also considered more favourable from a landscape and visual perspective, offering greater opportunities for mitigation planting and integration with the existing nursery planting to the north of the Siting Area.
- 3.9.14 From a socio-economic perspective, no strong preference emerged between the options. This factor did not influence the overall selection but was considered as part of a complete appraisal.
- 3.9.15 From a technical perspective, Option 1 was preferred over Option 3 due to the presence of a high pressure gas pipeline situated just to the north of the Option 3 Siting Area. If Option 3 were taken forward, both customer and National Grid connections would potentially have to cross this gas pipeline, introducing additional complexity and risk.
- 3.9.16 Taking all factors into account, Option 1 was selected as the preferred Siting Area for the new Weston Marsh Substation B. This option was taken forward for further design development. The design development undertaken following the outcomes of the **Weston Marsh Siting Study Report** are reported within the **Supplementary Design Development Report for Section 5**.

Alternative options considered for receptor group at Wykeham Chapel

- 3.9.17 As design development for Section 5 progressed, feedback received from the historic environment discipline prompted the appraisal of alternative routing of the 2WS overhead line coming out of the new Weston Marsh Substation B (WM-B) due to potential setting impacts on the high value receptor group at Wykeham Chapel. Three options were appraised, as follows:
- i. Option 1: The 2WS alignment makes use of the existing 2WS005 tension tower and routes north east to the WM-B Substation via an alignment which passes approximately 270 m from the Wykeham Chapel receptor group;

- ii. Option 2: The 2WS alignment connects to a new tower on the existing 2WS alignment at 2WS008-N and routes north west to the WM-B Substation via an alignment which passes approximately 460 m from the Wykeham Chapel receptor group; and
- iii. Option 3: The 2WS alignment makes use of the existing 2WS010 tension tower and routes north west to the WM-B Substation which passes approximately 710 m from the Wykeham Chapel receptor group.

3.9.18 Option 2 increased the distance between the proposed 2WS overhead line and Wykeham Chapel to approximately 460 m. However, this would not offer a material reduction in the potential significant effect on the scheduled monument, and would instead result in an increased risk of impacts on other environmental receptors, as follows:

- i. greater potential for impacts upon the water environment (such as deterioration of water quality or impacts on hydromorphology), due to an increased number of overhead line crossings of Lord's Drain (a high priority IDB watercourse), to three, compared with one crossing with Option 1;
- ii. greater potential for socio-economic impacts (on users of PRow), due to Option 2 intersecting PRow WSTN/3/1 at two locations compared to one location with Option 1;
- iii. greater potential for visual impacts to a residential property at Shepherd's Farm, due to the closer proximity of the overhead line; and
- iv. greater potential for landscape impacts due to an extra pylon being required compared with the Option 1 alignment.

3.9.19 Option 3 increased the distance between the proposed 2WS overhead line and Wykeham Chapel to approximately 710 m. However, this alignment increased the number of new build pylons required, increasing technical complexity, and would result in increased risks to other environmental receptors, as follows:

- i. greater potential for ecological impacts (such as potential for habitat loss and disturbance of protected species), due to a greater number of ditches being crossed by the overhead line in this option, including habitats suitable for water vole, as well as being in closer proximity to identified badger setts and otter holts, compared with the other two options;
- ii. greater potential for impacts upon the water environment (such as deterioration of water quality or impacts on hydromorphology), due to an increase in the number of overhead line crossings of the Lord's Drain, a high priority IDB watercourse, to three, compared with only one crossing for Option 1;
- iii. greater potential for socio-economic impacts (on users of PRow), due to Option 3 intersecting PRow WSTN/3/1 at two locations compared to one location with Option 1;
- iv. greater potential for visual impacts to a residential property at Shepherds Farm, with the overhead line routeing in close proximity to the property to its north, east and south, and to Bass Cottages to the north due to the proposed 2WS overhead line being routed closer to these properties; and

- v. greater potential for landscape impacts due to four additional pylons being required in the final configuration of overhead lines compared with the preferred alignment.

3.9.20 Following this detailed appraisal, Option 1 was chosen as the preferred option. Although this alignment is in the closest proximity to the Wykeham Chapel receptor group, this was chosen to avoid the receptors identified in the proximity of Option 2 and 3, including badger setts, otter holts, drainage ditches supporting water vole, including Lord's Drain (high priority IDB watercourse) and Public Rights of Way. Option 1 was also appraised as having comparatively less potential for landscape and visual impacts by being further from Shepherd's Farm and this alignment requiring one less pylon.

Alternative options considered for the New Weston Marsh Substation B

3.9.21 The preferred locations for the new Weston Marsh Substation A and new Weston Marsh Substation B are in the northern and central regions of the Refined Weston Marsh Substation Siting Zone respectively. These locations are detailed in the **Weston Marsh Siting Study Report**. Following completion of the initial siting study, further appraisals considered an alternative location for the new Weston Marsh Substation B. The alternative location was to the south of the siting zone and to the west of Wiseman's Gate. This location was proposed via Stage 2 Consultation feedback.

3.9.22 The appraisal identified that the primary benefit of the alternative location would be the potential avoidance of significant adverse effects upon two high-value heritage assets: the medieval Wykeham Chapel moated monastic grange and retreat house scheduled monument and the Grade I listed Wykeham Chapel of St Nicholas; and two medium-value heritage assets: the Grade II listed Chapel Farmhouse and the Grade II listed Gate Piers to Chapel Farmhouse. The alternative location would have increased the distance between the assets and the new Weston Marsh Substation B by approximately 150 m when compared with the preferred location. There would also be additional screening from existing vegetation that would help to mitigate views from the heritage assets towards the substation when compared with the preferred location. As with the preferred location, the setting of the assets would still be adversely impacted by the substation in this alternative location, due to the presence of the substation and associated overhead lines, but the risk of potential impacts would be reduced.

3.9.23 However, the alternative location would introduce a range of environmental disbenefits. These are primarily due to the increase in the expected lengths of overhead line and underground cable routes that would result from moving the new Weston Marsh Substation B further south. The increased lengths of overhead line and underground cable connections to the new Weston Marsh Substation B would lead to additional temporary and permanent loss of agricultural land. They would also cause a risk of additional impacts on the water environment due to the greater number of watercourse crossings required, and additional risks to protected species and habitats, for instance water voles, from the greater length of overhead lines and underground cables and the additional watercourse crossings which would be required.

3.9.24 In addition to the environmental disbenefits, the increased lengths of overhead lines and underground cables would result in additional Project cost. Furthermore, additional construction complexity would result from the increased congestion of the

connections to the Weston Marsh substations and the additional crossings of the Interger high pressure gas pipeline (which routes across the Refined Weston Marsh Substation Siting Zone from south west to north east) by both overhead lines and underground cable routes.

- 3.9.25 The alternative location for the new Weston Marsh Substation B would also increase the expected length of overhead line connection for the Weston Marsh to East Leicestershire Project.
- 3.9.26 A comparative assessment of the identified benefits and disbenefits determined that the reduction in impacts and effects upon the historic environment was not sufficient for the alternative location in the south of the siting zone to be the preferred overall.
- 3.9.27 While environmental, technical and cost considerations are primary factors for appraisal in National Grid's decision-making process, programme implications were also considered. A decision to change the preferred location of the new Weston Marsh Substation B would have resulted in delay to the critical path of the Project, due to the additional design and environmental survey and assessment work that would be required following a change. National Grid considered it important to take into account programme impact, as the Project will be delivered under the Accelerated Strategic Transmission Investment (ASTI) framework, and plays a vital part in the UK Government's Net Zero ambitions. Furthermore, National Grid is obliged, through its licence conditions, to provide timely access to the transmission system for customers with whom it has connection agreements. Considerations in relation to programme therefore represent an additional, confirmatory factor in the decision not to re-locate the new Weston Marsh Substation B in the south of the Siting Zone.

3.10 Design Evolution and Next Steps

- 3.10.1 The alternatives considered above have resulted in the development of draft Order Limits for Section 5, from the Refined Weston Marsh Substation Siting Zone presented during the Stage 2 Consultation. These draft order Limits are being consulted on as part of the Weston Marsh Targeted Consultation. Consultation on the information provided in this Supplementary PEI Report and the feedback received from the Weston Marsh Targeted Consultation, in addition to the feedback received on the June 2025 PEI Report for the Project during the Stage 2 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 is described in further detail in **Supplementary PEI Report Volume 2 Part A Chapter 5 Project Description** and for Section 5 specifically, in **Supplementary PEI Report Volume 2 Part B 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 (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 3 National Grid (2025). Grimsby to Walpole Preliminary Environmental Information Report. Available at: <https://www.nationalgrid.com/the-great-grid-upgrade/grimsby-to-walpole/document-library#4257225834-3023854277>
- Ref 4 National Grid (2022). Our Approach to Consenting [online]. Available at: <https://www.nationalgrid.com/document/342336/download>. [Accessed 09 May 2025].
- Ref 5 The Planning Act 2008 [online]. Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents> [Accessed 30 August 2024].
- Ref 6 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 7 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 8 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 9 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 10 National Grid (2023). Strategic Options Report [online]. Available at: <https://www.nationalgrid.com/document/352606/download> [Accessed 30 August 2024].
- Ref 11 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].
- Ref 12 National Grid Electricity Systems Operator (2023). Future Energy Scenarios [online] Available at: <https://www.nationalgrideso.com/document/283101/download> [Accessed 30 August 2024].
- Ref 13 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 14 National Grid (2022). Network Options Assessment [online]. Available at: <https://www.neso.energy/document/233081/download> [Accessed 30 August 2024].
- Ref 15 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 16 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 17 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 18 National Grid (2025). Stage 1 Consultation Feedback Report. Available at: <https://www.nationalgrid.com/document/560496/download> [Accessed 19 August 2025].
- Ref 19 National Grid (2025). Design Development Report. Available at: <https://www.nationalgrid.com/document/560486/download> [Accessed 19 August 2025].

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