The Great Grid Upgrade

Grimsby to Walpole

Design Development Report

June 2025

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Contents

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Executive summary

The purpose of this report is to describe how the Grimsby to Walpole Project (the 'Project') has evolved between the non-statutory (Stage 1) and the statutory (Stage 2) consultation periods.

National Grid Electricity Transmission plc (NGET), referred to as National Grid in this report, owns, builds and maintains the high-voltage electricity transmission network in England and Wales. National Grid is responsible for making sure electricity is transported safely and efficiently from where it's produced to where it's needed. It is National Grid that is developing plans for the Project. The Project would support the UK's net zero target through a proposed network reinforcement located in the East Midlands, Humber and East Anglia regions.

The Project conducted a Stage 1 consultation between January and March 2024. This consultation introduced the Project, explained why new electricity transmission infrastructure is needed in these regions, how National Grid had developed its proposals, and sought the views of the public and stakeholders.

The feedback received during the Stage 1 consultation has been carefully reviewed and considered, alongside the findings of environmental and engineering studies and emerging results from environmental surveys.

A review of our work to date, comprising the previous development stages of the Project, including the strategic proposal stage and options identification and selection stage has been carried out following the Stage 1 consultation.

This report presents the changes that have been made to the Project and its evolution since the Stage 1 consultation, including an explanation of how the proposed overhead line alignment and associated draft Order Limits for the proposed overhead line reinforcement and substation developments have been identified.

Following consideration of the feedback received in response to the upcoming Stage 2 consultation in summer 2025, we will further develop and refine our proposals and continue to review our work to date throughout the process of developing the Project.

Our current proposals for the Project as presently indicated and which are the subject of the Stage 2 consultation comprise:

- Approximately 140 km of new 400 kV overhead transmission line (OHL);
- a new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation and the existing 132 kV Northern Powergrid Substation in North East Lincolnshire (to be referred to as the new Grimsby West Substation). The existing 400 kV substation would be decommissioned, in all, or part[1]. The extent of decommissioning will be determined and reported in the Environmental Statement;
- Two new 400 kV Lincolnshire Connection substations located south west of Mablethorpe in East Lindsey (to be referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B);

[1] The existing 400 kV Substation will be decommissioned, in all or in part, only. The existing 132 kV Northern Powergrid Substation will not be decommissioned.

- Up to two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation A and Weston Marsh Substation B);
- A new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (to be referred to as Walpole B Substation); and
- Replacement of short sections of existing 400 kV OHL and local changes to the lower voltage distribution networks to facilitate the construction of the new OHL and substations.

The Project would include other required works, for example, temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including biodiversity net gain (BNG).

The feedback from the Stage 1 and Stage 2 consultations (as applicable) will be used to inform the final designs that will be put forward in the application for development consent. National Grid expects to submit an application for consent for the Project in 2027.

1. Introduction

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1. Introduction

1.1 Purpose of this report

1.1.1 The purpose of this report is to describe how the Grimsby to Walpole Project (referred to as the 'Project' in this report) has evolved since the Stage 1 (non-statutory) consultation (undertaken between January and March 2024). In conjunction with the **Stage 1 Consultation Feedback Report**, this report details the design evolution between the Stage 1 consultation and Stage 2 (statutory) consultation periods based on feedback and more detailed engineering work.

1.2 Overview

1.2.1 National Grid Electricity Transmission plc (National Grid), owns, builds and maintains the electricity transmission network in England and Wales, and operates the high voltage electricity network throughout Great Britain, transporting electricity from generators (such as wind farms, solar farms and power stations) to local distribution network operators. Under Section 9 of the Electricity Act 1989 (Ref 1), National Grid as the transmission licence holder, is required to develop and maintain an efficient, coordinated and economical electricity transmission system, and in a way which considers people, places and the environment (the desirability of preserving amenity duty under Schedule 9).

1.2.2 National Grid is working to build a cleaner, fairer, and more affordable energy system that serves everyone, powering the future of our homes, transport, and industry. The Project is part of The Great Grid Upgrade and, along with a number of other projects, will support the UK's net zero target through the connection of new low carbon energy generation, and by reinforcing the electricity transmission network in the Humber, East Midlands, East of England and East Anglia regions.

1.2.3 The Project is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which is generated by offshore wind) that is expected to connect to the network over the next ten years and beyond. The need case for the Project is set out in the **Stage 2 Consultation Document** and the **North Humber to High Marnham and Grimsby to Walpole - Strategic Options Report Update** (hereafter referred to as the **Strategic Options Report Update**). Completion of the Project, together with other new reinforcements across the country will meet this future energy transmission demand both within these regions and across the UK.

1.2.4 The Project proposes to build a new high-voltage electricity transmission line and associated works between a new substation at Grimsby West in North East Lincolnshire and a new substation in the Walpole area, in Norfolk. The Project also proposes two new connection substations near the Lincolnshire coast and up to two new substation(s) at Weston Marsh in Lincolnshire.

1.2.5 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under Section 16 of the Planning Act 2008 (PA 2008) (Ref 2) because it comprises a new electricity line above ground with a length of more than 2 kilometres (km), and with an operating voltage of above 132 kV. NSIPs are projects of certain types, over a certain

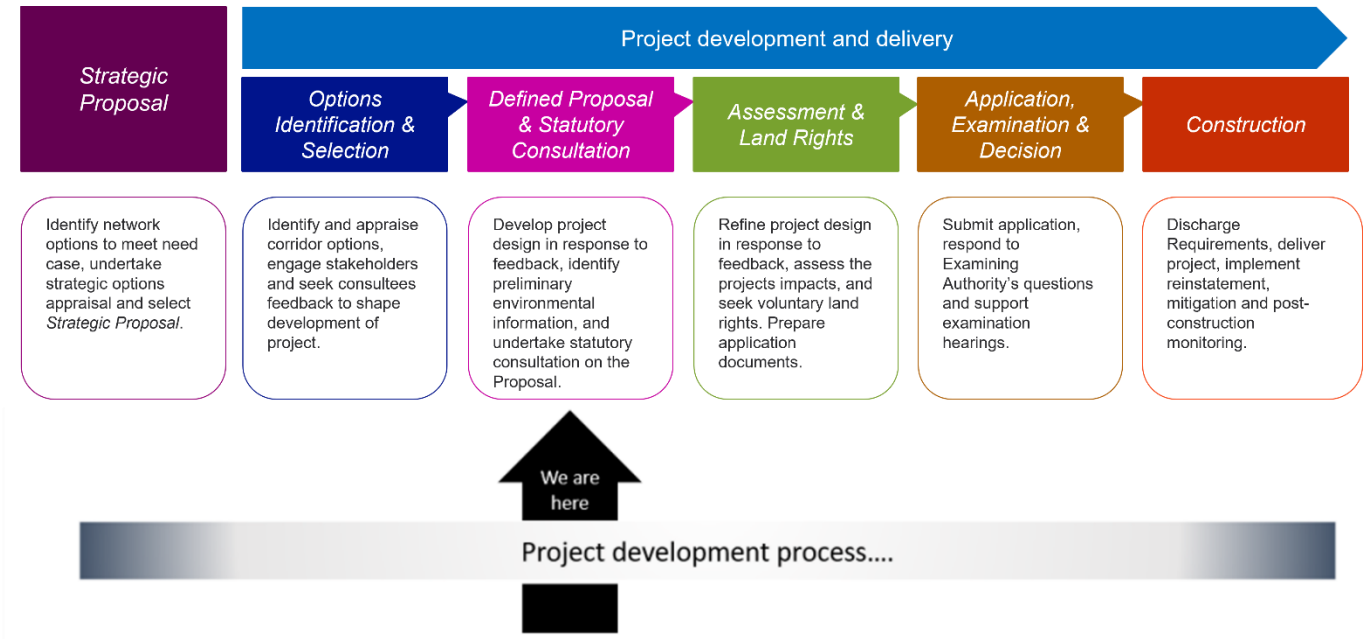
size, which are considered by the Government to be of national importance, hence permission to build them needs to be given at a national level, by the relevant Secretary of State (SoS), in this case the Secretary of State for Energy Security and Net Zero.

1.2.6 National Grid must apply to the SoS for development consent for the Project, via the Planning Inspectorate. If the application is accepted, an examining authority would be appointed (consisting of one or more examining inspectors) who, after a period of public examination, would make their recommendation to the SoS. The SoS would, in turn, decide on whether development consent, via a Development Consent Order (DCO) should be granted for the Project. The timescale between acceptance of the submission and a decision is approximately 18 months in most cases.

1.3 National Grid Approach to Options Identification and Selection

1.3.1 National Grid's Approach to Consenting outlines the development process for major infrastructure projects, from initial inception to consent and construction, as detailed on Image 1.1:

Image 1.1 National Grid's Consenting Process (Our Approach to Consenting, National Grid, 2022)



Strategic options considered

1.3.2 National Grid 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 **Strategic Options Report** which describes the future network requirements and the options appraised to meet these requirements. This report addressed two projects, 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.

1.3.3 The strategic options review process responds to the need case described in the **Strategic Options Report**. The **Strategic Options Report** identified a long-list of options which were capable of meeting the need case.

1.3.4 A focused list of strategic options was 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.

1.3.5 Strategic options that were considered included onshore options (overhead and underground) as well as offshore options. Technical, environmental and socio-economic factors were not considered to differentiate between offshore and onshore options. However, the offshore options were substantially more expensive than any of the onshore options and onshore options were therefore preferred.

1.3.6 The **Strategic Options Report** identified a new, primarily overhead line connection between a new Grimsby West Substation to a new substation at Walpole via two proposed Lincolnshire Connection Substation(s) (LCS) as the emerging preference.

1.3.7 Since the publication of the **Strategic Options Report**, further work has been 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 **Strategic Options Report Update**.

1.3.8 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**, which concluded that the preference for the new Walpole Substation (herein referred to as Walpole B Substation since the publication of the **Corridor and Preliminary Routeing and Siting Study**) was for it to be situated on the existing Burwell-Walpole 400 kV overhead line circuits.

1.3.9 Since publication of the **Strategic Options Report**, an exercise to review the conclusions of these reports has been undertaken and reported on in the **Strategic Options Report Update**. This review exercise is discussed in Chapter 4: Review of Previous Development Stages and includes an update to refer to the proposals for up to two 400kV substations at Weston Marsh.

Options identification and selection

1.3.10 Following identification of the Strategic Proposal, National Grid undertook a **Corridor and Preliminary Routeing and Siting Study (CPRSS)**.

1.3.11 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. The National Grid options appraisal process promotes good design to be considered at an early conceptual stage by avoiding environmental impacts at the outset, where practicable. This includes using the mitigation hierarchy (i.e. to avoid, then reduce and then

compensate) to avoid impacts in the first instance by locating project features away from sensitive receptors where practicable and considering measures that can be embedded into the design where sensitive receptors cannot be avoided.

1.3.12 The emerging preferred corridor was subject to Stage 1 consultation undertaken between January and March 2024.

1.3.13 Further details on National Grid's approach to consenting and the routeing and siting options considered is provided in the **CPRSS**, published in January 2024 to inform the initial Stage 1 consultation.

1.3.14 As detailed in this **Design Development Report**, the Project has evolved since the Stage 1 consultation in response to feedback from that consultation and further environmental and engineering studies.

1.3.15 Review of previous design decisions is undertaken to respond to new information and in order to ensure that the outcome of each stage remains valid and National Grid continues to review its proposals. Since publication of the **CPRSS**, a review of parts of the emerging preferred corridor in proximity to the Lincolnshire Wolds National Landscape (Area of Outstanding National Beauty) has been undertaken and is reported on in **PEI Report Volume 2 Part A Appendix 3A Western Corridor Review**. This review exercise is discussed in Chapter 4: Review of Previous Development Stages.

1.3.16 Options will continue to be reviewed throughout the process having regard to consultation responses and other relevant information, and as such no final decision has been made and none of the conclusions in this report should be seen as final.

1.3.17 The Project is now the subject of a Stage 2 consultation under the PA 2008. A list of all the documents produced for the Stage 2 consultation is available on the Project website.

1.4 Project Description

1.4.1 The Project would comprise a 400 Kilovolt (kV) overhead electricity transmission line over a distance of approximately 140 kilometres (km) and up to six new substations.

1.4.2 Our current draft proposals for the Project, referred to as the proposed alignment, which are the subject of the Stage 2 consultation, comprise the following principal components:

- Approximately 140 km of new 400 kV overhead transmission line (OHL);
- a new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation and the existing 132 kV Northern Powergrid Substation in North East Lincolnshire (to be referred to as the new Grimsby West Substation). The existing 400 kV substation would be decommissioned, in all, or part[1]. The extent of decommissioning will be determined and reported in the Environmental Statement.
- Two new 400 kV Lincolnshire Connection substations located south west of Mablethorpe in East Lindsey (to be referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B);

- Up to two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation A and Weston March Substation B);
- A new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (to be referred to as Walpole B Substation); and
- Replacement of short sections of existing 400 kV OHL and local changes to the lower voltage distribution networks to facilitate the construction of the new OHL and substations.

1.4.3 The Project would include other required works, for example, temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including biodiversity net gain (BNG).

1.4.4 At the Stage 1 consultation, the emerging preferred corridor was split into 11 sections, defined by key geographic features or settlements and encompassed the proposed substation siting zones.

1.4.5 For the Stage 2 consultation, the preferred route has been split into 7 sections to provide a clear distinction between substation locations and overhead line locations and to facilitate simpler and more consistent reporting across publications. These seven sections, as listed below, are based largely on the principal components:

- Section 1: New Grimsby West Substation;
- Section 2: New Grimsby West Substation to New Lincolnshire Connection Substation A;
- Section 3: New Lincolnshire Connection Substations A and B;
- Section 4: New Lincolnshire Connection Substation B to Refined Weston Marsh Substation Siting Zone;
- Section 5: Refined Weston Marsh Substation Siting Zone;
- Section 6: Refined Weston Marsh Substation Siting Zone to New Walpole B Substation; and
- Section 7: New Walpole B Substation.

1.4.6 The broad alignment between the previous 11 sections presented at Stage 1 consultation and the 7 sections presented at Stage 2 consultation is detailed within the **Stage 1 Consultation Feedback Report**.

1.4.7 The Project would be designed, constructed, and operated in accordance with applicable health and safety legislation. The Project would also need to comply with design safety standards including the National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS), which sets out the criteria and methodology for planning and operating the NETS. This informs a suite of National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, and operating assets such as proposed for the Project.

1.5 Project Timeline

1.5.1 A Stage 1 consultation took place between January and March 2024. This **Design Development Report** sets out how the Project has developed in response to feedback from the Stage 1 consultation and further environmental and engineering studies. As required under the PA 2008, a Stage 2 consultation is taking place between June to August 2025.

1.5.2 An indication of the Project timelines through to operation is provided below.

Image 1.2 Project timeline

1.6 Structure of this report

1.6.1 The report is structured as follows:

- Chapter 2 – provides an overview of the legislation and national policy relevant to the Project;
- Chapter 3 – provides an overview of the Stage 1 consultation and Design Change Control process;
- Chapter 4 – outlines the reviews of the previous strategic options and the routeing and siting studies undertaken by National Grid;
- Chapter 5 – provides a review of the Stage 1 consultation corridor and how feedback on this corridor has influenced proposals which are the subject of the Stage 2 consultation;
- Chapter 6 – describes the design evolution of the Project, including the design principles and technical considerations, pylon types, consultation responses, planning and environmental considerations, and approach to mitigation;
- Chapter 7 – describes the development of the proposed alignment and substation siting;
- Chapter 8 – describes the temporary works that will be required and Draft Order Limits development; and
- Chapter 9 – sets out the next steps that will be undertaken prior to the submission of an application for a DCO.

1.6.2 The report also includes the following appendices:

- Appendix A – Local Planning Policy of Relevance to Good Design;

- Appendix B – Chapter 7 (Development of the Proposed Alignment and Substation Sitings) Inset Images; and
- Appendix C – Pylon Comparison Images.

1.7 Relationship to other documents

1.7.1 This **Design Development Report** draws on information previously published at the Stage 1 consultation, including:

- **Grimsby to Walpole – Project Background Document 2024**;
- **Grimsby to Walpole – Strategic Options Report 2023**;
- **Grimsby to Walpole – Addendum to Strategic Options Report 2024**;
- **Grimsby to Walpole – New Walpole Substation Location Options Report 2024**; and
- **Grimsby to Walpole – Corridor and Preliminary Routeing and Siting Study; (CPRSS) 2024**.

1.7.2 This report details the design evolution between the Stage 1 consultation and the Stage 2 consultation and therefore also draws on information published at the Stage 2 consultation, including:

- **North Humber to High Marnham and Grimsby to Walpole – Strategic Options Report Update 2025**;
- **Preliminary Environmental Information (PEI) Report Volume 2 Part A Appendix 3A Western Corridor Review**; and
- **Stage 1 Consultation Feedback Report**.

2. Relevant Legislation and Planning Policy Context

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2. Relevant Legislation and Planning Policy Context

2.1 Context

2.1.1 This chapter sets out a summary of the principal legislation and planning policy of relevance to the design of the Project.

2.1.2 A summary of the wider regulatory and planning context of relevance to the Project is set out in **Preliminary Environmental Information (PEI) Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context** and supporting appendices. A summary of the relevant local planning policy is set out in Appendix A of this document. The Planning Statement which will accompany the DCO Application will identify and consider relevant legislation and policies and provide analysis on planning policy compliance.

2.2 Planning Act 2008

2.2.1 The PA 2008 (Ref 2) introduced a new consenting procedure for NSIPs. Under Section 14(1)(b) and Section 16 of the PA 2008 and the Planning Act (Electric Lines) Order 2013 a project that involves the installation of an electric line above ground of more than 2km, which will operate at 400kV in England is an NSIP.

2.2.2 For an NSIP the grant of development consent is required by the making of a DCO under the PA 2008 which includes associated development through Section 115 of the Act. As noted in Chapter 1, the Project is classed as an NSIP for which National Grid will need to obtain 'development consent' under statutory procedures set by Government. Further details of the PA 2008 regime are set out in **PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context**.

2.2.3 Section 10 and Section 183 of the PA 2008 place importance on good design:

'the Secretary of State must (in particular) have regard to the desirability of—

(a)mitigating, and adapting to, climate change;

(b)achieving good design.'

2.2.4 Section 104 of the PA 2008 states at (2)(a) that the SoS '*must have regard to any national policy statement which has effect in relation to development of the description to which the application relates' and 'must decide the application in accordance with any relevant national policy statement'*, except in a limited number of circumstances listed in subsections 4 to 8 of Section 104.

2.2.5 The National Policy Statements (NPS) contain specific references to the design of projects. This is covered in section 2.4 of this **Design Development Report**.

2.3 Electricity Act 1989

2.3.1 Section 9(2) of the Electricity Act 1989 (Ref 1) places general duties on National Grid as a license holder:

> *'to develop and maintain an efficient, co-ordinated and economical system of electricity transmission…'*

2.3.2 In addition, Section 38 and Schedule 9 of the Electricity Act 1989 requires an electricity licence holder such as National Grid, when formulating proposals for new lines and other works, to:

> *"(a)… have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and*
>
> *(b) shall do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."*

2.3.3 National Grid's Stakeholder, Community and Amenity Policy (Ref 3), published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the legislation.

2.4 National planning policy

2.4.1 This section sets out the design considerations of relevance to the Project within the current national planning policy documents for which the SoS must have regard to when determining the DCO application for the Project.

2.4.2 As identified in paragraph 1.3.4 of the Overarching NPS for Energy EN-1 (Ref 4), for infrastructure projects providing above ground electric lines at or above 132 kV (meeting the thresholds set out in the PA 2008), the following NPSs will be the primary basis for SoS decision making:

- Overarching National Policy Statement for Energy (EN-1) (Adopted 2024) (Ref 4); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Adopted 2024) (Ref 5).

2.4.3 The National Policy Statement for Renewable Energy (EN-3) (Adopted 2024) (Ref 6) is also of relevance for the onshore infrastructure required to deliver new offshore wind developments. This is relevant given the purpose of the Project includes enabling such projects to connect to the transmission system.

2.4.4 As background to the recently adopted NPSs referred to above, it is noted that an Electricity Networks Commissioner was appointed in 2022 to work with and advise the Government on how to halve the build time for new transmission infrastructure from around 12-14 to 7 years. The Commissioner's report (Ref 7) and a companion report (Ref 8) including a set of 43 recommendations, referred to as the 'Winser Report', was published in August 2023. This Report acknowledged that the speeding up the delivery of strategic transmission is both vital and challenging, and the recommendations on how to accelerate the deployment of strategic electricity

transmission infrastructure in Great Britain covered every part of the process and set out an integrated programme of reform.

2.4.5 The then Government's response to the Winser Report was set out in the Transmission Acceleration Action Plan (November 2023) (Ref 9). This Plan recognises that Great Britain's transmission network must undergo unprecedented expansion, as the economy electrifies to deliver energy security and Net Zero. It confirms that with the increasing shift towards electrification of transport, heating and industrial processes, a significant amount of additional grid capacity is required, and to deliver this expansion in time, there is a need to significantly reduce the current end-to-end build time for transmission infrastructure. The Action Plan accepted the 43 recommendations set out in the Winser Report, to accelerate the expansion of the transmission network. The new Government has continued to prioritise these issues.

2.4.6 The recently published updated versions of NPSs EN-1, EN-5 and EN-3 (17 January 2024) include changes to ensure the appropriate balance between the need to build vital infrastructure and the impacts this can have on the environment and communities and to ensure that the planning policy framework is suitably robust to support the infrastructure required for the transition to net zero carbon emissions. Low-carbon infrastructure, including large electricity grid infrastructure projects, are given 'Critical National Priority' (CNP) status to reflect the need for critical national infrastructure. The NPSs reinforce the Government's ambitions for high quality energy infrastructure set out in the British Energy Security Strategy (April 2022) and the Growth Plan (September 2022). Further details are provided below.

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

2.4.7 NPS EN-1 (Ref 4) sets out the Government's overarching policy regarding the development of Nationally Significant Infrastructure Projects (NSIPs) in the energy sector. EN-1 emphasises the need for new energy projects and that there is a CNP for the provision of nationally significant low carbon infrastructure. Paragraph 4.2.5 confirms that this includes electricity grid infrastructure including all power lines in the scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations.

2.4.8 Section 4.7 provides details on the criteria for good design for energy infrastructure.

2.4.9 Paragraph 4.7.1 states:

> *"The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important."*

2.4.10 Paragraphs 4.7.2 - 4.7.4 acknowledge the role of good design in energy projects to produce sustainable infrastructure sensitive to place, and a means by which many policy objectives of the NPSs can be met, such as how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts.

2.4.11 Paragraph 4.7.6 notes the ability for the design and sensitive use of materials for development such as electricity substations to assist in ensuring that such development contributes to the quality of the area.

2.4.12 Paragraph 4.7.7 is of particular reference to this Design Development Report and the need to demonstrate how the design process has been conducted and evolved over time:

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

2.4.13 The role of the SoS in decision making is outlined in Paragraphs 4.7.10 – 4.7.15.

2.4.14 Paragraph 4.7.10 states:

"In the light of the above and given the importance which the Planning Act 2008 places on good design and sustainability, the Secretary of State needs to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable, and adaptable (including taking account of natural hazards such as flooding) as they can be."

2.4.15 Paragraph 4.7.12 states:

'In considering applications, the Secretary of State should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy. Many of the wider impacts of a development, such as landscape and environmental impacts, will be important factors in the design process."

2.4.16 Paragraph 4.7.11 states:

"In doing so, the Secretary of State should be satisfied that the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible."

2.4.17 Section 4.6 provides details of how environmental and biodiversity net gain should be considered and confirms that this approach to development aims to leave the natural environment in a measurably better state than beforehand. Projects should therefore not only avoid, mitigate and compensate harms, following the mitigation hierarchy, but also consider whether there are opportunities for enhancements. Applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider environmental net gains have been considered, and where appropriate, incorporated into proposals as part of good design of the project.

2.4.18 Section 4.10 details how the effects of climate change should be taken into account during the design stage to ensure new energy infrastructure is sufficiently resilient against the possible impacts of climate change. Specifically, as new energy infrastructure is typically likely to remain operational over many decades, the direct and indirect impacts of climate change when considering the Project location, design, build, operation and where appropriate decommissioning will need consideration.

2.4.19 Section 5.4 also reiterates that the design process should embed opportunities for nature inclusive design, stating:

"energy infrastructure projects having the potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains…"

2.4.20 Provision for aerodrome safeguarding has been made within Section 5.5 Civil and Military Aviation and Defence Interests, though the section mainly focuses on the impacts from wind turbines, other energy project types can also affect civil and military assets. Paragraph 5.5.2 acknowledges that aviation, defence and the energy industry should be able to co-exist. Section 5 details the impact new development can have on aviation infrastructure and acknowledges that each project has unique challenges depending on its type, location and scale. It details the various ways new development can impact aviation broadly falling into two categories, physical obstructions and through radar interference, and that applicants should consult the Ministry of Defence, the Met Office, the Civil Aviation Authority, NATS and any aerodrome licenced or otherwise that is likely to be affected by the proposed development.

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

2.4.21 NPS EN-5 (Ref 5) relates to electricity networks, and Section 2 provides general assessment principles and technology-specific policies relating to matters including site selection and design, climate change adaptation, consideration of good design, biodiversity and geological conservation, landscape and visual and noise and vibration.

2.4.22 Section 2.2 considers factors influencing site selection and design and states that the SoS should bear in mind that the:

"…development zone - of new electricity network infrastructure is not substantially within the control of the applicant:

Siting is determined by:

- *the location of new generating stations or other infrastructure requiring connection to the network, and/or*
- *system capacity and resilience requirements determined by the Electricity System Operator.*"

2.4.23 However, paragraphs 2.2.5 – 2.2.8 acknowledge that applicants retain control in managing the identification of routeing and site selection within the development zone, and that this does not exempt applicants from their duty to consider and balance the site-selection considerations and policies on good design in section 2.4 of EN-5. There will usually be a degree of flexibility in the location of the associated substations which should be carefully considered, as well as their design.

2.4.24 Paragraph 2.2.9 states:

"In particular, the applicant should consider such characteristics as the local topography, the possibilities for screening of the infrastructure and/or other options to mitigate any impacts…"

2.4.25 Paragraph 2.2.10 reiterates the duties under Section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and, in formulating proposals for new electricity network infrastructure, to:

"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest;

and…do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

2.4.26 Section 2.3 of NPS EN-5 details how electricity network infrastructure should consider climate change adaptation and resilience within the design of new schemes. Paragraph 2.3.2 details that applicants should set out to what extent the Project is expected to be vulnerable and how it has been designed to be resilient to: flooding, particularly for substations; the effect of wind and storms on overhead lines; higher than average temperatures leading to increased transmission losses; and earth movement or subsidence caused by flooding or drought, for underground cables.

2.4.27 Section 2.4 considers good design for energy infrastructure, reiterating that the PA 2008 requires the SoS to have regard to the desirability of good design in determining applications, and that applicants should consider the criteria for good design set out in EN-1 Section 4.7 at an early stage in project development.

2.4.28 Paragraph 2.4.3 states that:

"…the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure."

2.4.29 Paragraph 2.4.4 follows on to say that whilst the above principles govern the design of electricity networks, the functional performance of the infrastructure in respect of security of supply and safety must not be threatened in the avoidance of, or mitigation of potential adverse impacts.

2.4.30 Section 2.5 considers environmental and biodiversity net gain:

"When planning and evaluating the proposed development's contribution to environmental and biodiversity net gain, it will be important – for both the applicant and the Secretary of State – to supplement the generic guidance set out in EN-1 (Section 4.6) with recognition that the linear nature of electricity networks infrastructure can allow for excellent opportunities to…connect people to the environment, for instance via footpaths and cycleways constructed in tandem with environmental enhancements."

2.4.31 Strategic network planning is covered in Section 2.8 and reinforces that the SoS should take into account that Transmission Owners are required to bring forward efficient and economical proposals in network design under Section 9 of the Electricity Act 1989. This section also identifies the need to take account of environmental and community impacts, alongside deliverability and economic cost, from the outset, and that strategic network planning, such as through the Holistic Network Design helps reduce the overall impact of infrastructure by identifying opportunities for coordination, where appropriate.

2.4.32 Section 2.9 covers the considerations for applicant assessment, including the requirement to embody the Holford and Horlock Rules into applicants' proposals.

2.4.33 Paragraph 2.9.17 sets out the Holford Rules, first published in 1959 and updated in the 1990's as guidelines for the routeing of new overhead lines. The Holford Rules state that applicants should:

- "*avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence;*
- *avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers, i.e. the bigger structures which are used when lines change direction;*
- *other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers;*
- *choose tree and hill backgrounds in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees;*
- *prefer moderately open valleys with medium or moderate levels of tree cover where the apparent height of towers will be reduced, and views of the line will be broken by trees;*
- *where country is flat and sparsely planted, and unless specifically preferred otherwise by relevant stakeholders, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or 'wirescape'; and*
- *approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, carefully assess the comparative costs of undergrounding.*"

2.4.34 Paragraph 2.9.18 covers the requirements of the Horlock Rules which are the guidelines for the design and siting of substations established by National Grid in 2009 pursuant to its duties under Schedule 9 of the Electricity Act. The following principles should be embodied in applicants' proposals:

- "*consider environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum.*
- *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.*
- *protect as far as reasonably practicable areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas.*
- *take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.*
- *keep the visual, noise and other environmental effects to a reasonably practicable minimum.*
- *consider the land use effects of the proposal when planning the siting of substations or extensions.*

- *consider the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.*
- *use space effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.*
- *make the design of access roads, perimeter fencing, earth-shaping, planting and ancillary development an integral part of the site layout and design, so as to fit in with the surroundings.*
- *in open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.*
- *study the inter-relationship between towers and substation structures and background and foreground features so as to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.*"

2.4.35 EN-5 also includes policies on the design of electricity network infrastructure. Paragraph 2.9.20 covers undergrounding:

"Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty)."

2.4.36 Paragraph 2.9.23 goes on:

"However, undergrounding will not be required where it is infeasible in engineering terms, or where the harm that it causes (see section 2.11.4) is not outweighed by its corresponding landscape, visual amenity, and natural beauty benefits. Regardless of the option, the scheme through its design, delivery, and operation, should seek to further the statutory purposes of the designated landscape. These enhancements may go beyond the mitigation measures needed to minimise the adverse effects of the scheme' (paragraph 2.9.22) and 'Additionally, cases will arise where – though no part of the proposed development crosses a designated landscape high potential for widespread and significant adverse landscape and/or visual impacts along certain sections of its route may result in recommendations to use undergrounding for relevant segments of the line".

2.4.37 Other topic specific design considerations relating to impacts and mitigation within Section 2.9 and Section 2.10 of EN-5 are covered in **PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context**.

2.4.38 Section 2.11 covers the SoS decision making considerations and sets out the requirement for the potential impact, siting and design alternatives to be fully considered as part of an application if a statutory consultee identifies a risk that Electric and Magnetic Fields (EMF) would compromise the effective and safe operation of the electricity network infrastructure.

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

2.4.39 NPS EN-3 (Ref 6) relates to nationally significant renewable energy projects including offshore wind, and contains relevant policies in relation to design including opportunities for co-location and coordination of onshore-offshore transmission.

2.4.40 Section 2.5 covers the considerations for good design of energy infrastructure, noting Section 4.7 of EN-1 sets out the criteria for good design that should be applied to all energy infrastructure.

2.4.41 Paragraph 2.5.2 states:

> *"Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage."*

2.4.42 Section 2.8 deals with offshore wind. Paragraph 32.8.1 states that:

> *"As set out in the British Energy Security Strategy, the Government expects that offshore wind …. Will play a significant role in meeting demand and decarbonising the energy system. The ambition is to deploy up to 50GW of offshore wind capacity (including up to 5GW floating wind) by 2030, with an expectation that there will be a need for substantially more installed offshore capacity beyond this to achieve net zero carbon emissions by 2050."*

2.4.43 Paragraphs 2.8.34 to 2.8.43 (inclusive) reiterate the position set out in EN-1 and EN-5 that a co-ordinated approach to onshore-offshore transmission is required. Paragraph 2.8.35 states that:

> *"The previous standard approach to offshore-onshore connection involved a radial connection between single wind farm projects and the shore. A coordinated approach will involve the connection of multiple, spatially close, offshore wind farms and other offshore infrastructure, wherever possible, as relevant to onshore networks."*

2.4.44 The NPS also includes references to CNP Infrastructure outlining that the assessment principles outlined in Section 4 of EN-1 continue to apply to this. Applicants must show how any likely significant negative effects would be avoided, reduced, mitigated, or compensated for, following the mitigation hierarchy. Early application of the mitigation hierarchy is strongly encouraged, as is engagement with key stakeholders including Statutory Nature Conservation Bodies (SNCB), both before and at the formal pre-application stage.

National Planning Policy Framework (NPPF)

2.4.45 The NPPF was most recently updated in December 2024 (Ref 10). Paragraph 5 of the NPPF sets out that it does not contain specific policies for NSIPs and states that:

> *"These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework)."*

2.4.46 Notwithstanding the above, paragraph 161 of the NPPF confirms the Framework's support for the transition to net zero by 2050 whilst taking full account of changing climate impacts. It states that:

> *"the planning system should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience...and support renewable and low carbon energy and associated infrastructure."*

2.4.47 While NPS EN-1 and NPS EN-5 remain the prime decision-making documents, the NPPF does include policies pertinent to generic development management considerations and some of its principles may be considered by the decision-making authority, where relevant to the Project. These principles are concerned with protection and conservation of the natural and built and historic environment, climate change and flooding as well as sustainable growth, development, and a strong, competitive economy.

2.4.48 At this stage, it is not possible to confirm if such secondary guidance will be considered important or relevant by the SoS, and it is therefore included for completeness.

2.4.49 Section 12 of the NPPF goes into greater detail on the requirements for *'Achieving well-designed places'*. Paragraph 137 sets out that:

> *"Design quality should be considered throughout the evolution and assessment of individual proposals. Early discussion between applicants, the local planning authority and local community about the design and style of emerging schemes is important for clarifying expectations and reconciling local and commercial interests. Applicants should, where applicable, provide sufficient information to demonstrate how their proposals will meet the design expectations set out in the local and national policy, and should work closely with those affected by their proposals to evolve designs that take account of the views of the community. Applications that can demonstrate early, proactive and effective engagement with the community should be looked on more favourably than those that cannot."*

2.4.50 Paragraph 164 of the NPPF states that:

> *"New Development should be planned for in ways that:*
>
> *a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and*
>
> *b) can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards."*

2.4.51 The revised NPPF put more emphasis on the need for renewable energy and low carbon development. Paragraph 168 states that

> "When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the proposal's contribution to renewable energy generation and a net zero future;

b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;

c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site".

2.4.52 The NPPF is supported by the National Planning Practice Guidance.

National Infrastructure Commission (NIC) Project Level Design Principles (2024)

2.4.53 The NIC Design Group was established in 2019 to inspire renewed ambition for the quality of the UK's infrastructure, with a mission is to inspire, promote and champion design excellence on all major infrastructure projects, which has social value and responds creatively to the needs of people, places and the environment.

2.4.54 The 2024 NIC Design Principles document (Ref 11) replaces the previous Design Principles for National Infrastructure published in 2020.

2.4.55 Section 1 covers the purpose and scope of the guidance, stating the National Infrastructure Commission's remit covers six economic infrastructure sectors, including the energy sector. It also impresses the importance of the design process being fit for purpose, and underpinned by principles that will drive standards and accountability, particularly as the UK's economic infrastructure needs to be transformed to:

- *"meet the challenge of net zero*
- *provide climate resilience*
- *deliver sustainable economic growth."*

2.4.56 Section 2 emphasises the importance of an iterative, structured design process from the project outset to deliver environmental, social, and economic benefits, while limiting adverse impacts.

2.4.57 The design principles for national infrastructure are covered in section 3 and include four main principles:

- *"Climate – seek opportunities to enable the decarbonisation of society through the mitigation of emissions, and allow the project to adapt over time to build resilience*
- *People – design infrastructure for people, not architects or engineers; make it human scale, easy to navigate and instinctive to use, helping to improve quality of life*
- *Places – provide a strong sense of identity and improve the natural and built environment; make a positive contribution to landscapes within and beyond the project boundary*
- *Value – achieve multiple benefits and solve problems well; add value by defining issues clearly from the outset and providing overall direction for everyone working on the project.*"

2.4.58 These principles form an outline framework for more detailed design thinking on individual schemes, and for the development of project level principles.

2.4.59 The development of project level principles is covered in section 4, noting that they should directly address the Design Principles for National Infrastructure laid out above. The development of project level design principles should be an iterative, process that becomes fixed once consent is achieved to outline how projects will achieve their outcomes. The principles should also be used to align all parties around agreed, shared outcomes. Paragraph 7 in section 4 states that project's design principles should:

- *"reflect the overarching design vision and address the agreed project requirements, benefits and outcomes*
- *firmly anchor the proposal, supporting a design narrative that's relevant to the local context*
- *recognise place including landscape, the natural environment, culture and heritage*
- *be informed by the people affected, including residents, community groups, infrastructure users, interest groups, and local employers*
- *reflect an inclusive approach to ensure equitable delivery of benefits and prevention from harm*
- *demonstrate that opportunities have been identified to deliver wider benefits and outcomes beyond the project, utilising systems thinking*
- *be clearly written, with quantifiable measures, so that final outcomes can be tested against them."*

2.4.60 The importance of effective leadership is covered in section 5, with leaders having overall responsibility for effective design and driving buy in to the design process from the project team.

2.4.61 Section 6 shows the process through which design principles can be developed and embedded within a project throughout its lifecycle and is particularly relevant to this **Design Development Report** with respect to how the design principles have influenced design development.

Nationally Significant Infrastructure Projects: Advice on Good Design (2024)

2.4.62 The Planning Inspectorate published the guidance "Advice on Good Design" (Ref 12) in October 2024, which sets out how good design might be successfully delivered in applications for NSIPs. The note reiterates that the NPSs set out criteria for achieving good design in projects and that this guidance is non-statutory but is intended to compliment the legislation, regulations and guidance issued by government and is produced under section 51 of the Planning Act.

2.4.63 The advice note states that:

- *"achieving good design requires a holistic approach to deliver high quality, sustainable infrastructure that responds to place and takes account of often complex environments. Good design is not primarily about how infrastructure looks, although these considerations (the aesthetics) are important.*

- *Achieving high quality, good design outcomes requires an effective, intentional, transparent, deliverable process to be planned, followed and secured. Success in good design comes from a combination of securing both good process and good outcomes.''*

2.4.64 The guidance references the NIC Design Group, which recommends that considering design properly in NSIPs supports the government's ambition to speed up delivery and maximise value by addressing: a structured design process, design principles, and multiple beneficial outcomes. The guidance further makes reference to the NIC Design Principles of climate, people, place and value, and of the Project Level Design Principles, which provide applicants with the issues to consider under each of the design principles, as set out above.

2.4.65 The guidance states that a good design process includes the following components:

- *"An effective, intentional, transparent and deliverable process*
- *A collaborative, multi-disciplinary approach including positive community and land rights engagement*
- *A succinct and ambitious vision for the project, underpinned by a clear analysis of the context for the place, its environment and the opportunities for creating social value, including for the local and wider economy*
- *A clear statement of design principles that will drive the project and deliver wider value and benefits beyond the core purpose of the scheme*
- *A narrative that explains how the approach to design has evolved, the reasons for the choices that have been, or will be, made, an explanation of the multiple beneficial outcomes the project will achieve and how they will be secured*
- *Design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control."*
- *Achieving good design outcomes involves:*
- *''securing a clearly understood, integrated design concept, consistent design language, and project-wide sustainability*
- *consistent design language where all components can be followed through in post-consent decisions*
- *clarity on achieving project-wide sustainability that goes beyond mitigating adverse effects to achieve economic, environmental and social net-gain*
- *design principles that respond positively to the four elements – climate, people, place and value - established by the NIC*
- *realistic assessments of the project's durability and effectiveness during its operational phase, to underpin and secure a successful maintenance and monitoring regime*
- *sufficient flexibility for technical innovation balanced by sufficient detail and controls for post-consent approvals that will ensure good design outcomes are achieved*
- *particular attention on place-making to ensure the development's positive effects on the character of a place and delivery of public benefits*

- *well thought out mechanisms to enable design outcomes to be scrutinised, assessed and developed during the post-consent design process. For example, parameter plans, design codes, management plans, independent design review and intentional community engagement which are secured in requirements or certified documents."*

2.4.66 The guidance sets out four key elements that applicants should consider during the pre-application process and should be addressed within an NSIP application. The extent to which these elements need to be covered will depend on the nature of the infrastructure proposed and the site. The four elements are set out below:

- Assemble – setting a brief including project's purpose, budget, timeline, multi-disciplinary team with design skills and baseline data gathering to inform consideration of alternatives and eventual site selection. The multi-disciplinary team must also develop a vision, considering construction and operation and define an ambition which goes beyond the Order limits in line with outcomes that are wider than the project limits. It must include the development of design principles.
- Research – An iterative process with analysis of constraints and opportunities of technology and location with a narrative of how the design evolved from the brief. It will need to mitigate adverse effects assessed as part of the EIA process and show how the proposed development will deliver positive outcomes and create a new and distinctive place. Engagement and consultation with statutory parties, affected persons, local communities and independent design panels should inform the project's design evolution and this should be explained.
- Co-ordinate – Further iteration to refine choices for details and parameters. This should incorporate consultation responses, independent design input and ensure that design principles are being met. Decisions need to be taken using strong design leadership, driven by the vision. This stage must set out the process by which future post-consent decision-making will be made.
- Secure – This stage must set out how the project's good design is secured and will be delivered, including ongoing design advice and community engagement. Applicants should be clear about the influence procurement decisions could have and that any differences with future consenting authorities are aired. ExAs will expect designs to be at a detailed level where the outcomes of the analysis, program and vision are defined. Clarity must be provided for how design elements with less certainty at application stage will be decided and secured post-consent.

2.4.67 The guidance note also draws attention to the EIA process and highlights how EIA is an important decision-making tool and can help to achieve good design outcomes. EIA should inform the design process, and its influence on the design should be clearly articulated in the Environmental Statement.

2.4.68 Annex A of the guidance sets out "good design issues" that applicants are encouraged to consider before submitting an NSIP application for Examination. These issues include:

- The Design Approach Document;
- Analysis and research of the site to inform good design;
- Response to main significant adverse effects identified in the EIA;
- Vision for the completed development and its surrounds;

- Design skills;
- Design development (including consideration of emerging design principles, design choices, flexibility and evolution, use of digital techniques, design outcomes, and presentation of a design narrative);
- Independent design review;
- Delivery of the design post-consent;
- Placemaking and community benefit;
- Consultation with statutory consultees, local authorities, communities and people with interest in the land;
- Integrated design approach;
- Compliance with National Policy Statements;
- Application of design principles and how they are secured; and
- Consideration of the NIC four principles of good design.

2.5 Local planning policy

2.5.1 Appendix A sets out local planning policy of relevance to good design.

2.5.2 Other topic specific design considerations within local planning policy are set out in **PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context** and supporting appendices.

3. Stage 1 Consultation and Design Change Control

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3. Stage 1 Consultation and Design Change Control

3.1 Context

3.1.1 National Grid held a Stage 1 consultation between 18 January 2024 and 13 March 2024. The aim of this was to:

- Introduce National Grid Electricity Transmission (NGET) and the Project proposals;
- Explain why we need to build new electricity transmission infrastructure in the region;
- Outline the work carried out to identify our emerging preferred overhead line route corridor and substation siting areas, as well as the graduated swathe which indicated the emerging preference for siting of infrastructure at the time of Stage 1 consultation;
- Ensure stakeholders had the opportunity to provide feedback on our proposals, including where within the corridor and siting zones infrastructure could be located; and
- Outline next steps for the Project following the Stage 1 consultation.

The Consultation Corridor

3.1.2 An overview of the emerging preferred route corridor, emerging preferred substation siting zones and graduated swathe were presented as part of the Stage 1 consultation and provided in the Project Background Document accessible at the following link: download (nationalgrid.com).

3.1.3 As part of the Stage 1 consultation, the emerging preferred route corridor was split into 11 sections to make it easier for people to give feedback about specific areas. Feedback was also sought on five substation siting zones alongside the preferred OHL corridor as part of the relevant route sections.

3.2 Responses to the Stage 1 consultation

3.2.1 A total of 7,694 feedback submissions were received at Stage 1 consultation from local communities, stakeholders and other consultees. This comprised paper feedback forms, online feedback forms, emails and letters.

Consideration of consultation feedback

3.2.2 The Stage 1 consultation followed the approach set out in National Grid's Consultation Strategy published in January 2024 and provided in Appendix B of the **Stage 1 Consultation Feedback Report**.

3.2.3 A range of both face-to-face and online events were held and promoted to provide opportunities for all stakeholders and communities to engage with the development of the Project proposals. The consultation also offered opportunities to provide feedback on the proposals at an early stage of the Project development.

3.2.4 The feedback received during consultation has been carefully reviewed and taken into account, informing the ongoing technical work on the engineering design and the environmental impact assessment process.

3.2.5 Feedback that contained requests for changes or considerations relevant to design elements of the Project was identified as Design Change Requests (DCRs) and carefully considered in the context of environmental and socioeconomic constraints and opportunities, engineering feasibility and cost, and planning policy considerations. Following this consideration, each DCR was either taken forward as a design change as part of the development of the proposals or a decision was taken not to consider it further. Further details on how design change requests have been considered by the Project is provided in Section 3.3 of this report.

3.2.6 The current draft proposals continue to be developed as we take account of feedback and further engineering and environmental studies, including internal design changes which may also arise.

Summary of changes to our proposals in response to consultation feedback

3.2.7 Further detail on the consideration of proposed design changes received from the Stage 1 consultation feedback is provided in Chapter 3 Section 3.5 of the **Stage 1 Consultation Feedback Report.**

3.3 Design Change Requests and the Design Change Control Process

3.3.1 In order to be considered as DCRs, requests had to be specific and locatable. They will constitute a request to alter a specific element of the design or avoid a specific feature. A vague statement, a request that relates to the whole route, or a general request for alternatives to be shown were not considered a DCR. Consultation feedback that was not considered a DCR was coded through consultation analysis and has been responded to in the **Stage 1 Consultation Feedback Report**.

3.3.2 Each DCR identified by the Project was then carefully considered through a Design Change Control (DCC) process as outlined in Image 3.1 below.

3.3.3 The DCC process is a multi-stage assessment used to:

- robustly consider each proposed change to ensure all decisions are recorded; and
- provide an audit trail of the reasons for changes being made or rejected.

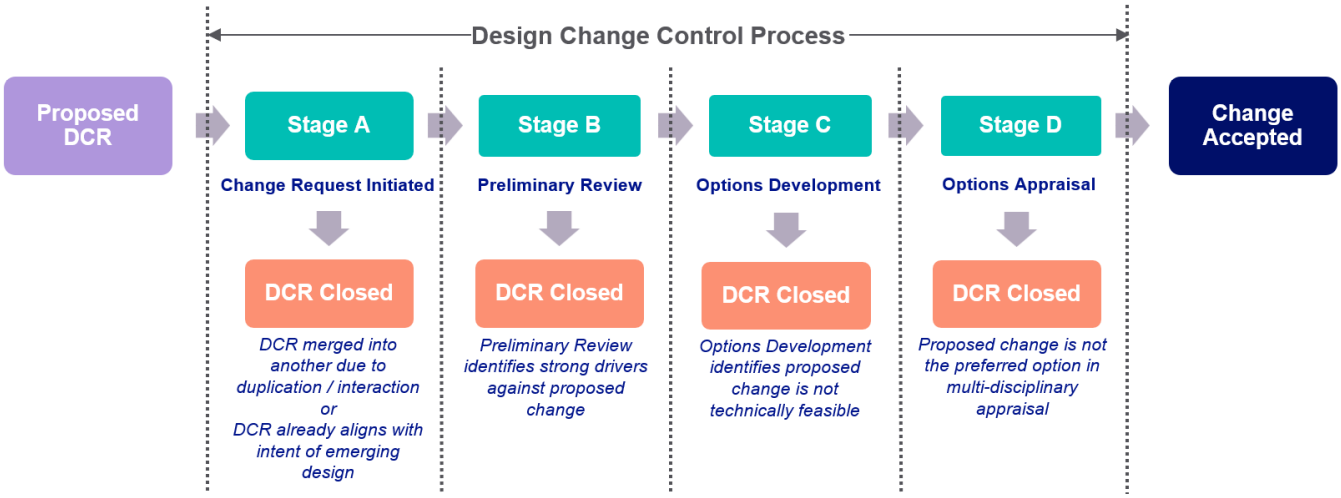
3.3.4 The DCC process covers any element of the design relevant to the stage of design development in the project programme. DCRs raised during the Stage 1 consultation period will relate to the graduated swathe; DCRs at a later stage of design development and during the Stage 2 consultation period may be raised for any

element of the design, from individual pylon locations to access routes to environmental mitigation.

3.3.5 The DCC process is a four-stage process, as shown in Image 3.1 and consisting of the following appraisal stages:

- **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.
- **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.
- **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.
- **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.

Image 3.1 Design Change Control Process



4. Review of previous Development Stages

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4. Review of Previous Development Stages

4.1 Context

4.1.1 Throughout the Project's design, consultation and engagement process, previous preliminary assumptions are subject to review in light of feedback received, information gathered and assessments undertaken to date.

4.1.2 The following Chapter summarises a review, carried out following the Stage 1 consultation of the previous development stages of the Project including the strategic proposal stage and options identification and selection stage, as set out in:

- **Grimsby to Walpole – Strategic Options Report 2023**;
- **Grimsby to Walpole – Addendum to Strategic Options Report 2024**; and
- **Grimsby to Walpole – Corridor and Preliminary Routeing and Siting Study; (CPRSS) 2024**.

4.1.3 The results of this review are presented in the following documents:

- The **North Humber to High Marnham and Grimsby to Walpole - Strategic Options Report Update**; and
- **PEI Report Volume 2 Part A Appendix 3A Western Corridor Review**.

4.2 Strategic Proposal Review

4.2.1 The **Strategic Options Report Update** 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**, carried out 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.

4.2.2 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.

4.2.3 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 generation connections in the area.

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

- 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.

- 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).

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

4.2.6 For further details see the **Strategic Options Report Update**.

4.3 Western Corridor Review

4.3.1 The Western Corridor Review provides a summary of work undertaken in reviewing parts of the emerging preferred corridor in proximity to the Lincolnshire Wolds National Landscape (Area of Outstanding National Beauty) following the original appraisal that was reported in the CPRSS.

4.3.2 The review considered two different options; the Western Option (which comprises part of the emerging preferred corridor presented in the CPRSS) and the Eastern Option. Both options comprise individual corridor sections, with some common corridor sections between the options.

4.3.3 The review considered additional information obtained by National Grid following the publication of the CPRSS to assess the appropriateness of selecting the Western Option for the Project compared to the alternative Eastern Option in this geographical area.

4.3.4 The outcome of the review is that the additional information and resulting change to the appraised constraints/impacts in the Western Option in comparison with the Eastern Option does not materially alter the previous conclusions reported in the CPRSS and the preference for the Western Option. Therefore, the review has confirmed the appropriateness of selecting the Western Option, as included in the emerging preferred corridor.

4.3.5 That conclusion is supported by the potential negative programme impact of a change in route corridor at this stage in the development of the Project, with the delivery of the Project on time playing a vital role in achieving the UK Government's ambition of connecting 50GW of offshore wind by 2030.

4.3.6 Having considered the results of the review, National Grid is continuing to progress the design of the Western Option and presenting it at Stage 2 consultation.

4.3.7 For further details see **PEI Report Volume 2 Part A Appendix 3A Western Corridor Review**.

5. Review of the Corridor Presented at Stage 1 Consultation

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5. Review of the Corridor Presented at Stage 1 Consultation

5.1 Introduction

5.1.1 The non-statutory (Stage 1) consultation presented a graduated swathe for the Project, which was the outcome of a preliminary routeing exercise undertaken on the emerging preferred corridor and siting zones to identify where it might be more appropriate to locate the required infrastructure. The graduated swathe used coloured shading of varying intensity to indicate areas where it was more likely (darker shaded colour) or less likely (lighter shaded colour) for infrastructure to be located.

5.1.2 The Project has been subject to design development between Stage 1 and Stage 2 consultation as a result of the following principal factors:

- feedback received at Stage 1 consultation (recorded as Design Change Requests);
- new information obtained by National Grid, such as environmental surveys and input from stakeholders;
- engineering design evolution; and
- the ongoing Environmental Impact Assessment (EIA) process.

5.1.3 This chapter provides an overview of the key areas of design development where the proposed overhead line alignment routes outside the darkest shaded areas of the graduated swathe as a direct result of Stage 1 consultation feedback. These were considered as Design Change Requests and were instigated through National Grid's design change control process, as outlined in Section 3.3 of this report.

5.1.4 This chapter also provides a summary of the key areas of design development where the proposed overhead line alignment routes outside of the darkest shaded areas of the graduated swather for reasons other than Stage 1 consultation feedback. The full rationale for this is discussed in Chapter 7 of this report which provides a detailed description of the proposed alignment.

5.1.5 Design change requests that were raised from Stage 1 consultation feedback but were ultimately not taken forward into design are discussed in the **Stage 1 Consultation Feedback Report**.

5.2 Design Change Considerations Regarding Residential Curtilage

5.2.1 Through the Stage 1 consultation, National Grid received feedback from consultees highlighting instances where residential curtilage had been included in the corridor presented at Stage 1 consultation. Each of these instances resulted in a separate design change request.

5.2.2 Each design change request was appraised by National Grid and the corresponding areas of residential curtilage were removed from the corridor prior to further design development. Based on the design presented at Stage 2 consultation:

- there are no instances of permanent overhead line or substation infrastructure being sited within residential curtilages; and
- wherever practicable, associated temporary works and access routes for construction and maintenance have been developed to avoid residential curtilages.

5.3 Location Specific Feedback

5.3.1 The following section outlines, for the seven route sections, the design development that resulted in routeing and siting outside the darkest shading of the graduated swathe presented at Stage 1 consultation. In particular, this results from consideration of consultation feedback, the availability of further environmental information, engineering design inputs and further environmental studies.

Section 1 – New Grimsby West Substation

5.3.2 Having taken account of Stage 1 consultation feedback, no changes to Section 1 were made as a result. The siting of the new Grimsby West Substation remains within the darkest area of the substation siting zone presented at Stage 1 consultation.

5.3.3 Section 7.2 of this report describes in detail the siting of the new Grimsby West Substation, the design considerations that have resulted in this siting and the design evolution that has taken place in Section 1.

5.3.4 Design Change Requests identified from the Stage 1 consultation feedback raised for Section 1 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute “main alternatives” in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

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

5.3.5 Section 2 comprises approximately 39 km of new 400 kV overhead line between the new Grimsby West Substation and the new Lincolnshire Connection Substation A (LCS A). The proposed alignment presented for Stage 2 consultation in Section 2 is described fully in Chapter 7 of this report and primarily follows the darker shaded areas of the graduated swathe presented at Stage 1 consultation.

5.3.6 Minor deviations from the darkest shading of the graduated swathe for the proposed alignment in Section 2 are proposed just north of Barnoldby le Beck, west of Covenham Saint Bartholomew and east of Claythorpe.

5.3.7 The following change has been made in this section to respond to new information obtained by National Grid, and is described in greater detail within Section 7.3 of this report:

- A more central route through the graduated swathe than was indicated by the darkest shading is proposed just north of Barnoldby le Beck, in response to direct engagement with the landowner regarding potential impacts to the consented (but not yet developed) Bradley Road Solar Farm at this location. This more central route is considered to minimise the impacts to the operation of the solar farm and to its skylark mitigation areas, by facilitating the siting of pylons outside of the solar arrays as far as possible and avoiding the proposed skylark mitigation areas.

5.3.8 The following change has been made in this section having taken into account the ongoing EIA process, and is described in greater detail within Section 7.3 of this report:

- The use of low-height pylons is proposed for pylons located in Section 2 between Barnoldby le Beck and Waithe. Low-height pylons are proposed in this location to reduce the potential for significant effects to the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) and the setting of Waltham Windmill. The use of low-height pylons has been proposed following a review of alternative pylon types for the whole route but also acts to mitigate some of the concerns regarding impacts to the Lincolnshire Wolds National Landscape (AONB) that were raised through Stage 1 consultation. An outline of National Grid's approach to pylon choice is provided in Section 6.4 of this Design Development Report and further details regarding the selection of pylon types for Section 2 is provided in Section 7.3.

5.3.9 The following changes have been made in this section in response to Design Change Requests resulting from Stage 1 consultation feedback, and National Grid's consideration of these changes is described in greater detail below:

- The overhead line alignment is proposed to be routed further west within the corridor presented at Stage 1 consultation than the most likely routeing indicated by the darkest shading of the graduated swathe adjacent to Covenham Saint Bartholomew. This is in response to feedback raised regarding The Thomas Centre at Covenham Saint Bartholomew. Routeing the overhead line further west in this location is considered to reduce the potential amenity impacts to users of this facility, which is balanced against landscape and visual impacts to the Lincolnshire Wolds National Landscape (AONB). This more westerly routeing has no greater effects on the AONB and is therefore considered acceptable.

- The overhead line alignment is proposed to be routed further west within the corridor presented at Stage 1 consultation than the most likely routeing indicated by the darkest shading of the graduated swathe, just east of Claythorpe near Mother Wood, in response to feedback regarding potential impacts to the operations of Strubby Airfield. This increases the separation between the airfield and the proposed overhead line.

5.3.10 Further details regarding other factors considered by National Grid in developing the overhead line alignment in Section 2 are outlined in Section 7.3 of this Design Development Report.

5.3.11 Design change requests identified from the Stage 1 consultation feedback raised for Section 2 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute "main alternatives" in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

Design change considerations regarding the potential impacts to users of the Thomas Centre

5.3.12 Through Stage 1 consultation, National Grid received feedback regarding concerns about the potential impacts to The Thomas Centre located in Covenham Saint Bartholomew, a facility identified as an important family-run holiday park catering for individuals affected by autism, epilepsy and other special needs, and their families.

5.3.13 National Grid undertook further early engagement with the owners of The Thomas Centre to develop a better understanding of the needs of the facility and its patrons, and the potential impacts the Project might have on these. Through this engagement, concerns were understood to be centred around the potential impacts to patrons of the facility who may experience greater sensitivity to the visual and noise impacts from construction works and because there is the potential for the overhead line alignment to be on three sides of the Thomas Centre, which could increase potential impacts on the centre and those who use it.

5.3.14 Following this additional engagement, a design change request was raised to consider alternative overhead line routeing options between North Thoresby and Keddington. Seven overhead line route options were developed for consideration by the Project team as part of this design change request, involving:

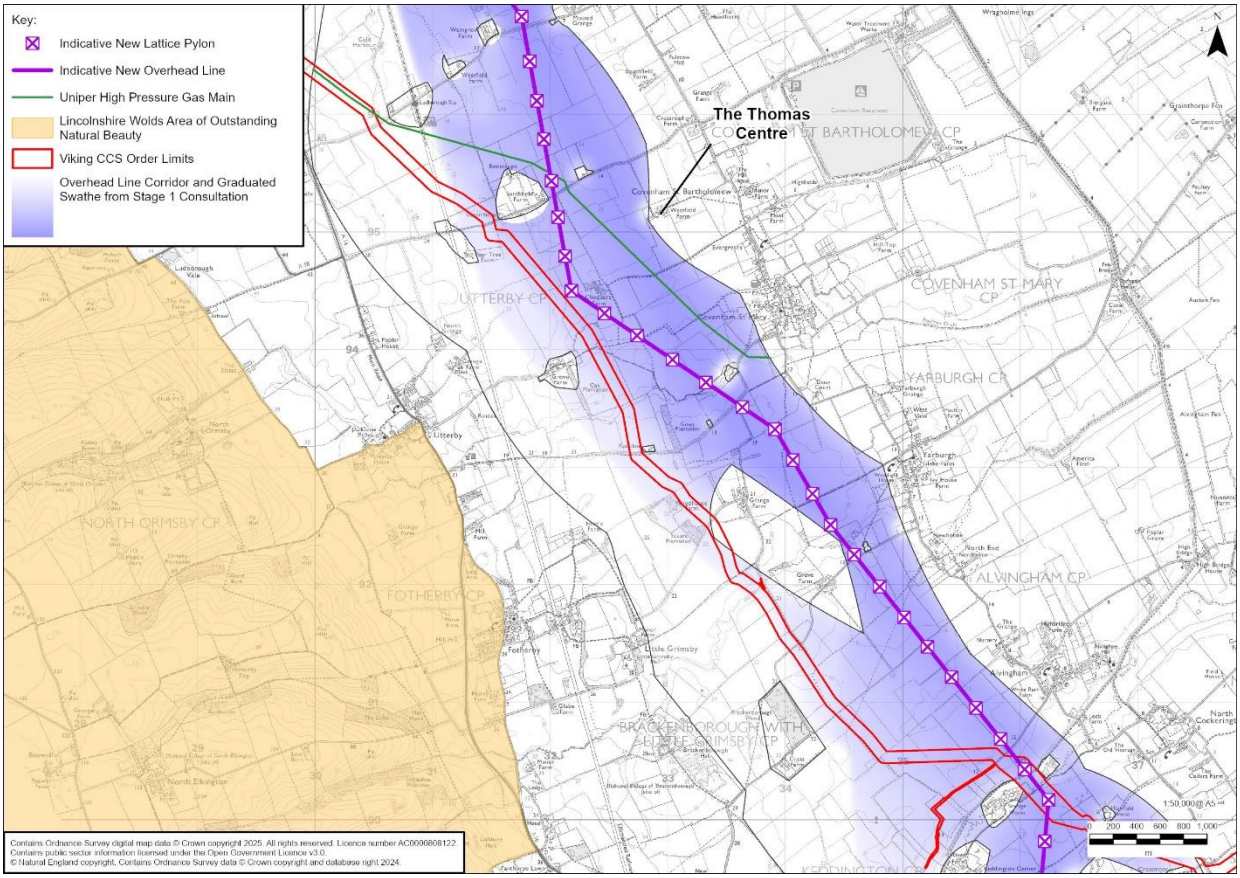
- one option routed through the westernmost gap between cut-outs from the corridor presented at Stage 1 consultation at Station Road and Pear Tree Lane, then continuing along the western edge of the graduated swathe between Utterby and Keddington;
- two options taking alternative central routes through gaps between cut-outs from the corridor 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;
- three options, each taking alternative routes through gaps between cut-outs from the corridor 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
- one option routed 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.

5.3.15 After consideration of the seven options, a central route was taken past Covenham Saint Batholomew, moving the proposed overhead line alignment further west within the corridor presented at Stage 1 consultation than the most likely routeing indicated by the shading of the graduated swathe as it passes The Thomas Centre. This route (as shown in Image 5.1 below) was chosen as the proposed option as it was considered to achieve the most appropriate balance between the following key considerations:

- reducing the 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;
- reducing interactions where the alignment crosses the Viking CCS Pipeline compared to other routeing options; and

- landscape and visual impacts to the Lincolnshire Wolds National Landscape (AONB) for which the proposed option has no greater effects on the AONB than the most likely routeing originally indicated by the darkest shading of the graduated swathe.

Image 5.1 Routeing of the overhead alignment further west of the Thomas Centre



Design change considerations regarding the potential impacts to Strubby Airfield

5.3.16 Feedback was received by National Grid through Stage 1 consultation regarding concerns about the potential impacts to the operations at Strubby Airfield due to the distance from the airfield to the corridor presented at Stage 1 consultation as it passes Claythorpe and approaches the new Lincolnshire Connection Substation A (LCS A).

5.3.17 In response to this feedback, and to determine the most appropriate overhead line route within the corridor, a Design Change Request was raised to consider alternative overhead line routeing options between Withern and the proposed siting of LCS A. Four routeing options were developed for consideration, which included:

- one option routed along the eastern edge of the graduated swathe;
- 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 Wood and Greenfield Wood;
- 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

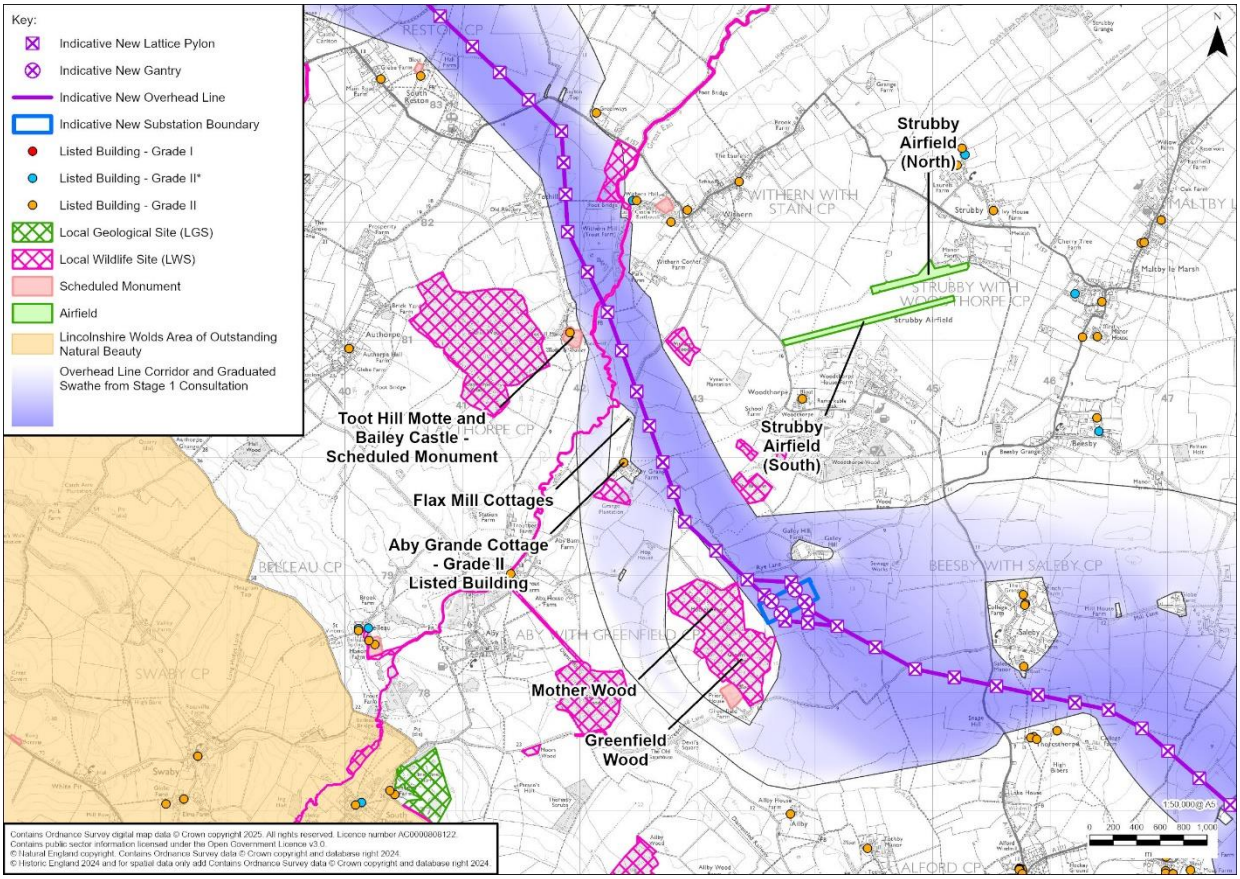
the eastern edge of the cut-outs for Mother Wood and Greenfield Wood to LCS A; and

- 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 Wood and Greenfield Wood, before continuing down along the eastern edge of the cut-outs for Mother Wood and Greenfield Wood to LCS A.

5.3.18 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 Wood and Greenfield Wood 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 corridor presented at Stage 1 consultation near Mother Wood. This route (shown in Image 5.2 below) was selected as the preferred option as it was considered to achieve the most appropriate balance between the following key considerations:

- minimising potential impacts to the operations at Strubby Airfield associated with the positioning of the overhead line in relation to aircraft movements; and
- minimising 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.

Image 5.2 Routeing of the overhead alignment further west of Strubby Airfield



Section 3 – New Lincolnshire Connection Substations A and B

5.3.19 The siting of the proposed new Lincolnshire Connection Substations A (LCS A) and B (LCS B) and the proposed routeing of the overhead line between them remain within the darkest areas of the substation siting zones and graduated swathe presented at Stage 1 consultation.

5.3.20 Section 7.4 of this report describes in detail the siting of the proposed LCS A and LCS B and the proposed overhead line routeing between them, the design considerations that have resulted in these proposals and the design evolution that has taken place in Section 3.

5.3.21 Design Change Requests identified from the Stage 1 consultation feedback raised for Section 3 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute "main alternatives" in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered.**

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

5.3.22 Section 4 comprises approximately 66 km of new 400 kV overhead line between the proposed Lincolnshire Connection Substation B (LCS B) and the Refined Weston Marsh Substation Siting Zone. The proposed alignment presented for Stage 2 consultation in Section 4 is described fully in Chapter 7 of this report and primarily follows the darker shaded areas of the graduated swathe presented at Stage 1 consultation.

5.3.23 Minor deviations from the darkest shading of the graduated swathe for the proposed alignment in Section 4 are proposed to the south of Burgh Le Marsh, to the north of Thorpe Culvert, between Kirton Holme and Kirton End, and in the vicinity of Wigtoft.

5.3.24 The following change has been made in this section through engineering design evolution, and is described in greater detail within Section 7.5 of this report:

- The overhead line has been routed more centrally through the graduated swathe than was indicated by the darkest shading just north of Thorpe Culvert, following an opportunity identified by the Project team to avoid impacts to holiday cottages located on the bank of Steeping River in Little Steeping.

5.3.25 The following change has been made in this section having taken into account the ongoing EIA process, and is described in greater detail within Section 7.5 of this report:

- The overhead line has been routed further west within the graduated swathe compared with the darkest shading following identification of an opportunity to provide a more direct route as it passes between Kirton Holme and Kirton End, which reduces potential visual, heritage and ecological impacts.

5.3.26 The following changes have been made in this section in response to Design Change Requests resulting from Stage 1 consultation feedback and National Grid's consideration of these changes is described in greater detail below:

- The overhead line has been routed more centrally through the graduated swathe than was indicated by the darkest shading in Burgh le Marsh, in response to feedback received indicating that routeing within the darkest shading would

necessitate the removal of solar panels and wind turbines and The Hollies Solar Park and The Hollies Wind Farm. Routeing the overhead line more centrally at this location is considered to avoid potential impacts to both the wind turbines and solar park at this location.

- The overhead line has been routed closer to the northern and western boundary of the graduated swathe than was indicated by the darkest shading near Wigtoft, in response to feedback regarding potential impacts to residents of Wigtoft and heritage assets, including listed buildings, in the area. The route chosen at this location is considered to manage the potential for setting impacts to Grade II listed buildings at Casterton House and its associated non-designated former parkland, and the Wigtoft conservation area including the Grade I listed Church of St Peter and St Paul and several other Grade II listed buildings, as well as reducing impact on properties in Wigtoft.

5.3.27 Further details regarding other factors considered by National Grid in developing the overhead line alignment in Section 4 are outlined in Section 7.5 of this Design Development Report.

5.3.28 Design Change Requests identified from the Stage 1 consultation feedback raised for Section 4 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute "main alternatives" in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered.**

Design change considerations regarding the potential impacts to The Hollies renewable energy developments

5.3.29 Through Stage 1 consultation, feedback was received by National Grid regarding concerns of potential impacts to the wind turbine operations at The Hollies Wind Farm, located south of Burgh Le Marsh, due to the location of two existing wind turbines within the northern extent of the proposed corridor.

5.3.30 Feedback was also received through Stage 1 consultation regarding potential impacts to The Hollies Solar Park located adjacent to The Hollies Wind Farm. Following more detailed review, a small portion of this solar park was identified to fall within the northern extent of the proposed corridor adjacent and to the east of the two wind turbines, with the majority of the solar park development falling outside the proposed corridor.

5.3.31 Prior to more detailed appraisal and to further support National Grid's understanding of these potential impacts, National Grid undertook further early engagement with the asset manager of The Hollies Wind Farm to understand the likelihood of interference with wind turbine operations. Following this engagement, it was concluded that routeing the overhead line through the northern extent of the proposed corridor would likely result in the need to remove the wind turbines, due to the requirement to maintain safe electrical clearances between the overhead line and the wind turbines and to ensure appropriate spacing for construction and ongoing maintenance of both assets in the future.

5.3.32 In response to the feedback received, and the subsequent stakeholder engagement, a Design Change Request was raised to consider alternative overhead line routeing options at The Hollies which might reduce impacts to both the wind farm and solar park. Additionally, this considered the implication of other constraints within the

southern extents of the proposed corridor in this location, including residential and commercial properties and an existing 132 kV overhead line.

5.3.33 Six overhead line routeing options were developed as part of the Design Change Request for consideration by the Project team between Burgh Le Marsh and Thorpe Saint Peter. This involved:

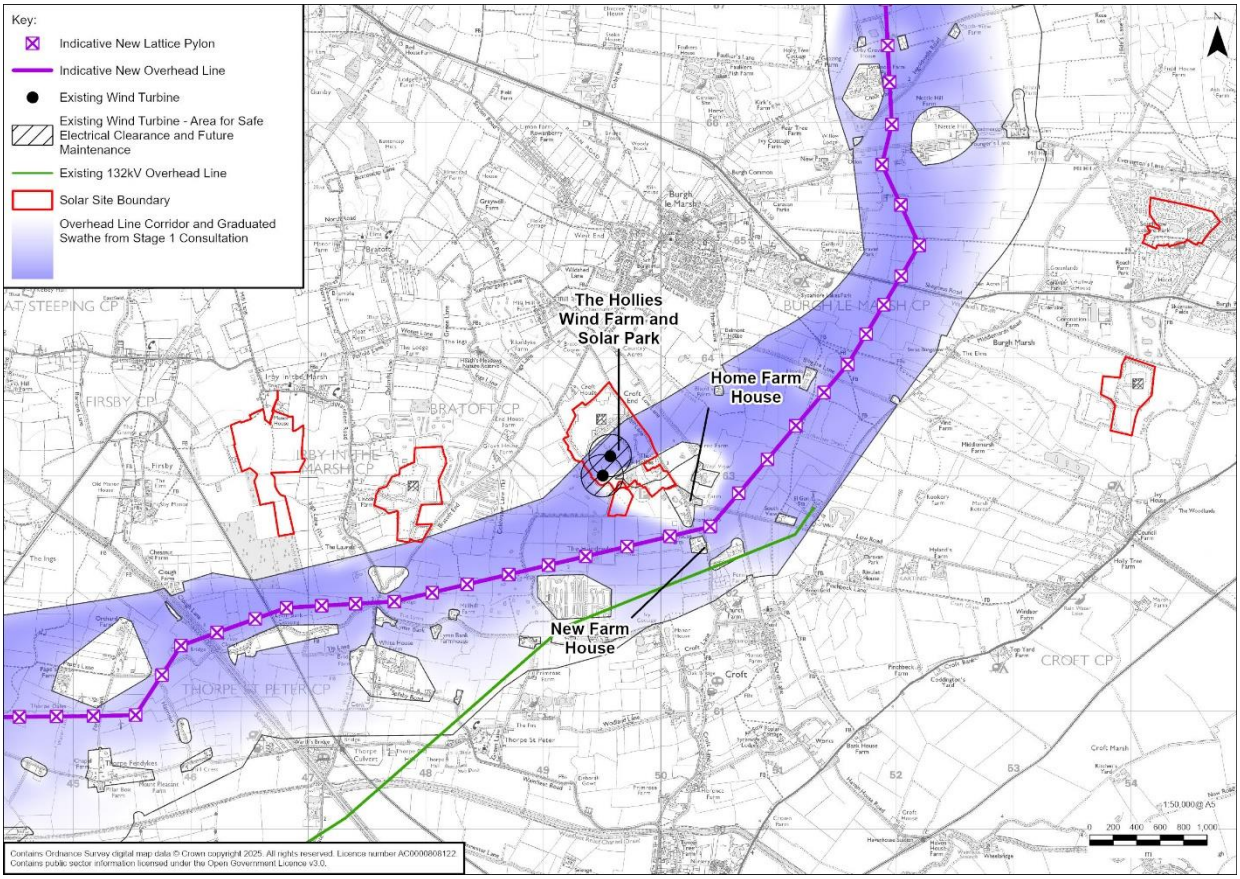
- one option routed to the north outside the proposed corridor;
- one option through the northern extent of the proposed corridor, representing the most likely routeing indicated by the darkest shading within the graduated swathe shown at Stage 1 consultation;
- two central options through the graduated swathe, routeing just south of Home Farm House; and
- two options through the southern extent of the graduated swathe, one routeing south of New Farm House and one routeing south of Kerryfields.

5.3.34 After consideration of the six options, a central routeing option through the graduated swathe was preferred. This was chosen as the proposed route as it was considered to achieve the most appropriate balance between the following key considerations:

- minimising impacts to wind farm and solar park operations as far as appropriate;
- avoiding the oversailing of residential and commercial properties and minimising impacts to farmland through this highly constrained section of the route as far as appropriate; and
- avoiding interactions with the existing 132 kV overhead line, located to the south of the proposed new overhead alignment to avoid a ‘wirescape’.

5.3.35 The proposed overhead line route option, along with the locations of The Hollies Wind Farm, The Hollies Solar Park and existing 132 kV overhead line are shown below in Image 5.3.

Image 5.3 Central routeing of the overhead line to minimise impacts to The Hollies Wind Farm and Solar Park



Design change considerations regarding the potential impacts to heritage assets and residential properties at Wigtoft

5.3.36 Through Stage 1 consultation, feedback was received by National Grid regarding concerns of potential impacts to residents of Wigtoft and heritage assets, including listed buildings, in the area. 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.

5.3.37 In response to this feedback, a Design Change Request was raised to consider alternative overhead line routeing options at Wigtoft. Four routeing options were developed for consideration between the B1391 Donnington Road in Kirton End and the B1397 Spalding Road to the south of Wigtoft, which included:

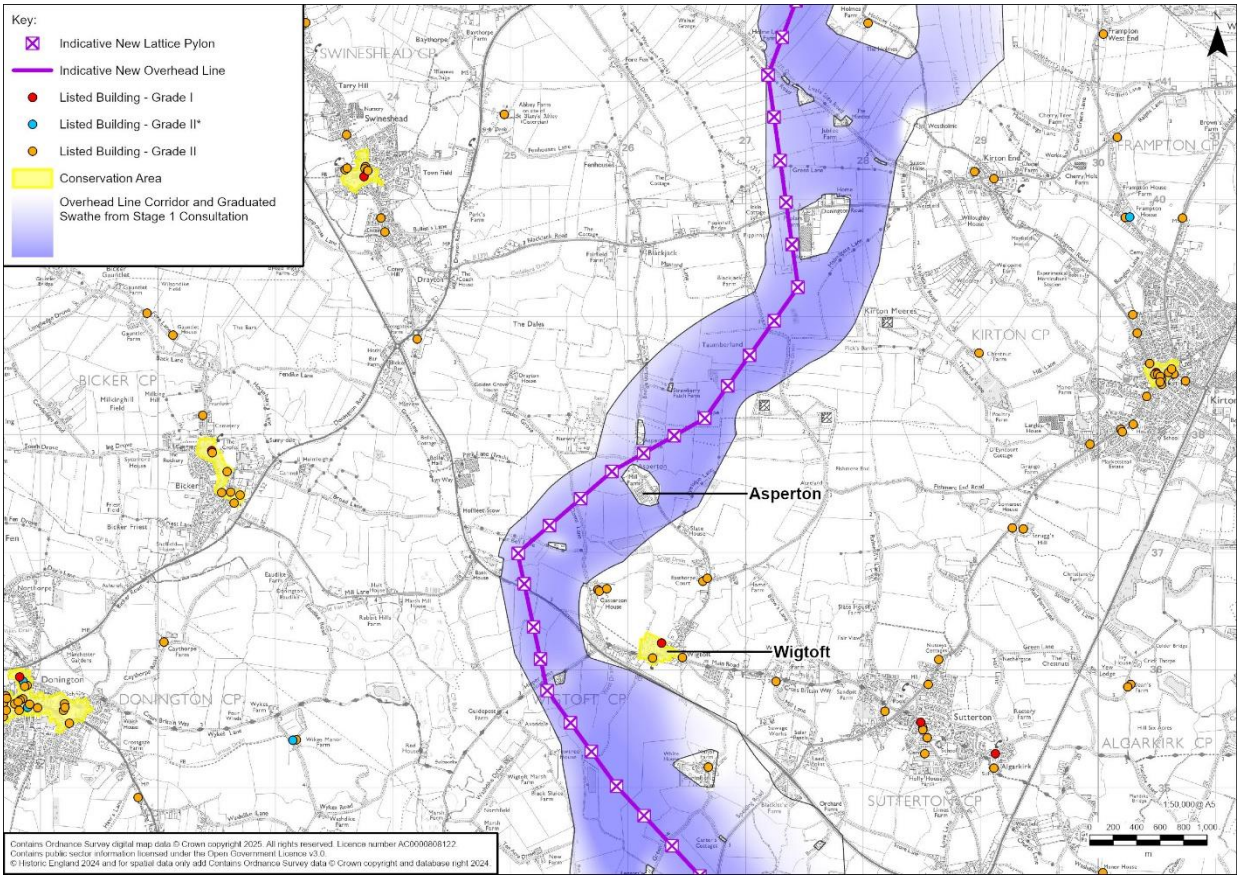
- one option routeing along the northern/western extent of the graduated swathe, to the north of the two cut-outs from the corridor presented at Stage 1 consultation at Asperton and west of the cut-outs from the corridor at Five Bells Lodge and along Hipper Lane;
- one option routeing along the southern/eastern extent of the graduated swathe, to the south of the two cut-outs from the corridor at Asperton and to the east of the cut-outs from the corridor 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;

- 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 from the corridor on Asperton Road to continue past Wigtoft at the western extent of the swathe; and
- 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 from the corridor on Asperton Road.

5.3.38 After consideration of the four options, a refined central/western alignment route as shown in Image 5.4 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 from the corridor on Asperton Road, and then follows the western extent of the graduated swathe southwards past Wigtoft. It was chosen as the proposed route as it is considered to achieve the most appropriate balance between the following key considerations:

- reducing potential setting impacts to heritage assets at Wigtoft and Casterton House compared with routeing following the darker shading of the graduated swathe;
- increasing the distance of the overhead line alignment from Wigtoft, compared with routeing following the darker shading of the graduated swathe, to reduce impacts to residential properties;
- maintaining an alignment that is relatively straight through and to the north east of Asperton, reducing the number of angle pylons required and having a reduced impact on the landscape compared with a less straight alignment; and
- minimising interactions with a poultry farm near Asperton and an equestrian paddock to the north of Asperton;

Image 5.4 Central and western routeing of the overhead line to minimise impacts to heritage assets and residential properties at Wigtoft



Section 5 – Refined Weston Marsh Substation Siting Zone

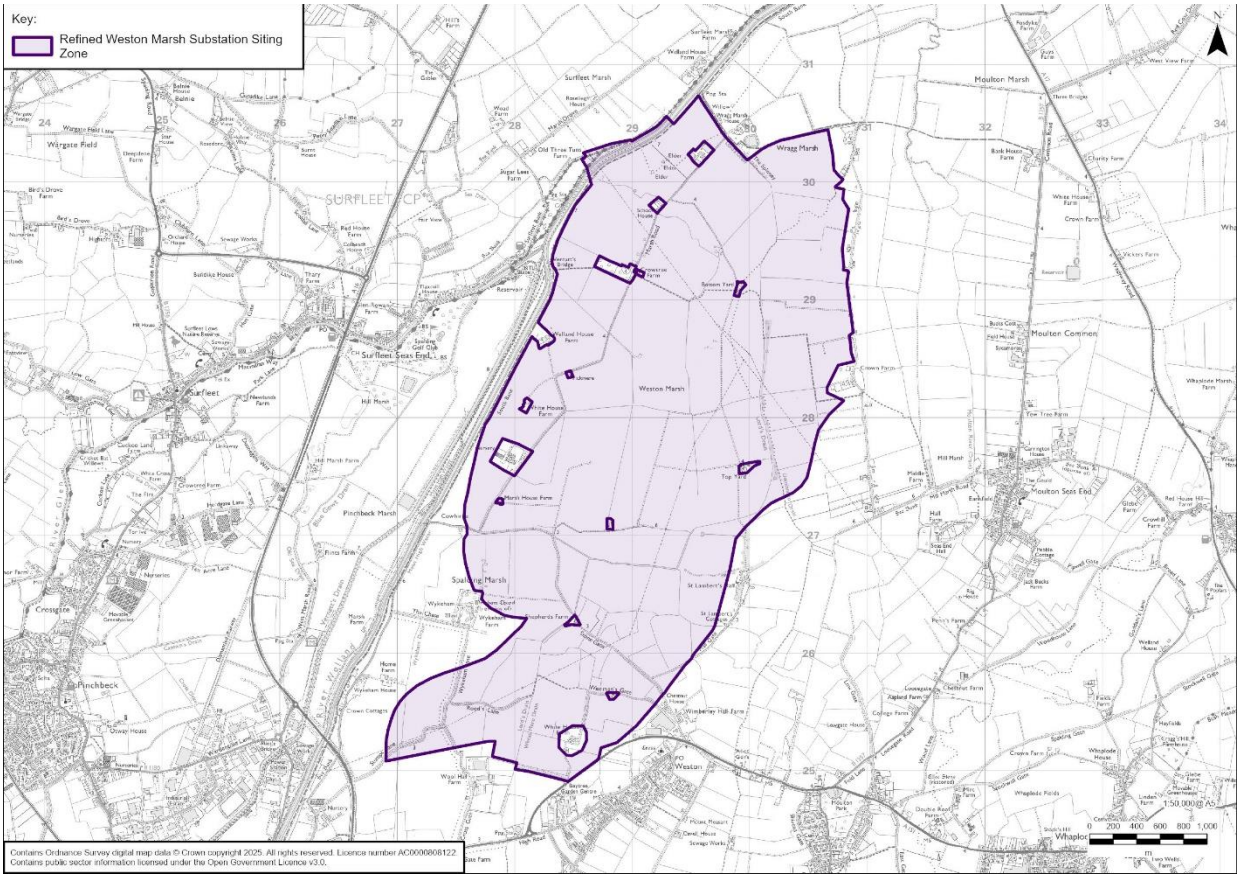
5.3.39 Following Stage 1 consultation, further design parameters have emerged which have resulted in the requirement for National Grid to undertake more extensive design activities within the substation siting zone.

5.3.40 These additional design activities are still progressing, thus only minor amendments to the substation siting zone have been made for Stage 2 consultation. National Grid will embark on further, localised consultation once this additional design detail is known.

5.3.41 The Refined Weston Marsh Substation Siting Zone has been based on a combination of the overhead line graduated swathe and the Weston Marsh substation siting zone presented at Stage 1 consultation. The rationale for the merging of these two swathes has considered the ongoing design evolution in this area for the positioning of infrastructure. Slight modification has been made to the original graduated swathe and substation siting zone to remove areas where infrastructure will not be sited. As such the Refined Weston Marsh Substation Siting Zone includes additional cut-outs around identified structures and curtilage that were not originally cut from the graduated swathe and substation siting zone. The extent of the refined zone is also clipped in some areas to constraining features, beyond which the positioning of new or modified infrastructure is not being considered.

5.3.42 Image 5.5 below shows the Refined Weston Marsh Substation Siting Zone presented as part of Stage 2 consultation for Section 5.

Image 5.5 Refined Weston Marsh Substation Siting Zone



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

5.3.43 Section 6 comprises approximately 27 km of new 400 kV overhead line between the Refined Weston Marsh Substation Siting Zone and the new Walpole B Substation. The proposed alignment presented for Stage 2 consultation in Section 6 is described fully in Chapter 7 of this report and primarily follows the darker shaded areas of the graduated swathe presented at Stage 1 consultation.

5.3.44 Minor deviations from the darkest shading of the graduated swathe for the proposed alignment in Section 6 are proposed near Weston Hills and between Tydd St Giles and Ingleborough.

5.3.45 The following change has been made in this section through engineering design evolution, and is described in greater detail within Section 7.7 of this report:

- Between Tydd St Giles and Ingleborough, the overhead line alignment routes further north within the corridor than the darker shading of the graduated swathe presented at Stage 1 consultation. This has been implemented following opportunities identified by National Grid to avoid interactions with a high-pressure gas pipeline located in the southern portion of the graduated swathe (just north of Newton in the Isle).

5.3.46 The following change has been made in this section in response to Design Change Requests resulting from Stage 1 consultation feedback, and National Grid's consideration of this change is described in greater detail below:

- The overhead line alignment has been routed further south within the corridor presented at Stage 1 consultation than the darkest shading of the graduated swathe near Weston Hills in response to feedback received during Stage 1 consultation requesting the overhead line alignment avoids the narrow gap between properties on Delgate Bank. This routeing avoids this identified narrow gap between the two properties and is considered to reduce impacts to these residential receptors.

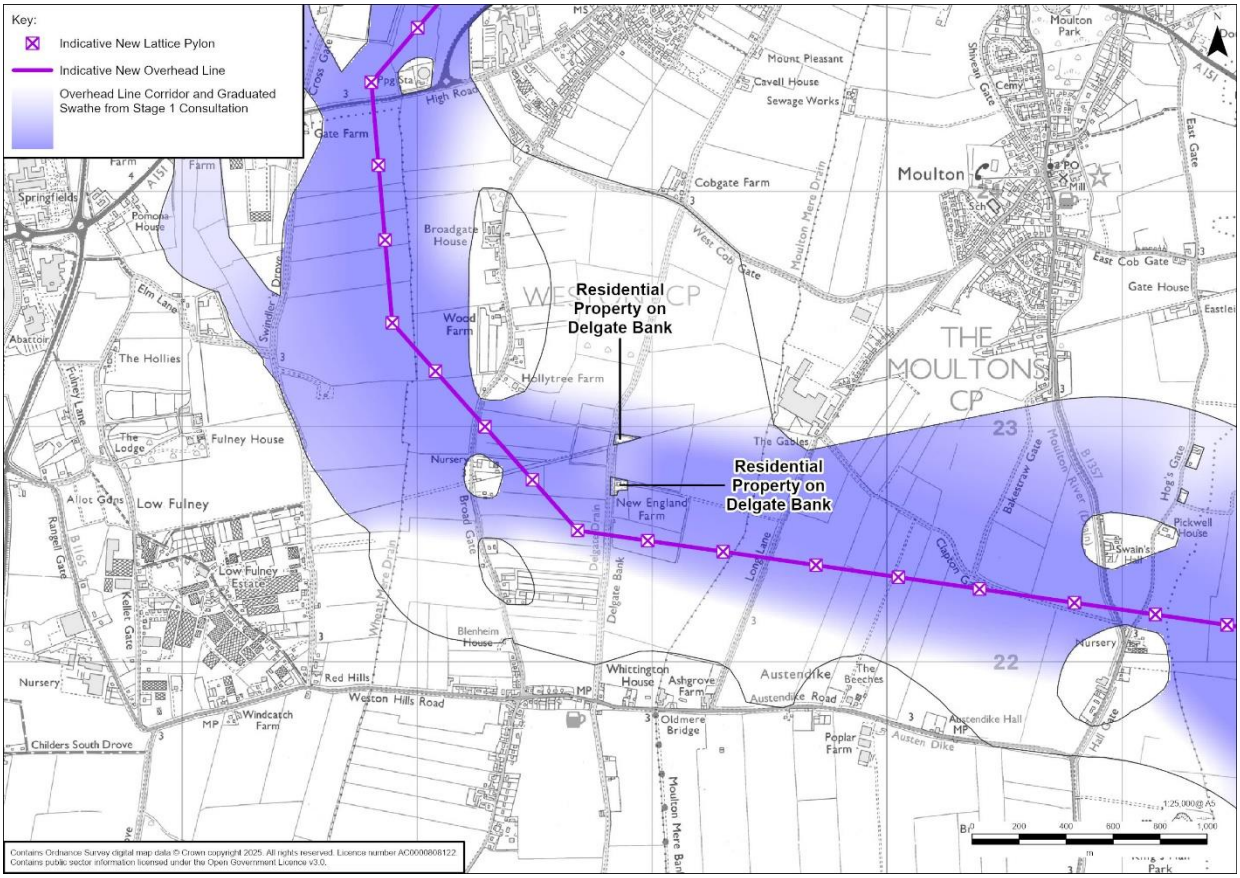
5.3.47 Further details regarding other factors considered by National Grid in developing the overhead line alignment in Section 6, are outlined in Section 7.7 of this Design Development Report.

5.3.48 Design Change Requests identified from the Stage 1 consultation feedback raised for Section 6 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute "main alternatives" in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

Design change considerations regarding residential properties at Weston Hills

5.3.49 Feedback was received by National Grid through Stage 1 consultation regarding the potential impacts of routeing the overhead line alignment between residential properties on Delgate Bank in Weston Hills, as indicated in Image 5.6 below.

Image 5.6 Residential properties on Delgate Bank



5.3.50 In response to this feedback, a Design Change Request was raised to consider alternative overhead line routeing options at Weston Hills. Five routeing options were

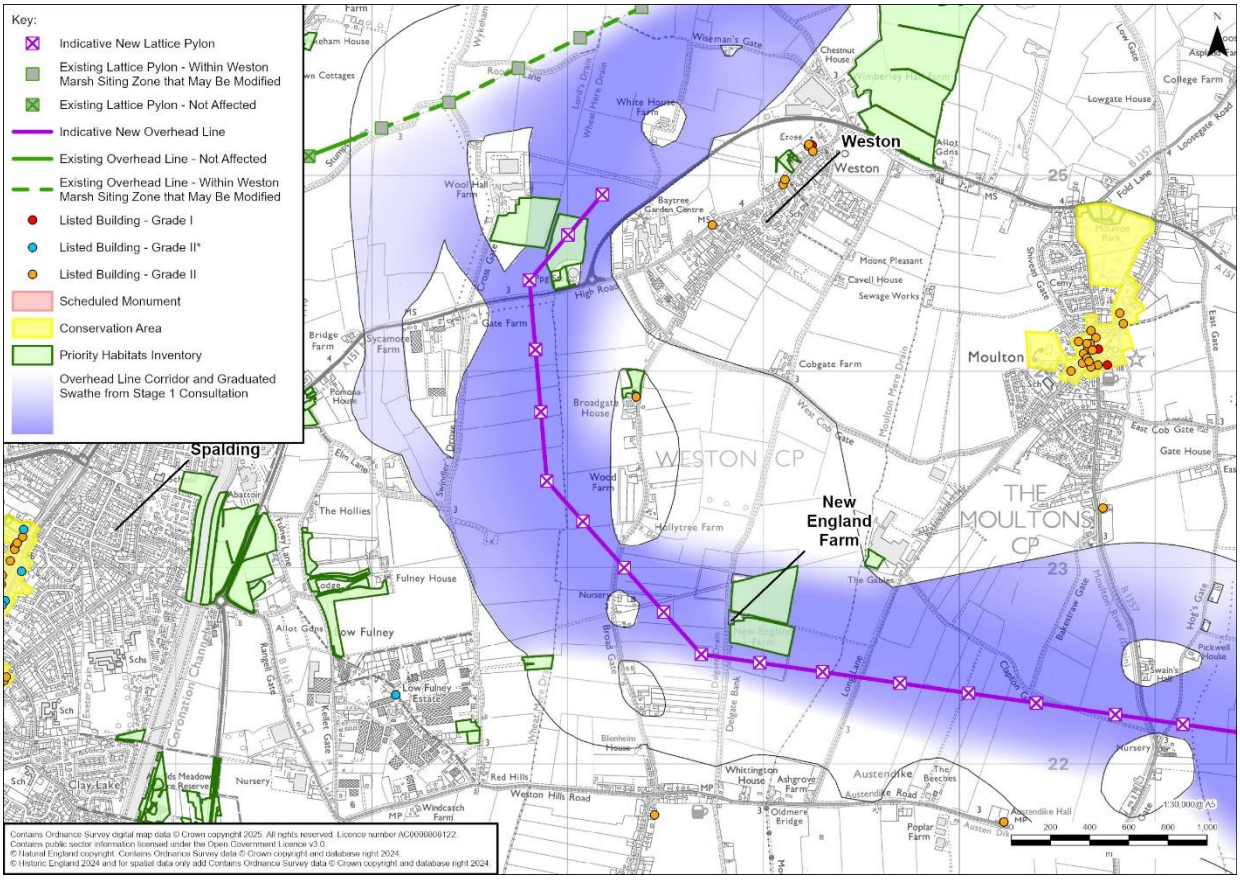
developed for consideration between the A151 High Road in Weston and the B1357 Hall Gate in Moulton, which included:

- two options routeing through the northern extent of the graduated swathe, north of Broadgate House and north of the residential properties on Delgate Bank;
- one option routeing centrally in the graduated swathe, between the properties on Delgate Bank, representing the most likely route indicated by the darkest shading within the graduated swathe shown at Stage 1 consultation; and
- two options routeing through the southern extent of the graduated swathe, south of New England Farm.

5.3.51 After consideration of the five options, a southerly alignment route as shown in Image 5.7 was chosen as the preferred option. Although this is a longer route, it was chosen as the proposed route as it was considered to achieve the most appropriate balance between the following key considerations:

- maintaining similar distances between, and reducing the potential impacts to, receptors located in the settlements at Weston and Spalding;
- avoiding the narrow gap between the residential properties located on Delgate Bank; and
- reducing potential impacts relating to various environmental features including trees, priority habitats and designated heritage assets.

Image 5.7 Proposed southerly overhead line alignment route between Weston and Spalding



Section 7 – New Walpole B Substation

5.3.52 The siting of the new Walpole B Substation remains within the darkest area of the substation siting zone presented at Stage 1 consultation.

5.3.53 Section 7.8 of this report describes in detail the siting of the new Walpole B Substation, the design considerations that have resulted in this siting and the design evolution that has taken place in Section 7.

5.3.54 Design Change Requests identified from the Stage 1 consultation feedback raised for Section 7 that have not been taken forward into the design are discussed in the **Stage 1 Consultation Feedback Report** and to the extent that they constitute “main alternatives” in the **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

6. Design Evolution

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6. Design Evolution

6.1 Overview

6.1.1 This chapter outlines the overarching technical, planning and environmental considerations that have informed the design evolution of the proposed alignment and substation sitings.

6.1.2 These considerations form the basis of National Grid's development of the design described in Chapter 7 from the non-statutory (Stage 1) consultation corridor and amendments described in Chapter 5.

6.2 National Grid's Approach to Routeing and Siting

6.2.1 Chapter 2 sets out in detail the legislation and planning policy context relevant to the design of the Project. Through the Electricity Act 1989 (Ref 1), as set out in Chapter 2, National Grid has statutory duties placed upon it to operate under the terms of its transmission licence. In addition, the Holford and Horlock rules, also described in Chapter 2, are used as two sets of guidelines for National Grid's routeing and siting approach.

6.2.2 National Grid employs the Holford and Horlock rules as the basis of the approach to overhead line routeing and substation siting, and these have underpinned the development of the proposed alignment and substation layouts described in Chapter 7.

6.2.3 In addition, a range of technical, planning and environmental considerations have been taken into account when developing the design for the Project. The design seeks to avoid planning designations and environmental features wherever it is reasonable to do so, within technical and other limitations and while remaining in compliance with the Holford and Horlock rules.

6.2.4 This chapter sets out the principles, considerations and constraints that have informed the Project's design evolution alongside the applicable legislation and planning policy described in Chapter 2. Chapter 7 goes on to describe in detail how the application of these has resulted in the proposed alignment and substation sitings presented at the statutory (Stage 2) consultation.

6.3 Design Principles and Technical Considerations

Overhead Line Considerations

6.3.1 This section sets out, in the context of developing the overhead line permanent infrastructure within the 'graduated swathe' presented at Stage 1 consultation, the technical principles and parameters generally applied in respect to overhead line routeing and pylon siting and how this has progressed to the overhead line design presented at the Stage 2 consultation.

The Graduated Swathe

6.3.2 The graduated swathe provided an indicative overhead line corridor in which the permanent infrastructure could be located. Permanent infrastructure was considered more or less likely to be located, shown by the varying levels of shading; darker shaded areas represented where infrastructure is likely to be better located. This was a sufficiently wide corridor to provide a relative degree of flexibility in order for an indicative centreline of an overhead line to be developed.

6.3.3 At the time of producing the graduated swathe, an engineering assessment was undertaken to test the feasibility of overhead line routeing options within the corridor. The initial linear feasibility study at this stage was conducted in accordance with National Grid's 'Our Approach to Consenting' (see Section 1.3) and an entirely overhead line alignment was considered feasible.

Indicative Centreline of an Overhead Line

6.3.4 The Holford Rules are relevant to the development of an indicative centreline of an overhead line alignment within a wider corridor. The Holford Rules were first set out in 1959 and subsequently reviewed by National Grid in 1992. Paragraph 2.8.5 of National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5) states that the Holford Rules *'should be used by developers when designing their proposals'*. They have become accepted within the electricity transmission industry as the basis for overhead line routeing. National Grid employs the Holford Rules to inform the design and routeing of all new overhead line projects, including this Project. The Holford Rules set out, at a general level, and in the absence of any other overriding constraints, the design principles that should be applied in developing permanent overhead line infrastructure. How the Project complies with the Holford Rules is set out in detail in Paragraphs 7.1.7 to 7.1.66 of this report.

6.3.5 The process of developing an indicative centreline for an overhead line, therefore, firstly begins with an analysis of known constraints within the corridor. The constraint types when designing or redesigning an overhead line route can generally be broken up into the following categories:

- engineering constraints;
- constructability constraints;
- service/outage constraints;
- economical constraints;
- environmental constraints; and
- socio-economic constraints.

6.3.6 This section does not seek to address the considerations of those constraints and how they have influenced the design (which is instead set out in detail in Chapter 7) but sets out the principles generally applied in respect to technical considerations for overhead line routeing.

6.3.7 When developing the indicative centreline of an overhead line alignment, prior to the siting of pylons along the alignment, a number of parameters to reach an appropriate design solution are considered, which are in turn considered compatible with the Holford Rules. From a technical perspective and relevant to the strategic proposal for the Project, such parameters are considered to include the following:

- Long straight sections of overhead line, avoiding sharp changes of direction, are preferred to avoid the need for more angle pylons. This has visual benefits as angle pylons are typically heavier set, financial benefits as they are typically more expensive to construct, and construction benefits as angle pylons are typically more technically challenging to construct. For example, a pylon with a sharp angle of deviation will require a larger pylon working area for construction activities, resulting in more stone material to construct the working area. Additionally, more angles on an indicative centreline of an overhead line alignment will increase the overall length of the overhead line, increasing cost and overhead line presence. Whilst long straight sections are preferred, in some instances sharper angles may be required to navigate existing constraints, such as to increase a separation distance from a residential property, or to avoid other sensitive environmental features.
- Perpendicular over sailing of main roads, railways and significant watercourses is preferred (where possible) to limit the length of the span across that feature.
- Where the indicative centreline of an overhead line alignment is situated between constraints, an assessment balancing the effects on those constraints and their relative importance is undertaken, promoting equidistant routeing where the effects are comparable.
- Major buried utility assets, such as high-pressure gas pipelines, generally are considered and avoided when developing the indicative centreline of an overhead line alignment, where possible, noting the complexities involved in mitigating any impact on such assets.
- Generally, the indicative centreline of an overhead line alignment would seek to avoid the paralleling of other linear metallic features, such as buried metallic pipelines and railway lines, to reduce the risk of induced voltage occurring. National Grid seeks to maintain a 50m lateral separation distance between the overhead line and other linear metallic features (below or above ground). Such risks can be mitigated with cathodic protection measures, but such measures would increase Project cost, add technical complexities and often involve third party agreements with the asset owner of the feature.
- Wherever practicable, National Grid's preferred approach is the avoidance of direct oversail of residential properties during routeing of new infrastructure, and National Grid also seeks to avoid oversailing any non-domestic buildings as far as possible, with a preference for avoiding built-up areas altogether. Generally, a stand-off distance of around 50m is sought in respect of residential properties.
- When developing the indicative centreline of an overhead line alignment, National Grid is also cognisant of other factors associated with the construction of that overhead line. Enough space should be retrained either side of the indicative centreline to allow for a limit of deviation (LoD) (see Section 8.9) and to facilitate the temporary works associated with the construction of the overhead line (see Chapter 8).

Close Parallel of Overhead Line Opportunities

6.3.8 The supplementary note to Holford Rule 6, which is in turn endorsed by paragraph 2.8.5 of EN-5 (Ref 5), states '*arrange wherever practicable, parallel or closely related routes with tower [pylon] types, spans and conductors forming a coherent appearance.'*, the impact of which is to reduce the magnitude of landscape and visual

effects and the concentration of overhead line and wirescapes in the landscape. National Grid recognises that close paralleling of an existing overhead line has the potential to reduce the overall extent of environmental impacts arising from the Project by avoiding the spread of impacts to receptors currently unaffected by existing overhead line, albeit this may well increase impacts on receptors already affected.

6.3.9 The minimum distance between overhead lines is determined by technical and safety constraints and would typically be 85 m. Whilst the maximum distance at which the benefits of close paralleling might be achieved depends on local factors, this is considered to be approximately around 200 m in most circumstances. Beyond 200 m, it is considered that the benefits associated with close paralleling begin to be outweighed. This larger separation distance increases the possibility of encircling receptors such as residential properties.

6.3.10 There are technical challenges associated with the construction and operation of a close parallel alignment, including difficulties with achieving the required offset from the existing overhead line and access where the existing overhead line is already within a relatively constrained working area. Opportunities for close paralleling have been considered from the early design stages on the Project. However, there are relatively few locations within the proposed route alignment where there are opportunities for close parallel with an existing overhead line. This is because opportunities are largely dictated by the existence of existing overhead lines within the study area, as well as other constraints that are to be avoided.

Pylon Siting

6.3.11 Following the refinement of an indicative centreline of an overhead line alignment, National Grid 'sites' pylons along the centreline of the overhead line alignment.

6.3.12 Pylons are used to regulate the statutory clearances. Statutory clearance for an overhead line refers to the legally required minimum distance that must be maintained between the conductors and other structures, objects, or the ground. This clearance is put in place to ensure safety and to allow for proper maintenance and operation of the overhead line. Minimum clearances can vary depending on factors such as the operating voltage of the overhead line and any constraints within the vicinity of that overhead line. The required height of the pylon is, therefore, influenced by the sag profile of the conductor and the span distance between adjacent pylons. Pylons need to be sufficiently tall to ensure that statutory clearances from the bottom conductors are achieved in all weather conditions and for the maximum permissible operating temperature. Steel lattice pylon heights are adjusted by adding extension panels, each typically adding around 3m for each extension panel.

6.3.13 Appropriate pylon siting, from a technical perspective, is considered to include the following:

- An average span length of 350 m, to balance the presence of pylons within the landscape and to regulate the statutory clearances. In some rarer instances, a longer span length may be required to oversail features or reduce the number of pylons in a section. In these instances, the sum of adjacent spans must not exceed 800 m.
- For traditional lattice pylons, a change in direction of up to 90 degrees can be achieved. However, for the reasons set out above, long straight sections, avoiding the need for angle pylons, are preferred.

- Careful siting of individual pylons is adopted to avoid direct and indirect impacts on protected habitats (including considering conductor swing, to avoid or minimise loss of vegetation), as far as practically possible. Conductor swing refers to the expected movement of the conductors (wires) of an overhead line due to external factors such as wind and temperature changes; causing the distance between the conductors and other structures (such as buildings, trees, or other conductors) to vary and change.
- Maintaining an offset from significant watercourses of around 15m limits environmental impacts and allows enough space for the construction of pylon working areas.

Substation Considerations

6.3.14 This section sets out, in the context of developing the substation permanent infrastructure within the siting zones presented at the Stage 1 consultation, the technical principles generally applied in respect to substation size and siting and how this has progressed to the substation design presented at the Stage 2 consultation.

6.3.15 The project proposes to construct up to six new substations which will connect the new overhead line route and customers to the wider transmission network:

- a new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation in North East Lincolnshire (referred to as the new Grimsby West Substation);
- two new 400 kV connection substations located south west of Mablethorpe in East Lindsey (referred to as the new Lincolnshire Connection Substations A and B);
- up to two new 400 kV substation compounds in the refined Weston Marsh Substation Siting Zone; and
- a new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (referred to as the new Walpole B Substation).

6.3.16 Initial designs for these substations have been developed in accordance with National Grid standards and specifications, which will ensure that the new sites can be constructed, operated and maintained safely.

6.3.17 Also relevant in this context is the Horlock Rules. National Grid devised the Horlock Rules in 2003, and these were subsequently updated in 2009. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. They facilitate consideration of the environment and amenity during the design and siting of new substation infrastructure. These were considered during the identification of potential locations for the proposed six substations and have influenced the siting and design of the substations.

6.3.18 All of the proposed substations have been designed as air insulated switchgear (AIS) substations rather than gas insulated switchgear (GIS) substations. AIS technology uses atmospheric air as an insulation medium between the electrical equipment in the substation, whereas GIS technology seals electrical equipment in pressured chambers filled with insulating gas (typically sulphur hexafluoride (SF6) which is an extremely potent greenhouse gas, although alternative insulation gases are

becoming increasingly available). AIS technology usually requires a larger footprint than GIS, with substation equipment typically located outdoors and requiring greater separation distances between each other to maintain electrical isolation, whilst for GIS, equipment is usually much closer together and enclosed within a building. For new substations, GIS is typically only implemented where there are significant space constraints or in areas where atmospheric pollution may impact outdoor AIS equipment (for example, due to nearby industry or in marine environments). In the absence of any requirements to use GIS, the Project is continuing on the basis of implementing AIS. Despite a larger land take for AIS, GIS is considered to have a greater impact on views and landscape character due to the height and scale of the building surrounding the equipment.

Substation Sizes (Footprint)

6.3.19 The size of the proposed substations is determined by their technical requirements, which include:

- number of customers to be connected;
- capacity of customer connections;
- mode of connection to the existing transmission network (i.e. number of overhead line or underground cable connections); and
- selection of AIS or GIS technology, as outlined above.

6.3.20 A greater number or capacity of customer connections, or a more complex connection to the existing transmission network, will generally result in a larger footprint.

Substation Siting

6.3.21 As stated above, the siting of the proposed substations within their siting areas has been developed in accordance with the Horlock Rules. Rules 7 to 11 are particularly relevant as they establish some technical design parameters. Details as to how the Project has complied with the Horlock Rules is set out in detail at Paragraphs 7.1.67 to 7.1.116 of this report.

6.3.22 In addition several technical factors, compatible with the Horlock Rules, have influenced the siting of the proposed substations:

- Preference for level, open areas free from existing above or below-ground infrastructure. This reduces the potential scope of enabling works (including groundworks and diversion of existing infrastructure).
- Where applicable, proximity to existing overhead line infrastructure if connections are required into them, to reduce the extent of new overhead line required.
- Where transformers are required to connect into the local distribution network, proximity to the connection point to the wider distribution network to minimise the amount of lower voltage cables or overhead lines required.
- Consideration given to the nature of the surrounding road network and its capacity to support construction and operational traffic.
- Sufficient space surrounding the substation for overhead line and underground cable connections.

6.3.23 Further details regarding the substation design requirements that have influenced the development of proposed siting locations are outlined below to provide a technical basis for the siting narrative in Chapter 7.

New Grimsby West Substation

6.3.24 The existing Grimsby West 400 kV Substation does not have sufficient capacity to accommodate new customers requiring a connection to the electricity network. National Grid have therefore identified the need for a new substation close to the existing Grimsby West Substation to connect several new customers. These customers comprise a total of eleven bays, five of which include super grid transformers to supply the adjacent Northern Powergrid site. The other six connect battery energy storage systems (BESS), solar photovoltaic (PV) and combined cycle gas turbine (CCGT) generation to the substation.

6.3.25 It is envisaged that the existing Grimsby West 400 kV Substation will be decommissioned once the new substation is operational, and all relevant circuits have been transferred and commissioned.

6.3.26 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- nineteen bays;
- four overhead line gantries;
- standard substation plant including circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, surge arrestors, and busbars (not necessarily an exhaustive list);
- five new 400/132 kV super grid transformers;
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);
- security fencing;
- lighting columns;
- CCTV surveillance;
- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- landscaping, drainage features and mitigation areas.

6.3.27 The new Grimsby West Substation is proposed to be served by a new access road off Aylesby Road.

6.3.28 The construction works would involve temporary diversions of the existing Grimsby West to Keadby and Grimsby West to South Humber Bank overhead electricity lines, currently connecting to the existing 400 kV substation.

6.3.29 The construction works would involve the permanent reconfiguration of the existing overhead lines, to be transferred from the existing to the new Grimsby West Substation. The detail of the overhead line works is presented in Chapter 7.

New Lincolnshire Connection Substation A (LCS A)

6.3.30 LCS A is one of two substations located south west of Mablethorpe, needed to facilitate the connection of battery storage, renewable generation, and an offshore link to connect to the electricity transmission system.

6.3.31 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- seventeen bays;
- four overhead line gantries;
- standard substation plant including, but not limited to, circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, and busbars;
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);
- security fencing;
- lighting columns;
- CCTV surveillance;
- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- landscaping, drainage features and mitigation areas.

6.3.32 LCS A is proposed to be served by a new access road off Rye Lane.

6.3.33 The construction works would involve the connection of new overhead lines to the substation. The detail of the overhead line works is presented in Chapter 7.

New Lincolnshire Connection Substation B (LCS B)

6.3.34 LCS B is one of two substations located south west of Mablethorpe, needed to facilitate the connection of battery storage, solar generation, and offshore transmission links to the electricity transmission system.

6.3.35 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- nineteen bays;
- four overhead line gantries;
- standard substation plant including circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, and busbars (not necessarily an exhaustive list);
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);
- security fencing;
- lighting columns;
- CCTV surveillance;

- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- Landscaping, drainage features and mitigation areas.

6.3.36 LCS B is proposed to be served by a new access road off Sutton Road.

6.3.37 The construction works would involve the connection of new overhead lines to the substation. The detail of the overhead line works is presented in Chapter 7.

Refined Weston Marsh Siting Zone

6.3.38 Up to two substation compounds are proposed in the Refined Weston Marsh Substation Siting Zone, with works ongoing to confirm their requirements and locations.

6.3.39 The substations are required to connect new customers (BESS, solar PV and wind generation) to the transmission network.

6.3.40 Existing 400 kV overhead lines would be modified to connect the new substations to the wider transmission network.

New Walpole B Substation

6.3.41 One new substation is proposed west of the village of Walpole St Andrew and north of the town of Wisbech, needed to connect proposed subsea links from Scotland and CCGT generation.

6.3.42 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- thirty-one bays;
- five overhead line gantries;
- standard substation plant including circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, surge arrestors, and busbars (not necessarily an exhaustive list);
- five new 400/132 kV super grid transformers;
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);
- security fencing;
- lighting columns;
- CCTV surveillance;
- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- landscaping, drainage features and mitigation areas.

6.3.43 The new Walpole B Substation is proposed to be served by a new access road off West Drove North.

6.3.44 The construction works would involve the reconfiguration of the existing overhead lines, to be turned into the new Walpole B Substation. The detail of the overhead line works is presented in Chapter 7.

6.3.45 It is envisaged that one cable sealing end compound (CSEC) would be required to connect the overhead lines to the substation via a short run of underground cable.

Substation Design Considerations

6.3.46 The specific design considerations of the new substations are set out in Chapter 7, including how the designs proposed respond to the local environment and socio-economic considerations, and to feedback from Stage 1 consultation.

6.4 Pylon Type Considerations

6.4.1 Whilst the vast majority of transmission lines in Britain use lattice steel pylons with three sets of cross arms, alternative pylon types have been approved for use which achieve the technical performance required for the Project. These pylon types are set out below. The choice of pylon design for overhead lines is considered on a project-by-project basis. This section of the report provides information on the features of 'traditional' lattice pylons, low height lattice and the T-pylon, including their construction, operation and maintenance. For the overhead line connection, in order to determine pylon types which meet the technical requirements of a project, consideration must be given to both:

- the conductor, which must be capable of carrying the required power; and
- the pylon type, which needs to be able to support the conductor bundles (wires) and an earth wire, as well be able to withstand any loading which will be applied to it by the environment it will be sited within (including wind and ice loading).

Conductor Options

6.4.2 The overhead wires that transport the electrical power are known as conductors and these are usually installed in a set (or bundle) on both sides of the pylon. Overhead lines can have different conductors, in terms of size (diameter), current carrying capacity, material, and the number combined to form a bundle. At 400 kV, conductor bundles can be twin (two), triple (three), or quad (four).

6.4.3 The type of conductor selected depends largely on the required rating of the overhead line (the maximum amount of electrical power that the new line needs to be capable of transmitting). The conductor choice will also dictate the range of pylon designs available, as not all are capable of carrying heavier conductor bundles.

Pylon Options

Design Characteristics

6.4.4 There are two main types of pylon used by National Grid in England and Wales – steel lattice pylons and the T-pylon.

6.4.5 Whilst there are differences between the steel lattice and T-pylon designs, they share a number of technical characteristics. These include the following:

- they are above ground structures built on permanent foundations;
- they can (typically) support two discrete electrical circuits (one on either side of the structure); and
- the height of the structures can be adapted to suit different terrains and physical obstacles (such as river/road crossings) to ensure statutory clearance distances from the conductors, although it should be noted that low height pylons can be subject to height extension limitations.

6.4.6 For standard height steel lattice pylons, each of the three arms supports a single conductor bundle on either side of the pylon body and the top of the pylon supports an earth wire, as illustrated on Image 6.1. Low height lattice pylons comprise just two sets of cross arms; a wide lower cross arm and a standard width upper crossarm. The lower crossarms each support two bundles of conductors, meaning four bundles are arranged in a horizontal alignment beneath this pair of cross arms. The upper cross arm supports just one conductor bundle on each side of the pylon body in the same way that a standard lattice pylon does.

6.4.7 In comparison, the T-pylon design connects all three conductor bundles for each circuit together in an inverted triangle configuration using solid insulated bars. With suspension from the cross beam of the "T", this forms a diamond shape. One of these diamond configurations (comprising all three bundles of conductors) is suspended from each side of the single cross beam of the T-pylon with a separate earth wire for each side of the pylon supported above the conductors.

6.4.8 For traditional steel lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger tension structures (tension pylons) are required. These have larger foundations, heavier steelwork and larger footprints than the suspension pylons used where an overhead line runs in a straight line. Taller and heavier pylons with larger footprints may also be required to negotiate more complex terrain.

6.4.9 As with the traditional lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger and heavier T-pylons (with an additional supporting member stabilising the diamond to the main structure, are required). T-pylons are shorter than traditional lattice pylons whilst maintaining statutory clearances.

6.4.10 Low height lattice pylons are also lower in height but wider than traditional lattice pylons and are generally used over relatively short straight sections of an overhead line route. Low height lattice pylons may be incorporated into a design to mitigate specific circumstances, for example, this may be considered on a case-by-case basis in the vicinity of airfields or to reduce the visual effect of the overhead line where landscape character and the distribution and orientation of local viewpoints afford this opportunity.

6.4.11 Steel lattice pylon heights are adjusted by adding extension pieces, each typically adding around 3 m. For a typical T-pylon height extensions are limited to 3 m for suspension pylons and 7 m for tension structures.

Construction

6.4.12 As construction methods for traditional steel lattice pylons and T-pylons are similar, this section of the report provides a brief comparison of the main differences in construction. In summary:

- Although construction work areas for both the T-pylon and lattice pylons are similar in size, T-pylon work areas require a fully stoned and compacted level work area for delivery of the large tubular sections of pylon. Earthworks to level out sloping terrain would be required for all T-pylons.
- In general foundation installation is similar, utilising common piling or concreting techniques, however the T-pylon requires a level, compressed surface to facilitate the specialist installation of the base flange which upon the pylon sits.
- Both pylon types are erected by mobile crane, however due to larger components a greater capacity crane is required for T-pylons.
- As T-pylons cannot be climbed, access for the installation of conductors and fittings is made from a specialised Mobile Elevated Work Platform (MEWP). This requires a suitable access route and a level working area, both of which will be required to be left in situ for future maintenance and defect repairs.
- Conductors and fittings should be installed soon after the construction of T-pylons to reduce the impact of weather induced fatigue. A more critical, sequenced construction programme is therefore required. Lattice pylons can be erected in advance of conductor installation with less risk of fatigue, allowing greater flexibility in the construction programme with a lower risk of delay.

Operation and Maintenance

6.4.13 Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 40 to 60 years and the insulators and fittings have a life expectancy of approximately 25 to 40 years. As the overhead conductors have a life expectancy which is lower than the pylon structures themselves, reconductoring will be required during the 80-year lifespan of the Project.

6.4.14 For pylons, maintenance operations include painting, corroded or damaged member replacement, insulator and fittings and conductor fittings replacement, pylon furniture repairs and other activities. Painting of the structures occurs approximately every 20 years and is based on a condition assessment. Painting of the crossarms and some sections of the pylon bodies requires the circuits to be switched out. Pylon inspection is currently done by helicopter or drone as well as occasional line walks. Helicopters can travel swiftly between structures and hold steady during pylon inspection whilst taking HD resolution video for subsequent analysis.

6.4.15 All lattice pylons on the network are climbable so many activities can be carried out without equipment such as specialised MEWPs.

6.4.16 Bespoke and conventional maintenance and defect rectification procedures, manuals and methodologies for steel lattice pylons are widely available within National Grid. These procedures have been developed over many years and are compliant with National Grid's and UK safety requirements, covering not only structures but also insulators, conductor systems and other overhead line components.

6.4.17 For the T-pylon, challenges may be anticipated when carrying out maintenance, defect rectification or refurbishment works on these lines, including painting, insulator and conductor and fitting replacement. Maintenance works are especially intricate due to the complex nature of the insulator arrays installed. Due to access requirements repair times could be increased and may need longer outages.

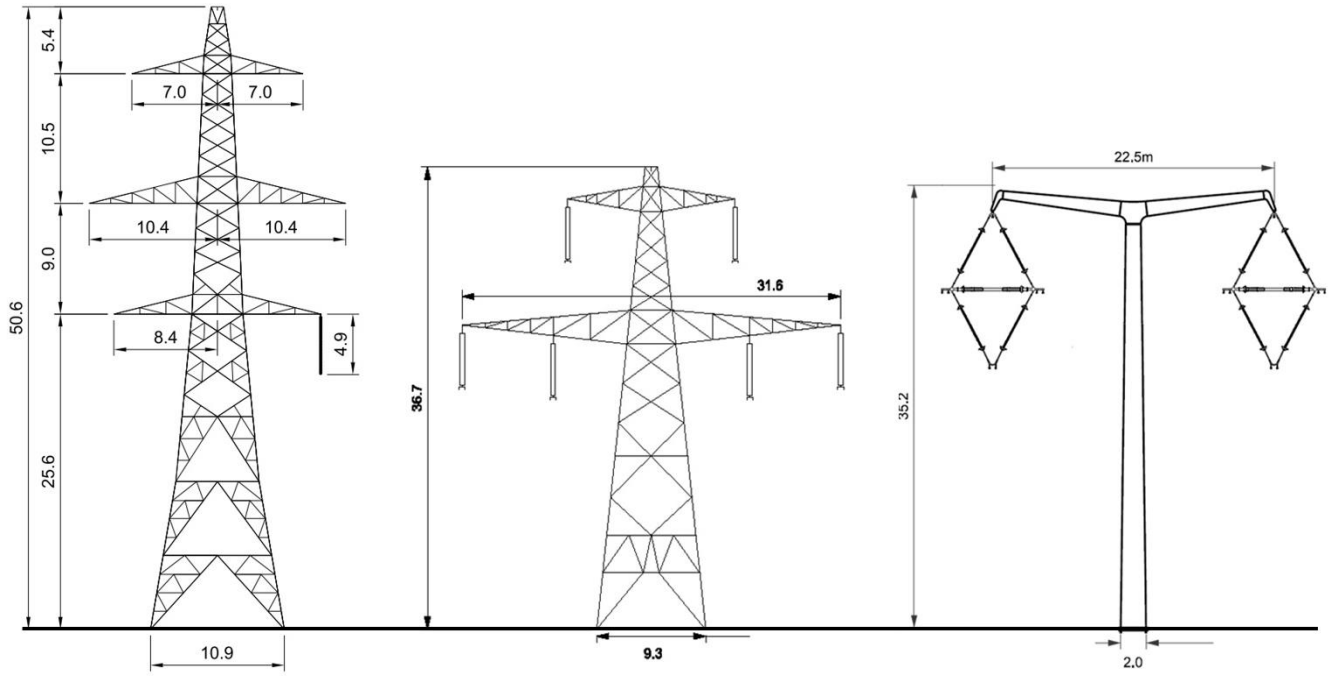
6.4.18 Access using conventional methods such as climbing is not possible for T-pylons and MEWPs will be required to access overhead line components for repair and/or replacement. A permanent access will therefore be required to be left in situ to each individual T-pylon site.

Pylons Options Available to the Project

6.4.19 For the Project, the all-aluminium alloy conductor (AAAC) type needed to meet the rating requirements for the new circuits is a triple bundle of 37 mm diameter (Araucaria) conductor. This conductor system has been selected at this stage due to its high current carrying capacity which can accommodate the high levels of power flow expected on the new overhead line circuits once in operation. Only the larger standard lattice steel designs (both standard height and low height) and T-pylons are capable of supporting this conductor bundle.

6.4.20 Newer conductor types constructed with composite material cores may also be considered for the Project as the design progresses. If it is appropriate to use these newer conductor types then a slightly lighter form of pylon design could potentially be utilised throughout as a more lightweight solution of twin conductor bundles could be sufficient. However, based on design work conducted to date, it is assumed that a triple bundle of Araucaria AAAC will be used on this Project to provide maximum possible capacity and flexibility in the design. Routeing and siting, as well as environmental studies for Stage 2 consultation, have been carried out on this basis. Further detail on the final choice of conductor system will be provided as part of the Development Consent Order (DCO) application, whilst further detail on the selection of pylon design for this stage of the Project based on the use of triple AAAC conductor can be found in Chapter 7.

Image 6.1 Pylon types available to the Project



Full Height Lattice (L6m) Low Height Lattice (L13) T-Pylon

6.5 Planning and Environmental Considerations

6.5.1 Planning designations and environmental features have been considered throughout the routeing and siting process. A buffer was applied to some of these features in compiling the materials that informed the Stage 1 consultation and developing the graduated swathe (**Section 5 of the CPRSS**).

6.5.2 As the design has developed, these features have continued to be considered as part of assessments informing the proposed alignment and substation siting. As a first principle, the design of the Project has sought to avoid the planning designations and environmental constraints outlined below wherever possible and appropriate.

6.5.3 There are instances where some features cannot be avoided entirely, due to technical limitations or conflicting constraints. Chapter 7 highlights how the proposed alignment has been developed in relation to planning and environmental constraints, and Chapter 8 includes details of National Grid's approach to environmental mitigation for affected features.

6.5.4 The features considered include the following:

- Air Quality: Residential Properties, Education Establishments (such as schools and colleges), Buildings (other than residential properties e.g. retail, industrial estates, religious and healthcare buildings), and Air Quality Management Areas (AQMA).
- Aviation and Defence: Radar, Radio Navigation Beacon, or Radio Sites, Ministry of Defence Low Flying Zone (only high priority and regular), Licensed Airfields, Unlicensed Airfields with Buildings, Unlicensed Airstrips, Ministry of Defence Properties, Civil Aviation Authority Airports, Civil Aviation Authority Aerodromes,

Military Airfield/Passenger Airport. Further details regarding aviation considerations are described later in this section (see Paragraph 6.5.6).

- Ecology: Ancient woodland (including ancient and veteran trees), Statutory designated sites (Ramsar, Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR)), Non Statutory designated sites (Local Wildlife Sites, Sites of Importance for Nature Conservation (SINC), County Wildlife Sites (CWS), roadside nature reserves), Habitats of Principal Importance, Protected Species and Species of Principal Importance, and Important Bird Areas.
- Socio-economic Activity: Businesses that operate as a commercial entity, renewable energy generation, aviation facilities (airfields), community facilities (places of worship, education, hospitals, etc.), open space, development land allocations (identified through local plans, which includes mineral resource allocations), tourism accommodation and bed space, strategic visitor attractions, and public rights of way and promoted recreational routes.
- Geology and Soils: Geological Sites of Scientific Interest, Local Geodiversity Sites, Peaty Soils, Best and Most Versatile Land, Landfill Sites (historic and authorised), and Mines.
- Health and Wellbeing: individual and clusters of residential properties, community facilities, parks, green open spaces, and promoted recreational routes.
- Historic Environment: Scheduled Monuments, Listed Buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and II), Conservation Areas, non-designated heritage assets, and National Trust Inalienable Land.
- Landscape and Visual: Areas of Outstanding Natural Beauty (AONB) (now known as National Landscapes), Important Landscape Areas (ILA), Areas of Great Landscape Value (AGLV), Residential Properties, National Trails, National Cycle Network, European Long-Distance Paths, Viewpoints, Recreational areas (e.g. country parks, Countryside and Rights of Way (CROW) access land), and Outdoor Recreational Facilities (e.g. canals, caravan parks).
- Noise and Vibration: Residential Properties, Education Establishments (e.g. schools and colleges), and Buildings (other than residential properties e.g. retail, industrial estates, religious and healthcare buildings).
- Traffic and Movement: National and Local Cycle Network, Public Rights of Way, promoted and recreational routes, Railway Infrastructure, Navigable Waterways, Highway Network including local roads, classified road network and the Strategic Road Network (SRN).
- Water: Statutory Main Rivers, Internal Drainage Board (IDB) watercourses, ordinary watercourses, tidal and fluvial floodplains, flood defences, Water Framework Directive (WFD) water bodies, Groundwater Dependent Terrestrial Ecosystems, primary and secondary aquifers, and groundwater Source Protection Zones
- Existing utility assets: high pressure gas pipelines, existing 400 kV and 132 kV overhead lines and other major utility buried assets such as carbon capture pipelines, fuel pipelines and high voltage electricity underground cables

6.5.5 Environmental surveys, including ecological, historic environment, and landscape and visual surveys, commenced in November 2022 and are ongoing. Design development to date has taken account of available environmental survey data and sought to avoid constraints identified through survey. Where appropriate, further refinements to the design will be made ahead of the DCO application as new information is made available through environmental survey.

Aviation Considerations

6.5.6 To further understand potential aviation related impacts resulting from the Project, a study has been undertaken to identify all operational airfields within a 5 km search area of the graduated swathe presented at Stage 1 consultation. Although impacts on aviation caused by the overhead line are not anticipated beyond 2 km away from any airfield, it is noted that several airfields outside of this 2 km area have provided feedback as part of the Stage 1 consultation. The search area was expanded to 5 km to ensure these airfields were also included in the assessment. This search area has also been subsequently updated based on the proposed overhead line alignment for Stage 2 consultation.

6.5.7 Fourteen operational, or understood to be recently operational, airfields or helipads were found to be located within this search area, each with varying characteristics and flight operations. Most of the identified airfields are unlicensed airfields which primarily operate light aircraft for recreational purposes.

6.5.8 For each of these airfields, a risk-based methodology has been implemented with the assistance of expert aviation consultants to understand the likely flightpaths of the aircraft which use them and how this could potentially interact with the Project. This analysis methodology has taken key parameters into account, including runway length and surface type, types and performance of aircraft flown, typical take-off and approach procedures, and any notable characteristics of specific airfields which may impact the analysis.

6.5.9 Combined with guidance provided in National Planning Policy (including the National Policy Statement for Energy (EN-1) (Ref 4), the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5)), and publications from the Civil Aviation Authority (CAA) related to safeguarding (including CAP 168: Licensing of Aerodromes (Ref 13), CAP 738: Safeguarding of Aerodromes (Ref 14) and CAP 793: Safe Operating Practices at Unlicensed Aerodromes (Ref 15)), as well as direct engagement with airfield operators where possible, this has informed a preliminary analysis of the potential impacts to operational aviation facilities within the 5 km search area.

6.5.10 This analysis has in turn been used to inform routeing and siting decisions in the development of the overhead line design. In the absence of any other limiting factors or conflicting constraints, the overhead line has been routed to provide the maximum feasible clearance for each airfield. However, where other factors have necessitated closer siting to operational airfields, clearances have been considered to understand whether safe operations can continue unaffected based on the information currently available. The impact of aviation on the routeing and siting of the Project where applicable is detailed in Chapter 7.

6.5.11 The analysis undertaken to date is preliminary in nature, and whilst it has been used to guide decisions on routeing and siting, further engagement is required throughout the Stage 2 consultation period and up to the submission of the DCO with all aviation

facilities to inform more detailed assessments. Finalised outcomes of these assessments will be reported on as part of the Environmental Statement (ES) and DCO submission.

Solar Farm Considerations

6.5.12 National Grid's routeing practice, guided by the overarching requirement in National Policy Statement EN-5 (Ref 5), requires applicants to demonstrate that they have '*considered reasonable opportunities to avoid impacts on existing low-carbon generation assets*.' As part of the route development process, National Grid has actively sought to avoid oversailing or directly impacting existing or consented solar farms wherever practicable, although the need to balance numerous conflicting constraints has sometimes required some impact on these sites following a thorough appraisal.

6.5.13 Oversailing a solar farm typically results in the clearance of land beneath and around the overhead line, due to the construction access and clearance requirements associated with high-voltage infrastructure. National Grid's Technical Guidance Note (TGN) 287 (Ref 16) sets out detailed requirements for the development of solar installations in close proximity to overhead lines. Where a minimum clearance of 5.3 m from the lowest conductor can be maintained, the clearance of land beneath the conductors may be considered temporary, allowing for potential reinstatement of panels following construction. However, within the immediate footprint of a pylon, permanent removal of solar infrastructure should be assumed. This could result in a reduction of installed solar capacity, which may impact renewable energy generation and potentially lead to compensation for the solar operator to offset any lost revenue.

6.5.14 Construction and maintenance of overhead lines within solar installations is also more complex. Equipment such as cranes, low loaders, and heavy machinery used for pylon erection, stringing or line maintenance must navigate around or through the solar farm, which can disrupt solar panel placement and access roads. National Grid requires unrestricted access to its assets for routine maintenance and emergency repairs. This may require the temporary removal of panels if there is insufficient space to conduct necessary maintenance.

6.5.15 Earthing upgrades may be required for sections of the solar farm to ensure safe working conditions and mitigate against the possibility of induced voltages and micro shocks. Suitable earthing of the panels and supply cables will also help minimise damage to equipment in proximity to the pylons, if a rise in earth potential were to occur during electrical storms.

6.5.16 For these reasons, and in line with NPS EN-5 (Ref 5) and TGN 287 (Ref 16), National Grid has generally routed the overhead line around existing or consented solar farms wherever a practicable alternative exists. However, in instances where the route passes through solar farms, this decision has been made after a thorough consideration of all relevant constraints. Routeing through solar sites was only pursued where alternative routes would introduce significant technical challenges, such as excessive complexity in the design, or may have resulted in substantial adverse effects on other sensitive receptors or environmental features, making them less viable. These factors have been carefully balanced in determining the final route alignment.

Landscape Considerations

6.5.17 Section 85(A1) of the Countryside and Rights of Way Act 2000 (Ref 17) imposes a duty on relevant authorities (including National Grid) to 'seek to further' the purpose of conserving and enhancing the natural beauty of the relevant Area of Outstanding Natural Beauty (AONB) when exercising or performing any functions in relation to, or so as to affect, land in an AONB. This requires a consideration as to whether a project is consistent with the purpose of conserving and enhancing the natural beauty of the relevant AONB and, if there is a conflict, a consideration of whether its promotion would be in accordance with the duty. If there is a conflict, consideration needs to be given to whether the project is nevertheless justified in the circumstances, with reference to, for example, the extent and severity of the conflict, any mitigation and any compensation or enhancements.

6.5.18 'Guidance for relevant authorities on seeking to further the purposes of Protected Landscapes' ('the Guidance') (Ref 18) was published in December 2024 and provides broad principles with respect to complying with the Section 85(A1) duty. The Guidance makes clear that the duty applies to functions performed outside the relevant designation boundary which affect the designated landscape. Similarly, paragraph 5.10.8 of EN-1 (Ref 4) confirms that the duty applies to projects which are located outside the designated area, but which may have impacts within them. As such, the duty applies in respect of the Project.

6.5.19 Paragraph 5.10.8 of EN-1 (Ref 4) goes on to state that such projects should be sensitively designed taking account of various siting, operational and other relevant constraints and also that the Secretary of State should be satisfied that the measures which seek to further the purpose of the designation are sufficient, appropriate and proportionate to the type and scale of development proposed. Paragraph 5.10.34 of EN-1 (Ref 4) highlights that the aim should be to avoid harming the purposes of designation or to minimise adverse effects on designated landscapes and also states that, "*The fact that a proposed project will be visible from within a designated area should not in itself be a reason for the Secretary of State to refuse consent*". Paragraph 5.10.35 then states that "*The scale of energy projects means that they will often be visible across a very wide area. The Secretary of State should judge whether any adverse impact on the landscape would be so damaging that it is not offset by the benefits (including need) of the project.*"

6.5.20 The policy requirements as to sensitive design, measures which seek to further the purpose of designation, avoidance of harm to the purposes of designation and minimising adverse effects under paragraphs 5.10.8 and 5.10.34 of EN-1 (Ref 4) will be borne out through the ongoing design process as, at this stage, proposals for mitigation, compensation and enhancement have not yet been fully defined. However, there has been ongoing consideration of mitigation as part of the design development process, which includes the routeing of the overhead line alignment as well as the use of low-height pylons in parts of the Project.

6.5.21 The full assessment of impacts will be presented in the ES, including an assessment of any conflict with the natural beauty, special qualities and key characteristics of the AONB. Further analysis will also be provided alongside those assessments as part of the wider DCO application, to address the duty applicable under section 85(A1) and the policy requirements detailed above. To the extent that the ES identifies residual adverse impacts on the landscape, this will include an analysis of those impacts against the benefits of the Project, as referred to in paragraph 5.10.35.

7. Development of the Proposed Alignment and Substation Sitings

nationalgrid

7. Development of the Proposed Alignment and Substation Sitings

7.1 Introduction

7.1.1 This chapter describes the proposed alignment and substation sitings which form the subject of the statutory (Stage 2) consultation. The proposed alignment and substation sitings presented in this chapter have been developed in response to feedback received at the non-statutory (Stage 1) consultation, further environmental and technical assessments, early stakeholder and landowner engagement, and a review of work undertaken to date.

7.1.2 This chapter outlines the design considerations and decisions made by National Grid to inform the proposed alignment and substation sitings. All proposed changes to the preferred corridor and graduated swathe (otherwise known as “Design Change Requests”) identified during the Stage 1 consultation phase were considered, however not all design changes were accepted and taken forward to inform the proposed design. This report describes the design changes that were accepted and taken forward to inform the proposed alignment and substation sitings. The **Stage 1 consultation report** provides details on design changes requested through Stage 1 consultation feedback that were not taken forward.

7.1.3 The images presented within this chapter show the proposed alignment and substation sitings for the Project across the entirety of the route, from the proposed new Grimsby West Substation to the proposed new Walpole B Substation. The images included in this chapter have been produced to aid understanding of the development of the proposed alignment and are not intended to show all the design elements and constraints associated with the Project, to ensure the images are legible. The images within the text have been scaled down and are not to scale; full size versions of the images are included in 0 of this report.

Pylon Choice

7.1.4 This chapter also sets out the pylon choice selected for each of the overhead line sections. The following factors, along with the pylon type considerations outlined in Section 6.4 of this report, have been considered in arriving at a proposed pylon design for the new overhead line:

- landscape and visual;
- historic environment;
- biodiversity;
- aviation; and
- technical considerations.

7.1.5 Across the Project, the starting point for pylon design choice is standard height steel lattice and this has been the basis for the development of the proposed overhead alignment. This is primarily because in most circumstances, standard height steel

lattice pylons provide the greatest flexibility in design as they can provide angle deviations up to 90 degrees, as opposed to low height pylons or T pylons which are both limited to 30 degrees, and they are able to be easily extended where required to provide additional clearance above specific constraints such as navigable waterways. Standard height pylons also require a narrower corridor for vegetation clearance than both low height lattice and T-Pylons, so across the full length of the Project the selection of standard height lattice reduces permanent impacts on vegetation and biodiversity. Developing the proposed overhead line design in this way, with a consistent starting point across the full route, also ensures that the overhead line has a consistent appearance across the majority of the Project which helps to reduce the negative visual impacts that can arise with multiple designs in close proximity.

7.1.6 However, where there are specific drivers to deviate from this standard design, both low height lattice pylons and T-pylons have been considered as alternative options primarily for the purpose of mitigation for a potential effect with respect to the factors listed in Paragraph 7.1.4. The summary of the appraisal for pylon choice where these areas for mitigation through the use of a different pylon type have been identified are provided in each section. A selection of views illustrating the use of the alternative pylon forms is included at 0. The views illustrated have been chosen from the viewpoints selected for the visual impact assessment which have been agreed with stakeholders. For full descriptions and reasoning for selection of viewpoints refer to **PEI Report Part B Appendix 3A Proposed Viewpoints**.

Holford Rules

7.1.7 Paragraph 2.8.5 of the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5) states that the Holford Rules *'should be used by developers when designing their proposals'.* The Holford Rules were first set out in 1959, and subsequently reviewed by National Grid in 1992. They have become accepted within the electricity transmission industry as the basis for overhead transmission line routeing. National Grid employs the Holford Rules to inform the design and routeing of all new overhead line projects, including the Project.

7.1.8 Whilst referred to in Chapter 2 and Chapter 6, the following sections of this Chapter further set out, in turn, how the Holford Rules are applied by National Grid and have formed an important part of developing the proposed alignment.

7.1.9 In cases where an overhead route has been selected, as is the case for the Project, National Grid will continue to apply the Holford Rules, as a starting point. However, other factors have also influenced the proposed alignment and design of the project; such as, environmental, engineering and socioeconomic considerations as well as feedback received during consultation. On occasion, such factors provide an overriding justification to depart from the Holford Rules, and all decisions in the design and delivery of major infrastructure projects inevitably balance a variety of considerations, with weight determined by legal and policy considerations. However, in most cases, where all other considerations are equal, the Holford Rules provide the guiding design principles. EN-5 states that the Secretary of State should be satisfied that the Project, so far as is reasonably possible, complies with the Holford Rules.

7.1.10 Holford Rules 1, 2, 3 and 7 have been particularly relevant in the selection of strategic options, route corridor and the proposed overhead line alignment for the project. Holford Rules 4, 5 and 6 have been relevant in the consideration of possible landscape and visual effects that may arise from the project.

Holford Rule 1

7.1.11 Holford Rule 1 states, *'avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence. Areas of highest value include AONBs, National Parks, Heritage Coasts, World Heritage Sites and Registered Parks and Gardens.'*

7.1.12 Holford Rule 1 was considered particularly during the development of the graduated swathe presented at the Stage 1 consultation and subsequently in the development of the preferred alignment within the graduated swathe.

7.1.13 The graduated swathe sought to avoid areas of highest value altogether, including Areas of Outstanding Natural Beauty (AONB), now known as National Landscapes, National Parks, Heritage Coasts, World Heritage Sites and Registered Parks and Gardens, thereby ensuring that any proposed alignment within the graduated swathe would not be in direct conflict with these designations. Of these designations, only Lincolnshire Wolds National Landscape (AONB), Well Hall Registered Park and Garden and Gunby Hall Registered Park and Garden are in the vicinity of the Project, none of which are directly impacted by the Project.

7.1.14 However, it is noted in this context that the Project is situated in closest proximity to, and parallel with, much of the eastern side of the Lincolnshire Wolds National Landscape ('the AONB'), adjacent to Section 2, Section 3 and part of Section 4 of its route. This proximity may have the potential to result in adverse effects on views from some notable vantage points on the higher ground of the AONB as well as views towards the AONB from within its setting. As such, it is acknowledged that there may be an impact on the AONB. This is reported in **PEI Report Volume 2 Part C Landscape.**

7.1.15 Responding in this context, and as detailed in this chapter, the Project is proposed to use low height lattice pylons between GL18 and GL36 (between Barnoldby le Beck and Waithe), compared with traditional standard height lattice pylons. This provides a mitigation measure to reduce the prominence of the new proposed alignment from views from the AONB to this part of the Project which falls closest to the AONB.

7.1.16 It is not considered that the impact on the AONB is in conflict with Holford Rule 1, as direct impacts have been avoided. However, given the Project's location partly within the AONB's setting, it is acknowledged that indirect impacts on the visual experience, sense of place, and overall landscape character of the AONB may be experienced.

7.1.17 The appraisal demonstrates that Holford Rule 1 has informed the design and routeing of the project.

Holford Rule 2

7.1.18 Holford Rule 2 states, '*avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers [pylons] i.e. the bigger structures which are used when lines change direction.'*

7.1.19 The additional note to Holford Rule 2 goes on to state, *'Some areas (e.g. Site of Special Scientific Interest) may require special consideration for potential effects on ecology (e.g. to their flora and fauna). Where possible choose routes which minimise the effects on the setting of areas of architectural, historic and archaeological interest including Conservation Areas, Listed Buildings, Listed Parks and Gardens and Ancient Monuments.'*

7.1.20 Whilst not defined by Holford Rule 2 specifically, areas of high amenity or scientific interest, are considered to mean areas of high 'environmental' or 'historic' amenity which may include, but are not limited to:

- Ancient woodland (including ancient and veteran trees);
- Ecological statutory designated sites (Ramsar, Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR);
- Ecological non-statutory designated sites: Local Wildlife Sites, Sites of Importance for Nature Conservation (SINC), County Wildlife Sites (CWS), roadside nature reserves), Habitats of Principal Importance, Protected Species and Species of Principal Importance, and Important Bird Areas; and
- Historic Environment: Scheduled Monuments, Listed Buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and II), Conservation Areas, non-designated heritage assets, and National Trust Inalienable Land.

7.1.21 The preferred route corridor sought to avoid areas which benefit from a statutory designation, as such, any proposed alignment within the graduated swathe would not be in direct conflict with these designations. Due to their statutory designations, these are afforded more weight in terms of avoidance, than non-statutory designated sites.

7.1.22 Other environmental factors, designations and constraints have been important considerations in developing the proposed alignment. Case-by-case specific design and routeing decisions have been made where the alignment encounters such features. These are detailed in the relevant sections of this chapter, as it is not straightforward, at a macro scale, to define all these micro design decisions.

7.1.23 Relevant in this context is the fact that Holford Rule 2 does caveat that avoidance is the starting point, unless it introduces '*too-many angle towers [pylons]*'. As such, on a case-by-case basis, the proposed alignment has sought to weigh the impact of potentially routeing through an area of high amenity value against the respective design solution to avoid it, as avoidance usually results in additional angle pylons. Additional angles would generally increase the overall number of pylons required and would increase environmental effects and costs. Holford Rule 3 below details the reasons the shortest route between two points is generally preferred.

7.1.24 A summary of all the design decisions taken forward in each section and the key environmental factors considered within the appraisal is, therefore, presented under the relevant section headings, thus demonstrating that Holford Rule 2 has informed the design and routeing of the project

Holford Rule 3

7.1.25 Holford Rule 3 states, *'other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers [pylons].'*

7.1.26 The additional note to Holford Rule 3 goes on to state, '*Where possible choose inconspicuous locations for angle towers, terminal towers and sealing end compounds.'*

7.1.27 Long straight sections of overhead line, avoiding sharp changes of direction, are preferred to avoid the need for more angle pylons. This has visual benefits as angle pylons are typically heavier set, financial benefits as they are typically more

expensive to construct, and construction benefits as angle pylons are typically more technically challenging to construct.

7.1.28 Whilst long straight sections are preferred, in some instances sharper angles may be required to navigate existing constraints, such as to increase a separation distance from a residential property (see Holford Rule 7 and Holford Rule Supplementary Note 1), to avoid siting pylons within solar farms or to avoid other sensitive environmental features (see Holford Rules 1 and 2).

7.1.29 There are several occasions where routeing that accords with Holford Rule 3 has been adopted in the development of the proposed alignment and this tends to be where the graduated swathe is relatively free of other constraints, or the constraints presented in that section are considered comparable in their importance/significance.

7.1.30 A summary of the opportunities to provide a straight alignment in each section, where possible, is presented under the relevant section headings, thus demonstrating that Holford Rule 3 has informed the design and routeing of the Project.

Holford Rule 4

7.1.31 Holford Rule 4 states, '*choose tree and hill backgrounds in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.'*

7.1.32 In consideration of Rule 4, National Grid has taken opportunities to work with the characteristics of the landscape and backgrounding when planning the route of the overhead line and selecting the type of pylon to be used in the landscape.

7.1.33 However, it is generally noted that the Project is situated in an area which is predominantly rural in character, covering a large, low-lying, flat fenland landscape with many large agricultural fields and drainage ditches, dykes and rivers. As such, with limited undulating landscape features, there have been relatively few opportunities to optimise route alignments in lower-lying areas of land, such as valleys, screened by higher areas of land, such as ridges.

7.1.34 That being said, National Grid has taken opportunities to work with existing blocks of woodland and tree belts to reduce prominence of impacts where overhead lines are viewed against sky backgrounds, where they are present within the landscape.

7.1.35 In addition, steel lattice pylons benefit from backgrounding because the thin steel members in an open structure make background features visible beyond, helping them to visually recede at greater distances. An assessment of pylon design considered different designs of pylons that could be used on the project and the potential effects of each. As detailed in Paragraph 7.1.5, standard height steel lattice towers would be the preferred pylon design across the majority of the Project as the starting point, primarily for reasons of design flexibility, however further narrative on the appraisal of alternative pylon options for each overhead line route section is provided later in this chapter.

7.1.36 The appraisal of strategic and pylon design options demonstrates that Holford Rule 4 has informed the design and routeing of the project.

Holford Rule 5

7.1.37 Holford Rule 5 states, '*prefer moderately open valleys with woods where the apparent height of towers [pylons] will be reduced, and views of the line will be broken by trees'.*

7.1.38 The additional note to Holford Rules 4 and 5 goes on to state, '*Utilise background and foreground features to reduce the apparent height and domination of towers from pan viewpoints. Minimise the exposure of numbers of towers on prominent ridges and skylines. Where possible avoiding cutting extensive swathes through woodland blocks and consider opportunities for skirting edges of copses and woods. Protecting existing vegetation, including woodland and hedgerows, and safeguard visual and ecological links with the surrounding landscape.'*

7.1.39 Generally, locations for above ground infrastructure were influenced by the existing landform and vegetation, including belts of woodland, which will help screen them, as also considered by Holford Rule 4. Additionally, the Project has sought to minimise the impact as far as possible on existing vegetation including woodland and hedgerows.

7.1.40 The use of low height lattice pylons between GL18 and GL36 (between Barnoldby le Beck and Waithe) also reduces the prominence of the Project in panoramic views from the edge of the AONB, where the Project would be visible on the skyline.

7.1.41 The consideration of landform, existing landscape features and site context demonstrates that Holford Rule 5 has informed the design and routeing of the project.

Holford Rule 6

7.1.42 Holford Rule 6 states, *'where country is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or wirescapes'.*

7.1.43 The additional note to Holford Rule 6 goes on to state '*Arrange wherever practicable, parallel or closely related routes with tower [pylons] types, spans and conductors forming a coherent appearance.'*

7.1.44 The term wirescape is a combination of the terms 'wire' and 'landscape', used to describe the often complex and sometimes visually intrusive network of cables/wires, poles and pylons, that can dominate views in certain areas.

7.1.45 The landscape baseline includes existing high voltage lattice steel pylons and lower voltage wood pole overhead line infrastructure. Prior to the construction of the Project, a significant amount of this existing overhead line third-party infrastructure would need to be diverted, undergrounded, or protected; with the general starting principle being that any existing overhead line asset, which interfaces with the proposed overhead line, would be undergrounded.[2] Not only does this help facilitate the construction of the overhead line, by ensuring the proposed route alignment is free from tall physical constraints and by not increasing the statutory clearances required over these features; the resultant impact is to also reduce the magnitude of

[2] The required mitigation methods and duration of mitigation works (permanent or temporary) need to be confirmed with the asset owners prior to any works being carried out.

landscape and visual effects and the concentration of line and wirescapes in the landscape.

7.1.46 In addition, National Grid recognises that close paralleling of an existing overhead line has the potential to reduce the overall extent of environmental impacts arising from the Project by avoiding the spread of impacts to receptors currently unaffected by existing overhead line, albeit this may well increase impacts on receptors already affected by existing infrastructure.

7.1.47 Opportunities for close paralleling have been considered from the early design stages on the Project. However, there are relatively few locations within the proposed route alignment where there are opportunities for close parallel with an existing overhead line. This is because opportunities are dictated by the existence of existing overhead lines, of a similar scale and route direction, within the study area, as well as other constraints that are to be avoided.

7.1.48 However, to the north of the Refined Weston Marsh Substation Siting Zone in Section 5, the proposed alignment seeks to parallel the existing 4ZM route, synchronising the pylon positions with the existing route where possible, helping create a coherent appearance in these span sections.

7.1.49 Meanwhile, in Section 5, National Grid has taken account of the need to avoid constraining future overhead line routes that are also proposed to route through this section once constructed (including the Weston Marsh to East Leicestershire Project). Following the Stage 2 Consultation, National Grid will continue to coordinate the with other National Grid projects across the route, in accordance with Holford Rule 7.

7.1.50 It is also noted, introducing a different pylon structure near an existing steel lattice pylon may produce an incoherent appearance; this would be a greater change than introducing a series of similar structures. As such, a good design measure incorporated into the design and in consideration of Holford Rule 6, includes the proposed use of standard lattice pylons which is the same style as the existing 400 kV overhead lines in the vicinity. In other locations where the new overhead line routes in close proximity to other overhead lines which are not of the same voltage or construction type, or where close paralleling is not technically feasible, the Project has sought to maintain appropriate clearances from the other overhead lines to minimise the concentration of wirescapes where possible.

7.1.51 The appraisal and the consideration of pylon design demonstrates that Holford Rule 6 has informed the design and routeing of the project.

Holford Rule 7

7.1.52 Holford Rule 7 states, '*approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.'*

7.1.53 The additional note to Holford Rule 7 goes on to state, *'When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development. Alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development. When siting substations take account of the effects of the terminal towers and line connections*

that will need to be made and take advantage of screening features such as ground form and vegetation.'

7.1.54 Whilst the new 400 kV overhead line would be of the highest voltage, so is less relevant in terms of Holford Rule 7, National Grid has still given due regard to this principle.

7.1.55 The Project is located in the Humber, East Midlands, East of England and East Anglia regions of England. The Project is located in an area that is predominately rural, with large parts of land under arable farming use. The towns of Grimsby, Wainfleet All Saints, Skegness, Louth, Wisbech, Long Sutton, Spalding and Boston are located within 5 km of the Project. There are also multiple villages and scattered properties nearer by to the Project. However, these urbanised areas are largely avoided all together, with the exception of some rural and more isolated sites. Hence, Holford Rule 7 is not strictly relevant to the Project.

7.1.56 Whilst not urbanised areas, and whilst the Project does not itself enter any urban area or development zone, Section 1 and Section 7 of the route are comparatively the most densely populated areas of the proposed alignment.

- Section 1 of the route is situated at Grimsby West, located at the northernmost extent of the Project. This section principally encompasses the land and works associated with the new Grimsby West Substation. The proposed new Grimsby West Substation in Section 1 is surrounded by a number of environmental features and residential communities, along with existing infrastructure and planned developments which present key opportunities and constraints on the siting of the new substation
- Section 7 of the route is situated at Walpole, located at the southernmost extent of the Project. This section principally encompasses the land and works associated with the new Walpole B Substation and covers an area to the north west of West Walton and to the north of Walton Highway, extending towards West Drove North to the east. The siting area for the new Walpole B Substation is surrounded by several residential communities and receptors which act to constrain the location of the new Project infrastructure. These include Walton Highway to the south, West Walton to the south west, Ingleborough to the north west, Walpole St Peter to the north and Stratton Farm Campsite to the east.

7.1.57 In siting these proposed substations and overhead line entries, National Grid has sought to maximise the separation from these communities as far as practicable, balanced with other technical and environmental factors; to reduce as far as possible the potential amenity impacts to these receptors.

7.1.58 The relevant National Policy Statement does not preclude the use of overhead line connections in most circumstances and the use of underground cables, at a considerably higher cost would, in such circumstances, not meet National Grid's statutory duties to develop the network in an economic and efficient manner, where it is considered that there are viable overhead line design solutions in both Section 1 and Section 7.

7.1.59 Whilst the Project does not approach urban areas, the appraisal demonstrates that Holford Rule 7 has still informed the design and routeing of the Project.

Holford Rules Supplementary Notes

7.1.60 In addition to the above, three supplementary notes have been added to the Holford Rules.

7.1.61 Holford Rule Supplementary Note 1 states, *'avoid routeing close to residential areas as far as possible on grounds of general amenity.'*

7.1.62 The Project is located in an area that is predominately rural in nature, with large parts of land under arable farming use. The proposed alignment, however, does route nearby to scattered residential properties in rural areas. In almost all cases, National Grid's preferred approach is the avoidance of direct oversailing of residential properties during routeing of new infrastructure, and National Grid also seeks to avoid oversailing any non-domestic buildings as far as possible, with a preference for avoiding built-up areas altogether. Generally, a stand-off distance is sought in respect of residential properties and/or residential curtilage. Across the project, there are no instances of permanent overhead line or substation infrastructure being sited within a residential curtilage.

7.1.63 Holford Rule Supplementary Note 2 states, '*where possible choose routes which minimise the effect on special landscape areas, areas of great landscape value and other similar designations of county, district or local importance.'*

7.1.64 There is only one Area of Great Landscape Value (AGLV) within 5 km of the Project. Great Limber and the Chalk Wold Estates AGLV is located to the north of the Lincolnshire Wolds National Landscape (AONB), approx. 2.7 km from the Project in Section 2 and therefore avoided by the Project.

7.1.65 Holford Rule Supplementary Note 3 states *'in addition to adopting appropriate routeing, evaluate where appropriate the use of alternative tower [pylon] designs now available where these would be advantageous visually and where the extra cost can be justified.'*

7.1.66 As noted in respect to Holford Rule 4 above, an assessment of pylon design was undertaken which considered different designs of pylons that could be used on the project and the potential effects of each. The assessment concluded that the steel lattice pylon would be the preferred pylon design.

Horlock Rules

7.1.67 The Horlock Rules provide guidelines for the siting and design of new substations, substation extensions or cable sealing end (CSE) compounds and these rules have been an important consideration in the design and siting of such infrastructure across the Project.

7.1.68 NPS EN-5 states, '*The Horlock Rules – guidelines for the design and siting of substations – were established by National Grid in 2009 in pursuance of its duties under Schedule 9 of the Electricity Act 1989. These principles should be embodied in Applicants proposals for the infrastructure associated with new overhead lines.*'

7.1.69 Potential sites for substations were considered at each of the five substation siting study areas and the Horlock Rules informed the selection of the study areas themselves. A summary of the study areas considered and the key environmental factors that were considered in the appraisal was previously presented in **Chapters 9 to 12 of the CPRSS**.

Overall System Options and Site Selection

7.1.70 **Horlock Rule 1** states, '*in the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum*.'

7.1.71 Environmental issues were a key driver in the site selection process for the substation siting locations, as well as the locations for the cable sealing end (CSE) compounds required at New Walpole B Substation.

7.1.72 Substation siting identification takes into consideration the key design drivers and individual needs cases for each substation(s) (such as, the connection of new generation), the substation(s) technical parameters (as detailed in Section 6.3.21 to 6.3.28) and the relevant environmental constraints (identified in Section 6.5.4).

7.1.73 Given the functional design nature of substations, landscape and visual amenity was considered to be of particular importance. As such, the availability of existing screening elements and the potential to introduce additional screening elements was a key driver. In addition, appropriate topography, proximity to major roads (to minimise the extent of required new access roads) and being outside of areas of higher flood risk (where possible), were also key drivers.

7.1.74 National Grid is regulated by Ofgem, the electricity and gas markets regulator, to ensure value for money for consumers and is required under the Electricity Act to '*develop and maintain an efficient, coordinated and economical electricity transmission system, and to facilitate competition in supply and generation of electricity*.' These duties and obligations mean that National Grid has a responsibility to deliver new electricity transmission infrastructure but also to be responsible for managing the cost of projects, as costs will ultimately be borne by electricity users.

7.1.75 In accordance with Horlock Rule 1, environmental constraints are sought to be avoided from the outset and during the early stages of optioneering, as well as the consideration of technical complexity and capital costs. Therefore, whilst strategic options have been developed to avoid environmental constraints as far as possible, this had to be balanced against the need to select a strategic option that provides the most cost-effective reinforcement to the network.

7.1.76 The conclusion of the strategic optioneering was that the option of constructing a new 400 kV overhead transmission line between Grimsby to Walpole and associated substations would achieve a balance between National Grid's technical, economic and environmental obligations. This is taking account of National Grid's statutory obligations, its licence requirements and other relevant considerations. However, National Grid also recognises that due to amenity issues or where environmental constraints are to be avoided, an appropriate balance must be struck between avoiding the constraints, whilst not resulting in unreasonable cost or complexity; for example, by virtue of a significant increase in the length of overhead line or siting a substation in a location which would be difficult for construction access or provide limited space for customer connections.

7.1.77 In the context of Horlock Rule 1, Table 7.1 below sets out any substation siting specific considerations relevant to each substation.

Table 7.1 Application of Horlock Rule 1

Section	Substation	Application of Rule 1
1	New Grimsby West	• The proposed siting, in proximity to the existing Grimsby West substations (National Grid and Northern Powergrid) offers greatest opportunities to limit the spread of environmental effects, effects upon adjacent land uses, utilising land within existing National Grid ownership, and limiting the lengths of realignments and replacement of the existing 4KG circuits to tie the substation into the existing network (thereby also reducing cost). • The proposed siting of the new substation, close to the existing Northern Powergrid 132 kV substation, is also beneficial to reduce the extent of new 132 kV underground cable connections required (thereby also reducing cost). • The siting avoids the identified centres of population at Aylesby, Wybers Wood, Laceby, Laceby Acres and Healing, and the listed buildings located within these populated areas. • The proposed siting avoids the two moated sites at Healing Hall Scheduled Monument, Laceby Beck. • The proposed siting avoids Flood Zone 3 areas.
3	LCS A	• The proposed siting avoids the populated areas of Louth and Alford to the west. • The proposed siting is located to the east of Mother Wood and north east of Greenfield Wood, avoiding these features. • The proposed siting avoids the AONB to the west. • The proposed siting avoids the populated area of Skegness to the south east. • The proposed siting avoids areas completely covered by Flood Zone 3 along the Lincolnshire coast (which will also avoid coastal settlements located in Flood Zone 3 areas). • The proposed siting avoids National site network (NSN) sites (SACs and SPAs) and Ramsar sites along the Lincolnshire Coast.
3	LCS B	• The proposed siting avoids the populated areas of Louth and Alford in the west. • The proposed siting avoids the AONB to the west. • The proposed siting avoids the populated area of Skegness to the south east. • The proposed siting avoids National site network (NSN) sites (SACs and SPAs) and Ramsar sites along the Lincolnshire Coast.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined*

Section	Substation	Application of Rule 1
		Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.
7	New Walpole B	• The proposed siting seeks to locate the substation close to the existing 400 kV 4ZM overhead line to reduce the length of overhead line reconfiguration and 400 kV overhead lines into the new substation to minimise environmental impacts (by reducing the geographical extent of effects) and cost. • The proposed siting avoids identified centres of population (where possible), the Sutton Bridge Power Station and the Middle Level Main Drain.

Amenity, Cultural or Scientific Value of Sites

7.1.78 **Horlock Rule 2** states, '*the siting of new National Grid Company substations, sealing end compounds and line entries should 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.*'

7.1.79 None of the proposed substation siting locations are located within internationally and nationally designated areas of the highest amenity, cultural or scientific value.

7.1.80 **Horlock Rule 3** states, '*areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable*.'

7.1.81 Practically all the land utilised for the proposed substation locations is within active agricultural use, which tends to have overall less habitat value. National Grid has also refined the positioning of the substations in response to significant survey findings.

7.1.82 The proposed siting of the substations sought to avoid areas of local amenity value. In the context of Horlock Rule 3, Table 7.2 below sets out any substation siting specific considerations relevant to each substation.

Table 7.2 Application of Horlock Rule 3

Section	Substation	Application of Rule 3
1	New Grimsby West	• The proposed siting has avoided hedgerows and woodland at Wybers Wood.
3	LCS A	• The proposed siting is located to the east of Mother Wood (ancient woodland) and north east of Greenfield Wood, avoiding these features.
3	LCS B	• During design development, geophysical surveys carried out identified archaeological anomalies indicative of late prehistoric or Romano-British settlement at the north eastern end of the proposed position of the substation. National Grid has refined the positioning of the substation in response to the

Section	Substation	Application of Rule 3
		survey findings to ensure the substation can be constructed without disturbance of known archaeological remains. • The proposed position of pylons for new overhead line entries[3] at the boundary between Sections 3 and 4, have been developed to avoid locating the pylon within a Source Protection Zone 1.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.*
7	New Walpole B	• During design development, National Grid has refined the design to avoid direct effects the historic moated site to the east.

Local Context, Land Use and Site Planning

7.1.83 **Horlock Rule 4** states, '*the siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum*.'

7.1.84 The substation siting locations would take advantage of screening which is provided by existing tree belts, hedgerows and woodland areas. There is also adequate space to carry out supplementary planting at all substation sites and within the Refined Weston Marsh Substation Siting Zone. Supplementary planting could consist of woodland planting and use of low mounds around the peripheries of the substation locations, which are not already screened by mature vegetation. The screening offered by existing field boundaries would be strengthened with supplementary planting where this would help to reduce negative effects on landscape character.

7.1.85 In the context of Horlock Rule 4, the Table 7.3 below sets out any substation siting specific considerations relevant to each substation.

Table 7.3 Application of Horlock Rule 4

Section	Substation	Application of Rule 4
1	New Grimsby West	• The proposed siting is adjacent to the existing Grimsby West Substation which also allows the new substation to benefit from screening provided by the Wybers Wood around the existing substation and to utilise the existing entrance point off Aylesby Road. Wybers Wood screens the proposed substation from the residential areas at Great Coates. Mature

[3] An overhead line entry into a substation refers to the method by which overhead lines are connected into a substation. Overhead lines typically connect to incoming structures such as gantries or terminal pylons within the vicinity of the substation.

Section	Substation	Application of Rule 4
		hedgerows along field boundaries to the north will screen and filter views from residential properties off the B1210. The presence of existing woodland and mature trees on boundaries means new planting will integrate the new substation into the landscape.
3	LCS A	• The proposed siting is well screened by Mother Wood to the west which is also on slightly more elevated landform and helps screen the substation in longer distance views from the AONB. Mature trees along Rye Lane will filter views towards the substation. The presence of existing woodland and mature trees on boundaries means new planting will integrate the new substation into the landscape.
3	LCS B	• The proposed siting avoids the areas of higher ground between Saleby and Markby in the northern portion of the original substation siting zone where the substation would have more widespread landscape and visual impacts. Although there is little existing vegetation in the vicinity of the new substation, the flat landform in this area means that any mounding and planting introduced will be effective in screening the substation from the residential areas at Bilsby.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage*.
7	New Walpole B	• The proposed siting in the south east of the siting zone presented at Stage 1 consultation is considered to fit better with the existing landscape pattern and maximises opportunities for the proposed substation to benefit from natural screening provided by existing trees and hedgerows. The presence of existing woodland and mature trees on boundaries means new planting will integrate the new substation into the landscape.

7.1.86 **Horlock Rule 5** states, '*the proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum*.'

7.1.87 Avoidance and mitigation of environmental effects was a key driver in the selection process for the proposed substation locations and fundamental to decisions to take areas of the original proposed siting zones forward for more detailed analysis.

7.1.88 With respect to the avoidance and mitigation of environmental effects, influencing factors have been identified in response to Horlock Rules 1, 2 and 3, as set out above. In respect of the avoidance and mitigation of visual effects, influencing factors have been identified in response to Horlock Rules 4, 7, 10 and 11 above and below.

7.1.89 In respect of influencing factors to minimise noise impacts, any substation would be designed to avoid any perceptible increase in background noise levels at residential properties. This would include enclosure of the transformers and the use of low noise cooler fans at substations that include this equipment.

7.1.90 In addition, all the proposed substations have been designed as air insulated switchgear (AIS) substations rather than gas insulated switchgear (GIS) substations. In terms of the likely environmental effects, by comparison with AIS, a GIS substation would be likely to have a greater impact on views and landscape character which is not as readily screened by vegetation due to the height and scale of the building surrounding the equipment.

7.1.91 **Horlock Rule 6** states, '*the land use effects of the proposal should be considered when planning the siting of substations or extensions*.'

7.1.92 The land use of the proposed siting locations and land immediately surrounding the proposed siting locations has influenced the design and siting of the substations. In the context of Horlock Rule 6, Table 7.4 below sets out any substation siting specific considerations relevant to each substation

7.1.93 Practically all the land utilised for the proposed substation locations is within active agricultural use. National Grid recognises that there is the potential for impacts on those affected agricultural landholdings and will continue to work with all affected landowners to understand the impacts of the Project. It is recognised that a proportion of the agricultural land affected by the Project (and specifically the substation locations) will experience permanent or temporary land loss or disturbance.

7.1.94 Whilst previously developed 'brownfield' land may be preferred for redevelopment, and this has been considered as part of the design evolution, other nearby sites lacked any existing previously developed land that could be used when taking into account technical and environmental considerations, and many sites were considered too far away to meet the strategic proposal criteria.

7.1.95 Meanwhile, attempts have been made to avoid Best and Most Versatile (BMV) agricultural land as part of the design evolution. Where BMV agricultural land is to be developed, if possible, this will be directed at land of the lowest possible grade within the site area.

Table 7.4 Application of Horlock Rule 6

Section	Substation	Application of Rule 6
1	New Grimsby West	• The direction of the overhead line as it enters the substation, from the south west, has been developed to minimise interactions with the Grimsby West Solar Farm and the proposed Grimsby West Sustainable Urban Extension, and to avoid residential property and farm buildings at Pyewipe Farm.
3	LCS A	• The proposed siting avoids any direct impact on aviation activities at Strubby Airfield, and the overhead line connection from the north is routed further west in the corridor to further increase distance to the airfield.

Section	Substation	Application of Rule 6
		• The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS A once it is constructed.
3	LCS B	• The proposed siting avoids the Viking Link high voltage direct current (HVDC) underground cable, running east to west to the south of Saleby and the north of Asserby, and a Cadent intermediate pressure gas pipeline running north east to south west to the east of Asserby and the west of Bilsby. • The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS B once it is constructed. • The proposed siting avoids the Cadent high-pressure gas pipeline to the south east of the substation.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.*
7	New Walpole B	• The proposed siting avoids the National Gas high pressure gas pipeline immediately to the north. • The proposed siting and resultant overhead line entries avoid the Rose and Crown Solar Farm to the north west.

7.1.96 **Horlock Rule 7** states, '*in the design of new substations or line entries, early consideration should be given to the options available for terminal towers [pylons], equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.*'

7.1.97 In assessing the siting areas from an engineering perspective, consideration was given to:

- individual site characteristics, environmental constraints and existing infrastructure to determine the appropriate location and orientation of the substation(s);
- the most appropriate form of connection to existing networks;
- the most appropriate route of any cable connections taking account of environmental constraints; and
- the most appropriate route for a permanent access route and the need for temporary works including overhead line diversions.

7.1.98 The proposed substation compounds have been oriented as to minimise overlapping of field boundaries as far as is reasonably practicable. However, this is not possible at all substation locations.

7.1.99 The proposed substation buildings and ancillaries form an integral part of the substation design, located near to the main entrance to allow for internal separation from the live 400 kV compound within the substation.

7.1.100 In the context of Horlock Rule 7, Table 7.5 below sets out any substation siting specific considerations relevant to each substation.

Table 7.5 Application of Horlock Rule 7

Section	Substation	Application of Rule 7
1	New Grimsby West	• The proposed siting, in proximity to the existing Grimsby West substations (National Grid and Northern Powergrid) offers greatest opportunities to limit the spread of environmental effects by limiting the lengths of realignments and replacement of the existing 4KG circuits to tie the substation into the existing network (thereby also reducing the wirescape in the area). • The proposed siting of the new substation, close to the existing Northern Powergrid 132 kV substation, is also beneficial in that it reduces the extent of new 132 kV underground cable connections required. This is because the transformers which are to be installed at the new 400 kV Grimsby West Substation must connect to the Northern Powergrid 132 kV substation via 132 kV underground cables. The greatest proximity between the two sites therefore reduces the total length of cabling, and keeps the associated disruptive impacts of construction to a minimum. • To minimise the permanent modifications to the 4KG route and extent of wirescape within the area, it is proposed to realign this overhead line to connect on the northern side of the new substation. • The new overhead line is proposed to enter the substation on its southern side. Routeing into the southern side of the proposed substation is preferred because it avoids interactions between the proposed new overhead line and the realigned 4KG route.
3	LCS A	• The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS A once it is constructed.
3	LCS B	• The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS B once it is constructed.
5	The Refined Weston Marsh Substation Siting Zone	• The proposal for the Refined Weston Marsh Substation Siting Zone is to locate the substation close to the Spalding Tee-Point, to minimise the extent of required diversions to the existing overhead lines, to facilitate the turn-in of the circuits

Section	Substation	Application of Rule 7
		to the new Weston Marsh substation and thereby limiting the spread of environmental effects and wirescape impacts.
7	New Walpole B	• The proposed Walpole B Substation is located to the immediate west of the existing 4ZM route, aligned to be parallel with the existing overhead line. By locating the new substation close to the existing, and in parallel to, the overhead line infrastructure, the overall extent of new overhead line construction required to divert the existing 4ZM route to connect into the new substation is kept to a minimum (thereby also reducing the wirescape). • The cable sealing end compound and cable route is required at Walpole B Substation due to electrical requirements within the internal layout. As a result, where two of the circuits connect to the substation, they must cross one another. The preferred method to facilitate a crossing of two circuits is to terminate one of these into a cable sealing end compound (thereby also reducing the wirescape as a consequence). National Grid has also considered the careful routeing of the underground cable for this short section. Optimising underground cable design to follow the most direct route helps minimise environmental impact by reducing the amount of land disturbed during installation; a shorter, more efficient path reduces the amount of excavated land, habitat disruption and vegetation clearance and overall provides for a quicker installation.

7.1.101 **Horlock Rule 8** states, '*space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation*.'

7.1.102 The size of the proposed substations is determined by their technical requirements, which include:

- number of customers to be connected;
- capacity of customer connections;
- mode of connection to the existing transmission network (i.e. number of overhead line or underground cable connections); and
- selection of AIS or GIS technology.

7.1.103 Despite typically having a smaller overall land take than AIS substations, a GIS substation would be likely to have a greater impact on views and landscape character due to the height and scale of the building surrounding the equipment, when compared to an AIS substation. All the proposed substations are assumed to be AIS substations, which will, therefore, inherently will have less of an environmental and visual impact.

7.1.104 A greater number or capacity of customer connections, or a more complex connection to the existing transmission network, will generally result in a larger substation footprint.

7.1.105 In addition, for each of the proposed substations siting areas, space to carry out some additional woodland and hedgerow planting is proposed. Opportunities for mitigation are restricted in some areas where a permanent clear easement is required, such as under the existing overhead lines and downleads and over the underground cables swathes.

7.1.106 In addition, the size of the equipment for the Grimsby West and Walpole substations means that when it is imported from the nearest port along roads to the site, it would be categorised as an Abnormal Indivisible Load (AIL) by virtue of its size. AILs are carried on vehicles capable of transporting equipment and plant too big for standard heavy goods vehicles, hence the need to ensure suitable roads are used between the port and the site, such as the strategic road network and main roads. Consideration of future AIL movements, therefore, has also influenced siting decisions.

7.1.107 In the context of Horlock Rule 8, Table 7.6 below sets out any substation siting specific considerations relevant to each substation.

Table 7.6 Application of Horlock Rule 8

Section	Substation	Application of Rule 8
1	New Grimsby West	• The proposed new Grimsby West Substation is located adjacent to the existing Grimsby West Substation. Whilst not a substation extension by definition, the new substation is proposed to be sited immediately west of the existing substation, with the new overhead line connecting into the south of this new substation. As such, the siting of the new substation has benefited from space around the existing substation, utilising land within existing National Grid ownership, minimising environmental impacts (by reducing the geographical extent of effects) and cost (by reducing the length of connection required between the two compounds). • Two construction compounds have been located in close proximity to the proposed substation, a practical arrangement which minimises severed land between the temporary compounds and permanent infrastructure. A third construction compound is located to the north of Aylesby Road, accessed by the proposed new road and screened by existing trees. • The proposed new access road joins Aylesby Road by modification of the existing accesses to the National Grid Grimsby West and the adjacent Northern Powergrid substations, avoiding the need to construct an additional connection point to the existing road network.
3	LCS A	• The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS A once it is constructed.

Section	Substation	Application of Rule 8
		• The construction compound has been located in close proximity to the proposed substation, a practical arrangement which minimises severed land between the temporary compound and permanent infrastructure. • The substation has been sited to allow for future extension if required, without introducing additional environmental or physical constraints.
3	LCS B	• The proposed siting takes account of the need to avoid constraining connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS B once it is constructed. • The construction compound has been located in close proximity to the proposed substation, a practical arrangement which minimises severed land between the temporary compound and permanent infrastructure. • The substation has been sited to allow for future extension if required, without introducing additional environmental or physical constraints.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.*
7	New Walpole B	• Eastern Green Link 3 and Eastern Green Link 4 is proposed to connect into the New Walpole B Substation. The two project teams have worked closely together during the development of the proposals in Section 7, to ensure a coordinated 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 Eastern Green Link 3 and Eastern Green Link 4. • The construction compound has been located in close proximity to the proposed substation, a practical arrangement which minimises severed land between the temporary compound and permanent infrastructure. • The proposed access road connects to the substation at its most southern point to reduce land severance.

7.1.108 **Horlock Rule 9** states, '*the design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings*.'

7.1.109 Horlock Rule 9 relates more so to the detailed design stages of the substations which would be undertaken at a later stage.

7.1.110 However, each proposed substation will have a temporary access during construction which will be made permanent for future operation and maintenance. The access will be constructed to enable AILs where required, to transport large equipment and plant, from main roads, suitable for this type of vehicle, to the site during construction.

7.1.111 In the context of Horlock Rule 9, Table 7.7 below sets out any substation siting specific considerations relevant to each substation.

Table 7.7 Application of Horlock Rule 9

Section	Substation	Application of Rule 9
1	New Grimsby West	• One construction access point is proposed off Aylesby Road which partially makes use of the existing access point for the existing Grimsby West 400 kV Substation. • Mitigation planting is proposed to reduce the visual effects of the proposed substation from those receptors where views are not already screened by existing vegetation at Wybers Wood. It should be noted that the land surrounding the proposed substation is proposed to be developed for solar farms and a residential extension to Grimsby and planting has taken account of those proposals. National Grid is working with the developers of these schemes to discuss and progress mitigation proposals.
3	LCS A	• One standalone access for LCS A is proposed off Rye Lane in addition to the overhead line accesses. • Mitigation planting is proposed to screen and filter views from the south and east which do not benefit from the existing vegetation at Greenfield Wood and Mother Wood. Planting will integrate the substation into the landscape and will also create habitat links with the existing woodland.
3	LCS B	• One permanent access for LCS B is proposed off the A1111 Sutton Road which coincides with an access for the overhead line. During construction this will just form one construction access. • Mitigation planting is proposed to screen views from Bilsby. Low mounding will be used where possible to increase the height of this planting. Any planting and mounding will be designed to take account of underground connections into the substation.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.*
7	New Walpole B	• One construction access is proposed on West Drove North. This access is used for access to the main substation compound, cable sealing end compound, and the 4ZM pylons

Section	Substation	Application of Rule 9
		which require dismantling, restringing or construction works. This access will also become the permanent access for the substation and the cable sealing end compound. • Mitigation planting is proposed to enhance the existing vegetation around the substation site and further screen views from Walton Highway and West Drove North. Any planting will be designed to take account of underground connections into the substation.

Line Entries

7.1.112 **Horlock Rule 10** states, '*in open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance*.'

7.1.113 The landscape baseline includes both existing high voltage steel lattice pylons and overhead lines and lower voltage wood pole overhead line infrastructure. Prior to the construction of the Project, a significant amount of this existing overhead line third-party infrastructure would need to be diverted, undergrounded, or protected, with the general starting principle being that any existing overhead line asset, which interfaces with the proposed overhead line, would be undergrounded. Not only does this help facilitate the construction of the overhead line, by ensuring the proposed route alignment is free from tall physical constraints and by not increasing the statutory clearances required over these features, the resultant impact is to also reduce the magnitude of landscape and visual effects and the concentration of line and wirescapes in the landscape.

7.1.114 In the context of Horlock Rule 10, Table 7.8 below sets out any substation siting specific considerations relevant to each substation.

Table 7.8 Application of Horlock Rule 10

Section	Substation	Application of Rule 10
1	New Grimsby West	• The proposed siting, in proximity to the existing Grimsby West substations (National Grid and Northern Powergrid) offers greatest opportunities to limit the spread of environmental effects by limiting the lengths of realignments and replacement of the existing 4KG circuits to tie the substation into the existing network (thereby also reducing the wirescape in the area). • To minimise the permanent modifications to the 4KG route and extent of wirescape within the area, it is proposed to realign the overhead line to connect on the northern side of the new substation. • The new overhead line is proposed to enter the substation on its southern side. Routeing into the southern side of the proposed substation is preferred because it avoids interactions between the proposed new overhead line and the

Section	Substation	Application of Rule 10
		realigned 4KG route (thereby also reducing the wirescape in the area).
3	LCS A	• There are no existing 132 kV or 400 kV overhead lines in the vicinity of LCS A and, therefore, the only high voltage wirescape will be from the project itself, the entry lines either side of the substation. In respect to low voltage overhead lines, prior to the construction of the Project, a significant amount of this existing third-party infrastructure would need to be diverted, undergrounded, or protected, with the general starting principle being that any existing overhead line asset, which interfaces with the proposed overhead line or substation, would be undergrounded.
3	LCS B	• There are no existing 132 kV or 400 kV overhead lines in the vicinity of LCS A and, therefore, the only high voltage wirescape will be from the project itself, the entry lines either side of the substation. In respect to low voltage overhead lines, prior to the construction of the Project, a significant amount of this existing third-party infrastructure would need to be diverted, undergrounded, or protected, with the general starting principle being that any existing overhead line asset, which interfaces with a proposed overhead line or substation, would be undergrounded.
5	The Refined Weston Marsh Substation Siting Zone	*Additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage.*
7	New Walpole B	• Full line tension gantries are proposed at the new Walpole B Substation. This removes the need for an additional terminal pylon and the potential for associated impacts particularly in relation to landscape and visual. • The proposed new Walpole B Substation is located to the immediate west of the existing 4ZM route, aligned to be parallel with the existing overhead line. By locating the new substation close to the existing, and in parallel to, the overhead line infrastructure, the overall extent of new overhead line construction required to divert the existing 4ZM route to connect into the new substation is kept to a minimum (thereby also reducing the wirescape). • The cable sealing end compound and cable route is required at new Walpole B Substation due to electrical requirements within the internal layout. As a result, where two of the circuits connect to the substation, they must cross one another. The preferred method to facilitate a crossing of two circuits is to terminate one of these into a CSE compound (thereby also reducing the wirescape).

7.1.115 **Horlock Rule 11** states, '*the inter-relationship between towers [pylons] and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers [pylons] on prominent ridges should be minimised by siting towers [pylons] against a background of trees rather than open skylines*.'

7.1.116 Due to the fenland character of the landscape with its flat landform and relatively low level of vegetation along much of the Project, there is little opportunity to use backgrounds of landform or vegetation to reduce the effects of pylons. The substation locations have made best use of landform and existing vegetation, and terminal pylons will be seen in that context.

7.2 Section 1 – New Grimsby West Substation

Overview

7.2.1 Section 1 of the route is situated at Grimsby West, located at the northernmost extent of the Project. This Section principally encompasses the land and works associated with the new Grimsby West Substation and covers an area extending from east of Wells Road in an easterly direction toward Wybers Wood and south toward Pyewipe Farm.

7.2.2 Section 1 of the Project comprises the following permanent works:

- the proposed new Grimsby West 400 kV Substation located west of Wybers Wood;
- decommissioning (in full or part) of the existing Grimsby West 400 kV Substation;
- an approximately 0.5 km long section of new 400 kV overhead line from the proposed new Grimsby West Substation, continuing south to the route section break for Section 2 (New Grimsby West Substation to New Lincolnshire Connection Substation A);
- modifications to approximately 2 km of the existing 400 kV overhead line (known as the 4KG route) between Wells Road and the existing Grimsby West Substation, to connect it to the proposed new Grimsby West Substation; and
- replacement of existing 132 kV underground cables between the 400 kV substation and the adjacent existing 132 kV substation

7.2.3 This section of the report describes the proposed siting of the proposed new Grimsby West Substation and the proposed alignments of the new 400 kV overhead line (continuing south into Section 2 of the Project) and the modified existing 400 kV overhead line to connect into the new Grimsby West substation. The routeing and siting proposals outlined in this section are not sensitive to whether the existing Grimsby West Substation is decommissioned in full or in part.

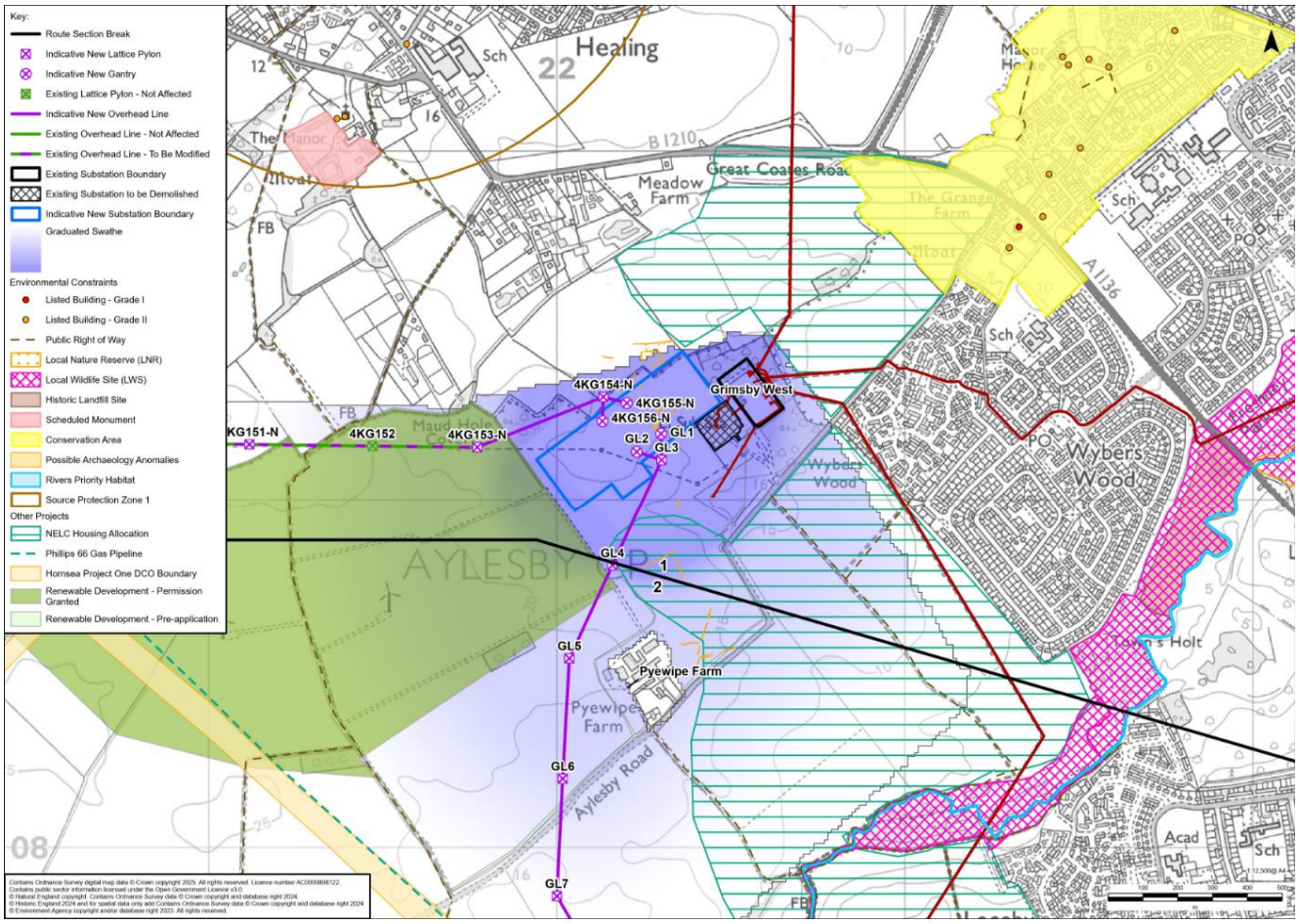
Proposed Alignment and Substation Siting

7.2.4 The proposed new Grimsby West Substation in Section 1 is surrounded by a number of environmental features and residential communities, along with existing

infrastructure and planned developments which present key opportunities and constraints on the siting of the new substation.

7.2.5 These features are discussed below and illustrated in further detail in Image 7.1.

Image 7.1 Proposed siting of the new Grimsby West Substation



7.2.6 The proposed new Grimsby West Substation is located adjacent to the existing Grimsby West Substation, north of Pyewipe Farm and west of Wybers Wood. The new substation is proposed to be sited immediately west of the existing substation, with the new overhead line connecting into the south of this new substation.

7.2.7 The siting area for this new substation is surrounded by several residential communities and receptors which act to constrain the location of the new Project infrastructure. These include Great Coates and Grimsby to the east, Healing to the north, Aylesby and Laceby to the south west, and Pyewipe Farm located directly south. In siting the new Grimsby West Substation, National Grid has sought to maximise the separation from these communities as far as practicable, balanced with other technical and environmental factors as described below, to reduce as far as possible the potential amenity impacts to these receptors (in accordance with Horlock Rule 1).

7.2.8 The proposed siting of the substation uses land already within National Grid ownership and adjacent to the existing Grimsby West Substation. By locating the new substation close to the existing infrastructure, the overall extent of new overhead line construction required to divert the existing 4KG route to the new substation is kept to a minimum (in accordance with Horlock Rule 7).

7.2.9 As the new Grimsby West 400 kV substation is also providing connections via multiple transformers and 132 kV underground cables to the existing Northern Powergrid 132 kV substation, which itself is adjacent to the existing 400 kV substation, siting of the new 400 kV substation close to the existing 132 kV substation is also beneficial to reduce the extent of new 132 kV underground cable connections required.

7.2.10 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 and to utilise the existing entrance point off Aylesby Road for the access road into the new substation (in accordance with Horlock Rule 4). Works are proposed at the entrance to form the junction between the existing and new accesses (in accordance with Horlock Rule 9).

7.2.11 To the north, east and south of the existing substation and proposed new substation is the proposed Grimsby West Sustainable Urban Extension, which would include new dwellings, a new road through the site, a new primary school with potential expansion to include a new secondary school, two local centres and a new country park.

7.2.12 To the immediate west of the proposed new Grimsby West Substation is the consented Grimsby Solar Farm, which will be constructed around two existing wind turbines.

7.2.13 The proposed substation therefore sits alongside the existing substation within a pocket of land surrounded by the proposed solar and residential developments, which constrain both the siting of the substation and the routeing of overhead lines.

7.2.14 The existing 4KG overhead line currently routes slightly within the development boundary of the proposed Grimsby Solar Farm but does not interact with any of the proposed solar panel arrays, which will be situated to the immediate south of the existing overhead line. The 4KG route connects to the existing substation on its southern side, on an alignment that crosses the proposed siting of the new substation. To minimise the permanent modifications to the 4KG route and extent of wirescape within the area, it is proposed to realign the existing overhead line to connect on the northern side of the new substation (in accordance with Holford Rule 6 and Horlock Rule 7).

7.2.15 During construction it is proposed to divert the 4KG route to a temporary alignment around the footprint of the proposed new substation, which involves the 4KG being temporarily routed within the boundary of the solar farm development. This temporary alignment is preferred, despite the interaction with the solar farm, because it minimises the length of the temporary diversion that can be achieved given the positioning of the existing and proposed infrastructure and other surrounding constraints (in accordance with Horlock Rules 1 and 7). To avoid routeing the temporary diversion of the 4KG route within the proposed solar farm would require an extensive diversion around the outside of the solar farm development boundary, with much more extensive draft order limits as a result (in accordance with Horlock Rules 4 and 6). A temporary alignment of the 4KG route around the southern side of the solar farm boundary would either need to navigate the same pinch point between Pyewipe Farm and the solar farm development boundary as the proposed new overhead line (as described below), resulting in additional complexities in the construction programme from the two overhead lines taking the same route, or route further east through the proposed Grimsby West Sustainable Urban Extension. To avoid routeing the temporary diversion of the 4KG route either across or around the

solar farm development entirely, it would need to be routed to the north and east of the proposed and existing Grimsby West substations, where routeing is heavily constrained by existing residential properties at Healing and Wybers Wood, by areas of woodland, and by Northern Powergrid 132 kV overhead lines connecting to the existing 132 kV substation.

7.2.16 The new overhead line is proposed to enter the substation on its southern side. Routeing into the southern side of the proposed substation is preferred because it:

- avoids interactions between the proposed new overhead line and the realigned 4KG route, avoiding any need for underground cabling to facilitate crossings of the two routes; and
- avoids any significant length of permanent overhead line routeing 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 (in accordance with Horlock Rule 6).

7.2.17 The direction of the overhead line as it enters the substation, from the south west, has been developed to minimise interactions with the Grimsby Solar Farm and the proposed Grimsby West Sustainable Urban Extension, and to avoid residential property and farm buildings at Pyewipe Farm (in accordance with Horlock Rules 4 and 6). Due to the proximity of the proposed solar and housing developments to each other, there is insufficient space to develop an overhead line route within the corridor presented at Stage 1 consultation that does not interact with either development to some extent.

7.2.18 The position of pylon GL4 sits close to both developments and its working area (see Section 8.5) extends across the proposed boundary of the Grimsby West Sustainable Urban Extension. The span between GL3 and GL4 oversails the edge of the proposed Grimsby West Sustainable Urban Extension and the span between GL4 and GL5 oversails the corner of the proposed Grimsby Solar Farm.

Pylon Choice

7.2.19 Section 1 of the Project primarily comprises the proposed new Grimsby West Substation and only a very short section of the new overhead line from the new Grimsby West Substation to the new Lincolnshire Connection Substation A, extending to pylon GL4. The assessment of pylon choice in Section 2 is therefore assumed to also cover this short stretch of the overhead line in Section 1, as any pylon choice selected for the northernmost portion of the overhead line in Section 2 would also apply in Section 1. Therefore, pylon choice was not considered for Section 1 in isolation.

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

Overview

7.3.1 Section 2 of the route extends from Grimsby West, at the northernmost extent of the Project, to Lincolnshire Connection Substation A, located to the north east of Mother Wood and Greenfield Wood and to the west of Saleby, and comprises approximately 39 km of new 400 kV overhead line routeing in a primarily south easterly direction.

7.3.2 From the new Grimsby West Substation, the proposed overhead line crosses the A46 Grimsby Road then routes south east between the villages of Barnoldby le Beck and Waltham and to the north of Brigsley. It continues across the A16 Louth Road to route east of North Thoresby, west of Covenham Reservoir and west of the villages of Covenham Saint Bartholomew, Covenham Saint Mary, Yarburgh and Alvingham. After crossing the Louth Canal the proposed overhead line routes east of Louth and passes between Legbourne and Manby, continuing south east to route between Tothill and Withern and around the north and east of Mother Wood to connect to the proposed Lincolnshire Connection Substation A.

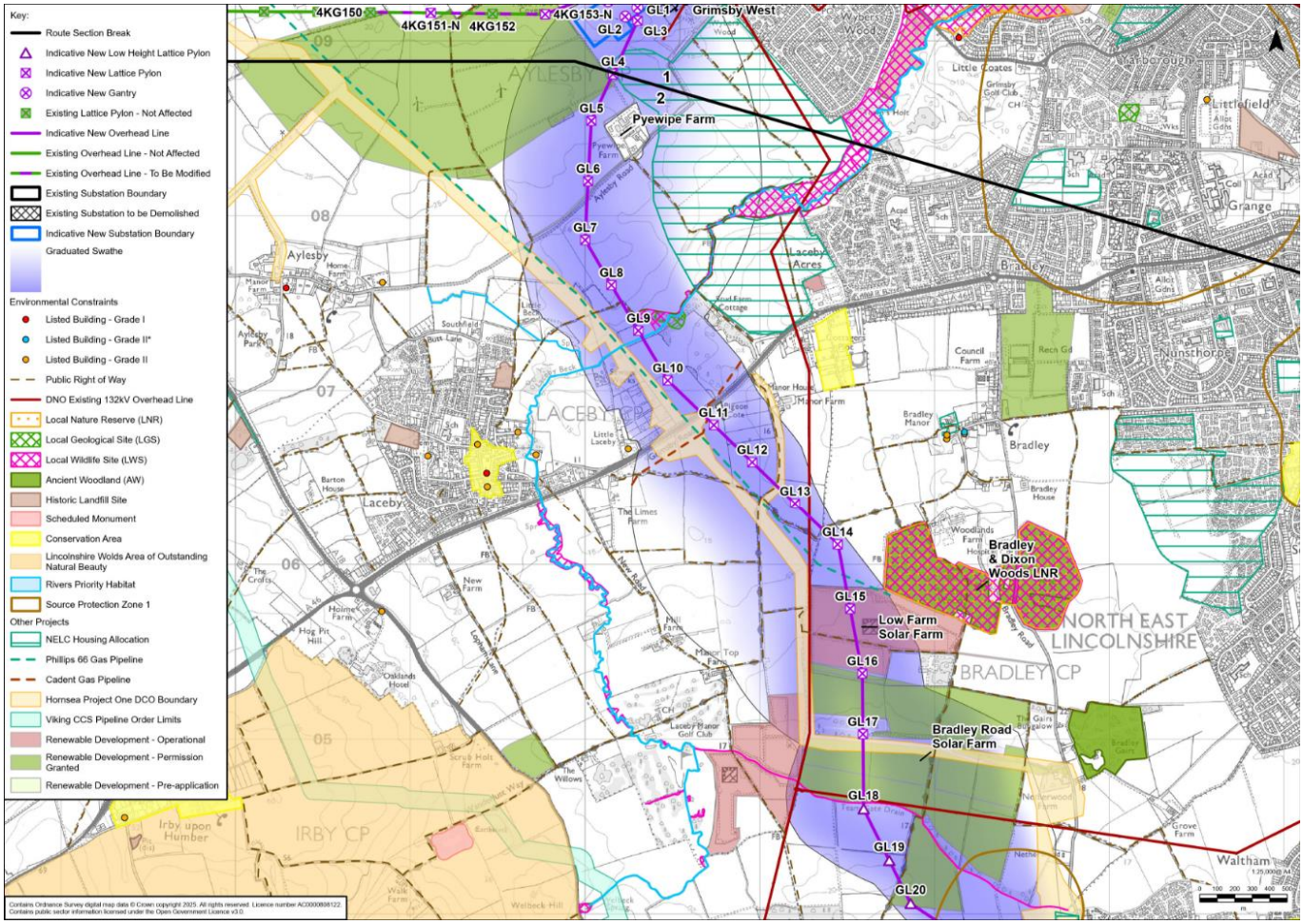
7.3.3 This section of the report describes the development of the proposed alignment and the consideration of alternative pylon types within Section 2.

Proposed Alignment

7.3.4 The proposed overhead line alignment in Section 2 has considered a range of constraints, including environmental features, residential communities, existing infrastructure and planned developments. These features are discussed below and illustrated in further detail in Image 7.2 to Image 7.8 below.

New Grimsby West Substation to Barnoldby le Beck

Image 7.2 Proposed overhead line alignment between the new Grimsby West substation and Barnoldby le Beck



7.3.5 As outlined for Section 1 (see Section 7.2 of this report), the proposed alignment from the new Grimsby West Substation initially routes south west, to minimise interactions with the proposed Grimsby Solar Farm and the proposed Grimsby West Sustainable Urban Extension as far as practicable (in accordance with Holford Rule 7 and Supplementary Note 1). Due to the proximity of the proposed solar and housing developments to each other, there is insufficient space to develop an overhead line route within the corridor presented at Stage 1 consultation that does not interact with either development to some extent. Pylon GL4 has been proposed with a working area (see Section 8.5) that crosses the boundary of the Grimsby West Sustainable Urban Extension, and both the proposed housing and solar developments are oversailed by one span of the proposed alignment (GL3 to GL4 and GL4 to GL5 respectively).

7.3.6 As it crosses from Section 1 into Section 2, the proposed alignment initially continues south west and then turns south, routeing to avoid the residential property and farm buildings at Pyewipe Farm (in accordance with Holford Rule Supplementary Note 1).

7.3.7 To the south of Aylesby Road, the alignment is constrained to the west by the Hornsea Project One and Two underground cables and the Conoco Phillips Oil and Gas Pipelines, with these two assets running alongside one another. The proposed alignment turns south east to run approximately parallel to this buried infrastructure along its eastern side, utilising a narrow corridor between the underground cables and pipelines to the west and the Grimsby West Sustainable Urban Extension to the east. These constraints lead to the siting of GL9 in close proximity to Laceby Beck Local Wildlife Site, but the pylon itself sits outside the Local Wildlife Site boundary (in accordance with Holford Rule 2). With the alignment proposed, the overhead line routes approximately midway between residential receptors at Laceby to the west and Laceby Acres to the east (in accordance with Holford Rule Supplementary Note 1).

7.3.8 South of the A46 Grimsby Road, the proposed alignment crosses an existing Northern Powergrid 132 kV overhead line, between GL13 and GL14. At the point where it is crossed by the new overhead line, the 132 kV overhead line will likely be diverted underground in line with the approach described in Section 8.6 of this report (in accordance with Holford Rule 6). Beyond GL14, the existing 132 kV overhead line runs parallel to the proposed alignment as far as GL18 (in accordance with Holford Rule 6), where, approximately 420m to the west of GL18, it meets a second 132 kV overhead line routeing to the east at a junction known as a tee-point.

7.3.9 Continuing south from GL14, the proposed alignment crosses the existing Low Farm Solar Farm and the recently consented Bradley Road Solar Farm. While National Grid seeks to avoid impacts on such developments where possible, routeing through solar developments cannot be avoided in this area due to their extents across the preferred corridor and other constraints in the vicinity as described in this section. National Grid 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.

7.3.10 GL14 is proposed as an angle pylon at which the proposed alignment turns to route in a more southerly direction. This keeps the alignment at a consistent offset from the Hornsea Project One and Two cables, which also turn to route south, and ensures it avoids Bradley and Dixon Local Nature Reserve, an ancient woodland site, to the east. Close to GL14 and GL15 the Hornsea Project One and Two cables and Conoco

Phillips Oil and Gas Pipelines diverge, and the proposed alignment crosses the route of the oil and gas pipelines approximately equidistant between the two pylons. The position of GL14 has been developed to be as far south east within the corridor presented at Stage 1 consultation as possible while avoiding construction of the pylon foundations in close proximity to the Conoco Phillips Oil and Gas Pipelines, approximately 140m from the pylon centre at its closest point. This avoids any overlap between the pylon stringing position (see Section 8.5) and the area of ancient woodland.

7.3.11 As a consequence of routeing the overhead line towards the eastern side of the corridor presented at Stage 1 consultation, to minimise interactions with existing buried and overhead line infrastructure including the Hornsea Project One and Two underground cables and the Northern Powergrid 132 kV overhead line, and of positioning GL14 to avoid interactions with the Conoco Phillips Oil and Gas Pipelines and the ancient woodland (in accordance with Holford Rule 2), the proposed alignment routes across the Low Farm Solar Farm to the south of GL14, with GL15 and GL16 proposed to be sited within the existing solar arrays. The spans between GL14 and GL15 and GL15 and GL16 are close to the maximum spans that are technically preferable, due to structural loadings on the pylons, which precludes extending these spans further to move GL16 beyond the southern boundary of the existing solar farm.

7.3.12 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, and as outlined in Section 5.3 of this report, the routeing of the 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. This more central routeing is preferred because:

- it avoids the siting of pylons within planned solar arrays associated with the Bradley Road Solar Farm development, allowing the proposed solar panels to be oversailed by conductors rather than removed for pylon foundations;
- it avoids the siting of pylons within skylark mitigation areas proposed as part of the Bradley Road Solar Farm development; and
- it facilitates the proposed alignment to the south of the proposed solar farm being routed further from residential receptors on Waltham Road than the alternative route to the eastern side of the graduated swathe (in accordance with Holford Rule Supplementary Note 1).

7.3.13 Close to GL17 the Hornsea Project One and Two cables turn to route east, facilitating a perpendicular crossing by the proposed alignment between GL17 and GL18, beyond which the Hornsea cables continue routeing to the south along the eastern side of the proposed alignment, between the alignment and the village of Waltham. Also between GL17 and GL18, the proposed alignment crosses an existing Northern Powergrid 132 kV overhead line, which will be diverted underground (in accordance with Holford Rule 6).

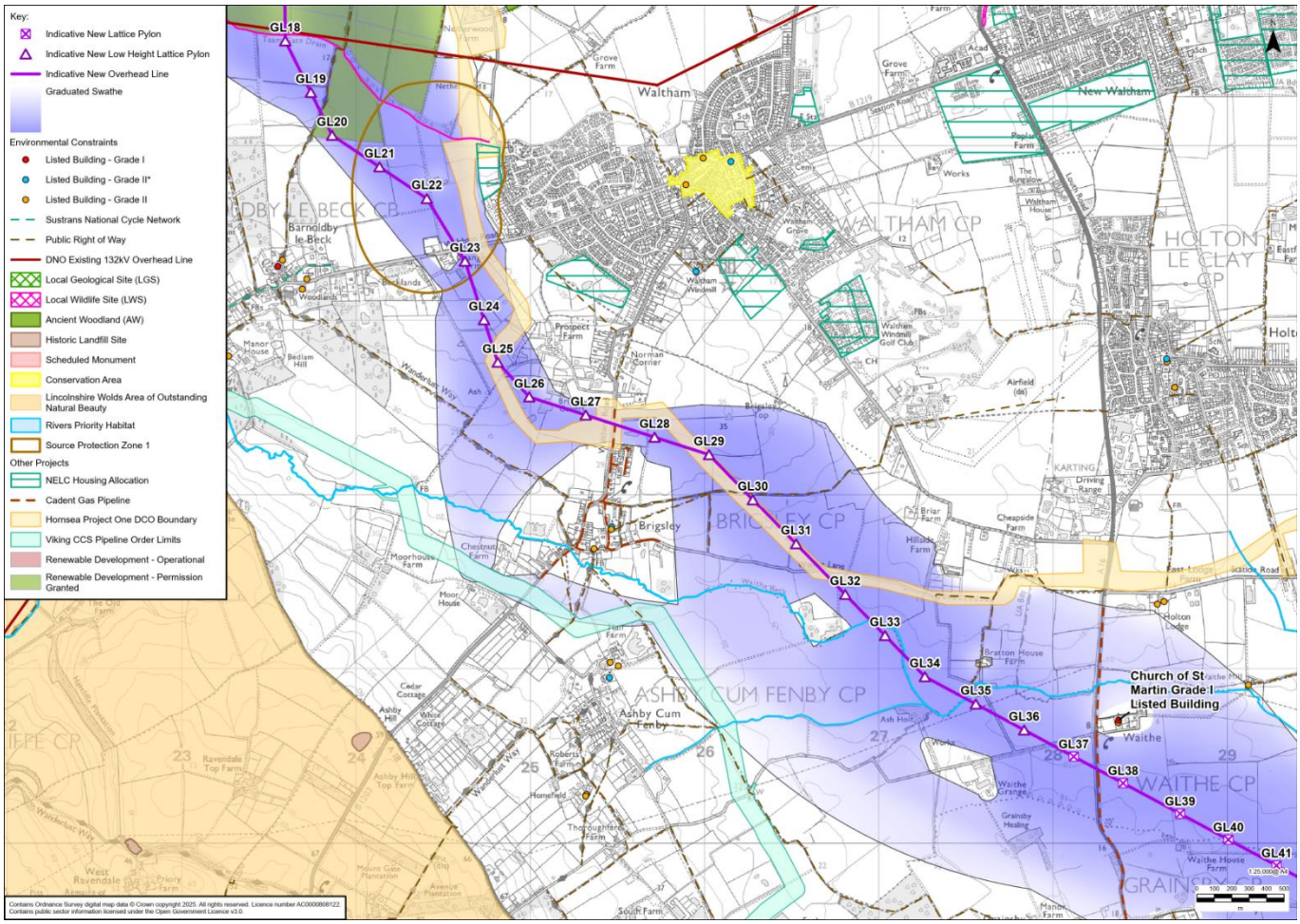
7.3.14 In order to site pylons to avoid planned solar arrays for the Bradley Road Solar Farm, the Hornsea Project One and Two cables and the Northern Powergrid 132 kV tee-point, while also avoiding the introduction of significant heavy angles (in accordance

with Holford Rule 3) to the proposed alignment, GL17 has been positioned within an area of deciduous woodland priority habitat (in conflict with Holford Rule 2).

7.3.15 As described above, there are several constraints in this area to the routeing of the new overhead line between GL13 and GL18. Alternative routeing which would avoid some of these constraints was considered by National Grid either along the alignment of the 132 kV overhead line on the approach up to the tee-point, or immediately to the west of and in parallel with the 132 kV overhead line with a crossing of the 132 kV line further south than the current proposed location. The latter option was ultimately discounted as it would introduce a significant length of parallelling with the Hornsea Project One and Two cables, increasing the risk of AC interference, and would require a more significant length of the 132 kV overhead line to be undergrounded either very close to, or at the tee-point, adding design complexity. This would also likely introduce a much more significant impact to the existing Laceby Solar Farm as well as increased proximity to Laceby Manor, particularly if the Low Farm and Bradley Road Solar Farms and the deciduous woodland priority habitat were to be avoided entirely. The option of utilising the 132 kV overhead line corridor itself up to the tee-point was also discounted as it would require a significant length of 132 kV overhead lines in this area to either be undergrounded and diverted, with the tee-point rebuilt elsewhere (tee-points themselves cannot be undergrounded), or for the tee-point to be removed entirely and to be reconnected at a new Grid Supply Point (GSP) substation in the area. The latter option of installing a new GSP substation in the area could have the potential benefit of allowing the 132 kV overhead line between the existing Grimsby West 132 kV substation and the tee-point to be removed if no longer required with a parallel path at 400 kV, although this would be subject to technical studies and agreement with Northern Powergrid. However, on review, both of these options to make use of the 132 kV corridor were considered to add a significant level of cost and technical complexity to the project which was not justifiable or preferred to options which routed further to the east. As a result, these alternatives were not progressed and the current proposals which avoid direct interaction with the 132 kV tee-point by crossing the existing 132 kV overhead line to the north of the tee-point and routeing to the east of it were taken forward as the preferred option. The presence of the tee-point, in combination with the existing Laceby Solar Farm and the Hornsea Project One and Two underground cables which lie adjacent to it, therefore have restricted the proposed alignment from routeing any further to the west.

Barnoldby le Beck to Grainsby

Image 7.3 Proposed overhead line alignment between Barnoldby le Beck and Grainsby



7.3.16 At GL18 the proposed alignment turns from routeing southwards to routeing in a more south easterly direction again, which facilitates the overhead line routeing at similar distances from the villages of Barnoldby le Beck, to the west, and Waltham, to the east. The proposed alignment routes in a more southerly direction between GL22 and GL26 and in a more easterly direction between GL26 and GL29 as it avoids residential properties on the outskirts of Waltham (in accordance with Holford Rule Supplementary Note 1), before reverting to a more south easterly direction from GL29.

7.3.17 The proposed alignment between GL26 and GL29 routes to the north of Brigsley, taking a gap between residential properties on the outskirts of Waltham to the north and Brigsley to the south. At the Stage 1 consultation the graduated swathe presented two alternative routes around Brigsley, to the north and to the south, with the darkest shading of the graduated swathe indicating most likely routeing to the north of Brigsley.

7.3.18 Consultation feedback was received indicating preferences for both routes and, in response to this feedback, the Project team reviewed the two options, with the northern alignment chosen as the preferred option because:

- The northern route offers greater flexibility for the development of an overhead line alignment. The path to the south of Brigsley would require the overhead line

to route through narrower gaps between properties than the path to the north and is also constrained by the presence of the Viking Carbon Capture and Storage (CCS) Pipeline. Although the route to the north of Brigsley interacts with the Hornsea Project One and Two cables, the wider corridor presents greater opportunity to design around the existing infrastructure. The route south of Brisgley, due to the constraints mentioned, would likely require a greater number of angle structures and, as a result, a slightly longer route (in accordance with Holford Rule 2).

- The northern route places the overhead line a greater distance from the Lincolnshire Wolds National Landscape (AONB) (in accordance with Holford Rule 1).
- The northern route places the overhead line a greater distance from listed buildings within Brigsley (including the Grade II* listed Church of St Peter) and Grade II listed buildings Ashby cum Fenby (in accordance with Holford Rule 2).

7.3.19 Paragraphs 7.3.50 to 7.3.65 of this section of this report describe and explain National Grid's proposed pylon choices for Section 2 of the route, including National Grid's proposal to adopt low height lattice pylons between GL18 and GL36. Compared with traditional standard lattice pylons, electrical clearances limit the span lengths of standard low height lattice pylons and the conductor arrangement limits the maximum change in angle of the overhead line that can be accommodated. Both standard lattice pylons and low height lattice pylons can be deployed with vertical extensions to help ensure electrical clearances are achieved. In order to maintain similar span lengths between pylons and avoid the introduction of a number of additional pylons to this section, at least one extension has been applied. The decision to use low-height pylons between GL18 and GL36 (in accordance with Holford Rules 1 and 2) has influenced the development of the proposed alignment, which must account for the resulting restrictions on span lengths and allowable angle changes.

7.3.20 Between GL22 and GL32 the proposed alignment again routes in proximity to the Hornsea Project One and Two Cables, and in routeing to avoid other constraints including the communities of Barnoldby le Beck, Waltham and Brigsley and scattered residential properties, the proposed alignment crosses the underground cables at multiple locations. Through this section the placement of pylons is informed by the crossings of the underground cables, in an effort to maintain an adequate stand-off distance, and the combination of the low-height section and the Hornsea Project One and Two Cables means more frequent angles and shorter spans are required from GL23 to GL29.

7.3.21 Beyond GL29, the proposed alignment runs south east and maintains a straight alignment between GL29 and GL34, and between GL34 and GL45, routeing at similar distances from the villages of Ashby cum Fenby and Holton le Clay and avoiding properties at Waithe and Grainsby and other scattered properties in the area (in accordance with Holford Rule Supplementary Note 1).

7.3.22 The proposed alignment places a single pylon, GL33, to the west of the Waithe Beck, a Chalk Stream Priority Habitat, necessitating two overhead line crossings of the chalk stream (in conflict with Holford Rule 2). As described above, GL33 forms part of the long straight section of overhead line extending from GL29 to GL34, which is followed by a further straight line from GL34 to GL45 (in accordance with Holford Rule 3). GL33 is, in the first instance, positioned to the west of Waithe Beck so as not to introduce unnecessary angles (in accordance with Holford Rule 2). New angles

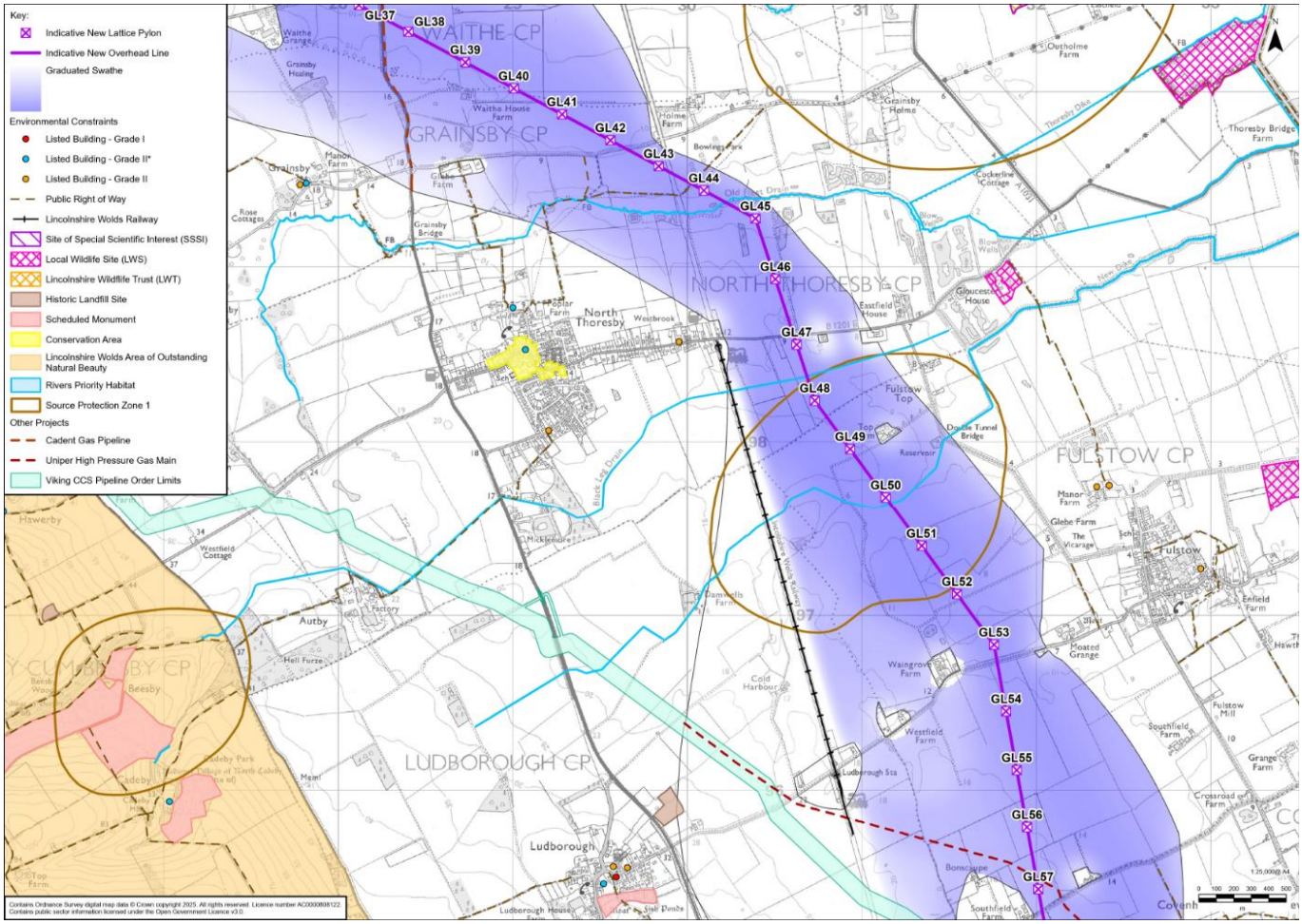
would likely be required to facilitate a move of GL33 to the east of Waithe Beck and, as the section to GL36 consists of low height pylons, any new angles would be limited to 30 degrees which would restrict the possible options for pylon placement. Additionally, the position of the angle pylon at GL34 was selected as a viable position for pylon stringing (see Section 8.5). Relocating GL33 to avoid overhead line crossings of the Waithe Beck would result in more angle pylons (in conflict with Holford Rule 2) and technical challenges in identifying viable positions for pylon stringing.

7.3.23 The straight alignment between GL34 and GL45 routes between Waithe Grange and the Grade I listed Church of St Martin at Waithe. National Grid considered routeing further north in the graduated swathe, to the north of the church, but this was not preferred because:

- it 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;
- it would route the overhead line through a pattern of small fields and equestrian paddocks, where the siting of pylons would have a greater impact in terms of limiting land use compared with larger fields (in accordance with Holford Rule 2); and
- it would increase the proximity to properties at Cheapside and Station Road (in accordance with Holford Rule Supplementary Note 1).

Grainsby to Covenham St Bartholomew

Image 7.4 Proposed overhead line alignment between Grainsby and Covenham St Bartholomew



7.3.24 The proposed alignment remains straight from the angle pylon at GL34 as far as GL45, to the north east of North Thoresby, taking the shortest, straightest route through this area (in accordance with Holford Rule 3). This routeing places the proposed alignment at similar distances from the communities of Tetney, to the north east of the route, and North Thoresby, to the south west (in accordance with Holford Rule Supplementary Note 1).

7.3.25 At GL45 the proposed alignment turns to route in a more southerly direction, before turning back towards the south east at GL48. The proposed alignment has been developed with a general preference to route towards the eastern side of the corridor presented at Stage 1 consultation, to maximise the distance from the Lincolnshire Wolds National Landscape (AONB) to the west (in accordance with Holford Rule 1), but also to provide the shortest, straightest routeing (in accordance with Holford Rule 3) while avoiding routeing immediately adjacent to the resdential receptors and the villages of Fulstow and Covenham St Bartholomew to the east (in accordance with Holford Rule Supplementary Note 1).

7.3.26 The positioning of the angle pylon at GL45 has been proposed to avoid routeing the overhead line through blocks of woodland on either side of the proposed alignment (in accordance with Holford Rule 2), and to use the existing woodland as screening to

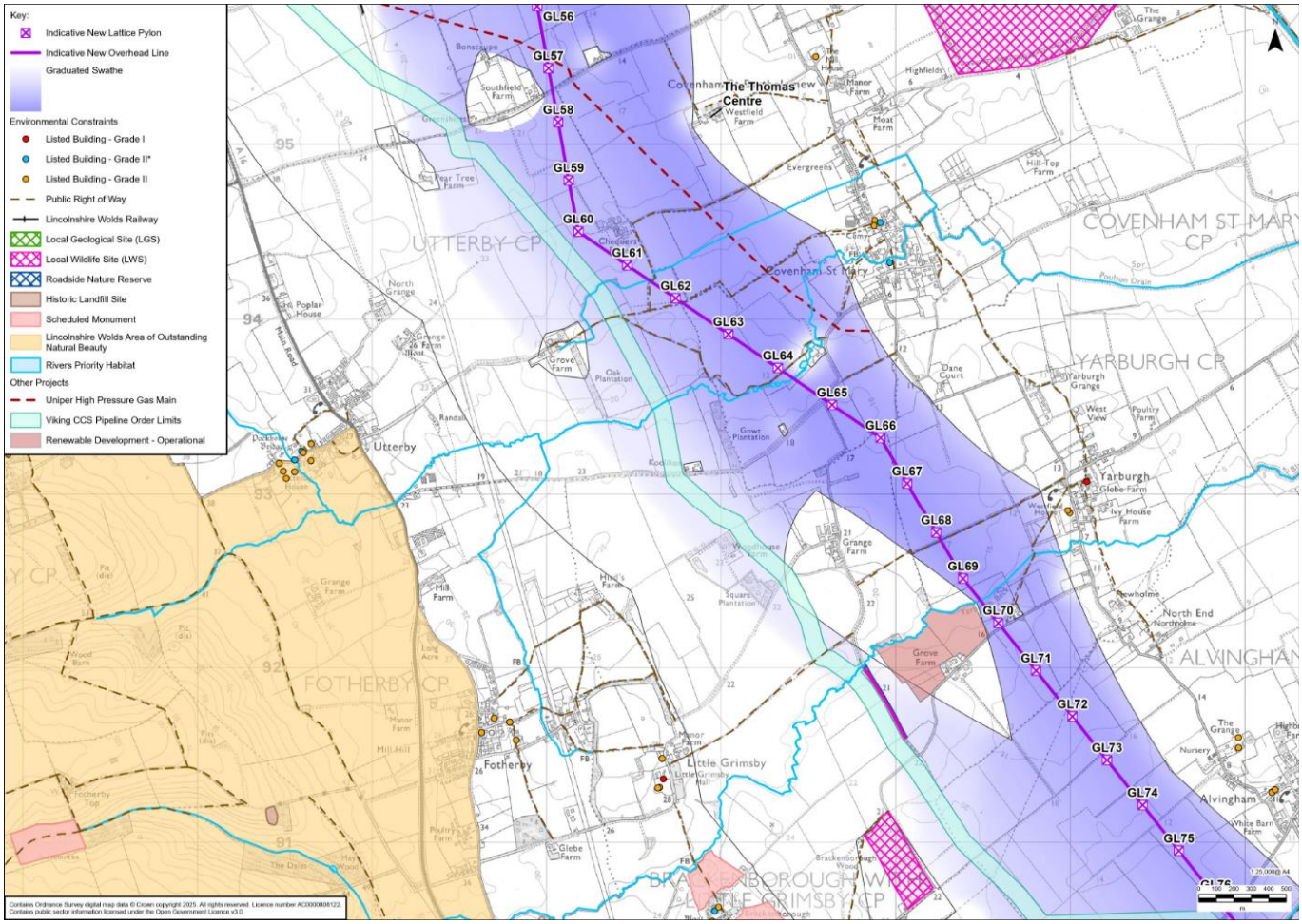
help obstruct sightlines to the angle pylon from North Thoresby (in accordance with Holford Rules 4 and 5).

7.3.27 The relative positioning of angle pylons GL45 and GL48 facilitates the overhead line crossing the B1201 Fen Lane approximately midway between residential properties (in accordance with Holford Rule Supplementary Note 1) while avoiding routeing the proposed alignment through the pattern of small fields to the west of GL47 and GL48 where pylon siting would have a greater impact in terms of limiting land use compared with larger fields (in accordance with Holford Rule 2).

7.3.28 In the absence of other constraints, the proposed alignment would likely have continued on the same straight alignment heading south east beyond GL53 (in accordance with Holford Rule 3). However, at GL53 the overhead line turns to route towards the south, taking a deviation that was adopted in response to feedback at the Stage 1 consultation regarding the potential impacts on users of the Thomas Centre, a family-run holiday park at Covenham St Bartholomew catering for individuals affected by autism, epilepsy and other special needs, and their families. National Grid had due regard to the requirements of the public sector quality duty under the Equality Act 2010 when considering this feedback. Paragraphs 5.3.12 to 5.3.15 of this Design Development Report describe in detail how the corridor and graduated swathe presented at Stage 1 consultation were amended in response to Stage 1 consultation feedback regarding the Thomas Centre, to route the proposed overhead line further west compared with the most likely routeing indicated by the shading of the graduated swathe.

Covenham St Bartholomew to Alvingham

Image 7.5 Proposed overhead line alignment between Covenham St Bartholomew to Alvingham



7.3.29 The routeing of the proposed alignment towards the south between GL53 and GL60, and then to the south east between GL60 and GL66, results in the overhead line routeing further west as it passes the Thomas Centre compared with the most likely routeing indicated by the darkest shading of the graduated swathe at Stage 1 consultation.

7.3.30 As described in Paragraph 5.3.15 of this report, the alignment between GL53 and GL60 has been developed to increase the distance between the proposed overhead line and the Thomas Centre, compared with the darkest shading of the graduated swathe, to reduce the potential amenity impacts to users during construction in relation to noise and vibration, air quality and visual impact, while also:

- avoiding additional crossings of the Viking CCS Pipeline, which would add technical complexity to the Project; and
- maintaining distance between the proposed overhead line and the Lincolnshire Wolds National Landscape (AONB) (in accordance with Holford Rule 1). Routeing considered that the desired amenity benefits to the Thomas Centre can be achieved while having no greater effects on the AONB.

7.3.31 In amending the proposed routeing of the overhead line compared with the darkest shading of the graduated swathe, the proposed alignment routes across Pear Tree

Lane through the gap between cut-outs from the corridor presented at Stage 1 consultation at Southfield Farm and Beckwood House. The proposed alignment has been developed to ensure these residential receptors remain outside of the Limits of Deviation (described further in Section 8.9 of this Design Development Report) of the overhead line.

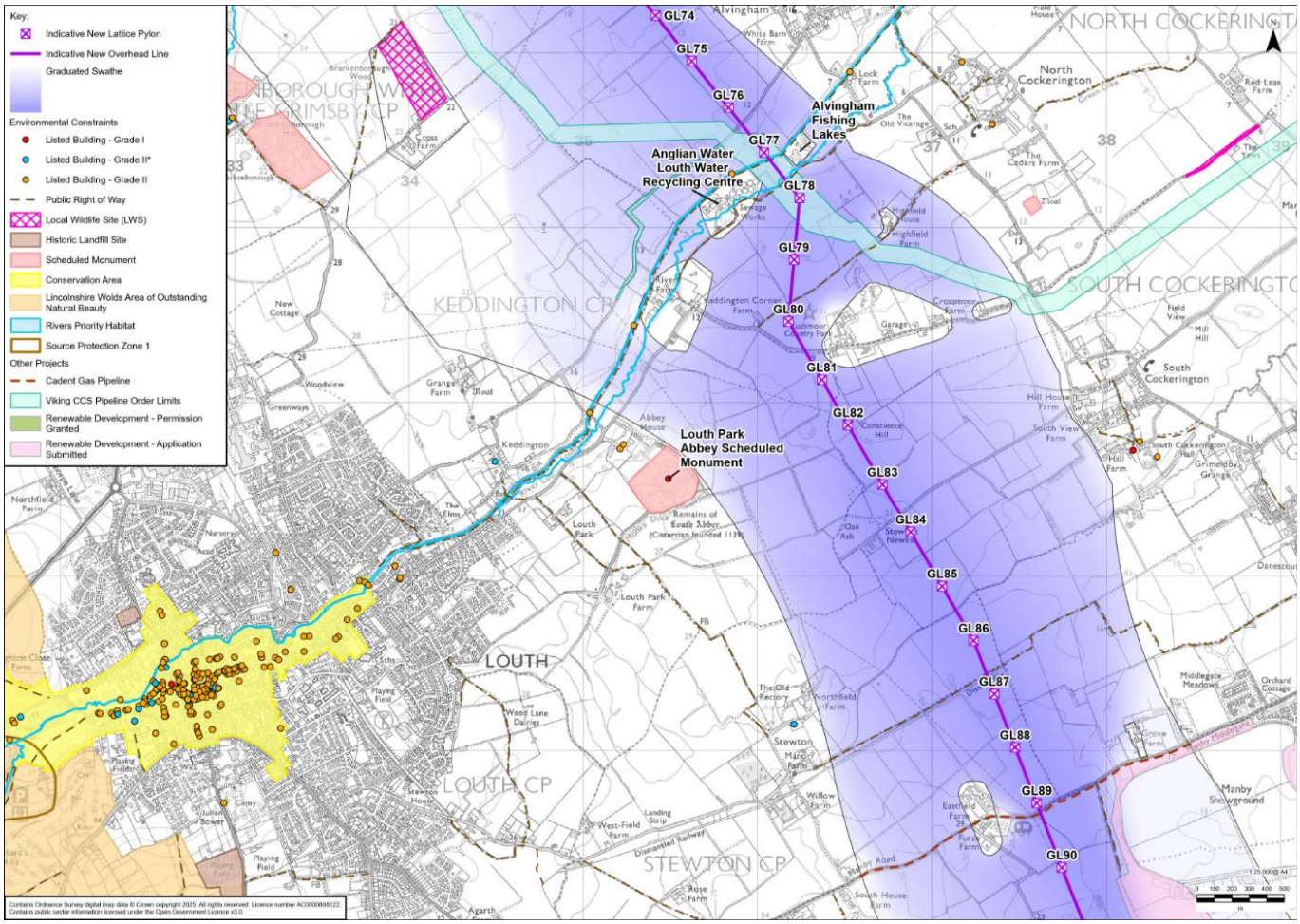
7.3.32 The proposed alignment through this section also minimises interactions with the Viking CCS Pipeline, which routes close to GL60 but is not crossed by the overhead line, and the Uniper high pressure gas main, which routes across the corridor presented at Stage 1 consultation from north west to south east between Ludborough and Covenham St Mary. The proposed alignment crosses the gas pipeline between GL56 and GL57, but multiple crossings and close parallel routeing are avoided.

7.3.33 Beyond GL66 the proposed alignment takes a near straight route from south of Covenham St Mary to Alvingham. The proposed alignment through this area has been developed to maintain the shortest, straightest routeing (in accordance with Holford Rule 3) with a preference towards the eastern side of the corridor presented at Stage 1 consultation to maximise the distance from the Lincolnshire Wolds National Landscape (AONB) to the west (in accordance with Holford Rule 1), while also avoiding routeing immediately adjacent to residential properties in the settlements of Covenham St Mary, Yarburgh and Alvingham to the east (in accordance with Holford Rule Supplementary Note 1).

7.3.34 The proposed alignment takes a slight deviation from a straight line to avoid a residential property on Westfield Road to the south west of Yarburgh (in accordance with Holford Rule Supplementary Note 1), where the overhead line routes to the immediate east of the existing solar farm at Yarburgh Grove Farm. This results in the Limits of Deviation for the overhead line (described further in Section 8.9 of this Design Development Report) between GL69 and GL70 intersecting the edge of the cut-out from the corridor presented at Stage 1 consultation for Grange Farm and Grove Farm, which places a small area of the Limits of Deviation outside of the consulted corridor. This placement of GL69 is preferred because it maximises the distance the overhead line can achieve from the village of Yarburgh while maintaining as straight an alignment as possible and minimising the number of angle pylons (in accordance with Holford Rules 2 and 3).

Alvingham to Manby

Image 7.6 Proposed overhead line alignment between Alvingham to Manby



7.3.35 The proposed overhead line maintains a straight alignment as it passes Alvingham and as far as GL78, to the south east of Louth Canal, maintaining a preference to route to the east of the corridor presented at Stage 1 consultation, to maximise the distance from the Lincolnshire Wolds National Landscape (AONB) to the west (in accordance with Holford Rule 1), while also avoiding routeing immediately adjacent to residential properties in the settlements of Alvingham and North Cockerington to the east (in accordance with Holford Rule Supplementary Note 1).

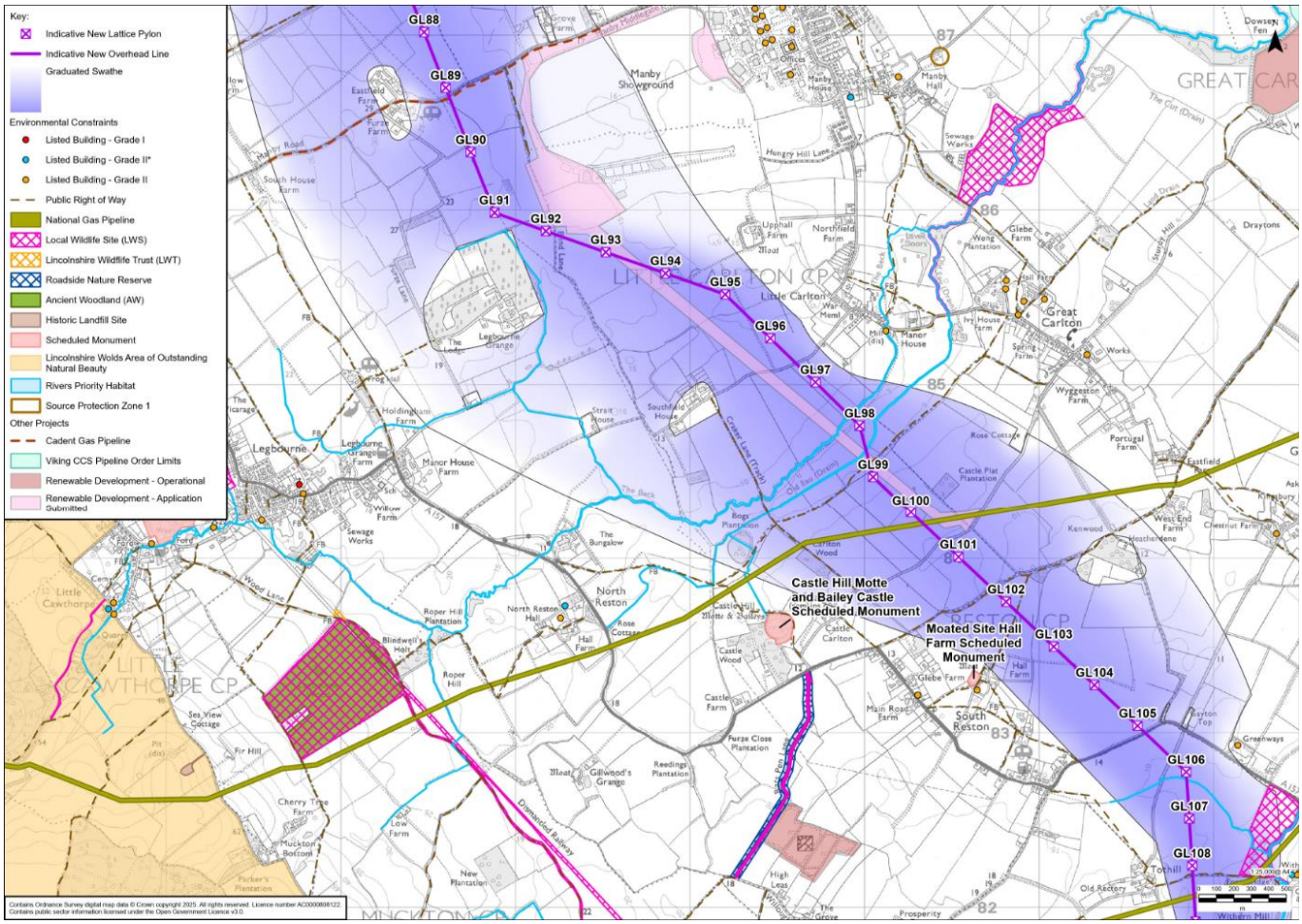
7.3.36 Routeing over the Louth Canal is constrained by developments to its immediate south, including the Anglian Water Louth Water Recycling Centre and Alvingham Fishing Lakes. To avoid these developments, maintain a straight alignment (in accordance with Holford Rule 3), and avoid routeing closer to residential properties to either side of the proposed alignment (in accordance with Holford Rule Supplementary Note 1) it is necessary for the overhead line to interact with the routeing of the Viking CCS Pipeline where both projects take the same gap between Louth Water Recycling Centre and Alvingham Fishing Lakes.

7.3.37 To the south of Louth Canal, the proposed alignment turns to route to the south between GL78 and GL80, before continuing towards the south east. This deviation avoids the cluster of residential properties along Louth Road (in accordance with Holford Rule Supplementary Note 1), taking the overhead line to the west of these.

7.3.38 From GL80 the alignment follows a straight route towards the former site of RAF Manby, routeing centrally within the corridor presented at Stage 1 consultation. This alignment follows the shortest, straightest alignment (in accordance with Holford Rule 3), while seeking to route at similar distances from the communities of Louth, South Cockerington, Grimoldby and Manby (in accordance with Holford Rule Supplementary Note 1). In taking this route, the proposed alignment routes to the east of the scheduled monument of Louth Park Abbey (in accordance with Holford Rule 2), to the east of the cut-out from the corridor presented at Stage 1 consultation at Eastfield Farm and Furze Farm, and to the west of the former site of RAF Manby.

Manby to Withern

Image 7.7 Proposed overhead line alignment between Manby and Withern



7.3.39 As it passes the former site of RAF Manby, the alignment turns to route more towards the east between GL91 and GL95, taking the overhead line to the east of woodland and properties within the cut-out from the corridor presented at Stage 1 consultation at Legbourne Grange. Routeing to the east of this large cut-out is preferred to routeing to the west because this provides a shorter route (in accordance with Holford Rule 3) and avoids bringing the overhead line closer to the communities of Louth and Legbourne (in accordance with Holford Rule Supplementary Note 1) and to the Lincolnshire Wolds National Landscape (AONB) (in accordance with Holford Rule 1).

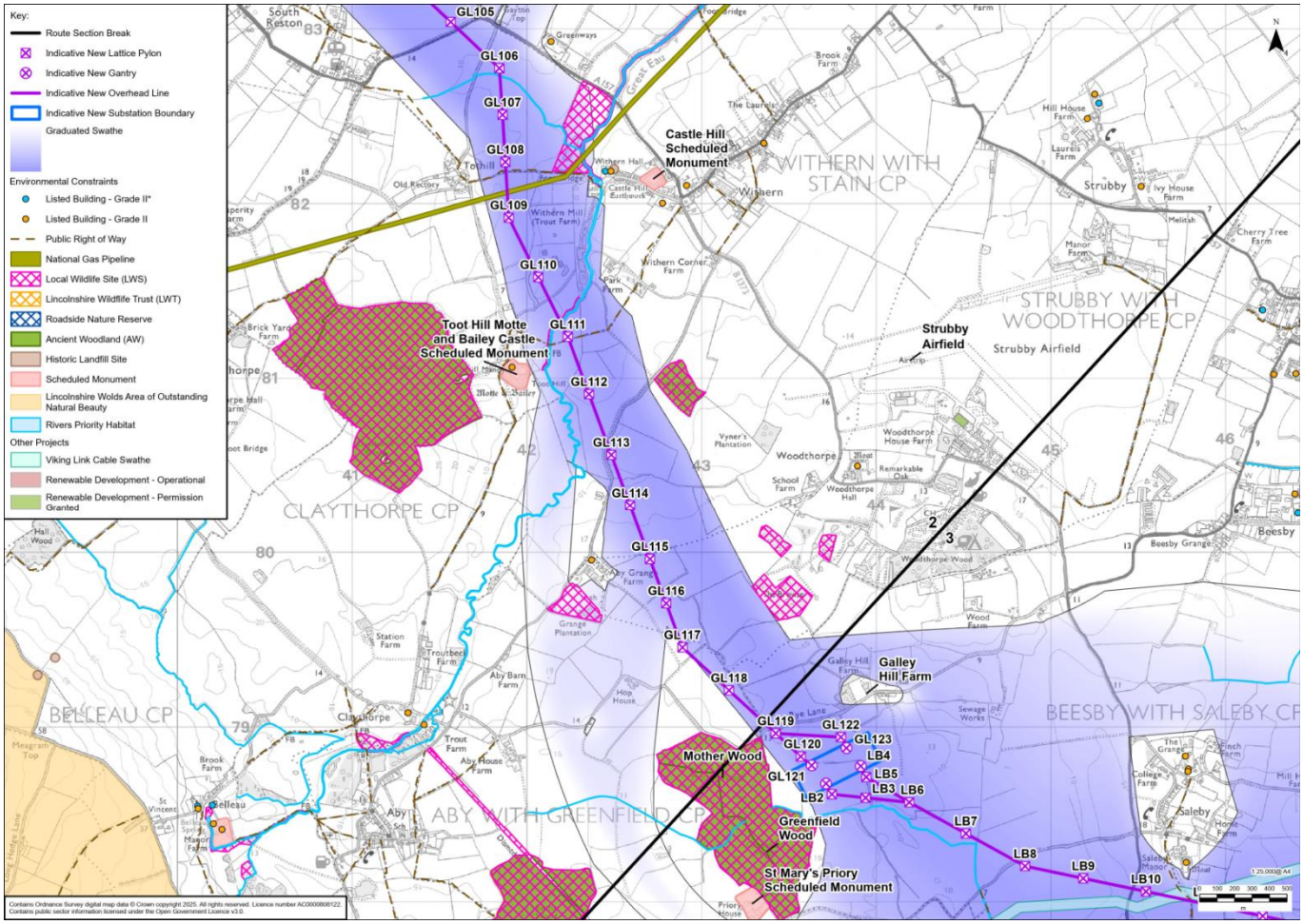
7.3.40 Beyond the former site of RAF Manby, the proposed alignment routes initially to the east and then in a central position within the corridor presented at Stage 1 consultation, taking the shortest and straightest route that can be achieved (in accordance with Holford Rule 3) given existing properties in the area, and seeking to route at similar distance, as far as practicable, from the settlements of Legbourne, North Reston and South Reston to the west of the corridor and Little Carlton, Great Carlton and Gayton le Marsh to the east, as well as the scheduled monuments of Castle Carlton and Hall Farm to the west (in accordance with Holford Rule 2).

7.3.41 The proposed alignment between GL91 and GL99 deviates from a central position in the corridor presented at Stage 1 consultation towards its eastern edge, near Little Carlton, before returning to the centre. This facilitates the positioning of infrastructure in the wider open fields near Little Carlton, avoiding the pattern of small fields to the north of the cut-out from the corridor presented at Stage 1 consultation at Southfield House, where the siting of pylons would have a greater impact in terms of limiting land use compared with larger fields (in accordance with Holford Rule 2), and also seeks to route at similar distances, as far as practicable, from residential receptors within the cut-outs from the corridor and in Little Carlton (in accordance with Holford Rule Supplementary Note 1).

7.3.42 The deviation towards the east between GL91 and GL95 routes the overhead line approximately 100 m to the south west of the proposed Manby Anaerobic Digester, which was granted planning permission in March 2025. Proposals for this development include a digester plant and flare stacks located in the south west corner of the proposed site. Between GL91 and GL93 the proposed alignment has been carefully routed to avoid overlap between the Limits of Deviation for the overhead line (described further in Section 8.9 of this Design Development Report) and the development boundary for the anaerobic digester site.

7.3.43 The proposed Manby Anaerobic Digester development includes a connecting high pressure gas pipeline extending south east from the former site of RAF Manby as far as GL101. The proposed alignment has been developed to achieve a minimum 30m stand-off from this pipeline and to cross as close to perpendicular as can reasonably be achieved. This has led to additional angle pylons being introduced between GL91 and GL99.

Image 7.8 Proposed overhead line alignment between Withern to the new Lincolnshire Connection Substation A



7.3.44 At GL106 the proposed alignment, in line with the corridor presented at Stage 1 consultation, turns to route towards the south. To a large extent, routeing from GL106 onwards is informed by the proposed siting of the Lincolnshire Connection Substation A (LCS A) (as described in Section 7.4 of this Design Development Report) through adopting the shortest and straightest routeing to the proposed substation (in accordance with Holford Rule 3).

7.3.45 The proposed alignment through this area has been developed to route as close to equidistant as practicable between the scheduled monuments of Toot Hill to the west and Caste Hill to the east (in accordance with Holford Rule 2), while avoiding the introduction of multiple angle pylons (in accordance with Holford Rules 2 and 3).

7.3.46 At the southern end of Section 2, the corridor presented at Stage 1 consultation divides into two distinct paths, to the east and west of Mother Wood and Greenfield Wood, with the proposed alignment taking the path to the east of Mother Wood and Greenfield Wood in response to the proposed siting of LCS A.

7.3.47 The proposed alignment southwards from GL109 runs centrally within the Stage 1 corridor before routeing at the westernmost extent of the eastern path of the corridor, taking an alignment that was adopted in response to feedback at the Stage 1 consultation regarding the potential impacts on aviation activities at Strubby Airfield.

Paragraphs 5.3.16 to 5.3.18 of this Design Development Report describe in detail how the corridor and graduated swathe presented at Stage 1 consultation were amended in response to Stage 1 consultation feedback regarding Strubby Airfield, to move the proposed routeing of the overhead line to the west compared with the most likely routeing indicated by the shading of the graduated swathe, while remaining within the eastern path of the corridor around Mother Wood (in accordance with Holford Rule 2) .

7.3.48 As a result, the overhead line is routed further west than the darkest shading of the graduated swathe as it passes Strubby Airfield. As described in Paragraph 5.3.18 of this report, the alignment between GL109 and LCS A is considered to minimise the potential for impacts to operations at Strubby Airfield, while avoiding environmental features such as the Great Eau Local Wildlife Site (in accordance with Holford Rule 2) and routeing approximately equidistant, as far as practicable, between the scheduled monument of Toot Hill (in accordance with Holford Rule 2) and residential receptors located either side of the overhead line (in accordance with Holford Rule Supplementary Note 1).

7.3.49 The alignment taken forward at this location results in pylon GL117 being located just within the cut-out from the corridor presented at Stage 1 consultation at Mother Wood, which places a small area of the Limits of Deviation (described further in Section 8.9 of this Design Development Report) outside of the consulted overhead line corridor (although within the substation siting area for LCS A presented at Stage 1 consultation). This placement of GL117 is preferred to maintain a straight alignment between GL111 and GL117, and between GL117 and GL119 on the approach to LCS A, while achieving the desired benefits to Strubby Airfield compared with the darkest shading of the graduated swathe and avoiding a small block of woodland to the immediate east of GL117.

Pylon Choice

7.3.50 This section is approximately 39 km in length and is predominantly rural in character, encompassing an arable landscape with a number of hedgerows and patches of woodland. This section is located in the Lincolnshire Coast Marshes, characterised by a wide coastal plain extending from Barton-upon-Humber in the north, across to Grimsby at the mouth of the Humber and south to Skegness. The Lincolnshire Wolds National Landscape (AONB) is located to the west. The main residential areas are Grimsby and Louth, however, within the area there are a number of other villages including Laceby, Brigsley, North Thoresby, Alvingham, Manby and Grimoldby.

7.3.51 As this section of the route runs parallel to the edge of the Lincolnshire Wolds National Landscape (AONB) and passes some sensitive receptors, including Waltham Windmill, Louth Abbey Ruins scheduled monument, Toot Hill motte and bailey castle and Grade II listed buildings, this part of the route has been considered for alternative pylon types, including T-pylons and low height lattice pylons.

7.3.52 Views 1 and 4 presented in 0 illustrate views from the Lincolnshire Wolds National Landscape (AONB) in Section 2. View 1 is located on the boundary of the Wolds at Ashby Hill and View 4 is from an elevated location on the A16 to the south of Louth. Views 2 and 3 illustrate views towards the Lincolnshire Wolds National Landscape (AONB) from Covenham Reservoir and Alvingham respectively. For full descriptions and reasoning for selection of viewpoints refer to **PEI Report Part B Appendix 3A Proposed Viewpoints**.

7.3.53 In views to the east from the Lincolnshire Wolds National Landscape (AONB) in this section, the T-pylon would be a more solid structure that would benefit less from any backclothing from landform. Although there are wind turbines visible in views which have a similar form to the T-pylon, these are more distant, being closer to the coast and are seen less against landform. Using T-pylons closer to the designated landscape would draw the eye to the proposed overhead line. This is illustrated in View 1 in 0 which shows a view from the boundary of the designation which is at a lower elevation, and in View 4 from a more elevated location within the designation.

7.3.54 In views west towards the Wolds, the T-pylon would potentially be seen more against the slightly elevated ground of the Wolds and within a landscape and in views that do not contain any similar structures such as wind turbines, as shown in View 2 of 0. The simple form and lower height may have benefits for views at lower elevations where the Wolds is not prominent and more of the structure seen more against the sky, as shown in View 3 of 0.

7.3.55 Due to the views from the Lincolnshire Wolds National Landscape (AONB) and that the T-pylon would potentially be more visible, particularly where they would be seen against a backcloth, combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6, there was not considered to be a justification for T-pylons to be used in Section 2.

7.3.56 However, the review of alternative pylon types in this section concluded that several sections should be considered for the use of low height lattice pylons. The following sections were put forward, primarily for landscape and visual and heritage reasons:

- a 6.5 km section between Barnoldby le Beck and Waithe, to reduce impacts on views from the Lincolnshire Wolds National Landscape (AONB) including views towards Grimsby Dock Tower and to reduce impacts on Waltham Windmill;
- a 12 km section between Covenham St Bartholomew and Manby, 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; and
- a 5.5 km section between Great Carlton and Tothill, to reduce impacts on heritage receptors including Toot Hill motte and bailey castle.

7.3.57 Each of the sections was considered within a multi-disciplinary appraisal by technical and environmental disciplines. It was considered that although there may be some localised benefits for heritage assets for short sections of low height lattice pylons, 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 during the construction and operational phases. This is due to the different loading profiles between different pylon types which can require different foundations and changes to fittings, as well as installation of tension pylons and additional modifications to cross-arms and extensions that may be required to transition between standard height and low height pylons. From a biodiversity perspective, a change to 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 show low height pylons would reduce bird collision risk.

7.3.58 However, introducing low height lattice pylons for the 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 pylon 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 (in accordance with Holford Rules 1, 4 and 5). 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 has been adopted into the design.

7.3.59 Low height lattice pylons have also been considered where the proposed overhead line routes in proximity to aviation receptors. As detailed in Chapter 6, all identified operational airfields within 5 km of the proposed overhead line have been assessed to understand the possible effects of overhead line infrastructure being introduced near active aviation operations.

7.3.60 Table 7.9 below lists the aviation receptors which have been identified within 5 km of the proposed overhead line alignment in Section 2. The receptors are listed from north to south, and the approximate distances to the overhead line alignment are measured from the closest part of the centreline of the proposed overhead line alignment to the nearest threshold (the location that demarcates the start of the area that is usable for take-off and landing) of the runway or helipad.

Table 7.9 Aviation receptors within 5 km of the proposed alignment in Section 2

Receptor	Description
Lindens Farm Airstrip	This receptor is an unlicensed airfield located approximately 2,700 m from the new overhead line alignment in Section 2 (although it is closer to the existing 4KG overhead line). The airstrip is situated approximately 3 km north west of Laceby
Manby Eastfield Farm Airstrip	This receptor is an unlicensed airfield located approximately 2,300 m from the overhead line alignment. The airstrip is situated approximately 1 km east of Manby.
Eastfield Farm Cottage Helipad	This receptor is a helipad located approximately 300 m from the overhead line alignment. The helipad is situated approximately 2.5 km west of Manby.
Louth (Stewton) Airstrip	This receptor is an unlicensed airfield located approximately 1,800 m from the overhead line alignment. The airstrip is situated approximately 2 km southeast of Louth. It is understood that this airfield is not currently operational, but that there are plans to potentially bring the airfield back into operation in the near future.
North Reston Airstrip	This receptor is an unlicensed airfield located approximately 2,200 m from the overhead line alignment. The airstrip is situated approximately 6 km southeast of Louth.
Strubby Airfield (North)	This receptor is an unlicensed airfield located approximately 2,200 m from the overhead line alignment. The airfield is situated approximately 7 km southwest of Mablethorpe. Strubby Airfield (North) primarily operates powered fixed wing light aircraft.

Receptor	Description
Strubby Airfield (South)	This receptor is an unlicensed airfield located approximately 1,300 m from the overhead line alignment. The airfield is situated approximately 7 km southwest of Mablethorpe and approximately 200 m to the south of Strubby Airfield (North). Strubby Airfield (South) primarily operates glider aircraft.

7.3.61 Based on the information in Table 7.9 above, the following sections of low height pylons were considered based on proximity to aviation receptors:

- A short section to the west of Strubby Airfield (North) and Strubby Airfield (South) between pylons GL111 and GL114, to provide additional clearance to overflying aircraft taking off from Runway 26 or approaching Runway 08 at either airfield. Both airfields have the same runway heading, however the assessment of low height pylons in this area was primarily driven by proximity to Strubby Airfield (South) as the receptor with the closest runway threshold. Due to the close proximity of the two airfields to each other, low height pylons between GL111 and GL114 would have a similar effect on both airfields.

7.3.62 At this stage, the preliminary analysis undertaken for Strubby Airfield (South) 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. On balance, low height pylons have therefore not been implemented between pylons GL111 and GL114, noting that such a short section of alternative pylon types with transitions to standard height at each end would have an overall negative visual impact. 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 both airfields at Strubby. Strubby Airfield (South) in particular will be reviewed in more detail between Stage 2 consultation and DCO Submission noting its closer proximity to the proposed overhead line alignment and any additional considerations around gliding operations.

7.3.63 Low height pylons were not considered to make any material difference to impacts on flight operations at any of the other aviation receptors. As such, they were not taken forward for further consideration in these areas.

Summary

7.3.64 In summary, it is considered that a section of overhead line between pylons GL18 and GL36 should be constructed using low height lattice pylons to reduce effects on landscape and visual and heritage receptors in Section 2 (in accordance with Holford Rules 1, 4 and 5).

7.3.65 The remainder of this section of the route should be constructed using standard lattice pylons height as the use of an alternative pylon design is not justified.

7.4 Section 3 – New Lincolnshire Connection Substations A and B

Overview

7.4.1 Section 3 of the route extends from the new Lincolnshire Connection Substation A (LCS A), located to the north east of Mother Wood and Greenfield Wood and to the west of Saleby, to the new Lincolnshire Connection Substation B (LCS B), located to the north east of Bilsby and west of Asserby, to the east of the A1111 Sutton Road.

7.4.2 Section 3 of the Project comprises the following permanent works:

- a short length of new 400 kV overhead line between Section 2 and LCS A, to connect into the substation on its north western side;
- one new 400 kV substation at the north western extent of Section 3, the new LCS A;
- an approximately 5 km section of new 400 kV overhead line between the two new substations, routeing in a primarily south easterly direction and crossing the A1104 Alford Road to the south of Saleby;
- one new 400 kV substation at the south eastern extent of Section 3, the new LCS B; and
- a short length of new 400 kV overhead line between LCS B and Section 4, to connect into the substation on its south eastern side.

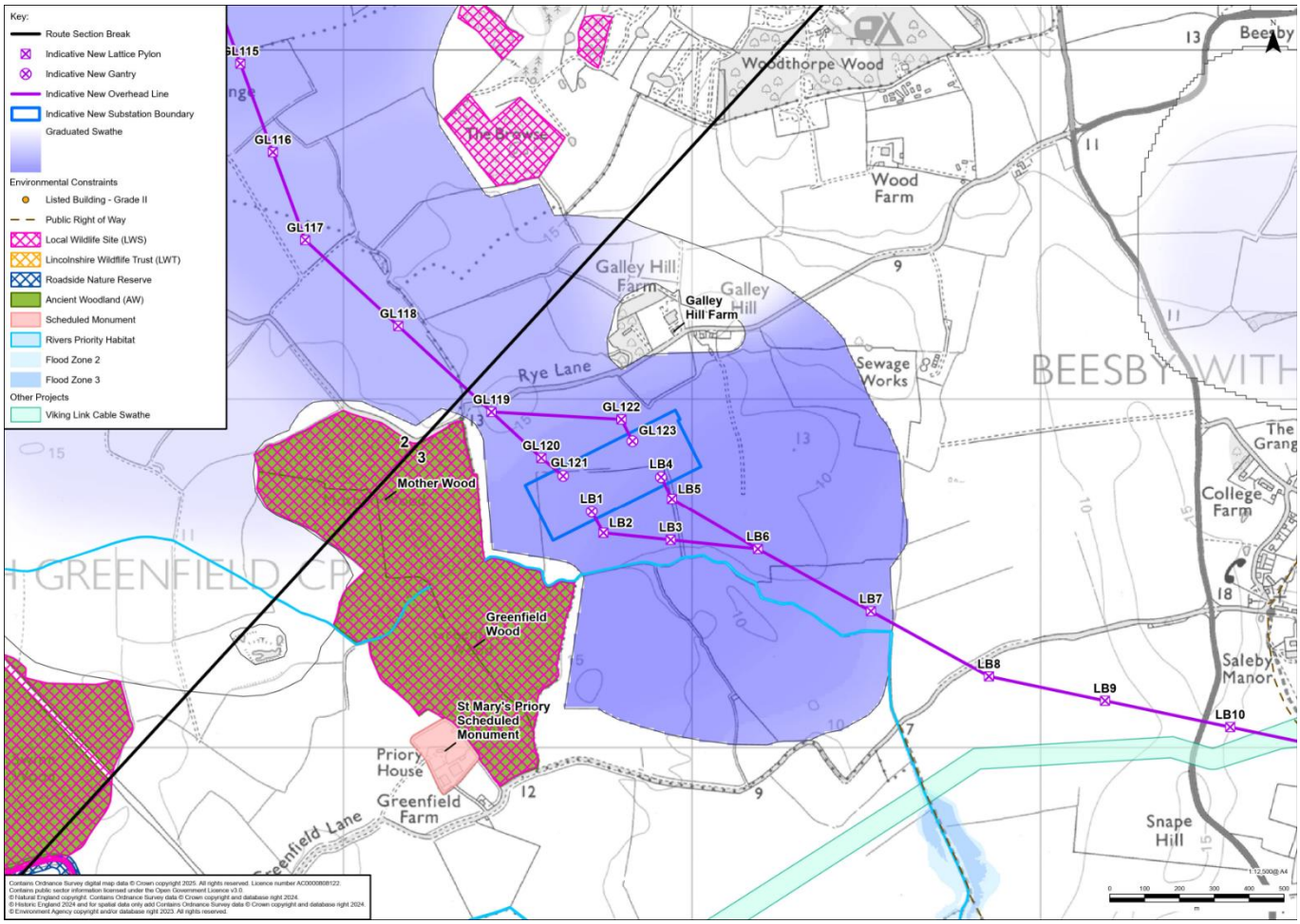
7.4.3 This section of the report describes the proposed siting of the new LCS A and LCS B and the proposed alignment of the new 400 kV overhead line between them.

Proposed Alignment and Substation Siting

7.4.4 The siting of the proposed new LCS A and LCS B and the proposed overhead line alignment in Section 3 has considered a range of constraints, including environmental features, residential communities and existing infrastructure. These features are discussed below and illustrated in further detail in Image 7.9 to Image 7.11 below.

New Lincolnshire Connection Substation A

Image 7.9 Proposed siting of the new Lincolnshire Connection Substation A



7.4.5 The proposed new LCS A is located to the east of Mother Wood and north east of Greenfield Wood, and south of Rye Lane and Galley Hill Farm.

7.4.6 Within the broader siting zone for LCS A presented at Stage 1 consultation, this location is preferred because of the opportunity presented by the existing woodland to screen views of the substation from the Lincolnshire Wolds National Landscape (AONB) and heritage assets such as the scheduled monument of St Mary's Priory (in accordance with Horlock Rule 4). 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 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 (in accordance with Horlock Rules 1 and 3).

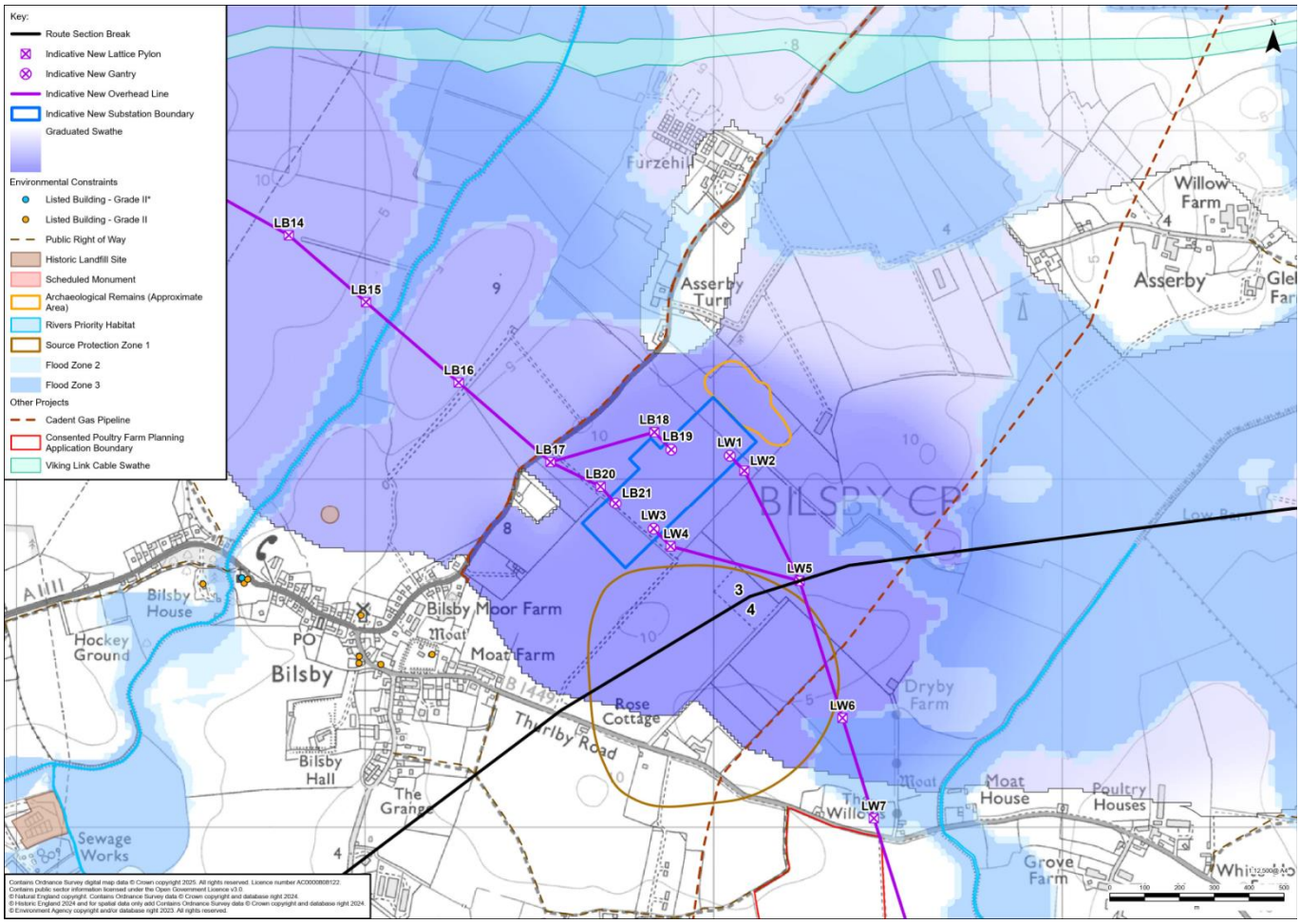
7.4.7 National Grid also refined out the portion of the substation siting zone to the north of Rye Lane, where the screening benefit from Mother Wood and Greenfield Wood would be less than to the south of Rye Lane. The north eastern most part of the substation siting zone is also not preferred because it could limit the options for routeing the proposed overhead line to avoid impacts on aviation activity at Strubby Airfield (in accordance with Horlock Rules 6 and 8).

7.4.8 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 (in accordance with Holford Rule 3).

7.4.9 Between the route section break between Sections 2 and 3 and the new LCS A, the proposed new overhead line routes close to ancient woodland at Mother Wood. The proposed overhead line alignment where it connects into the substation has been developed so that it can be constructed without direct impacts on the ancient woodland (in accordance with Holford Rules 2 and 4).

New Lincolnshire Connection Substation B

Image 7.10 Proposed siting of the new Lincolnshire Connection Substation B



7.4.10 The proposed new LCS B is located to the immediate east of the A1111 Sutton Road and approximately 0.5 km north of the B1449 Thurlby Road near Bilsby.

7.4.11 The siting area for this new substation is surrounded by several residential communities and residential receptors which act to constrain the location of the Project infrastructure. These include Saleby and Thoresthorpe to the west, Alford to the south west, Bilsby to the south, Huttoft and Asserby to the east, Hannah to the north east, Markby to the north and Beesby to the north west, as well as other scattered properties. In siting the new LCS B, National Grid has sought to maximise

the separation from these communities and residential receptors as far as practicable (in accordance with Holford Rule Supplementary Note 1 and Horlock Rules 6 and 8), balanced with other technical and environmental factors described below, to reduce as far as possible the potential amenity impacts.

7.4.12 The siting zone for the new LCS B is crossed by existing buried infrastructure, including the Viking Link high voltage direct current (HVDC) underground cable, running east to west to the south of Saleby and the north of Assbery, and a Cadent intermediate pressure gas pipeline running north east to south west to the west of Asserby and the east of Bilsby. As well as avoiding these assets in the siting of the substation itself (in accordance with Horlock Rules 6 and 8), National Grid has considered how the substation can be sited to minimise interactions between the new 400 kV overhead line in Section 3 and Section 4 and existing buried infrastructure, and minimise the extent to which the Viking Link cable and the gas pipeline could constrain connection routes for the battery storage, solar generation and offshore transmission link projects that are proposed to connect to the new LCS B (in accordance with Horlock Rule 8).

7.4.13 In siting the new LCS B, National Grid has also considered the topography of the siting zone. High points within the siting zone existing to the west of the A1111 Sutton Road and to the north of the siting zone between Saleby and Markby. As these areas are local high points, siting the substation here would have the potential for widespread landscape and visual impacts to key visual receptors including residential areas at Beesby, Saleby, Thoresthorpe and Markby (in accordance with Horlock Rule 4).

7.4.14 Significant areas of the siting zone for the new LCS B are intersected by Flood Zones 2 and 3. In considering the siting of the substation relative to flood zones, National Planning Policy (National Policy Statement for Energy (EN-1) (Ref 4)) requires National Grid to apply a sequential, risk-based approach that steers development to areas with the lowest flood risk. National Grid has sought to avoid locating the new LCS B within, or immediately adjacent to, flood zone areas, where the substation would be at increased risk of flooding.

7.4.15 Considering the factors outlined above, the proposed siting of LCS B has been chosen because:

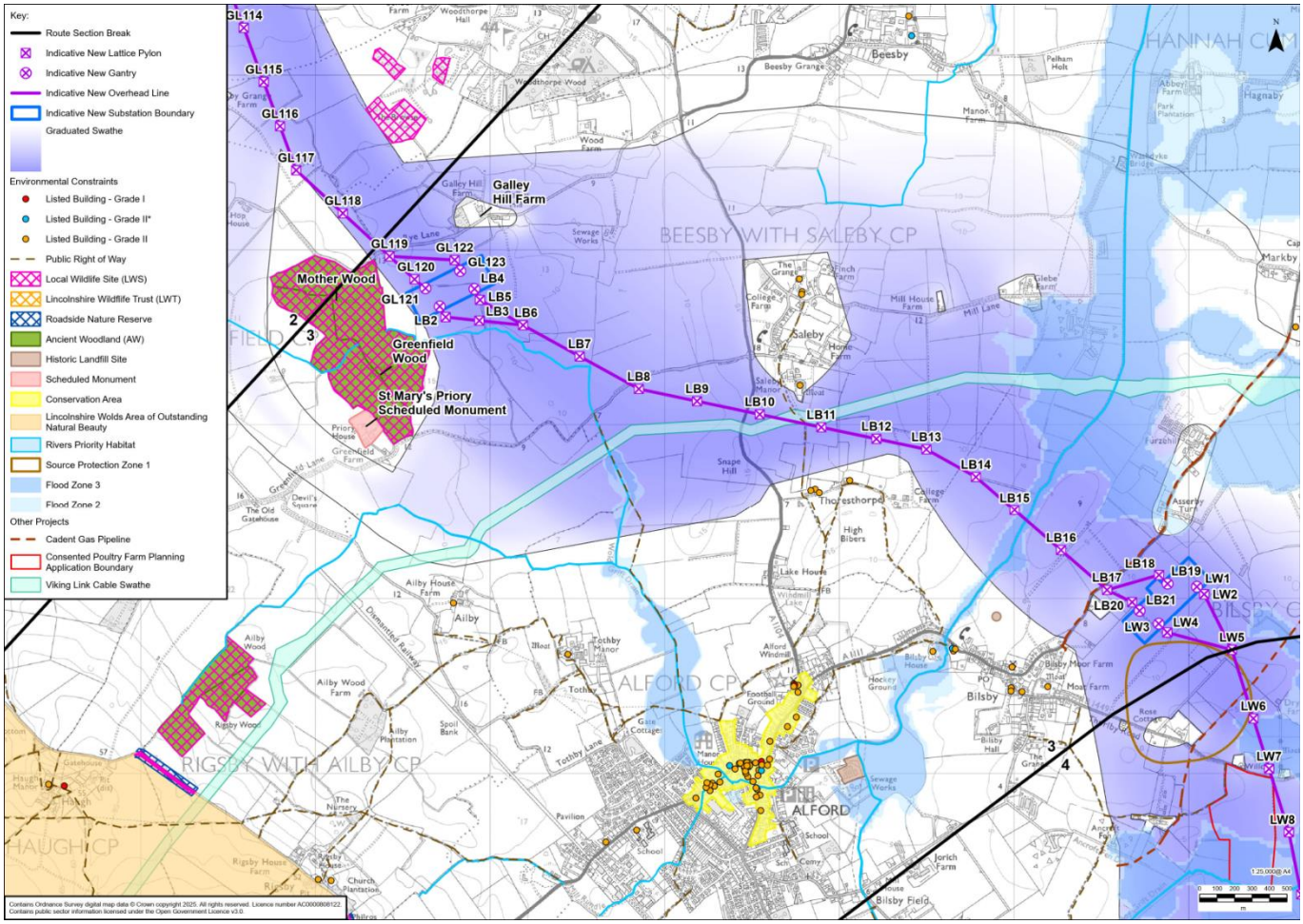
- It avoids the areas of higher ground between Saleby and Markby in the northern portion of the substation siting zone, to the north of the Viking Link underground cable, where the substation would have more widespread landscape and visual impacts (in accordance with Horlock Rule 4).
- It avoids the area of Flood Zones 2 and 3 in the eastern portion of the siting zone, to the east of the Cadent gas pipeline, where the substation would be at increased risk of flooding.
- It avoids any overlap of the substation footprint and the Viking Link HVDC underground cable and Cadent intermediate pressure gas pipeline, as diversion of these assets would add cost, risk and technical complexity to the Project and potentially extend the construction programme (in accordance with Horlock Rules 6 and 8). It also positions the proposed substation where routeing of the proposed overhead line and connection routes for other projects connecting into LCS B can be developed without being in close proximity to this existing underground infrastructure over significant lengths (in accordance with Horlock Rules 6 and 7).

- After refining out the areas described above, there are two possible areas large enough to accommodate the required substation footprint, to the east and west of the A1111 Sutton Road, south of the cut-out from the substation siting zone at Asserby Turn. The area to the west of the A1111 is much more constrained by Flood Zones 2 and 3, and would necessitate the substation being sited either immediately adjacent to, or slightly overlapping, these flood zones. The proposed siting of LCS B to the east of the A1111 Sutton Road is preferred because it offers lower risk of flooding compared with the position to the west of the A1111.

7.4.16 During design development for the new LCS B, geophysical surveys carried out by National Grid identified archaeological anomalies indicative of late prehistoric or Romano-British settlement at the north eastern end of the proposed position of the substation. National Grid has refined the positioning of the substation in response to the survey findings to ensure the substation can be constructed without disturbance of known archaeological remains at this location. While this has resulted in the proposed substation being sited over a field drain, which will need to be diverted, this was considered preferable to disturbing the archaeological remains (in accordance with Horlock Rule 3).

7.4.17 Between the new LCS B and the route section break between Sections 3 and 4, the proposed new overhead line entries into the new LCS B route close to groundwater Source Protection Zone (SPZ) 1, which represents the area immediately around an abstraction point used for domestic supply or food production purposes. The construction of pylon foundations within SPZ 1 would require careful planning and management to ensure compliance with regulations to prevent contamination of the groundwater, and therefore the position of LW5, at the boundary between Sections 3 and 4, has been developed to avoid locating the pylon within SPZ 1 (in accordance with Horlock Rule 3).

Image 7.11 Proposed overhead line alignment between the new Lincolnshire Connection Substations A and B



7.4.18 The development of the proposed alignment between the new LCS A and the new LCS B has been informed primarily by the substation positions and arrangements and to provide the shortest and straightest route between the two substations (in accordance with Holford Rule 3), as far as practicable, considering existing technical and environmental constraints within the area as described below.

7.4.19 To the immediate south of the overhead line as it routes south east from the new LCS A is an area of Chalk Stream Priority Habitat. The proposed alignment for the overhead line where it connects into LCS A has been developed so that it does not cross the chalk stream (in accordance with Holford Rule 2).

7.4.20 A direct straight-line alignment between the two substations cannot be achieved as this would impact on residential properties at Thoresthorpe. Therefore, between LB8 and LB13, the proposed alignment routes in a more easterly direction, to pass between residential receptors at Saleby, to the north of the overhead line, and Thoresthorpe, to the south of the overhead line (in accordance with Holford Rule Supplementary Note 1).

7.4.21 This routeing of the proposed alignment introduces an interaction between the overhead line and the Viking Link HVDC underground cable, which also runs east to west to the south of Saleby. Between LB9 and LB12 the overhead line must cross

the Viking Link cable in a narrow gap between residential properties at Saleby and Thoresthorpe, whilst ensuring, wherever practicable, that residential receptors remain outside of the Limits of Deviation (described further in Section 8.9 of this Design Development Report) of the proposed overhead line. This area has been a key constraint in the development of the proposed alignment through Section 3.

7.4.22 Despite the challenges of crossing the Viking Link cables in a narrow gap between residential receptors, routeing the overhead link to the south of Saleby is preferred to routeing to the north of the village. An alignment to the north of Saleby would result in a longer overall length of overhead line through Section 3, requiring additional angle towers that are more visually intrusive in the landscape, and would cross the higher ground described in Paragraph 7.4.13 above. This would result in greater landscape and visual impacts from the overhead line infrastructure.

7.4.23 As the overhead line approaches the new LCS B, the proposed alignment crosses Flood Zones 2 and 3. The spans of the overhead line have been arranged to avoid locating a pylon within the flood zones.

Pylon Choice

7.4.24 In this section of the Project between LCS A and LCS B, the overhead line routes to the north of Alford where the landscape is characterised by the wide coastal plain. The Lincolnshire Wolds National Landscape (AONB) is located over 3.3 km to the west. This section is approximately 5 km in length and is predominantly rural in character, encompassing an arable landscape with a number of hedgerows and large blocks of woodland. The main residential area is Alford. Within the wider rural area there are a number of other villages including Beesby, Saleby, Ailby, Markby, Asserby and Bilsby.

7.4.25 As the route would potentially be visible from the Lincolnshire Wolds National Landscape (AONB) and passes some sensitive receptors, including Markby Priory, the Site of St Mary's Priory and a Grade II listed buildings, this part of the route has been considered for alternative pylon types, including T-pylons and low height lattice pylons.

7.4.26 As with Section 2, in views to and from the Lincolnshire Wolds National Landscape (AONB), the T-pylon would be a more solid structure that would benefit less from any backclothing. Since this section will be seen in combination in views from the Lincolnshire Wolds National Landscape (AONB) with Section 2, it will be important to maintain consistency. Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6, there was not considered to be a justification for T-pylons to be used in Section 3.

7.4.27 The review of alternative pylon types also concluded that although the use of low height pylons could reduce the prominence of the new overhead line between the substations, this would not reduce the level of significance of the Project on the local landscape, views and the setting of heritage assets. The overhead line is over 3.3 km from the Lincolnshire Wolds National Landscape (AONB). Although there may be some localised benefits for heritage assets for short sections of low height pylons, combining different pylon types along the route of the new overhead line would give an incoherent appearance (in conflict with Holford Rule 6) and would also add technical complexity to the Project during the construction and operational phases. This is due to the different loading profiles between different pylon types which can require different foundations and changes to fittings, as well as installation of tension

pylons and additional modifications to cross-arms and extensions that may be required to transition between standard height and low height pylons. From a biodiversity perspective, a change to 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 show low height pylons would reduce bird collision risk.

7.4.28 Low height pylons have also been considered to mitigate potential impacts on aviation receptors. As detailed in Chapter 6, all identified operational airfields within 5 km of the proposed overhead line have been assessed to understand the possible effects of overhead line infrastructure being introduced near active aviation operations.

7.4.29 There are no aviation receptors within 5 km of the overhead line or substations in Section 3 that are not already assessed as part of Section 2 or Section 4. Strubby Airfield (North) and Strubby Airfield (South) are both located closer to the overhead line in Section 2 than any of the overhead line or substations in Section 3, and the runways at both airfields are orientated such that any potential impacts would be caused primarily by the infrastructure in Section 2. It is therefore not considered that any alternative pylon designs need to be appraised in Section 3 for aviation.

Summary

7.4.30 In summary it is considered that the use of an alternative pylon design to standard lattice pylons in Section 3 is not justified.

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

Overview

7.5.1 Section 4 of the route extends from Lincolnshire Connection Substation B (LCS B), to the north east of Alford and Bilsby, to the Refined Weston Marsh Substation Siting Zone, the northernmost extent of which is situated to the immediate north of the River Welland between Surfleet Seas End and Fosdyke Bridge. Section 4 of the route comprises approximately 66 km of new 400 kV overhead line which, overall within Section 4, routes from LCS B in the north east towards Weston Marsh to the south west.

7.5.2 From LCS B, the proposed overhead line routes initially towards the south east, routeing to the east of Bilsby and Sloothby and to the west of Cumberworth and Listoft. East of Habertoft, it turns to route towards the south, crossing the A158 Skegness Road to the east of Burgh le Marsh. From here the overhead line turns first towards the south west and then the south, taking a route to the south of Burgh le Marsh and Irby in the Marsh and to the north of Thorpe St Peter and Thorpe Culvert towards the Steeping River. Beyond the river, it continues towards the west as far as Midville, then routes south for a short distance, continues south west towards Gipsey Bridge, then routes to the south to cross the A1121 Boardsides and A52 Swineshead Road to the west of Boston. Beyond the A52, the overhead line routes generally south west to pass to the north of Wigtoft, crossing the B1391 Donington Road to the west of Kirton End, before routeing south east with Wigtoft and Sutterton to its east. West of Sutterton Dowdyke the overhead line turns south for a short distance, before

routeing south east over the A16 towards the Refined Weston Marsh Substation Siting Zone, in parallel with the existing 400 kV overhead line between the existing Bicker Fen and Walpole substations.

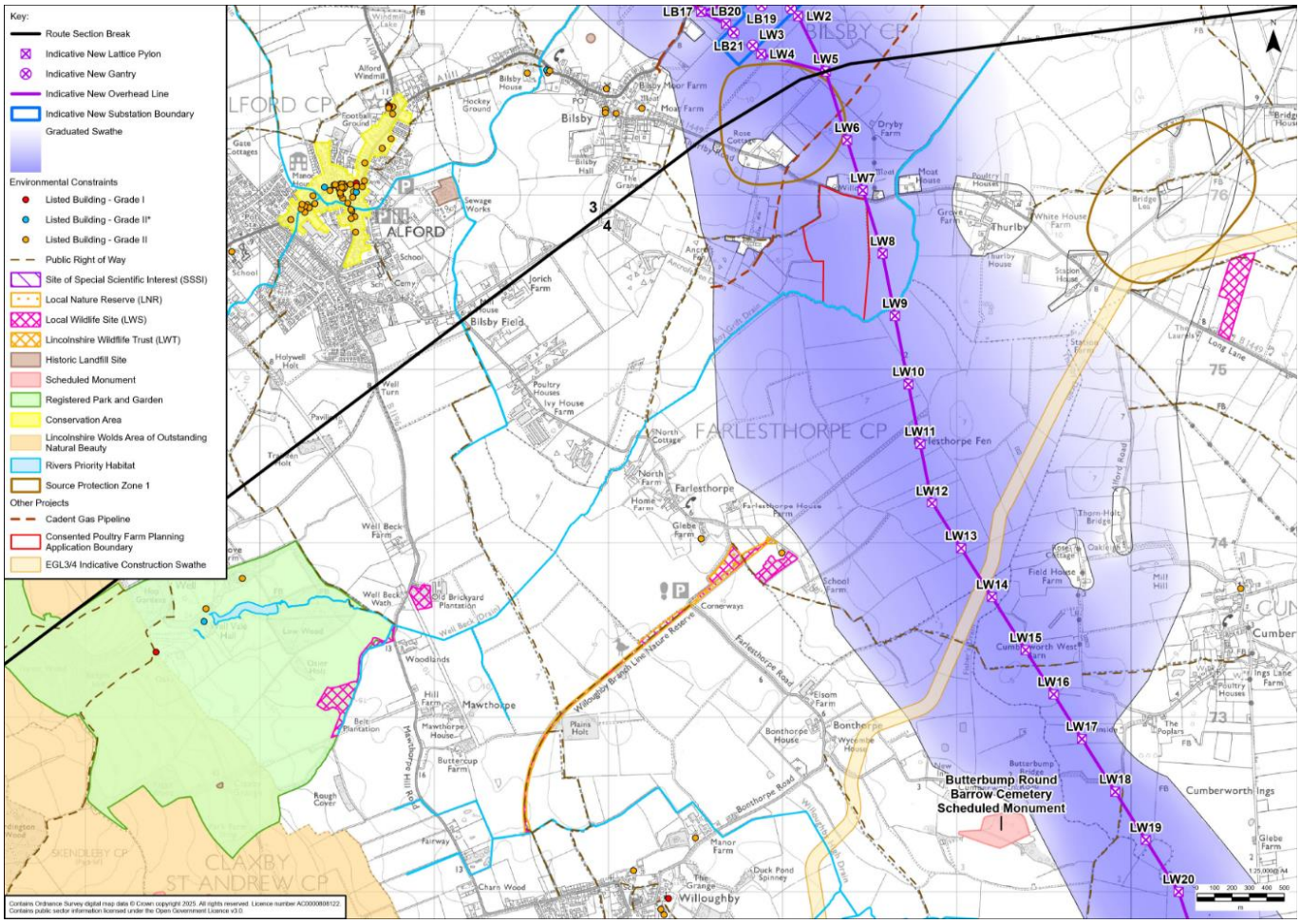
7.5.3 This section of the report describes the development of the proposed alignment and the consideration of alternative pylon types within Section 4.

Proposed Alignment

7.5.4 The proposed overhead line alignment in Section 4 has considered a range of constraints, including environmental features, residential communities, existing infrastructure and planned developments. These features are discussed below and illustrated in further detail in Image 7.12 to Image 7.22 below.

New Lincolnshire Connection Substation B to Sloothby

Image 7.12 Proposed overhead line alignment between the new Lincolnshire Connection Substation B and Sloothby



7.5.5 As outlined in Section 3 (see Section 7.4 of this report), the position of LW5, at the boundary between Sections 3 and 4, has been developed taking into account the position of the new LCS B and the overhead line bays within the substation layout, and to avoid locating the pylon within groundwater Source Protection Zone (SPZ) 1 (in accordance with Holford Rule 2). SPZ 1 represents the area immediately around an abstraction point used for domestic supply or food production purposes, where the

construction of pylon foundations would require careful planning and management to ensure compliance with regulations to prevent contamination of the groundwater.

7.5.6 From LW5, the proposed alignment routes initially towards the south, as far as LW12 where it turns to route towards the south east. The alignment through this area has been informed, in part, by the position and arrangement of new LCS B, and has been developed by taking the shortest and straightest alignment as far as possible in light of environmental constraints in the area, as outlined below (in accordance with Holford Rule 3).

7.5.7 Between LW5 and LW6 the overhead line oversails SPZ 1, but the position of LW6 has been developed to avoid the pylon being placed within SPZ 1. Due to the extents of the source protection zones across the corridor presented at Stage 1 consultation, the proposed alignment includes pylons sited within the less sensitive SPZ 2 and SPZ 3.

7.5.8 Between LW7 and LW8 the proposed alignment crosses the B1449 Thurlby Road to the west of Thurlby. A key constraint in the development of the proposed alignment crossing Thurlby Road is the presence of a consented planning application for a free-range poultry farm in the field to the immediate south of Thurlby Road and west of the proposed alignment between LW7 and LW9. Due to the potential impact construction activities could have on the free-range status of the poultry farm, National Grid has avoided locating any permanent infrastructure and sought to minimise the extent of any temporary works within its planning application boundary.

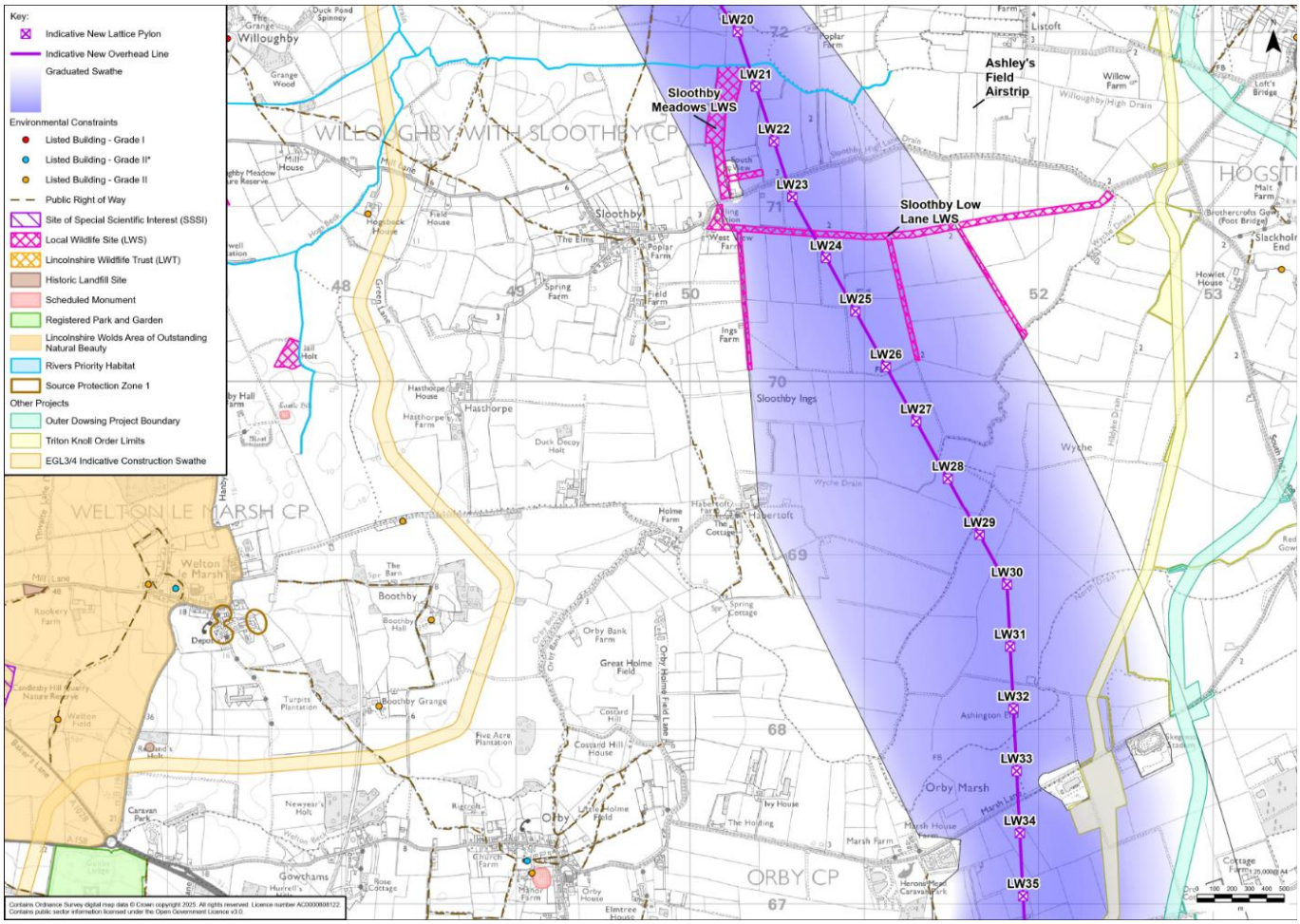
7.5.9 The corridor presented at Stage 1 consultation showed several cut-outs for scattered properties along Thurlby Road. The proposed alignment has been routed through a gap between properties that is wide enough to accommodate the full 100 m width of the Limits of Deviation for the proposed overhead line (described further in Section 8.9 of this Design Development Report) (in accordance with Holford Rule Supplementary Note 1), avoiding the poultry farm as described above, whilst also avoiding the introduction of additional angle pylons to the alignment from the substation (in accordance with Holford Rules 2 and 3).

7.5.10 From LW12 the proposed alignment turns to route towards the south east, consistent with the corridor presented at Stage 1 consultation in this area, and maintains a straight alignment as far as LW20. The position of the alignment within the corridor presented at Stage 1 consultation has been developed with a general preference towards the eastern side of the corridor, to maximise the distance from the Lincolnshire Wolds National Landscape (AONB) to the west (in accordance with Holford Rule 1), but also to provide the shortest, straightest routeing (in accordance with Holford Rule 3) while avoiding routeing immediately adjacent to either the scheduled monument of Butterbump round barrow cemetery (in accordance with Holford Rule 2), to the west, or the community of Cumberworth, to the east.

7.5.11 Through the development of the proposed alignment, the position of LW17 has been refined to avoid siting this pylon within an area of Coastal and Floodplain Grazing Marsh Priority Habitat, which is oversailed between LW17 and LW18 (in accordance with Holford Rule 2).

Sloothby to Marsh Lane

Image 7.13 Proposed overhead line alignment between Sloothby and Marsh Lane



7.5.12 From LW20, the overhead line routes towards the south east as far as LW30. Considering the Lincolnshire Wolds National Landscape (AONB) to the west, the development of the proposed alignment has been based on a preference towards the eastern side of the corridor presented at Stage 1 consultation (in accordance with Holford Rule 1), to the extent that this is practicable in consideration of the other constraints outlined below, particularly Ashley's Field Airstrip, and while seeking to minimise the length of the overhead line and avoid the introduction of additional angle pylons (in accordance with Holford Rule 3).

7.5.13 The proximity to Ashley's Field Airstrip, located to the north of Sloothby High Lane and to the east of the corridor presented at Stage 1 consultation, has been a key consideration in this area, with the proposed alignment developed to maximise the distance from the villages of Sloothby and Habertoft, to the west, while allowing the continuation of airfield operations at Ashley's Field Airstrip, to the east. The potential impact of the proposed alignment on airfield operations at Ashley's Field Airstrip has been further considered in deciding on the type of pylons to use in this section, which is explained further in Paragraph 7.5.96 below.

7.5.14 The proposed alignment between LW20 and LW23 also avoids placing infrastructure within Sloothby Meadows Local Wildlife Site (in accordance with Holford Rule 2), but the oversailing of Sloothby Low Lane Local Wildlife Site between LW23 and LW24 is unavoidable as this site extends from west to east across the whole width of the

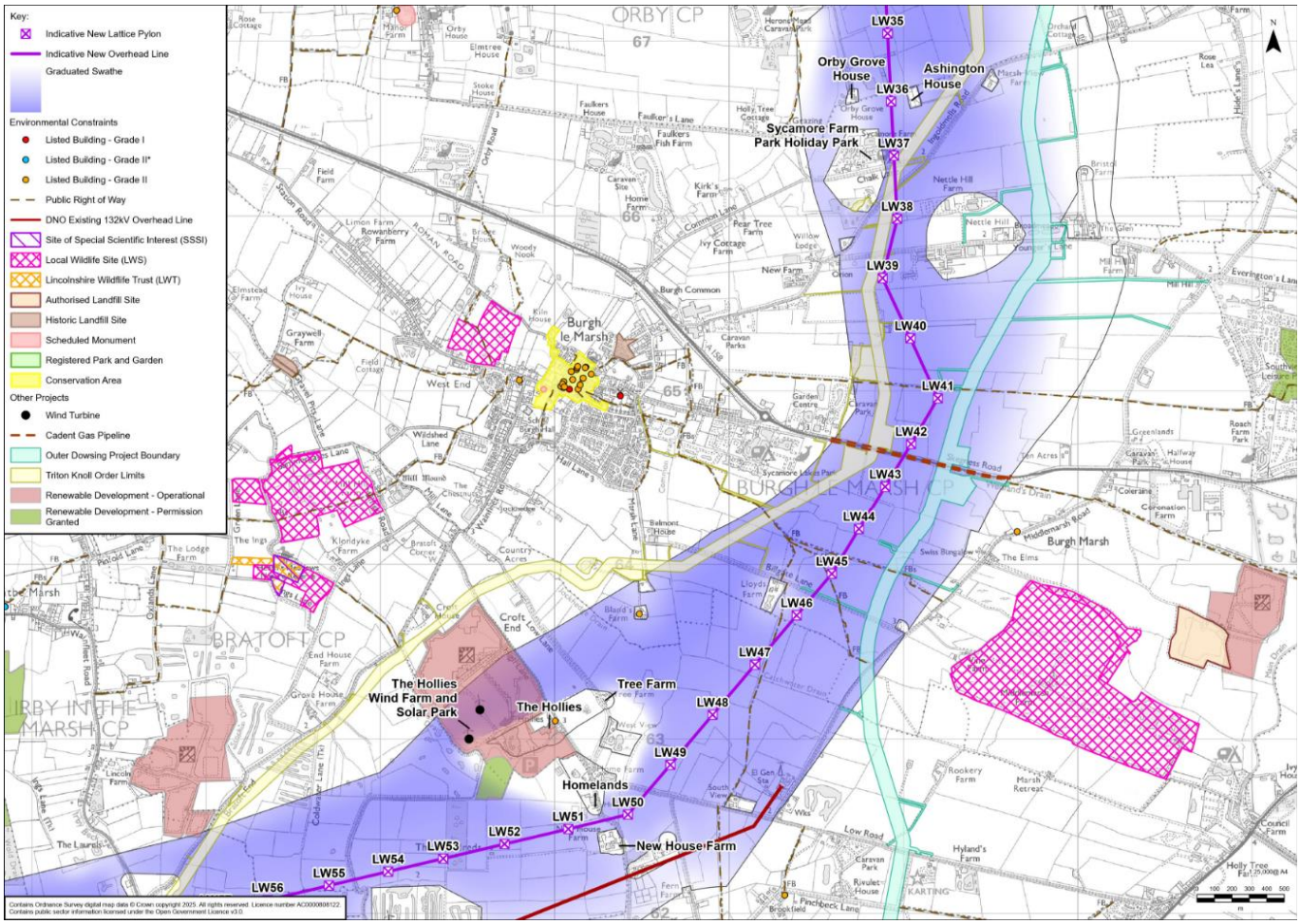
corridor presented at Stage 1 consultation (in conflict with Holford Rule 2). The proposed alignment between LW23 and LW30 has been developed to minimise interactions with Sloothby Low Lane Local Wildlife Site by avoiding crossing the strips of this site that extend from north to south.

7.5.15 In the vicinity of LW30, the preferred corridor at Stage 1 consultation is intersected by the draft order limits for the onshore cable elements of the Triton Knoll Offshore Wind Farm and the proposed Outer Dowsing Offshore Wind project, and these both route broadly north to south in the eastern part of the corridor presented at Stage 1 consultation from LW30 southwards. As a result of the existing and proposed buried infrastructure, it is preferable for the overhead line to route more towards the centre and west of the corridor presented at Stage 1 consultation to the south of LW30.

7.5.16 At LW30, the proposed alignment therefore turns to route towards the south, to cross Marsh Lane to the west of the two cut-outs from the corridor presented at Stage 1 consultation. In doing so, it avoids interactions with the underground cables for both the Triton Knoll Offshore Wind Farm and the proposed Outer Dowsing Offshore Wind project, maximising routeing flexibility by avoiding the gaps between properties on Marsh Lane that are already occupied or proposed to be occupied by these projects. Beyond LW30, the proposed alignment routes towards the south as far as LW38, with the new overhead line proposed to route approximately parallel to the existing Triton Knoll Offshore Wind Farm high voltage alternating current (HVAC) underground cable and the proposed Outer Dowsing Offshore Wind HVAC underground cable as far as LW35.

Marsh Lane to Thorpe St Peter

Image 7.14 Proposed overhead line alignment between Marsh Lane and Thorpe St Peter



7.5.17 Beyond LW35, the existing Triton Knoll Offshore Wind Farm high voltage alternating current (HVAC) underground cable turns to route towards the south west, parallel to Ingoldmells Road on the northern side of the road, while the proposed Outer Dowsing Offshore Wind HVAC underground cable continues towards the south as far as LW39.

7.5.18 Also at Ingoldmells Road, a series of individual residential properties resulted in four small cut-outs from the corridor presented at Stage 1 consultation approximately in line with each other from east to west, creating five possible gaps through which the proposed alignment could route. The proposed alignment continues to route towards the south as far as LW38, taking the gap between Orby Grove House and Ashington House. This gap is preferred because it:

- maximises routeing flexibility and avoids technical complexity by avoiding the gaps between properties that are already used for the Triton Knoll Offshore Wind Farm HVAC underground cable and proposed to be used for the Outer Dowsing Offshore Wind HVAC underground cable;
- avoids the narrow gaps between cut-outs and the edge of the corridor presented at Stage 1 consultation along Chalk Lane on the eastern side of the corridor and Ingoldmells Road on the western side of the corridor (in accordance with Holford Rule Supplementary Note 1); and

- allows the proposed overhead line to maintain a straight alignment to minimise the number of angle pylons required (in accordance with Holford Rule 3).

7.5.19 Routeing through the chosen gap to avoid interactions with the Triton Knoll Offshore Wind Farm HVAC underground cable and the proposed Outer Dowsing Offshore Wind HVAC underground cable means the proposed alignment routes across an area of Coastal Floodplain Grazing Marsh Priority Habitat between LW34 and LW36 (in conflict with Holford Rule 2).

7.5.20 As the existing Triton Knoll Offshore Wind Farm HVAC underground cable routes across the corridor presented at Stage 1 consultation from north east to south west, there is increased interaction between the proposed alignment and the cable route between LW37 and LW42. This occurs in a constrained area of the corridor presented at Stage 1 consultation where there are large cut-outs for the Sycamore Farm Park holiday park along Chalk Lane and clusters of residential properties and agricultural buildings along Younger's Lane, as well as the proposed Outer Dowsing Offshore Wind HVAC underground cable routeing through the more eastern gap between residential properties on Younger's Lane.

7.5.21 To navigate this constrained area, it is necessary for the proposed alignment to route close to Sycamore Farm Park holiday park, to the west of the overhead line, and to cross the existing Triton Knoll Offshore Wind Farm HVAC underground cable between LW37 and LW38 before running in close parallel with the proposed cable route between LW38 and LW39. AC interference effects may require further study to understand whether any additional mitigation needs to be included in the Project design. Angle pylons have been introduced at LW38, LW39 and LW41, with multiple changes in direction of the overhead line deemed necessary to maintain a safe stand-off distance from agricultural buildings (in conflict with Holford Rule 3) while also minimising interactions with the Triton Knoll Offshore Wind Farm HVAC underground cable and avoiding a crossing of the proposed Outer Dowsing Offshore Wind HVAC underground cable.

7.5.22 Beyond LW41, the proposed alignment routes towards the south west, through a narrow gap between the Triton Knoll Offshore Wind Farm HVAC underground cable and the proposed Outer Dowsing Offshore Wind HVAC underground cable where these cross the A158 Skegness Road, before the space between the underground cables widens as the Triton Knoll Offshore Wind Farm cable route continues towards the west and the proposed Outer Dowsing Offshore Wind cable route continues towards the south.

7.5.23 Between LW41 and LW50 the proposed alignment continues towards the south west, routeing centrally within the corridor presented at Stage 1 consultation to the south east of Burgh Le Marsh. This alignment takes the overhead line away from the most likely routeing that was indicated by the darkest shading of the graduated swathe at Stage 1 consultation, which ran towards the north of the corridor presented at Stage 1 consultation.

7.5.24 The proposed alignment through the centre of the corridor presented at Stage 1 consultation was adopted in response to feedback at the Stage 1 consultation regarding the potential impacts on The Hollies Wind Farm and The Hollies Solar Park. Paragraphs 5.3.29 to 5.3.35 of this Design Development Report describe in detail how the corridor and graduated swathe presented at Stage 1 consultation were amended in response to Stage 1 consultation feedback regarding The Hollies Wind Farm and The Hollies Solar Park.

7.5.25 To the south of The Hollies Wind Farm and The Hollies Solar Park, there are multiple residential, agricultural and commercial properties, including Windfarm Park Touring and Camping and Virley House Country Park, which resulted in a cluster of cut-outs from the corridor presented at Stage 1 consultation. The proposed alignment has been routed between cut-outs, crossing Low Road between LW49 and LW50 and Croft Lane between LW50 and LW51 because:

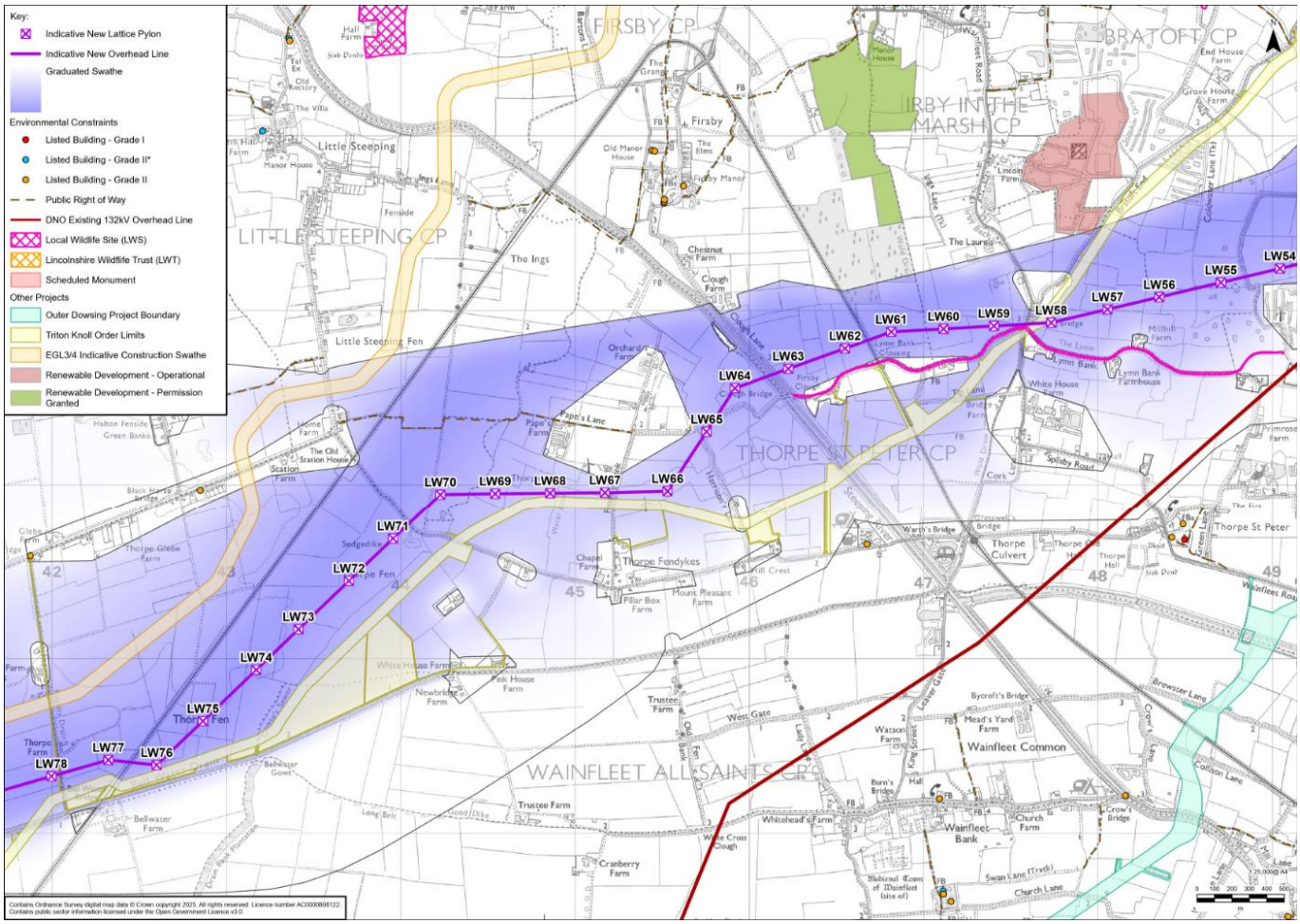
- the northernmost gap, between the northern edge of the corridor presented at Stage 1 consultation and The Hollies, would impact on the solar panels and wind turbines and The Hollies Solar Park and The Hollies Wind Farm respectively;
- the narrow gap on Low Lane, to the immediate south of Tree Farm, is very constrained, offering limited routeing flexibility, and would route the overhead line in close proximity to a Grade II listed building at The Hollies (in conflict with Holford Rule 2), to the north, and the caravan park to the south;
- the narrow gap on Croft Lane, to the immediate south of New House Farm, is very constrained, offering limited routeing flexibility; and
- the southernmost gap, adjacent to the southern edge of the corridor presented at Stage 1 consultation, would require either close paralleling of the existing National Grid Electricity Distribution (NGED) 132 kV overhead line, which has been considered but ruled out due to significant engineering complexities, or routeing close enough to the existing overhead line that it would create a wirescape in the area, with associated landscape and visual impacts (in accordance with Holford Rule 6).

7.5.26 The proposed alignment through this area has been developed with an angle pylon at LW50, where the overhead line turns from routeing towards the south west to routeing towards the west. This allows the proposed alignment to remain central in the corridor providing the shortest and straightest routeing (in accordance with Holford Rule 3), while passing at similar distances from properties at Homelands and New House Farm (in accordance with Holford Rule Supplementary Note 1) and passing to the north of the large area of Coastal and Floodplain Grazing Marsh Priority Habitat in the cut-out from the corridor presented at Stage 1 consultation to the south of LW53 and LW54 (in accordance with Holford Rule 2). As a result of this routeing preference, the proposed alignment crosses a small block of woodland between LW52 and LW53.

7.5.27 As described in Paragraph 5.3.34 of this report, the proposed alignment through this has area been developed to avoid oversailing residential properties (in accordance with Holford Rule Supplementary Note 1), to avoid interactions with the existing 132 kV overhead line (in accordance with Holford Rule 6), and to avoid the potential for impacts to wind farm and solar farm operations at The Hollies Wind Farm and The Hollies Solar Park.

Thorpe St Peter to Bell Water Bridge

Image 7.15 Proposed overhead line alignment between Thorpe St Peter and Bell Water Bridge



7.5.28 Between LW57 and LW64, the proposed alignment must navigate between several cut-outs from the corridor presented at Stage 1 consultation as it routes west towards a crossing of the Steeping River.

7.5.29 Routeing in this section must also take into account the high voltage alternating current (HVAC) underground cable for the Triton Knoll Offshore Wind Farm, which re-enters the corridor presented at Stage 1 consultation to the north of LW58, alongside Burgh Lane to the south east of Irby in the Marsh. The proposed HVAC underground cable routes generally from north east to south west across the corridor presented at Stage 1 consultation throughout this area, introducing a constraint on the proposed alignment as National Grid seeks to minimise interactions with and crossings of the cable route.

7.5.30 The existing National Grid Electricity Distribution (NGED) 132 kV overhead line continues through the southern part of the corridor presented at Stage 1 consultation, routeing towards the south west as far as Thorpe St Peter. The proposed alignment remains central or to the north within the corridor presented at Stage 1 consultation, maintaining sufficient stand-off from the existing overhead line to avoid introducing a wirescape (in accordance with Holford Rule 6).

7.5.31 Additionally, the proposed overhead line encounters its first crossing of the Grantham and Skegness Railway, a non-electrified railway, between LW62 and LW63. In line

with best practice the overhead line crossing of the railway would ideally be perpendicular or, where this is not possible, at a minimum angle of 75 degrees between the overhead line centreline and the orientation of the railway.

7.5.32 The proposed alignment between LW58 and LW62 has been developed to account for all the above constraints while minimising the number of angle pylons required and avoiding very narrow gaps between residential properties which limit routeing flexibility (in accordance with Holford Supplementary Note 1). A single crossing of the Triton Knoll Offshore Wind Farm HVAC underground cable is required between LW58 and LW59, with the proposed alignment then routeing to the north of the cut-out from the corridor presented at Stage 1 consultation along Lymn Bank from an angle pylon at LW58, to avoid further interactions with the proposed cable route.

7.5.33 A further angle pylon at LW61 turns the proposed alignment back towards the centre of the consultation corridor, facilitating a perpendicular crossing of the Grantham and Skegness Railway and a near perpendicular crossing of the Steeping River.

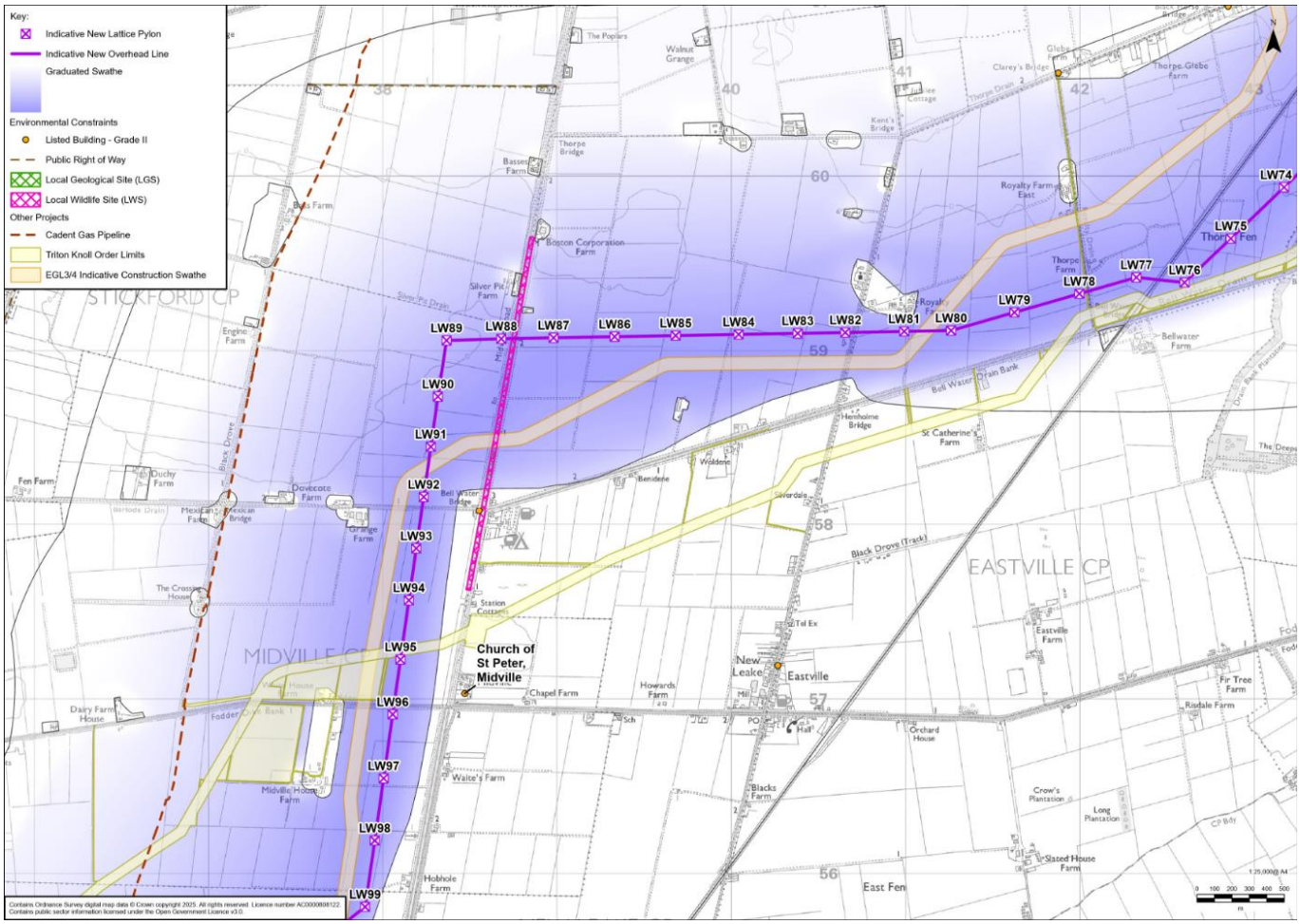
7.5.34 In turning towards the south west at LW61 and LW64, the proposed alignment routes to the south of the large cut-out from the corridor presented at Stage 1 consultation at Pape's Lane and Fendyke Bank to the north of Thorpe Fendykes, and deviates away from the darkest shading of the graduated swathe as presented at Stage 1 consultation. This change has been adopted to avoid the small cut-out from the corridor presented at Stage 1 consultation to the immediate west of the Steeping River (in accordance with Holford Rule Supplementary Note 1). National Grid has identified that the properties within this cut-out are holiday cottages, and further design development has demonstrated that routeing to the north of the corridor presented at Stage 1 consultation, as indicated as the most likely routeing by the graduated swathe, would not be possible without oversailing these properties unless multiple angle pylons were introduced to the proposed alignment (in accordance with Holford Rule Supplementary Note 1). Consideration of routeing options by the Project team identified a preference to route centrally to avoid either oversailing the holiday cottages or introducing additional angle pylons to the overhead line alignment in this area (in conflict with Holford Rule 3).

7.5.35 Adopting the central route through the corridor to the north of Thorpe Fendykes introduces greater interaction with the Triton Knoll Offshore Wind Farm HVAC underground cable between LW66 and LW69, but an engineering review confirmed there is adequate space to site pylons in proximity to the proposed cable with sufficient stand-off.

7.5.36 Beyond LW70 the proposed alignment routes towards the south west, reflecting a preference to be in the southern portion of the corridor presented at Stage 1 consultation approaching Eastville and Midville, as described below Image 7.16. The proposed alignment between LW70 and LW78 remains to the north of the Triton Knoll Offshore Wind Farm HVAC underground cable, minimising further interactions, and is largely informed by a second crossing of the Grantham and Skegness Railway, between LW76 and LW77, which again should ideally be at a minimum angle of 75 degrees between the overhead line centreline and the orientation of the railway, in line with best practice.

Bell Water Bridge to Midville

Image 7.16 Proposed overhead line alignment between Bell Water Bridge and Midville



7.5.37 Through this area the corridor presented at Stage 1 consultation turns from routeing east to west to routeing from north to south, and this is reflected in the development of the proposed alignment which routes towards the west as far as LW89 then turns to route towards the south.

7.5.38 The proposed alignment routes generally to the south of the corridor as far as LW89 and then to the east of the corridor where the overhead line turns towards the south, which represents the shortest route through this area (in accordance with Holford Rule 3), avoiding the longer and potentially more angular alignment that would be necessary to route between properties along Thorpe Bank, Fen Road, Spilsby Bank, Fenside Road, Hobhole Bank, Black Drove, Barlode Drain, Scarborough Bank, Fodderdyke Bank and Midville Road, as well as seeking to minimise the number of residential receptors affected (in accordance with Holford Rule Supplementary Note 1).

7.5.39 In keeping to the east of the corridor presented at Stage 1 consultation at Midville, the proposed alignment also avoids the risks and challenges that would be associated with paralleling the Cadent high-pressure gas pipeline towards the west of the corridor.

7.5.40 Throughout this area, development of the proposed alignment has also considered the significant linear drain network, which generally routes north to south through the area, and forms a significant constraint to pylon placement.

7.5.41 Pylon placement has also taken into consideration other proposed buried infrastructure in the area, specifically:

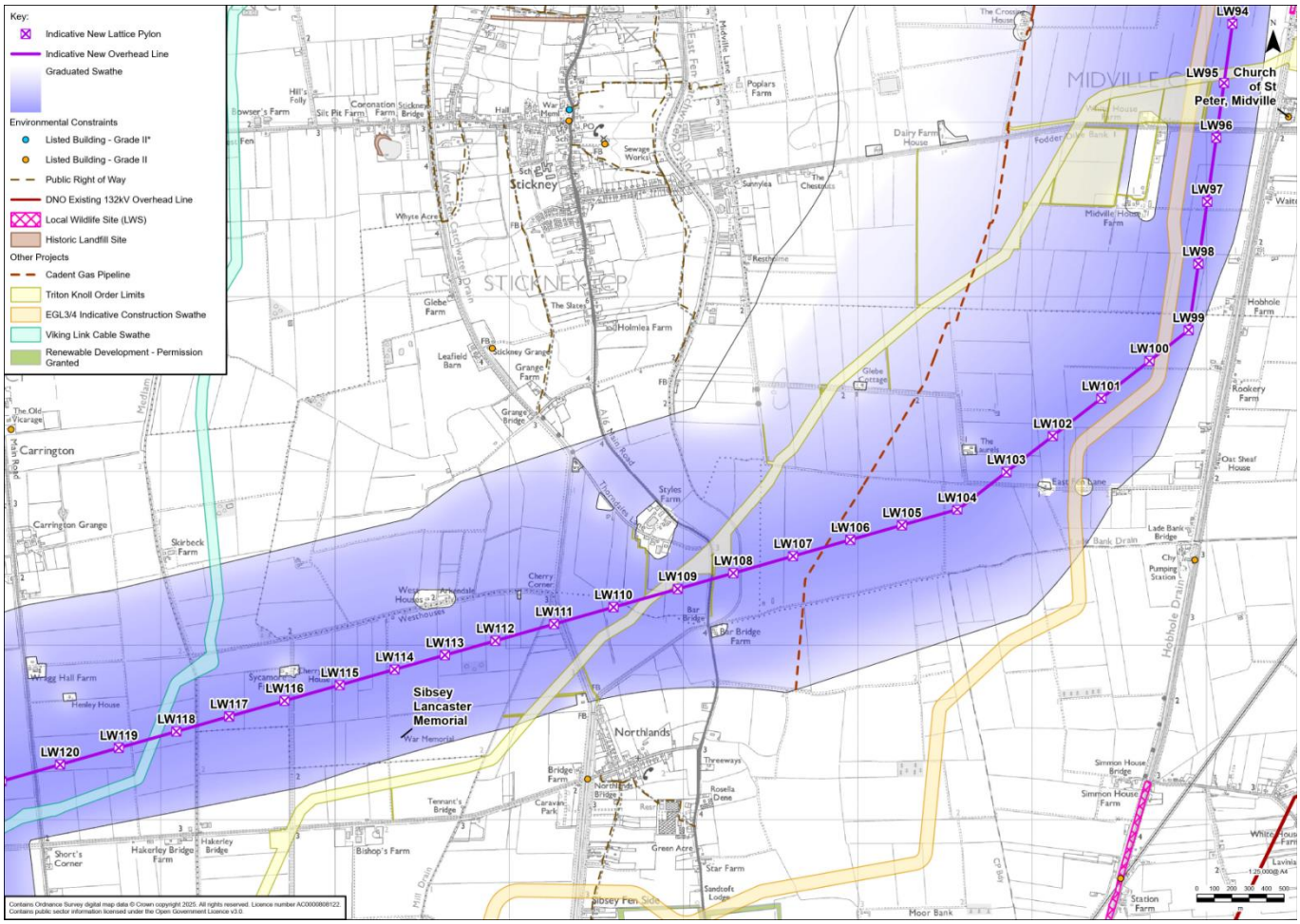
- the high voltage alternating current (HVAC) underground cable for the Triton Knoll Offshore Wind Farm, which routes from north east to south west in the corridor presented at Stage 1 consultation near Midville, and is crossed perpendicularly by the proposed alignment between LW94 and LW95; and
- the proposed Eastern Green Link 3 and Eastern Green Link 4 cable route, which follows a similar alignment to the proposed new overhead line, informing the proposed alignment between LW89 and LW99, to achieve an appropriate stand off from the proposed underground cable, and the placement of pylons at crossings of the proposed underground cable between LW80 and LW81 and between LW91 and LW92.

7.5.42 At the angle pylon LW89, the overhead line alignment turns through an angle close to 90 degrees. This change in angle is facilitated by a single angle pylon, rather than two or more shallower angles, due to the restriction on pylon placement introduced by Hobhole Bank and Hobhole Drain, which route from north to south between LW87 and LW88, and the preference to cross these as close to perpendicular as possible. The introduction of two or more shallower angles at this location would likely have reduced the separation of the overhead line from Bell Water Bridge by bringing the alignment south.

7.5.43 Between LW92 and LW96, the proposed alignment routes close to the Grade II listed bridge over Barlode Drain and the Grade II listed Church of St Peter at Midville. Pylon positions and overhead line span lengths have been developed to maximise the opportunity for pylon placement outside of key views from these heritage assets, particularly views across the open fen landscape from the Church of St Peter (in accordance with Holford Rule 2).

Midville to Carrington Road

Image 7.17 Proposed overhead line alignment between Midville and Carrington Road



7.5.44 From LW99 the proposed alignment turns to follow the darkest shading of the graduated swathe presented at Stage 1 consultation in routeing towards the south west, taking an alignment that provides the shortest, straightest routeing (in accordance with Holford Rule 3), and avoiding the greater concentration of residential properties in the northern part of the corridor, which would potentially result in more angle pylons and impacts on a greater number of residential receptors (in accordance with Holford Rule Supplementary Note 1).

7.5.45 The proposed overhead line between LW99 and LW104 takes an alignment that passes at similar distances from residential properties on East Fen Lane. The proposed overhead line between LW104 and LW121 takes an alignment that passes at similar distances from residential properties on Thorndales Lane and Barbridge House, the single property on the A16 Main Road to the north of Northlands (in accordance with Holford Rule Supplementary Note 1).

7.5.46 In developing the proposed alignment through this area, National Grid has taken into consideration the Sibsey Lancaster Memorial, a memorial to the crew of an Avro Lancaster which crashed at Northlands in 1943 (in accordance with Holford Rule 2). The memorial was constructed at the crash site and consecrated in 1947 and marks the resting place of five of the six crewmen. It is now preserved by the Sibsey Lancaster Memorial Trust, which holds an annual service of commemoration at the memorial. The memorial is located to the west of the community of Northlands and to

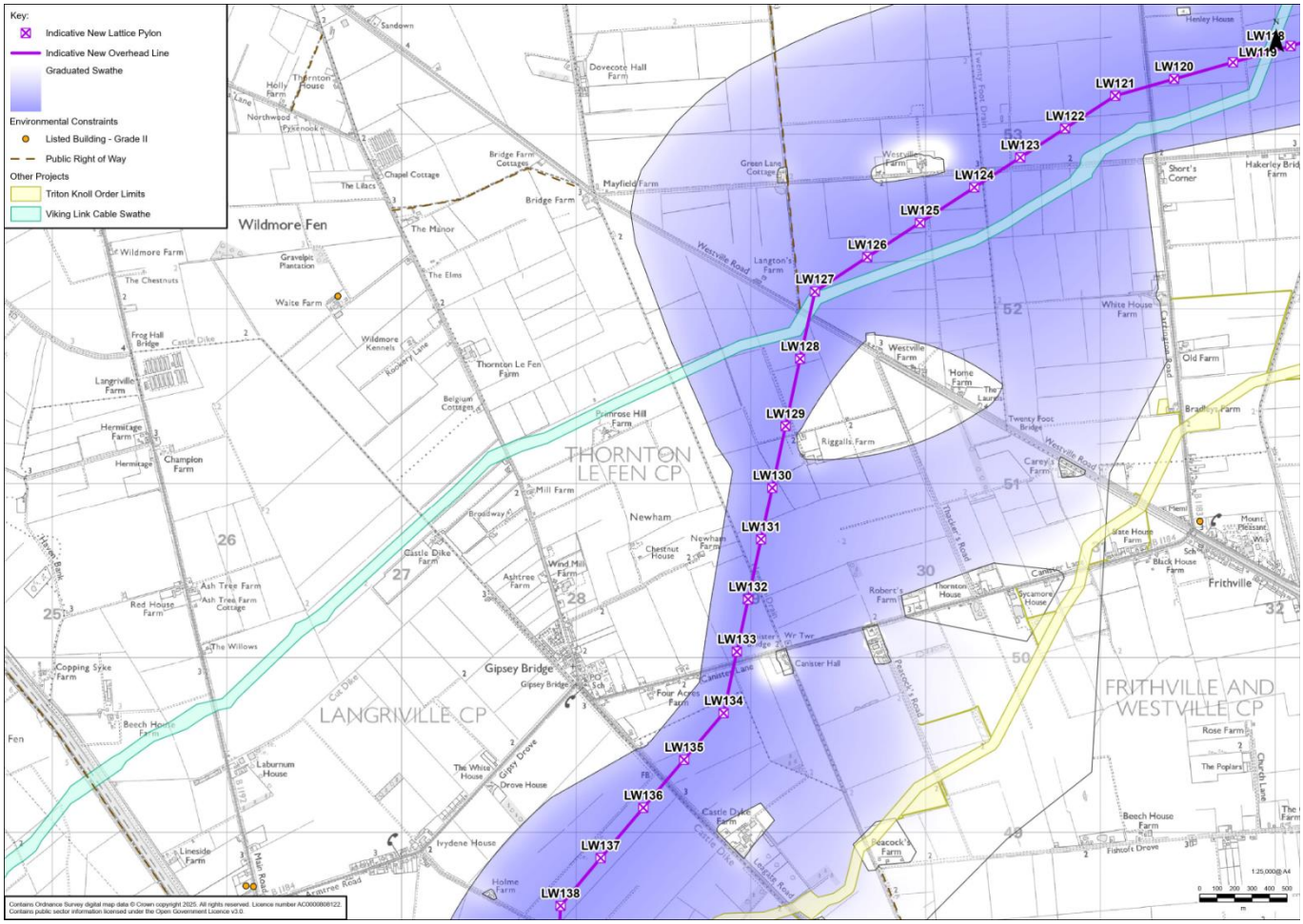
the south of Westhouses, and relative to the proposed alignment is to the south of LW114.

7.5.47 The proposed alignment between LW104 and LW121 has been developed in consideration of balancing distance from the Sibsey Lancaster Memorial with the distance from the overhead line to residential receptors at Northlands and along Thorndales Lane to the south of Stickney, and remains straight over a total distance of approximately 5.7km.

7.5.48 Through this area, it is necessary for the proposed alignment to cross the proposed Eastern Green Link 3 and Eastern Green Link 4 cable route, a Cadent high pressure gas pipeline, the high voltage alternating current (HVAC) underground cable for the Triton Knoll Offshore Wind Farm, the Viking Link high voltage direct current (HVDC) underground cable and a series of Anglian Water clean water pipelines, all of which route across the full width of the corridor presented at Stage 1 consultation between LW99 and LW121. These interactions with existing and proposed buried infrastructure have informed the development of the proposed alignment and the positioning of pylons, in seeking to propose crossings as perpendicular as practicable to minimise the constraint to pylon placement and the extent of mitigation for Alternating Current (AC) interference effects potentially required.

Carrington Road to Gipsey Bridge

Image 7.18 Proposed overhead line alignment between Carrington Road and Gipsey Bridge



7.5.49 Beyond LW121, the proposed alignment routes towards the south west as far as LW127, and then turns towards the south, which routes the overhead line along the western side of the corridor presented at Stage 1 consultation.

7.5.50 The preference to route to the west of the corridor results primarily from the routeing of the high voltage alternating current (HVAC) underground cable for the Triton Knoll Offshore Wind Farm in the east of the corridor to the south west of Frithville, and in particular the alignment of the cable crossing the B1184 Canister Lane near Frithville. The combination of the Triton Knoll Offshore Wind Farm cable easement and the large areas cut-out from the corridor presented at Stage 1 consultation for residential properties along Canister Lane between Frithville and Gipsey Bridge restricts viable routeing options in the eastern part of the corridor.

7.5.51 Considering the constraints along the B1184 Canister Lane in conjunction with the large cut-out from the corridor presented at Stage 1 consultation for residential properties along Westville Road to the north west of Frithville, an alignment that minimises the number of angle pylons to remain as straight as practicable is best achieved by routeing to the west of the corridor presented at Stage 1 consultation (in accordance with Holford Rule 3).

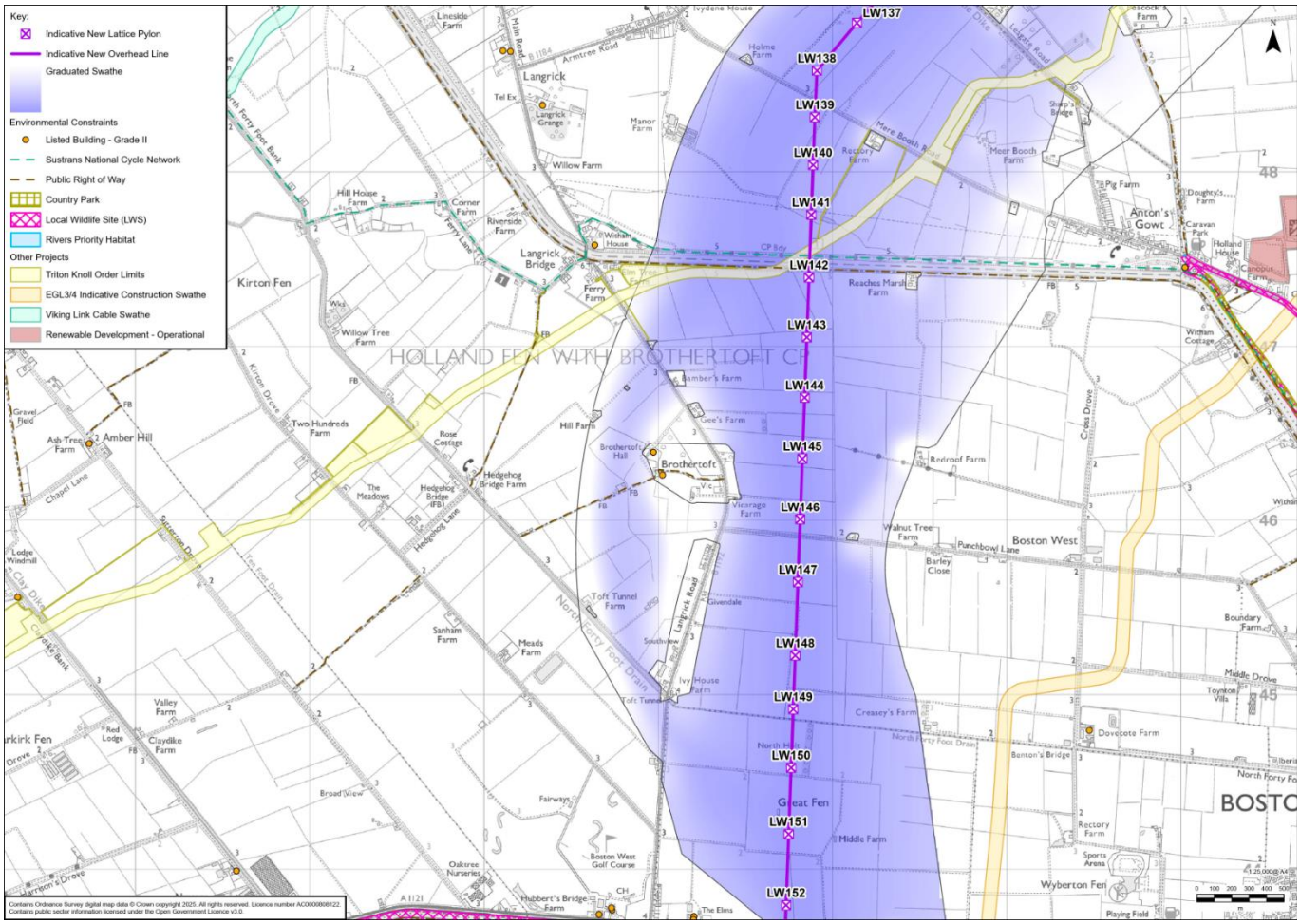
7.5.52 The proposed alignment between LW121 and LW127 has been developed to facilitate the routeing of the overhead line towards the west of the corridor presented at Stage 1 consultation while minimising as far as possible the interactions with the Viking Link high voltage direct current (HVDC) underground cable which routes across the corridor in this area from north east to south west, with a single crossing of the HVDC cable proposed between LW127 and LW128, where the overhead line is also proposed to cross West Fen Drain.

7.5.53 The position of the angle pylon at LW127 has been carefully developed to allow the proposed alignment to route as far as practicable from residential properties along Northlands Road, to the north of LW125, while routeing at similar distances from residential properties where it crosses the B1184 Canister Lane, remaining within feasible limits for span lengths for the overhead line and avoiding the introduction of additional angle pylons in this area (in accordance with Holford Rule 3). This has resulted in LW127 being sited within approximately 20 m of the cable easement for Viking Link, but at a stand-off of approximately 35 m from the cable centreline.

7.5.54 Between LW127 and LW134 the proposed alignment follows the western edge of the corridor presented at Stage 1 consultation. At the angle pylon at LW134 the overhead line turns to route towards the south west as far as LW138, which places the overhead line at similar distances from residential properties to the south east of Gipsey Bridge along Castledyke Bank.

Gipsey Bridge to Hubbert's Bridge

Image 7.19 Proposed overhead line alignment between Gipsey Bridge and Hubbert's Bridge



7.5.55 At LW138 the proposed overhead line turns to route towards the south and, with no significant environmental or planning constraints to navigate around, is able to maintain a straight alignment through this area as far as LW156 to the south east of Hubbert's Bridge (in accordance with Holford Rule 3).

7.5.56 The proposed alignment routes centrally within the corridor presented at Stage 1 consultation, which facilitates the overhead line routeing approximately midway between communities at Langrick Bridge, to the west of the corridor, and Anton's Gowt, to the east, as well as at similar distances from other scattered properties within the corridor including those on Mere Booth Road near Langrick, and on Main Road and Punchbowl Lane at Brothertoft (in accordance with Holford Rule Supplementary Note 1).

7.5.57 Throughout this area the proposed alignment interfaces with a number of large drains forming part of the Boston Navigable Drain Network, with the north to south alignment being preferred as it facilitates predominantly perpendicular crossings of drains and watercourses in the area. In particular, the proposed alignment crosses perpendicularly over the River Witham between LW141 and LW142 and the North Forty Foot Drain between LW149 and LW150.

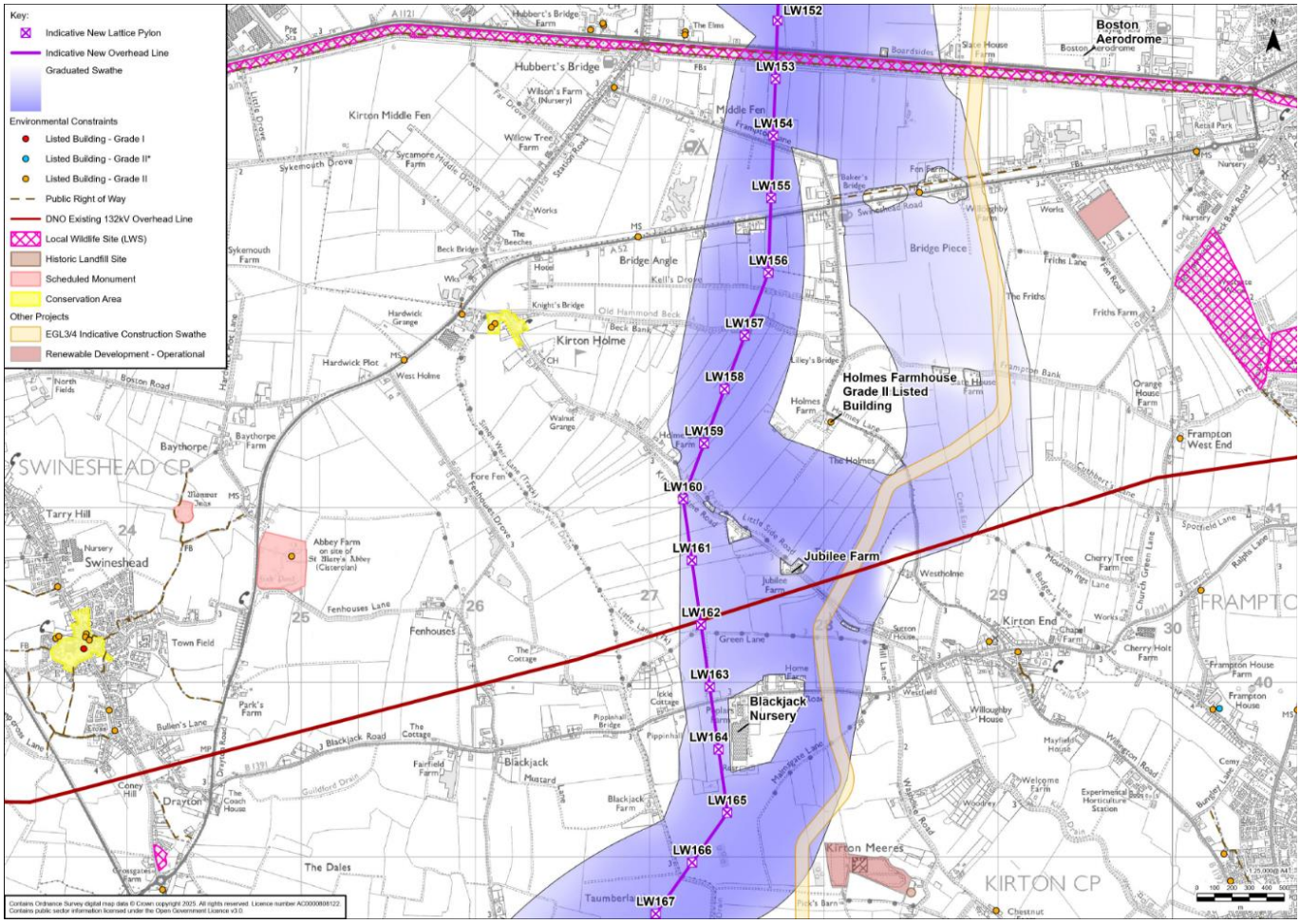
7.5.58 The high voltage alternating current (HVAC) underground cable for the Triton Knoll Offshore Wind Farm routes from north east to south west across the corridor presented at Stage 1 consultation in this area, from north of Anton's Gowt to south of

Langrick Bridge, resulting in the cable route being crossed by the proposed alignment between LW141 and LW142, in the same span as the River Witham crossing.

7.5.59 The proposed alignment through this area has also taken into account Boston Aerodrome, shown on Image 7.20, which is located to the immediate north of the A1121 Boardsides to the west of Boston and to the east of LW152. This is described further below.

Hubbert's Bridge to Kirton End

Image 7.20 Proposed overhead line alignment between Hubbert's Bridge and Kirton End



7.5.60 The proposed alignment continues straight from LW138 (on Image 7.19) as far as LW156 to the south of the A52 Swineshead Road, which routes the overhead line in the western portion of the corridor presented at Stage 1 consultation where this splits around the large cut-out along the B1192 Holmes Road.

7.5.61 In continuing the straight alignment from LW138 as far as LW156, the proposed alignment has been developed to balance the distance from the overhead line to residential receptors to the east and west, including the communities of Hubbert's Bridge and Frampton Fen, holiday parks including Orchard Park to the west, and Boston Aerodrome to the east.

7.5.62 The potential impact of the proposed alignment on airfield operations at Boston Aerodrome has been further considered in deciding on the type of pylons to use in this section, which is explained further in Paragraph 7.5.97 below.

7.5.63 In developing the proposed alignment near Hubbert's Bridge, National Grid considered routeing options to the east and west of the large cut-out from the corridor presented at Stage 1 consultation along the B1192 Holmes Road, and identified a preference to route to the west of the cut-out because routeing to the east would:

- bring the overhead line in close proximity to Boston Aerodrome, located to the east of the corridor to the immediate north of the A1121 Boardsides, which would introduce impacts on aviation activities at the airfield due to reduced clearances to the overhead line from overflying aircraft;
- bring the overhead line closer to a greater number of residential properties, including properties on the outskirts of Boston along the A52 Swineshead Road and the community of Kirton End (in conflict with Holford Rule Supplementary Note 1);
- require the introduction of an additional angle pylon compared with the straighter alignment that could be proposed if routeing to the west, which would likely be visible from dispersed properties along the B1192 Holmes Road and Frampton Bank, resulting in visual impacts to a greater number of properties (in conflict with Holford Rule 3);
- require a very constrained crossing of the A52 Swineshead Road due to the narrow gaps between properties, as indicated by the cut-outs from the corridor presented at Stage 1 consultation, which would introduce a risk of oversail of residential curtilage (in conflict with Holford Rule Supplementary Note 1); and
- require the overhead line to route from north east to south west through the area between the cut-out along the B1192 Holmes Road and the village of Kirton End, an area that is already crossed by an existing National Grid Electricity Distribution 132 kV overhead line, which would likely result in a wirescape in this area (in conflict with Holford Rule 6).

7.5.64 Routeing the overhead line from north to south in this area also facilitates a perpendicular crossing of the A1121 Boardsides, the Grantham and Skegness Railway, a non-electrified railway, and the South Forty Foot Drain, which are all crossed by the span between LW152 and LW153. In line with best practice the overhead line crossing of the railway would ideally be perpendicular or, where this is not possible, at a minimum angle of 75 degrees between the overhead line centreline and the orientation of the railway.

7.5.65 At LW156 the proposed alignment turns towards the south west, as far as LW160, then routes back towards the south east to LW165. This routes the overhead line through the gap between the western edge of the corridor presented at Stage 1 consultation and the westernmost cut-out for residential properties along Holme Road, between Kirton Holme and Kirton End, and to the west of the large cut-out from the corridor presented at Stage 1 consultation along the B1391 Donington Road to the west of Kirton End.

7.5.66 In routeing to the west of the corridor presented at Stage 1 consultation between LW158 and LW165, the proposed alignment deviates away from the darkest shading of the graduated swathe as presented at Stage 1 consultation. This change has been adopted because it is considered to reduce visual, ecology and heritage impacts, by:

- routeing the overhead line at similar distances from 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 (in accordance with Holford Rule Supplementary Note 1), while also seeking to minimise the number of angle pylons required in the area (in accordance with Holford Rule 3);
- avoiding an area of Coastal and Floodplain Grazing Marsh Priority Habitat located along Holme Road between Jubilee Farm and Kirton End (in accordance with Holford Rule 2); and
- maximising, as far as practicable, the distance between the overhead line and the Grade II listed Holmes Farmhouse along the B1192 Holmes Road (in accordance with Holford Rule 2).

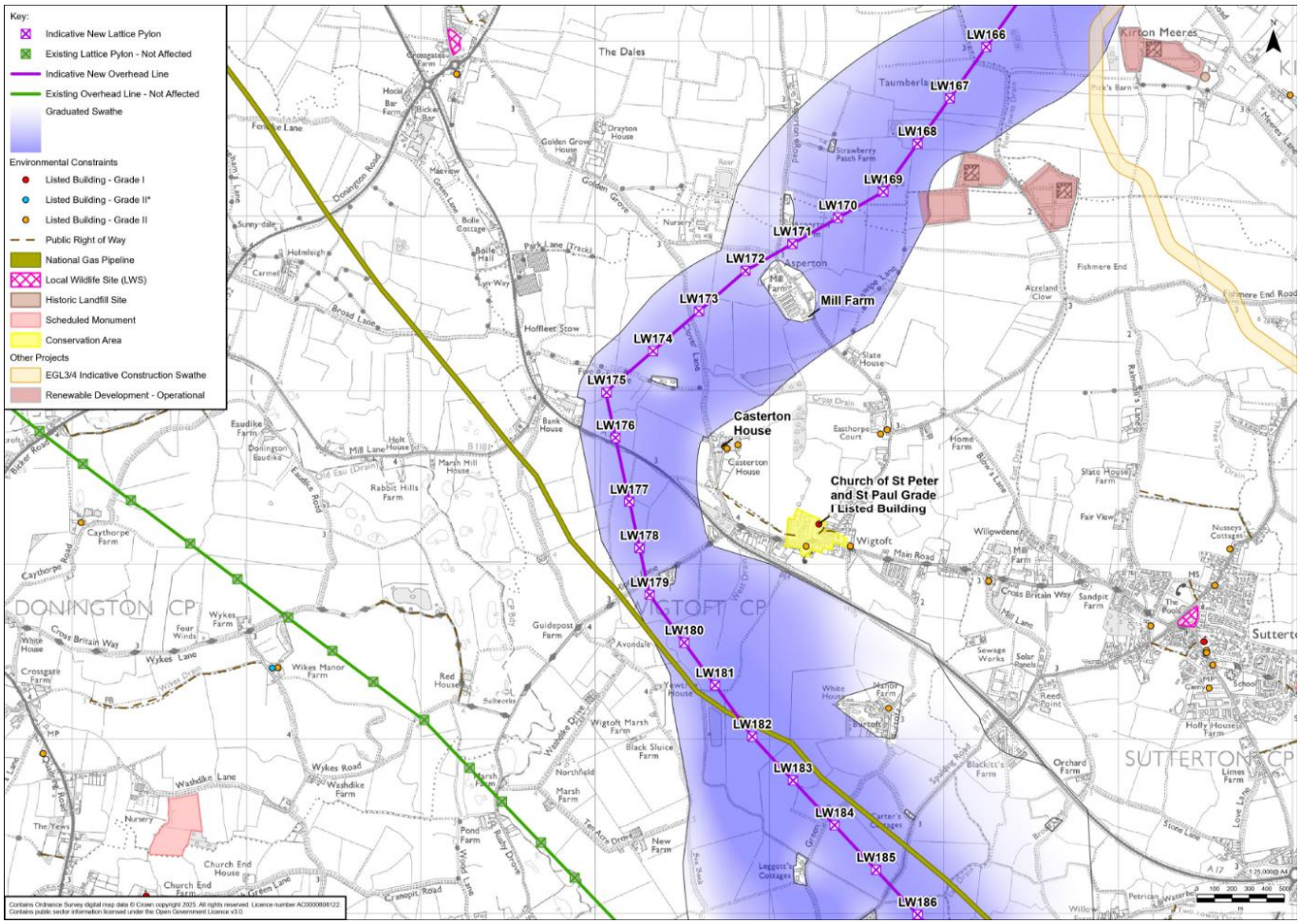
7.5.67 Additionally, routeing to the west of the cut-out on the B1391 Donington Road avoids the consented extension to Blackjack Nursery to the south of Donington Road. If the overhead line were routed to the east of the cut-out, it would need to avoid the land being developed by the nursery, which would likely introduce further angle pylons to the alignment (in conflict with Holford Rule 3).

7.5.68 From LW165 the proposed alignment turns to route towards the south west, following the corridor presented at Stage 1 consultation.

7.5.69 Throughout the area shown on Image 7.20, the corridor presented at Stage 1 consultation for the Project overlapped with the corridor presented at Stage 1 consultation for the proposed Eastern Green Link 3 and Eastern Green Link 4. Coordination between the two project teams has taken place during the development of the proposed alignment to ensure interactions between the proposed overhead line and the proposed underground cable are minimised as far as practicable. In this area, the proposed cable route for Eastern Green Link 3 and Eastern Green Link 4 runs at the eastern extent of the corridor presented at Stage 1 consultation for the proposed new overhead line, which avoids any crossings or close parallel routeing between the proposed overhead line and the proposed underground cable.

Kirton End to Sutterton Dowdyke

Image 7.21 Proposed overhead line alignment between Kirton End and Sutterton Dowdyke



7.5.70 From LW165, the proposed alignment routes towards the south west as far as LW175, then towards the south to LW179, before turning towards the south east, following the routeing of the corridor presented at Stage 1 consultation.

7.5.71 Between LW169 and LW187, the proposed alignment deviates from the most likely routeing that was indicated by the darkest shading of the graduated swathe at Stage 1 consultation. The proposed alignment shown was adopted in response to feedback at the Stage 1 consultation regarding the potential impacts to:

- heritage assets at Wigtoft, which 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 (in accordance with Holford Rule 2).; and
- residential properties at Wigtoft.

7.5.72 Paragraphs 5.3.36 to 5.3.38 of this Design Development Report describe in detail how the corridor and graduated swathe presented at Stage 1 consultation were amended in response to Stage 1 consultation feedback regarding Wigtoft, to increase the distance between the overhead line and the key heritage and residential receptors.

7.5.73 As described in Paragraph 5.3.38 of this report, the alignment between LW169 and LW187 is considered to reduce the potential for setting impacts to heritage assets at Wigtoft and Casterton House (in accordance with Holford Rule 2) and to increase the distance of the overhead line from residential properties at Wigtoft (in accordance with Holford Rule 2), while also minimising the number of angle pylons required in the vicinity of Asperton (in accordance with Holford Rule 3) and routeing at similar distances from scattered residential properties in the area as far as practicable.

7.5.74 The cut-out from the corridor presented at Stage 1 consultation at Mill Farm, along Asperton Road, represents a key constraint in the development of the proposed alignment between LW169 and LW175. Routeing to the immediate north of this cut-out, centrally within the corridor presented at Stage 1 consultation, is considered to best facilitate an overhead line alignment to the north and west of the corridor near Casterton House and Wigtoft while, as far as practicable, remaining at similar distances from scattered properties (in accordance with Holford Rule Supplementary Note 1) and providing the shortest and straightest routeing (in accordance with Holford Rule 3).

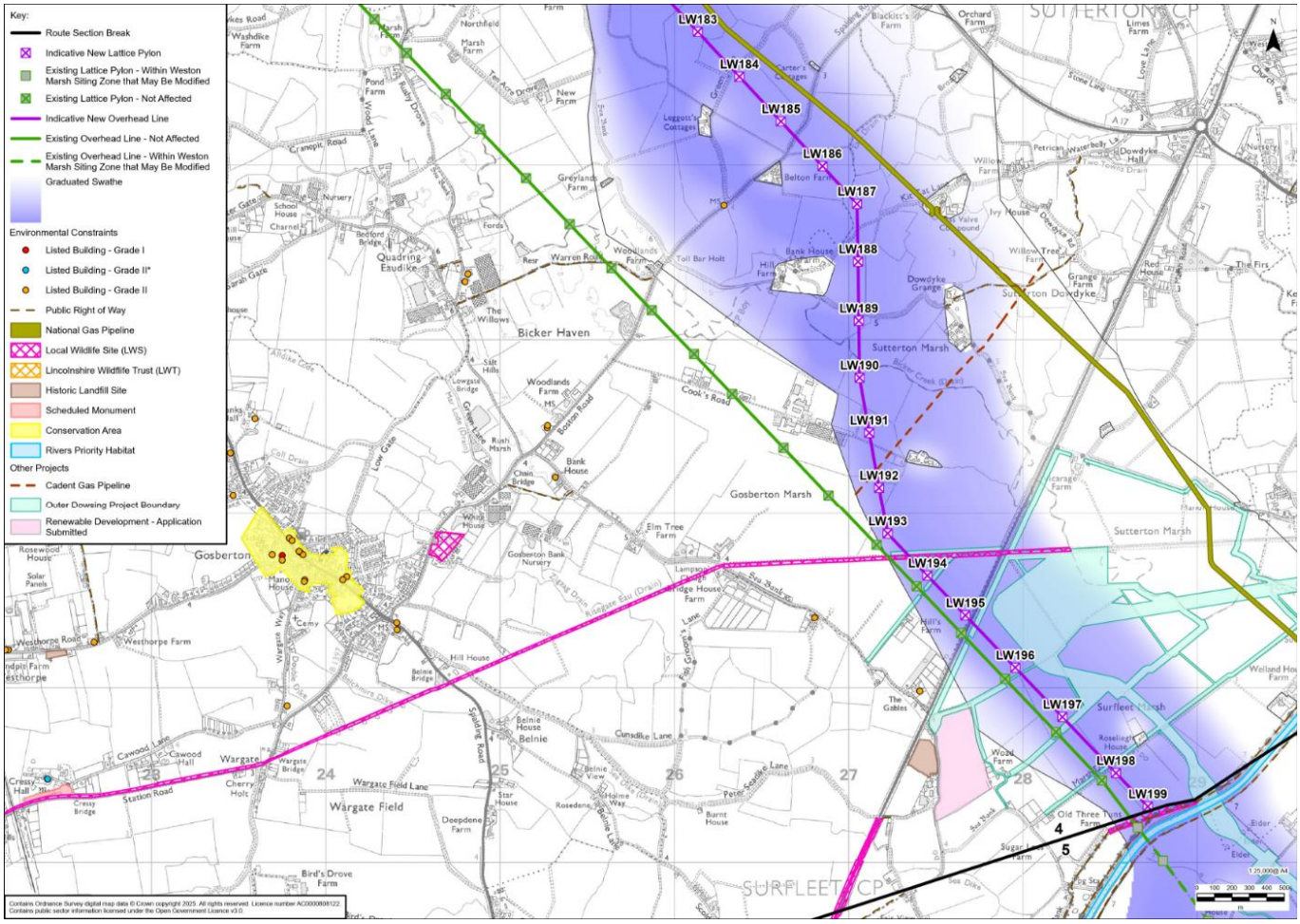
7.5.75 The proposed alignment then routes to the north west of the cut-out from the corridor presented at Stage 1 consultation along Five Bell Lane, near LW174, and to the west of the cut-out along Hipper Lane, near LW179, to maximise as far as possible the distance of the overhead line from Casterton House and Wigtoft (in accordance with Holford Rule 2).

7.5.76 South of Wigtoft, the preference to avoid routeing towards the eastern side of the corridor presented at Stage 1 consultation continues. This is in part to route the overhead line away from the greater number of residential properties to the east of the corridor, on the outskirts of Wigtoft and Sutterton (in accordance with Holford Rule Supplementary Note 1), but also reflects the preference to provide a more direct route towards the west of the corridor to the south of Sutterton Dowdyke, shown on Image 7.22, where routeing on the western side of the corridor presents opportunities to close parallel existing overhead line infrastructure, as explained below (in accordance with Holford Rule 6).

7.5.77 Between LW179 and LW187, the proposed alignment routes in proximity to a National Gas high pressure gas pipeline, which routes across the corridor presented at Stage 1 consultation from north west to south east. The proposed alignment between LW179 and LW187 has been developed to remain, as far as practicable, the shortest, straightest routeing (in accordance with Holford Rule 3), while also:

- remaining at similar distances from scattered residential properties (in accordance with Holford Rule Supplementary Note 1); and
- minimising the number of crossings of the gas pipeline, and the length of parallel routeing of the proposed overhead line and gas pipeline, to minimise the potential for electrical interference between the two assets. The proposed alignment crosses the gas pipeline once between LW181 and LW182.

Image 7.22 Proposed overhead line alignment between Sutterton Dowdyke and Refined Weston Marsh Substation Siting Zone



7.5.78 The proposed overhead line continues on the straight alignment towards the south east from LW179 (on Image 7.21) as far as LW187, to the west of Sutterton Dowdyke. At LW187 the overhead line turns towards the south while the National Gas high pressure gas pipeline continues south east, and therefore no longer acts as a constraint within the corridor.

7.5.79 Routeing towards the south between LW187 and LW193 takes the proposed alignment to the western edge of the corridor presented at Stage 1 consultation, which it then follows towards the south east from LW193 to the route section break between Section 4 and Section 5, at LW199.

7.5.80 Routeing in this area is primarily influenced by the existing 400 kV overhead line (known as the 4ZM route) which routes from north west to south east along the western side of the corridor presented at the Stage 1 consultation. To avoid creating a wirescape in the area (in accordance with Holford Rule 6) and to provide the most direct route towards the Refined Weston Marsh Substation Siting Zone that minimises angle pylons (in accordance with Holford Rule 3), the proposed alignment has been routed to closely parallel the 4ZM route from the furthest tower north west where it is practicable to do so, LW193, to the route section break between Sections 4 and 5, over a total of six spans. North of LW193, the proposed alignment has been developed to take the shortest, straightest route towards the 4ZM (in accordance with

Holford Rule 3) while avoiding cut-outs from the corridor presented at the Stage 1 consultation and seeking to route at similar distances from residential properties as far as practicable (in accordance with Holford Rule Supplementary Note 1).

7.5.81 Also constraining routeing in this area is the proposed infrastructure for the onshore elements of Outer Dowsing Offshore Wind Farm, including a proposed substation included within the Outer Dowsing Development Consent Order application, located at Surfleet Marsh, to the north east of the proposed alignment between LW195 and LW196. Routeing the proposed alignment in close parallel with the 4ZM (in accordance with Holford Rule 6) route also avoids any interaction with this proposed substation and the high voltage alternating current (HVAC) underground cable route.

7.5.82 The draft order limits of Outer Dowsing Offshore Wind extend to the east of their proposed substation for the purposes of access, a construction compound and mitigation planting. The pylon positions for the proposed alignment where it parallels the 4ZM route have been developed to synchronise with the pylon positions of the 4ZM as far as possible (in accordance with Holford Rule 6), while avoiding the draft order limits of Outer Dowsing Offshore Wind and other constraints such as existing roads, most notably the A16, and field boundaries.

Pylon Choice

7.5.83 This section is approximately 66 km in length and is predominantly rural in character, encompassing a large, low-lying, flat landscape with many large agricultural fields and drainage ditches, dykes and rivers. The main residential areas are Skegness and Boston. Within the wider rural area there are a number of other villages including Burgh le Marsh and Stickney.

7.5.84 As the route would potentially be visible from the Lincolnshire Wolds National Landscape (AONB) and passes several sensitive receptors, including the Grade II listed buildings at Brothertoft Hall, Casterton House and the Church of St Peter in Midville, this part of the route has been considered for alternative pylon types, including T-pylons and low height lattice pylons.

7.5.85 Views 5 and 6 presented in 0 illustrate views from the Lincolnshire Wolds National Landscape (AONB) in Section 4. View 5 is located to the south of Ulceby and View 6 from Bluestone Heath Road, both showing the longer distance views from the Wolds. Views 7 to 10 illustrate views across the low-lying landscapes within Section 4. For full descriptions and reasoning for selection of viewpoints refer to **PEI Report Part B Appendix 3A Proposed Viewpoints**.

7.5.86 As with Sections 2 and 3, in views east from the Lincolnshire Wolds, the T-pylon would be a more solid structure that would benefit less from any backclothing. Although there are wind turbines visible in views which have a similar form to the T-pylon, these are more distant, being closer to the coast and are seen less against a backcloth. Using T-pylon closer to the designated landscape would draw the eye to the proposed overhead line. This is illustrated in View 5 in 0. Similarly in views west towards the Wolds, the T-pylon would potentially be seen more against the slightly elevated ground of the Wolds and within a landscape and in views that do not contain any similar structures such as wind turbines.

7.5.87 Moving away from the Lincolnshire Wolds and towards the south of Section 4, there are existing 132 kV and 400 kV lattice overhead lines within the landscape. A 132 kV lattice overhead line is present in the landscape between Burgh le Marsh and Boston, with 132 kV and 400 kV lattice overhead lines to the south and west of

Boston. Introducing T-pylons in this area would be inconsistent with existing infrastructure.

7.5.88 The proposed overhead line route in Section 4 also includes several locations where the route of the overhead line changes direction by more than 30 degrees. T-pylons are designed for a maximum angle deviation of 30 degrees, so a change to T-pylons for these parts of the alignment would result either in multiple consecutive angle pylons at closer proximity to receptors, or a short section of lattice towers to enable the angle deviation of greater than 30 degrees at one lattice tension pylon. Both of these options would potentially increase the visual impact on nearby receptors.

7.5.89 Combined with the general technical disadvantages of the T-pylon design outlined in Chapter 6, there was not considered to be a justification for T-pylons to be used in Section 4.

7.5.90 However, the review of alternative pylon types concluded that a number of sections should be considered for the use of low height lattice pylons. The following sections were put forward, primarily for heritage reasons:

- a 2.5 km section to the north of Croft, to reduce impacts on a number of heritage assets including listed buildings at Bland's Farmhouse, Lymm Bank Farmhouse and The Hollies;
- a 3.5 km section relating to reducing impacts on heritage assets including The Church of St Peter at Midville and Kings Hill motte and bailey castle scheduled monument; and
- a short 500 m section to the east of Brothertoft, to reduce impacts on heritage assets including Brothertoft Hall and Church of St Gilbert.

7.5.91 Each of the sections was considered within a multi-disciplinary appraisal by technical and environmental disciplines. It was considered that although there may be some localised benefits for heritage assets for short sections of low height pylons, 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 during the construction and operational phases. This is due to the different loading profiles between different pylon types which can require different foundations and changes to fittings, as well as installation of tension pylons and additional modifications to cross-arms and extensions that may be required to transition between standard height and low height pylons. Views of the proposed overhead line from the Lincolnshire Wolds National Landscape (AONB) tend to be more elevated and distant to the Project as shown in View 6 in 0, and the presence of existing overhead lines to the south of this section means full height lattice would be more consistent visually with a similar cross arm configuration. From a biodiversity perspective, a change to 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 show low height pylons would reduce bird collision risk.

7.5.92 To the north of the Refined Weston Marsh Substation Siting Zone, the proposed alignment looks to parallel the existing 4ZM route, synchronising the pylon positions with the existing route where possible. Using a similar pylon type, with similar spans, would help create a coherent appearance (in accordance with Holford Rule 6).

7.5.93 Low height pylons have also been considered where the proposed overhead line routes in proximity to aviation receptors. As detailed in Chapter 6, all identified operational airfields within 5 km of the proposed overhead line have been assessed to understand the possible effects of overhead line infrastructure being introduced near active aviation operations.

7.5.94 Table 7.10 below lists the aviation receptors which have been identified within 5 km of the proposed overhead line alignment in Section 4. The receptors are listed from north to south, and the approximate distances to the overhead line alignment are measured from the closest part of the centreline of the proposed overhead line alignment to the nearest threshold of the runway or helipad.

Table 7.10 Aviation receptors within 5 km of the proposed alignment in Section 4

Receptor	Description
Ashley's Field Airstrip	This receptor is an unlicensed airstrip located approximately 1,000 m from the overhead line alignment. The airstrip is situated approximately 11 km northwest of Skegness.
Skegness Airfield	This receptor is an unlicensed airfield located approximately 3,200 m from the overhead line alignment. The airfield is situated approximately 3 km north of Skegness.
East Kirkby Airfield	This receptor is an unlicensed airfield located approximately 5,000 m from the overhead line alignment. The airfield is situated approximately 9 km southwest of Mablethorpe.
Loxley Airfield	This receptor is an unlicensed airfield located approximately 2,700 m from the overhead line alignment. The airfield is situated approximately 1.2 km northeast of Stickford. It is not currently known if Loxley Airfield remains operational.
Croft Airstrip	This receptor is an unlicensed airfield located approximately 1,800 m from the overhead line alignment. The airstrip is situated approximately 5 km southwest of Skegness.
Boston Airfield	This receptor is an unlicensed airfield located approximately 1,500 m from the overhead line alignment. The receptor is situated approximately 1.5 km to west of Boston.

7.5.95 Based on the information in Table 7.10 above, the following sections of low height pylons were considered based on proximity to aviation receptors:

- a short section to the west of Ashley's Field Airstrip between pylons LW21 and LW23, to provide additional clearance to overflying aircraft taking off from Runway 25 or approaching Runway 07, due to the proximity of the overhead line to this

runway and the near perpendicular angle between the runway orientation and the overhead line alignment; and

- a short section to west of Boston Aerodrome between pylons LW151 to LW153, to provide additional clearance to overflying aircraft taking off from Runway 27 or approaching Runway 09, due to the proximity of the overhead line to this runway and the near perpendicular angle between the runway orientation and the overhead line alignment.

7.5.96 At Ashley's Field Airstrip, 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. However, at shallower approach angles to Runway 07 (4 degrees or lower), the clearance begins to approach what is considered to be a minimum safe level. Low height pylons between LW21 and LW23 would slightly increase this clearance, however based on preliminary assessments 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 between pylons LW21 and LW23, 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.

7.5.97 At Boston Aerodrome, 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 LW152 and LW153 (those which are under the flightpath of straight-ahead departures from Runway 27 and approaches to Runway 09), 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 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 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. Considerations related to flight training activities at Boston Aerodrome in particular, including engine failure after take-off (EFATO) exercises, will require ongoing assessment between Stage 2 consultation and DCO submission.

7.5.98 Low height pylons were not considered to make any material difference to impacts on flight operations at any of the other aviation receptors in Section 4. As such, they were not taken forward for further consideration in these areas.

Summary

7.5.99 In summary it is considered that the use of an alternative pylon design to standard lattice pylons in Section 4 is not justified.

7.6 Section 5 – Refined Weston Marsh Substation Siting Zone

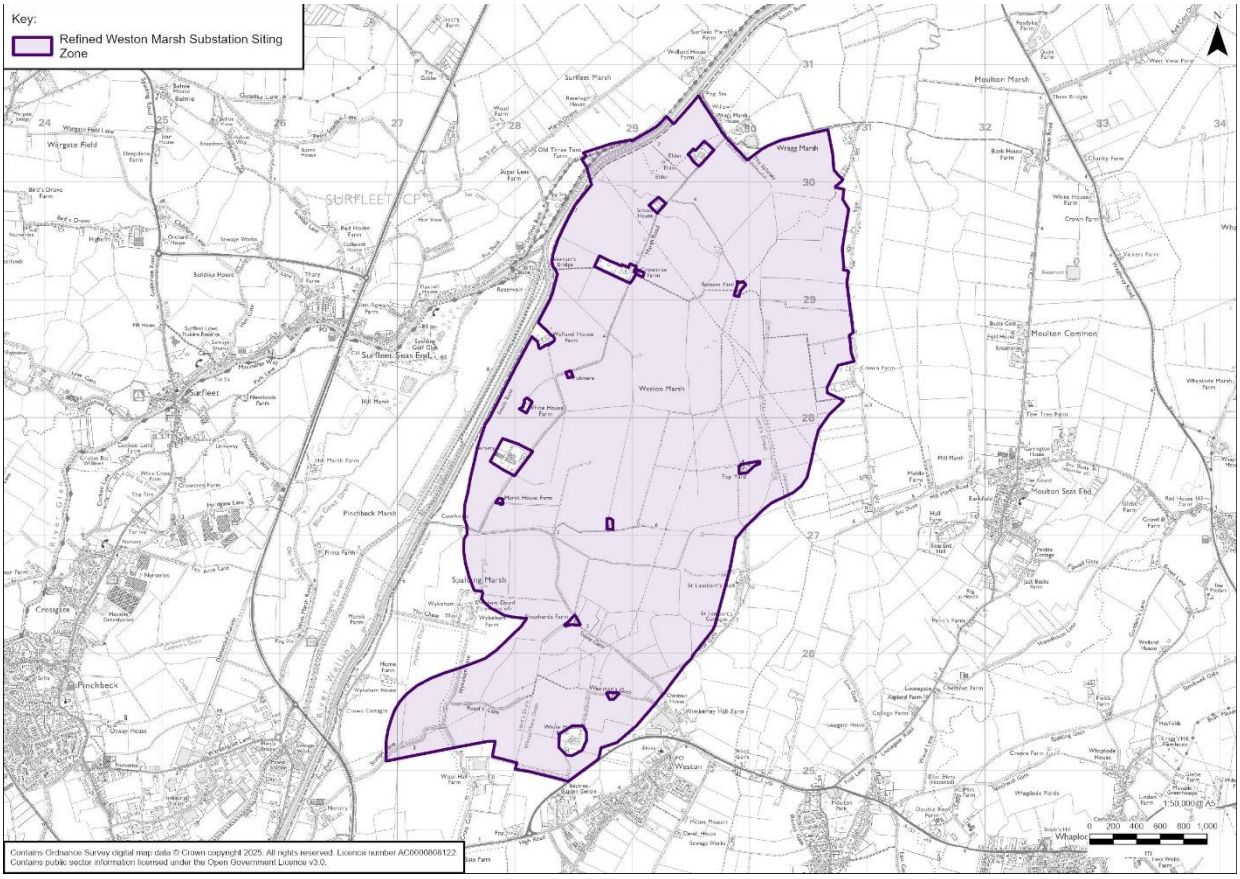
Overview

7.6.1 Section 5 is located to the north east of Spalding, east of the River Witham near Surfleet Seas End and west of Moulton Seas End, and could comprise up to two, separate substation compounds (Weston Marsh Substation A and Weston Marsh Substation B), with an appropriate electrical interconnection (either underground cable or overhead line) between them.

7.6.2 As described in Chapter 5 (Paragraphs 5.3.39 to 5.3.42), additional design considerations have emerged since Stage 1 consultation which are still being progressed. The outcome of this additional design work will determine the specific infrastructure requirements that will need to be located within the Refined Weston Marsh Siting Zone, hence no specific design elements are shown at this stage. The boundary of the Refined Weston Marsh Substation Siting Zone is shown in Image 7.23.

7.6.3 As a result, optionality has been retained in this Section until such time that this additional design work has concluded. Any proposed design updates to this Section following the outcomes of this work will then be taken forward as part of further, localised Stage 2 consultation at a future date. This will include any amendments within Sections 4 and 6, close to their boundaries with Section 5, to integrate these sections with the additional design work within Section 5.

Image 7.23 Refined Weston Marsh Substation Siting Zone



Pylon Choice

7.6.4 At this stage of design development, pylon choice for Section 5 is yet to be confirmed. Pylon choice will be reviewed as part of additional design work and will be presented as part of additional Stage 2 consultation.

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

Overview

7.7.1 Section 6 of the route extends from the Refined Weston Marsh Substation Siting Zone, the southernmost extent of which is situated to the immediate north of the A151 Weston Bypass and to the west of Weston, to the proposed new Walpole Substation (new Walpole B Substation), to the north of Walton Highway and approximately 2.5 km to the south of the existing Walpole Substation. Section 6 of the route comprises approximately 27 km of new 400 kV overhead line routeing in a primarily south easterly direction.

7.7.2 From the Refined Weston Marsh Substation Siting Zone, the proposed overhead line routes short distances to the south west, then south, then south east as it routes between Spalding, to the west, and Weston, to the east. Near Weston Hills it turns towards the east, routeing between Weston Hills and Austendike, to the south, and Moulton, to the north, before routeing back towards the south for a short distance to the south of Whaplode. From here the proposed overhead line routes east as far as

Whaplode St Catherine, then continues south east to route to the north east of Holbeach St Johns and the south west of Sutton St James. To the west of Tydd St Giles, the proposed overhead line turns to route towards the east to cross the A1101 Sutton Road to the south of Four Gotes, from where it continues east across the River Nene. Beyond the river, the proposed overhead line routes south east to the proposed new Walpole B Substation.

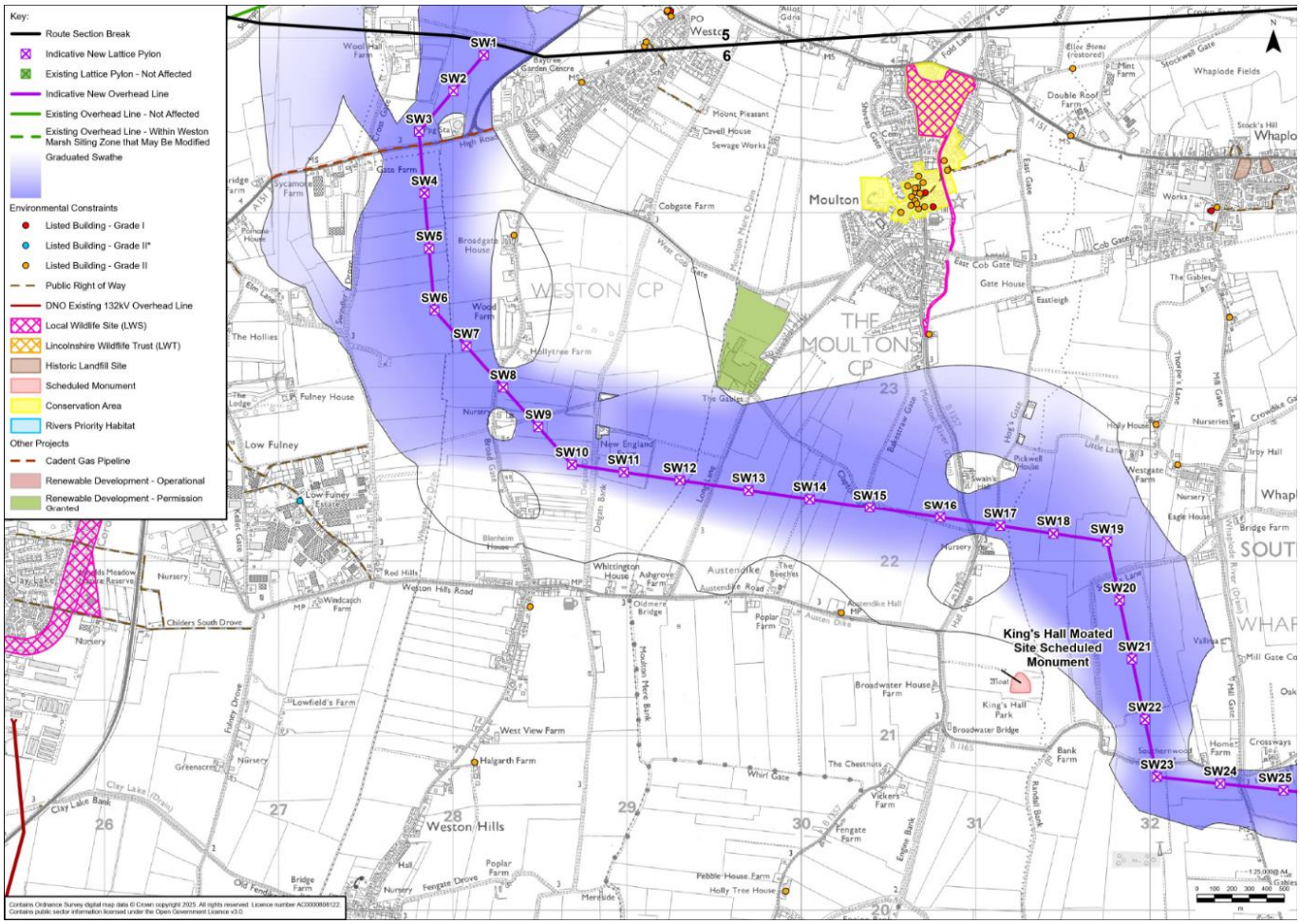
7.7.3 This section of the report describes the development of the proposed alignment and the consideration of alternative pylon types within Section 6.

Proposed Alignment

7.7.4 The proposed overhead line alignment in Section 6 has considered a range of constraints, including environmental features, residential communities, existing infrastructure and planned developments. These features are discussed below and illustrated in further detail in Image 7.24 to Image 7.27 below.

Refined Weston Marsh Substation Siting Zone to Whaplode

Image 7.24 Proposed overhead line alignment between Refined Weston Marsh Substation Siting Zone and Whaplode



7.7.5 At the route section break between Sections 5 and 6, to the west of Weston, pylon SW1 has been located towards the east side of the corridor presented at Stage 1 consultation. When the overhead line alignment within Section 5 is developed, this

will facilitate routeing between the cut-outs from the corridor presented at Stage 1 consultation to the west of SW1, along Cross Gate, and to the north east of SW1, along Wiseman's Gate.

7.7.6 Routeing to the west of the cut-out along Cross Gate is not preferred as this would result in a longer overhead line route in closer proximity to residential properties and developments to the east of Spalding (in conflict with Holford Rule Supplementary Note 1). Routeing to the east of the cut-out along Wiseman's Gate is not preferred as this would bring the overhead line in closer proximity to residential properties and developments at Weston (in conflict with Holford Rule Supplementary Note 1), as well as resulting in more constrained routeing through the narrow gap between the cut-out and the A151 Weston Bypass.

7.7.7 Should National Grid identify any subsequent changes to the proposed routeing at the northern end of Section 6 as a result of the additional design work in Section 5, these will be evaluated as part of the ongoing design work within the Refined Weston Marsh Siting Zone.

7.7.8 From SW1, the proposed alignment initially routes to the south west, before turning to the south at SW3 to facilitate a perpendicular crossing of the A151 High Road. The location for the proposed overhead line crossing of the A151 High Road is constrained by the Anglian Water pumping station located to the immediate north of the road and to the east of the proposed overhead line alignment. Crossing the A151 High Road to the east of the pumping station was also considered but was not preferred because:

- the roundabout junction on the A151, to the immediate east of the pumping station, would significantly constrain pylon placement; and
- National Grid is aware of an outdoor children's play area at the Fun Farm soft play centre on High Road to the east of the roundabout junction on the A151, and has sought to increase the stand-off of the overhead line from this facility.

7.7.9 Five Anglian Water pipelines connecting to the pumping station, crossing the corridor presented at Stage 1 consultation from north west to south east to the north of the A151 High Road, are crossed by the proposed alignment between SW2 and SW3 and have constrained the placement of pylons.

7.7.10 To the south of the A151 High Road, the proposed alignment continues towards the south as far as SW6, routeing centrally within the corridor presented at Stage 1 consultation. This routes the overhead line at similar distances from properties in the two large cut-outs from the corridor presented at Stage 1 consultation along Swindlers Drove to the west and Broadgate to the east, and at similar distances from Spalding and Weston (in accordance with Holford Rule Supplementary Note 1).

7.7.11 At SW6 the proposed alignment turns towards the south east as far as SW10, routeing through the most central of the four possible gaps between cut-outs in the corridor presented at Stage 1 consultation along Broadgate. This facilitates the proposed alignment turning from routeing from north to south to routeing from west to east via two angle pylons at SW6 and SW10, rather than a single angle pylon with a much more significant change in angle located to the west of Broadgate. National Grid considered that a single angle pylon would have greater visual impact, as the pylon design required for an approximately 90 degree change in angle is bulkier in appearance than pylons used for shallower changes in angle, and its location would have been prominent in views from a number of properties located along Broad Gate, Austendyke Road and Swindler's Drove.

7.7.12 National Grid is aware of the recent proposals by Downing Renewable Developments to route their overhead line connection for the proposed Meridian Solar Farm along a similar alignment to the Project between SW1 and SW10. The timing of this occurred during the latter stages of finalising the proposed alignment and National Grid will continue to work collaboratively with this customer to resolve this potential routeing conflict following Stage 2 consultation.

7.7.13 Between SW8 and SW16, the proposed alignment deviates from the most likely routeing indicated by the darkest shading of the graduated swathe at Stage 1 consultation, by routeing to the south of the two cut-outs from the corridor presented at Stage 1 consultation along Delgate Bank rather than routeing in between them. Paragraphs 5.3.49 to 5.3.51 of this Design Development Report describe in detail how the corridor and graduated swathe presented at Stage 1 consultation were amended in response to Stage 1 consultation feedback regarding potential impacts to residential properties along Delgate Bank (in accordance with Holford Rule Supplementary Note 1).

7.7.14 As described in Paragraph 5.3.51 of this report, the proposed alignment near Weston Hills, routeing to the south of the cut-outs on Delgate Bank, is preferred to avoid routeing in the narrow gap between properties and avoid an area of Coastal and Floodplain Grazing Marsh Priority Habitat located to the east of Delgate Bank and to the north of the proposed alignment (in accordance with Holford Rule 2).

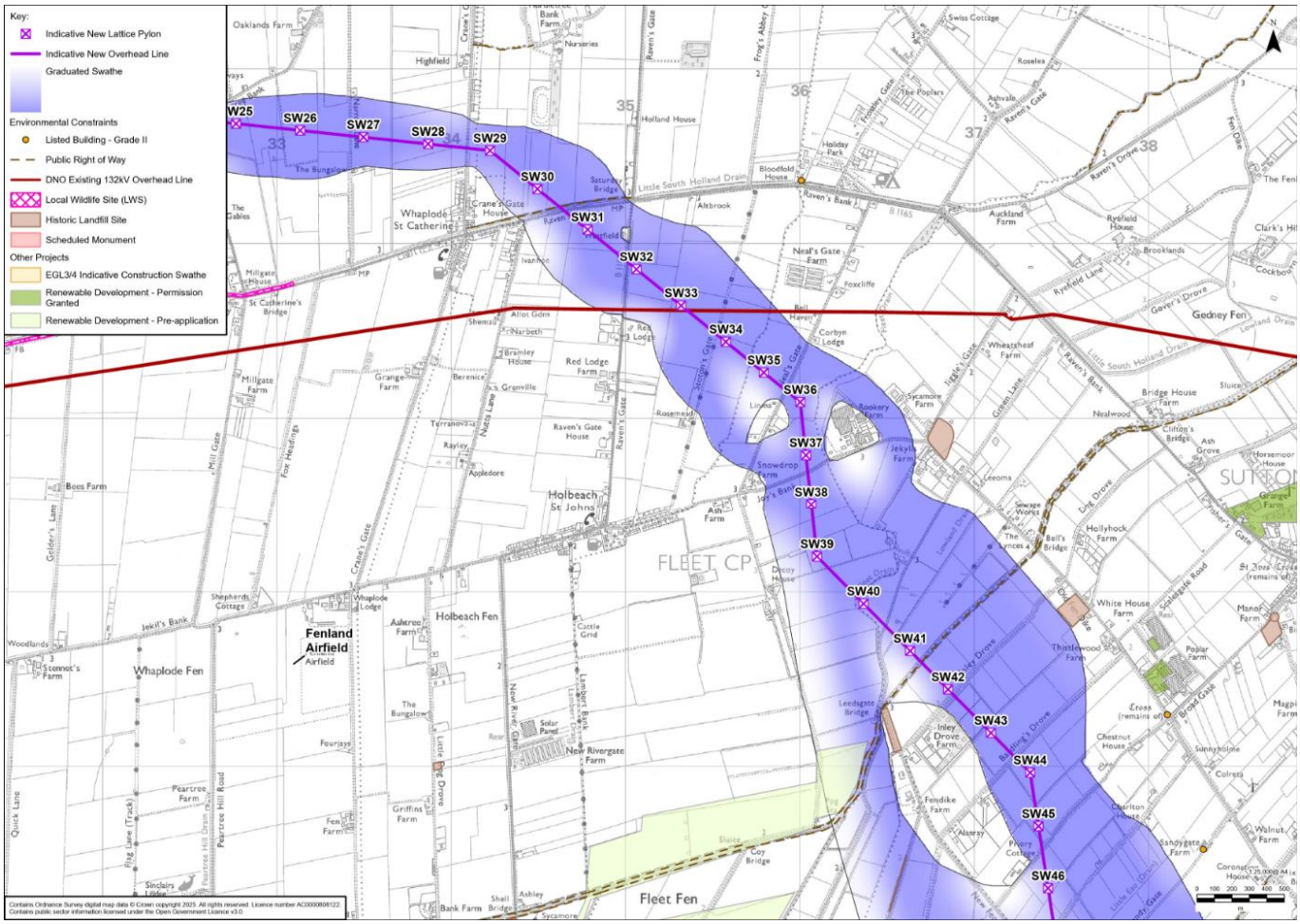
7.7.15 Beyond the angle pylon at SW10, the proposed alignment routes towards the east on a straight alignment as far as SW19. Through this area, the proposed alignment routes centrally within the corridor presented at Stage 1 consultation and centrally between the cut-outs along Hall Gate and Hogs Gate to the south of Moulton, to follow the principles of shortest and straightest routeing (in accordance with Holford Rule 3), routeing at similar distances from scattered properties as far as possible (in accordance with Holford Rule Supplementary Note 1).

7.7.16 As the proposed alignment follows the corridor presented at Stage 1 consultation in turning to route to the south at SW19 and back towards the east at SW23, it routes within approximately 600 m of the King's Hall moated site scheduled monument. To maximise, as far as practicable, the distance from the overhead line to the scheduled monument (in accordance with Holford Rule 2), the proposed alignment has been developed with a sharper angle at SW19 in preference to two shallower angles comparable to the approach taken between SW6 and SW10. Using two shallower angles at this location would have routed the overhead at a similar proximity to the scheduled monument as the proposed alignment, but maintained this proximity over a greater length of overhead line.

7.7.17 At SW23 the proposed alignment similarly uses a single, sharper angle, rather than two shallower angles, due to the narrow width of the corridor presented at Stage 1 consultation at this location as it routes to avoid residential properties (in accordance with Holford Rule Supplementary Note 1).

Whaplode to New Fen Dike

Image 7.25 Proposed overhead line alignment between Whaplode and New Fen Dike



7.7.18 The proposed alignment continues towards the east as far as SW29 then turns to route to the south east between SW29 and SW36. Through much of this area the corridor presented at Stage 1 consultation is narrow with limited optionality, and the proposed alignment has been developed centrally within the corridor considering the shortest and straightest routeing with minimal angle pylons (in accordance with Holford Rule 3).

7.7.19 Between SW36 and SW39 the proposed alignment routes from north to south to pass centrally between the two cut-outs from the corridor presented at Stage 1 consultation along Neals Gate and Joys Bank to the east of Holbeach St Johns. Routeing to the east or west of these cut-outs is not preferred as it would increase the overall length of the overhead line and the number of angle pylons, (in conflict with Holford Rule 3), and would impact additional residential properties to either side of the corridor (in conflict with Holford Rule Supplementary Note 1).

7.7.20 In developing the proposed alignment near Holbeach St Johns, National Grid has also considered the proximity of the overhead line to Fenland Airfield, located to the east of Holbeach St Johns, to avoid impacts on aviation activities. The potential impact of the proposed alignment on airfield operations at Fenland Airfield has been further considered in deciding on the type of pylons to use in this section, which is explained further in Paragraph 7.7.46 below.

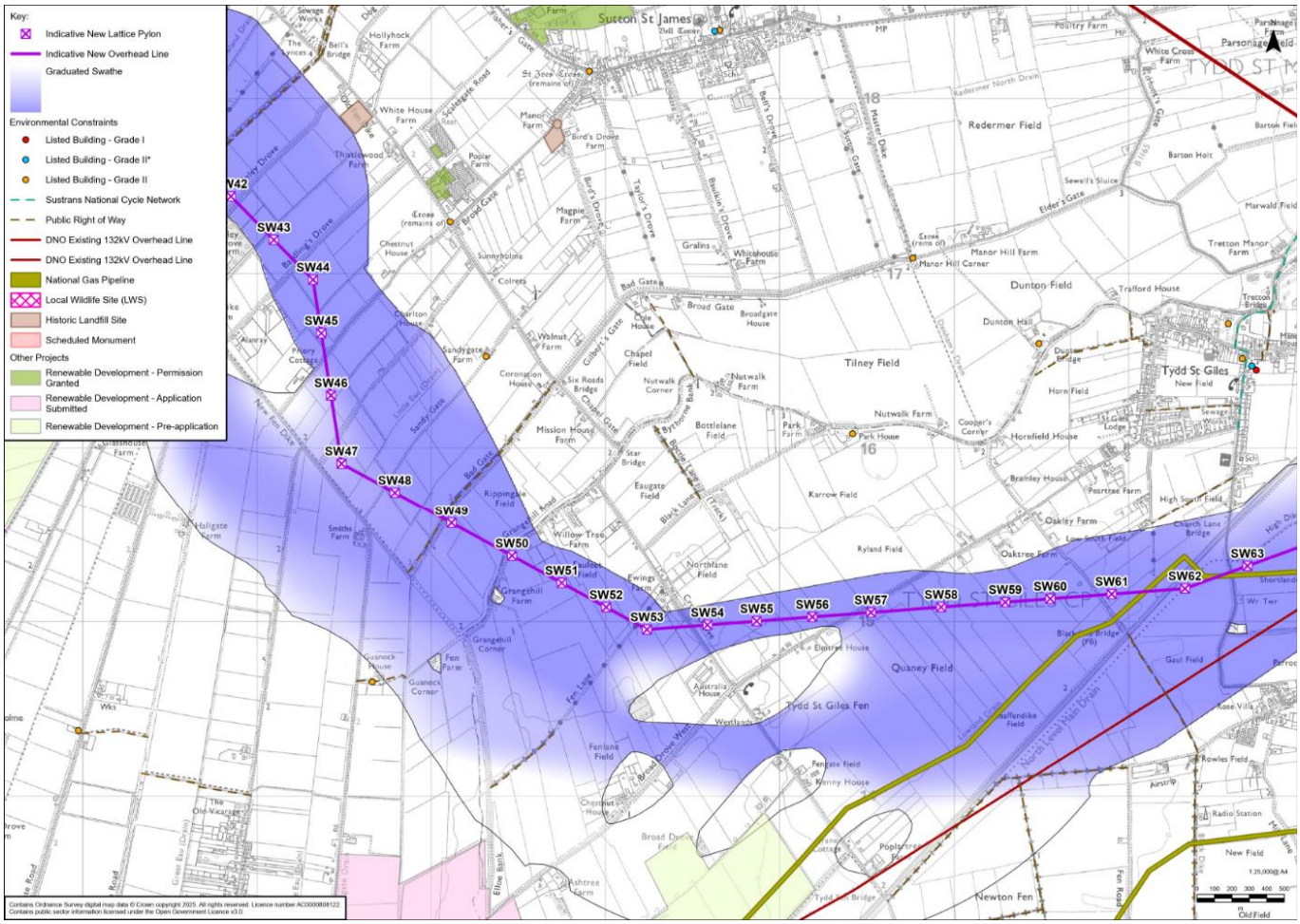
7.7.21 From SW39, the proposed alignment routes towards the south east to take the eastern path where the corridor presented at Stage 1 consultation splits around the large cut-out from the corridor at New Fen Dike. Consideration of the two routes by the Project team found little to choose between them environmentally, and National Grid has therefore opted to route the proposed alignment to the east of New Fen Dike as this results in a shorter overhead line alignment than routeing to the west of New Fen Dike (in accordance with Holford Rule 3).

7.7.22 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 – and 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 (in accordance with Holford Rule 3). 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.

7.7.23 There are areas of Coastal and Floodplain Grazing Marsh Priority Habitat to both sides of the cut-out from the corridor presented at Stage 1 consultation along New Fen Dike. In routeing to the east of the cut-out, National Grid has developed pylon positions to avoid placing a pylon within the Priority Habitat area (in accordance with Holford Rule 2).

New Fen Dike to Tydd St Giles

Image 7.26 Proposed overhead line alignment between New Fen Dike and Tydd St Giles



7.7.24 From the cut-out in the corridor presented at Stage 1 consultation at New Fen Dike, the proposed alignment routes towards the south between SW44 and SW47 and then to the south east between SW47 and SW53, which takes the overhead line to the centre of the corridor presented at Stage 1 consultation at SW47 then back out towards its eastern edge near SW50. This routeing avoids oversailing of a barn along Goochgate, to the east of SW46, and increases the separation of the overhead line from linear residential properties along Old Fendyke to the north east of the proposed alignment (in accordance with Holford Rule Supplementary Note 1).

7.7.25 From SW53, the proposed alignment turns to route towards the east, generally following the northern edge of the corridor presented at Stage 1 consultation through this area.

7.7.26 In this area there are several large cut-outs from the corridor presented at Stage 1 consultation in the vicinity of Tydd St Giles Fen, along Cross Drove, Broad Drove West and Middle Broad Drove. Consideration of routeing options around these cut-outs concluded with a preference to route to the north of the corridor presented at Stage 1 consultation for a number of reasons:

- Routeing to the north of the corridor presented at Stage 1 consultation provides the shortest and straightest alignment (in accordance with Holford Rule 3).

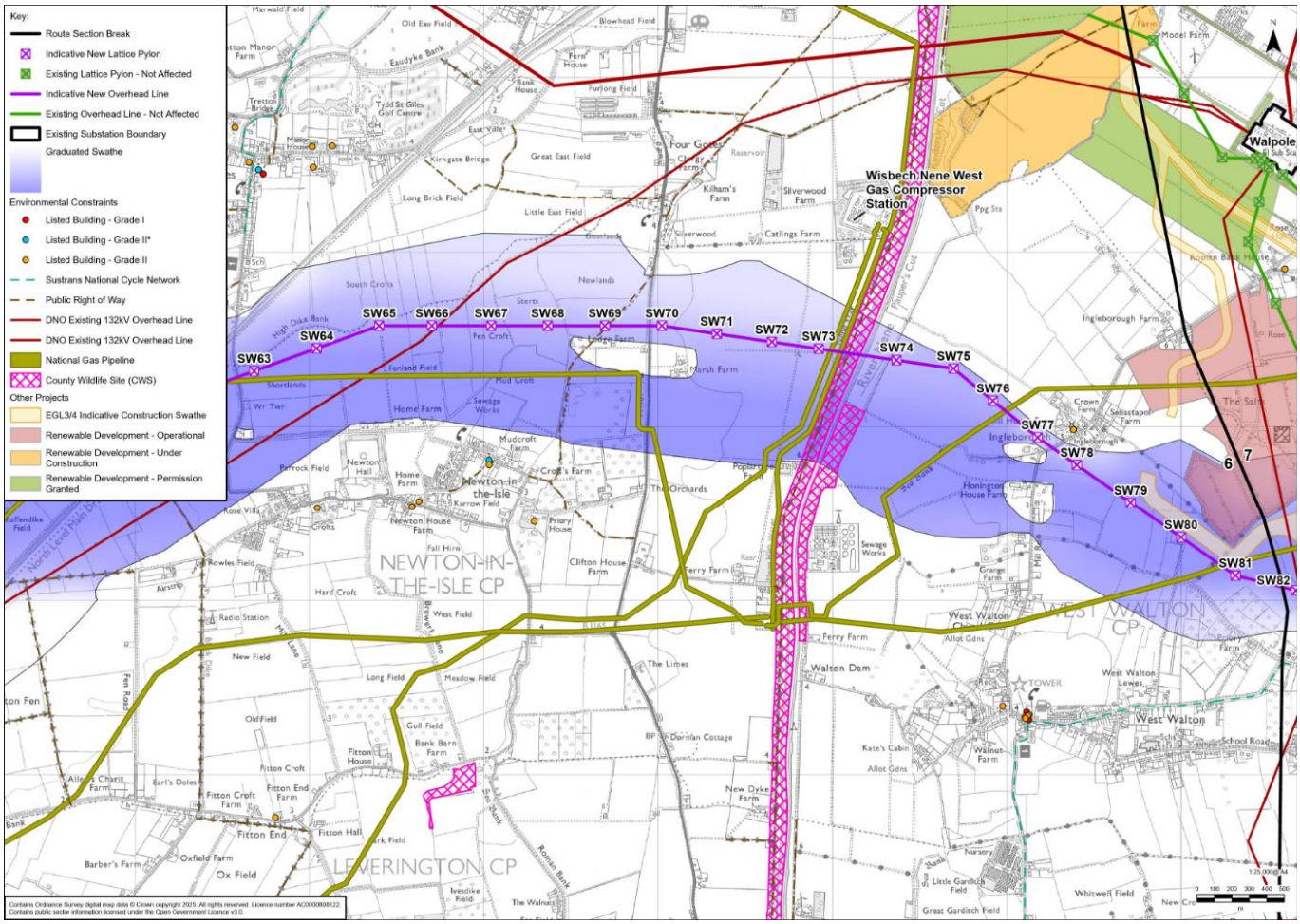
- Routeing the overhead line further south in the corridor would result in a longer overhead line alignment and a greater number of angle pylons (in conflict with Holford Rule 3).
- A UK Power Networks (UKPN) 132 kV overhead line routes through the corridor presented at Stage 1 consultation from south west to north east. The 132 kV overhead line enters the corridor to the south of Tydd St Giles Fen and east of Cross Drove, runs parallel to the southern edge of the corridor as far as Newton-in-the-Isle, then crosses to leave the corridor on its northern edge near Four Gotes. Routeing further south within the corridor presented at Stage 1 consultation introduces greater interactions with the UKPN 132 kV overhead line, constraining alignment options due to considerations of maintaining sufficient separation from the existing overhead line, limiting the number of crossings, and crossing at an angle as close to perpendicular as possible. As 132 kV overhead lines use different pylon heights and types, and different span lengths from 400 kV overhead lines, close paralleling is generally not preferable for reducing visual impact, and alignment options that route closer to, or interact more, with the existing 132 kV overhead line are more likely to introduce a wirescape (in conflict with Holford Rule 6). Routeing the proposed alignment to the north of the corridor presented at Stage 1 consultation limits the interaction with the UKPN 132 kV overhead line to a single crossing (shown on Image 7.27).
- A National Gas high pressure pipeline routes through the corridor presented at Stage 1 consultation from south west to north east between Tydd St Giles Fen and Tydd St Giles. Close parallel of high-pressure gas mains by overhead lines is avoided wherever possible due to the potential for induced voltages. Routeing to the north of the corridor presented at Stage 1 consultation minimises the extent to which the proposed alignment interacts with the existing gas pipeline, requiring two crossings, between SW61 and SW62 and between SW62 and SW63, but avoiding any significant lengths of close parallel.
- The corridor presented at Stage 1 consultation is also crossed by the North Level Main Drain, which routes from south west to north east across the corridor along a similar line to the National Gas high pressure pipeline, and is spanned by the proposed alignment between SW61 and SW62. The preference is to route the overhead line across the North Level Main Drain as close to perpendicular as possible, to reduce the technical complexity of the crossing, which is more readily achieved by alignment options in the north of the corridor.
- National Grid is aware of the proposed Treading Bank Solar Farm, a potential solar farm development in the south of the corridor presented at Stage 1 consultation, to the south east of Broad Drove West and the south west of Cross Drove. Routeing to the north of the corridor presented at Stage 1 consultation avoids interactions with this solar farm development should it proceed.
- Given the potential for interactions with the UKPN 132 kV overhead line, the National Gas high pressure pipeline, the North Level Main Drain and the proposed Treading Bank Solar Farm, routeing further south within the corridor presented at Stage 1 consultation would increase the technical complexity and risk for the overhead line construction. The Project team did not identify any significant environmental benefits from routeing further south that would justify this additional complexity and risk. Routeing the overhead line alignment further south results in impacts to different residential receptors but does not reduce the extent to which residential properties are affected, and routeing centrally in the

corridor could potentially impact a greater number of residential properties on Cross Drove and Broad Drove West.

7.7.27 Overall, the proposed alignment is considered to balance considerations of routeing in compliance with the Holford Rules, avoiding additional technical complexity, avoiding the potential for introducing a wirescape with the existing UKPN 132 kV overhead line, and minimising the impacts on residential properties as far as practicable.

Tydd St Giles to New Walpole B Substation

Image 7.27 Proposed overhead line alignment between Tydd St Giles and the new Walpole B Substation



7.7.28 To the east of Tydd St Giles, the proposed alignment continues towards the east, and routes to the north of the cut-out from the corridor presented at Stage 1 consultation on the A16 Sutton Road to the south of Four Gotes. In doing so, the proposed alignment deviates away from the darkest shading of the graduated swathe as presented at Stage 1 consultation, which indicated the most likely routeing to the south of the cut-out on the A16 Sutton Road.

7.7.29 This change has been adopted to avoid close parallel of the National Gas high pressure gas pipeline which routes from west to east within the corridor from south of Tydd St Giles to the A16 Sutton Road, to the north of Newton-in-the-Ilse, following an alignment in the southern portion of the corridor presented at Stage 1 consultation and to the south of the cut-out on the A16 Sutton Road. Close parallel of high-

pressure gas mains by overhead lines is avoided wherever possible. This is due to the potential for induced voltages, which may occur in nearby conductive materials such as metal pipelines, whereby the changing electrical field of an overhead line can push a small charge onto nearby objects. Where objects can't be avoided, alternative mitigation such as grounding can be utilised to remove this risk. Consideration of routeing options by the Project team identified that there were no overriding environmental considerations that would justify routeing in close parallel with the gas pipeline, and hence an overall preference to route to the north of the cut-out from the corridor presented at Stage 1 consultation to avoid further interactions with the gas pipeline.

7.7.30 In developing the proposed alignment to the north of the cut-out, National Grid has sought to balance the distance between the overhead line and the communities of Tydd St Giles and Four Gotes to the north and Newton-in-the-Isle to the south (in accordance with Holford Rule Supplementary Note 1).

7.7.31 Beyond the A16 Sutton Road, the proposed alignment continues to the east to cross the River Nene. To the west of the river, two National Gas high pressure gas pipelines cross the full extent of the corridor presented at Stage 1 consultation from south to north, in parallel with each other and the river. This necessitates the overhead line crossing the two gas mains and the river in a single span, as close to perpendicular as possible, which has acted as a significant constraint on pylon placement in this area.

7.7.32 In routeing to the north of the corridor presented at Stage 1 consultation, the proposed alignment avoids the Honington House County Wildlife Site along the east bank of the River Nene (in accordance with Holford Rule 2), but oversailing of the River Nene County Wildlife Site along the west bank of the river is unavoidable due to its extent across the whole consultation corridor.

7.7.33 National Grid is aware of ecological sensitivities at the River Nene crossing, resulting from the presence of a range of breeding, passage and wintering bird species. Environmental surveys are ongoing which will, if necessary, inform further design development in this area once a full data set is available.

7.7.34 To the east of the River Nene, the proposed alignment turns to route towards the south east at SW75, having spanned an Anglian Water waste water pipeline between SW74 and SW75. From SW75 the proposed alignment routes through a constrained area along Mill Road to the south west of Ingleborough, where there were two cut-outs from the corridor presented at Stage 1 consultation for residential properties. The proposed alignment routes through the northern gap between properties along Mill Road (in accordance with Holford Rule Supplementary Note 1), which represents the most direct route from the River Nene crossing towards the proposed new Walpole B Substation (in accordance with Holford Rule 3), and is also preferred due to the greater impact on woodland that would result from routeing through the central gap (in conflict with Holford Rule 2) and the limited routeing flexibility resulting from the narrow gap between residential properties in the southern gap.

7.7.35 To the east of Mill Road, the proposed alignment takes the shortest and straightest route (in accordance with Holford Rule 3) towards the proposed new Walpole B Substation while avoiding the existing Rose and Crown Solar Farm to the north of SW80 and SW81. In routeing the proposed alignment through the area to the east of the River Nene, pylon placement has been constrained by additional National Gas high pressure gas pipelines, between SW76 and SW77 and between SW80 and SW81, and Anglian Water waste water pipes between SW74 and SW75.

Pylon Choice

7.7.36 This section is approximately 27 km in length and is predominantly rural in character, encompassing large, low-lying, flat landscapes with many drainage ditches, dykes and rivers that slowly drain towards the Wash. The main residential areas are Spalding and Wisbech. Within the wider rural area there are a number of other villages including Weston, Sutton St James and Tydd St Giles.

7.7.37 The landscape contains a number of other existing overhead lines which converge at the existing Walpole Substation. These comprise standard full height pylons on both 400 kV and 132 kV overhead lines. View 11 presented in 0 illustrates the view from Tydd St Giles in Section 6. For full descriptions and reasoning for selection of viewpoints refer to **PEI Report Part B Appendix 3A Proposed Viewpoints**.

7.7.38 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, and are not preferred from a landscape and visual perspective on this basis.

7.7.39 The proposed overhead line route in Section 6 also includes several locations where the route of the overhead line changes direction by more than 30 degrees. T-pylons are designed for a maximum angle deviation of 30 degrees, so a change to T-pylons for these parts of the alignment would result either in multiple consecutive angle pylons at closer proximity to receptors, or a short section of lattice towers to enable the angle deviation of greater than 30 degrees at one lattice tension pylon. Both of these options would potentially increase the visual impact on nearby receptors.

7.7.40 Furthermore, significant height extensions are required to pylons SW73 and SW74 where the overhead line crosses the River Nene. T-pylons are not able to be extended to a height which is sufficient for this river crossing. If T-pylons were to be used in this part of Section 6, there would therefore need to be a short section of lattice towers where the overhead line crosses the River Nene, creating a further confusing appearance in this area with multiple designs being used in close proximity.

7.7.41 In combination with the general technical disadvantages of the T-pylon design outlined in Chapter 6, there was not considered to be a justification for T-pylons to be used in Section 6.

7.7.42 However, the review of alternative pylon types concluded that a part of the route in Section 6 should be considered for the use of low height lattice pylons. A 1.8 km section between Sutton St James and Sutton St Edmund was considered to reduce impacts to heritage assets including listed buildings at Sandy Gate Farmhouse and Guanock House.

7.7.43 The use of low heights pylons was considered within a multi-disciplinary appraisal by technical and environmental disciplines. Although there may be some localised benefits for heritage assets for short sections of low height pylons, 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 during the construction and operational phases. This is due to the different loading profiles between different pylon types which can require different foundations and changes to fittings, as well as installation of tension pylons and additional modifications to cross-arms and extensions that may be required to transition between standard height and low height pylons. From a biodiversity perspective, a change to 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 show low height pylons would reduce bird collision risk.

7.7.44 Low height pylons have also been considered where the proposed overhead line routes in proximity to aviation receptors. As detailed in Chapter 6, all identified operational airfields within 5 km of the proposed overhead line have been assessed to understand the possible effects of overhead line infrastructure being introduced near active aviation operations.

7.7.45 Table 7.11 below lists the aviation receptors which have been identified within 5 km of the proposed overhead line alignment in Section 6. Approximate distances to the overhead line alignment are measured from the closest part of the centreline of the proposed overhead line alignment to the nearest threshold of the runway.

Table 7.11 Aviation receptors within 5km of the proposed alignment in Section 6

Receptor	Description
Fenland Airfield	This receptor is a licensed airfield located approximately 2,700 m from the overhead line alignment. The airstrip is situated approximately 8 km southeast of Spalding.

7.7.46 At this stage, low height pylons are not considered to provide any material benefit to flight operations at Fenland Airfield due to the significant distance between the proposed overhead line and both of its runways. Low height pylons have therefore not been considered for use in Section 6 to mitigate impacts on aviation receptors.

Summary

7.7.47 In summary it is considered that the use of an alternative pylon design to standard lattice pylons in Section 6 is not justified.

7.8 Section 7 – New Walpole B Substation

Overview

7.8.1 Section 7 of the route is situated at the southernmost extent of the Project, to the north of Walton Highway and approximately 2.5 km to the south of the existing Walpole Substation. This section principally encompasses the land and works associated with the new Walpole B Substation and covers an area to the north east of West Walton and to the north of Walton Highway, extending towards West Drove North to the east.

7.8.2 Section 7 of the Project comprises the following permanent works:

- a new 400 kV substation (the proposed new Walpole B Substation);
- an approximately 0.5 km long section of new 400 kV overhead line from the proposed new Walpole B Substation extending north west to the route section

break for Section 6 (Refined Weston Marsh Substation Siting Zone to New Walpole B Substation); and

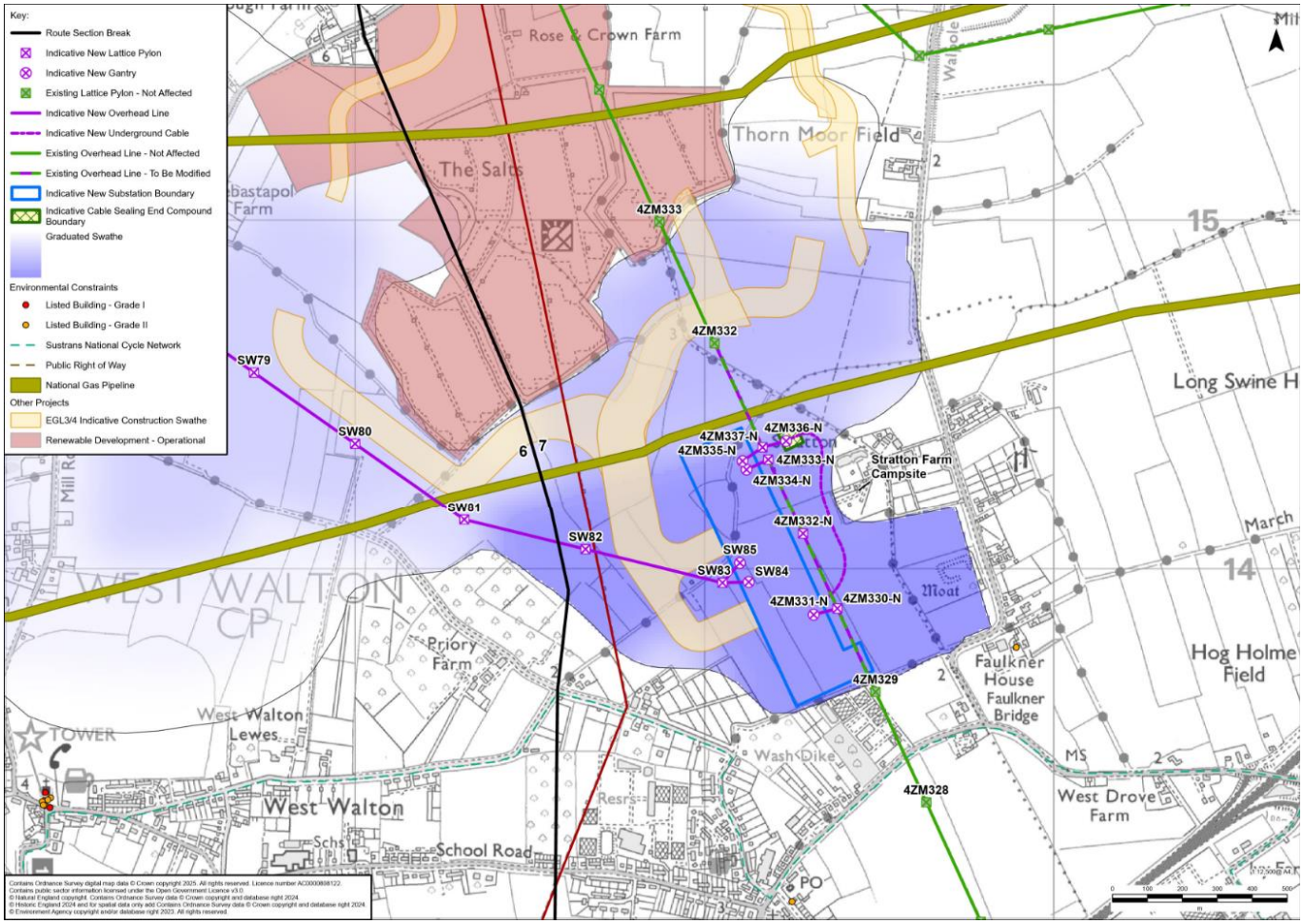
- modifications to approximately 1 km of the existing 400 kV overhead line (known as the 4ZM route) extending to the north and south of the proposed new Walpole B Substation on its eastern side, to connect it to the proposed new Walpole B Substation.

7.8.3 This section of the report describes the proposed siting of the new Walpole B Substation and the proposed alignments of the new 400 kV overhead line (continuing north west into Section 6 of the Project) and the modified existing 400 kV overhead line to connect into the new Walpole B Substation.

Proposed Alignment and Substation Siting

7.8.4 The siting of the proposed new Walpole B Substation in Section 7 has considered a range of constraints, including environmental features, residential communities and existing infrastructure. These features are discussed below and illustrated in further detail in Image 7.28 below.

Image 7.28 Proposed siting of the new Walpole B Substation



7.8.5 The proposed new Walpole B Substation is located to the north of Walton Highway, north of Lynn Road and west of West Drove North and Stratton Farm Campsite. The new substation is proposed to be sited in an area between the existing 400 kV

overhead line (the 4ZM route) running parallel with West Drove North to the west of Stratton Farm Campsite and the existing UK Power Networks (UKPN) 132 kV overhead line to the west of the 4ZM route.

7.8.6 The siting area for the new Walpole B Substation is surrounded by several residential communities and receptors which act to constrain the location of the new Project infrastructure. These include Walton Highway to the south, West Walton to the south west, Ingleborough to the north west, Walpole St Peter to the north and Stratton Farm Campsite to the east. In siting the new Walpole B Substation, National Grid has sought to maximise the separation from these communities and receptors as far as practicable, balanced with other technical and environmental factors outlined below, to reduce as far as possible the potential amenity impacts to these receptors (in accordance with Horlock Rules 6 and 8).

7.8.7 Throughout the area shown on Image 7.28, the corridor and siting zone presented at Stage 1 consultation for the Project overlapped with the corridor and siting zone presented at Stage 1 consultation for the proposed Eastern Green Link 3 and Eastern Green Link 4, which is proposed to connect into the new Walpole B Substation. The two project teams have worked closely together during the development of the proposals in Section 7, to ensure a coordinated 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 Eastern Green Link 3 and Eastern Green Link 4 (in accordance with Horlock Rule 7). The proposed new Walpole B Substation has also been included within the Stage 2 consultation for Eastern Green Link 3 and Eastern Green Link 4.

7.8.8 The proposed Walpole B Substation is located to the immediate west of the existing 4ZM route, aligned to be parallel with the existing overhead line (in accordance with Holford Rule 6 and Holford Rule 7). By locating the new substation close to the existing overhead line infrastructure, the overall extent of new overhead line construction required to divert the existing 4ZM route to connect into the new substation is kept to a minimum.

7.8.9 Locating the proposed new Walpole B Substation adjacent to the existing 4ZM route places the substation in the eastern portion of the substation siting zone presented at Stage 1 consultation. The western portion of the substation siting zone, to the west of the narrowing of the substation siting zone around the southern boundary of the Rose and Crown Solar Farm near SW81, is not preferred because:

- it is largely constrained for routeing incoming overhead line and customer connections, due to the proximity to the River Nene, West Walton Sewage Facility and Wisbech Nene West Gas Compressor Station to the west, the villages of Ingleborough and West Walton, and scattered properties (in conflict with Horlock Rules 4, 6 and 8);
- it would require a longer diversion of the existing 4ZM route, which would likely result in interactions between the diverted 4ZM route (in conflict with Holford Rule 6) and two existing National Gas high pressure gas pipelines which route across the western portion of the siting zone (in conflict with Horlock Rule 7); and
- in introducing a longer diversion of the 4ZM route, it would increase the spread of impacts to a greater number of receptors in the villages of Ingleborough and West Walton (in conflict with Holford Rule Supplementary Note 1).

7.8.10 To the immediate north of the proposed new Walpole B Substation is a National Gas high pressure gas pipeline. The substation has been positioned to avoid any overlap between the substation footprint and the gas pipeline, as diversion of the pipeline would add cost, risk and technical complexity to the Project and potentially extend the construction programme (in accordance with Horlock Rules 6 and 8). As the alignment of this gas pipeline effectively divides the eastern portion of the substation siting zone in two, it leaves two potential options for the substation siting, to the north and south of the gas pipeline.

7.8.11 Of these two possibilities, the preference for siting the proposed Walpole B Substation within the eastern portion of the siting zone is to the south of the existing National Gas high pressure gas pipeline, because:

- The position of the new Walpole B Substation has been developed with consideration of the routeing of the proposed new overhead line through Section 6 as it approaches the route section break between Sections 6 and 7, in particular in relation to the Rose and Crown Solar Farm, as routeing the proposed alignment through the solar farm would result in the removal of solar panels and limit the placement of replacement panels in the future. Avoiding any interaction between the proposed new substation and overhead line and the solar farm also improves flexibility for access and future maintenance of the infrastructure. When considering how the proposed overhead line and the proposed infrastructure for Eastern Green Link 3 and Eastern Green Link 4 could be routed and sited in relation to the possible substation positions, avoidance of the Rose and Crown Solar Farm by the overhead line routeing can be more easily achieved with the southern substation position, due to this position being less constrained by the solar farm and existing buried and overhead assets (in accordance with Horlock Rules 6 and 8).
- An existing UKPN 132 kV overhead line routes through the Rose and Crown Solar Farm from north to south, running to the west of the proposed new Walpole B Substation, approximately parallel to the substation and close to pylon SW82 of the proposed new overhead line. The proposed siting of the new Walpole B Substation facilitates the proposed alignment crossing the UKPN 132 kV overhead line outside of the solar farm. Siting the substation in the north east of the siting zone would necessitate the proposed alignment crossing the existing 132 kV overhead line within the solar farm, which would lead to more extensive removal of solar panels to facilitate the undergrounding of the existing overhead line, increasing the impact on the solar farm (in conflict with Horlock Rules 6 and 8).
- The siting of the proposed new Walpole B Substation in the south east of the substation siting zone is also considered to fit better with the existing landscape pattern than other areas of the substation siting zone presented at Stage 1 consultation (in accordance with Horlock Rule 4). The proposed siting is more closely aligned with existing overhead lines than other parts of the siting zone and benefits from proximity to existing trees and hedgerows which offer natural screening of the substation.

7.8.12 Overall, the siting of the new Walpole B Substation has been developed to:

- minimise 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 4 with the National Gas high pressure gas pipeline, the UKPN

132 kV overhead line and the Rose and Crown Solar Farm (in accordance with Holford Rule 6 and 7 and Horlock Rules 6 and 8);

- facilitate the shortest and straightest routeing of the proposed new overhead line and the existing 4ZM route to the substation and, in doing so, limit the spread of impacts associated with these overhead lines (in accordance with Holford Rule 3);
- maintain flexibility for future connection routes to the substation (in accordance with Horlock Rules 8); and
- maximise opportunities for the proposed substation to benefit from natural screening provided by existing trees and hedgerows (in accordance with Horlock Rule 4).

7.8.13 During construction of the new Walpole B Substation, temporary diversions of the existing 400 kV 4ZM overhead line route would take place to allow new terminal pylons to be constructed on the existing overhead line alignment, before the overhead line would be moved back onto the new pylons with new conductors installed between the new terminal pylons and the substation gantries to connect into the proposed Walpole B Substation. Two existing pylons will be dismantled as part of this work, along with a short section of the existing overhead line which is no longer required. Furthermore, as part of the works, a proposed new cable sealing end compound would be erected east of the proposed Walpole B Substation containing a further gantry with an associated overhead conductor connection to one of the new terminal pylons. A short section of underground cable, approximately 0.6 km in length, would connect the cable sealing end compound to the substation. The cable sealing end compound and cable route are required at Walpole B Substation due to electrical requirements within the internal layout. As a result, where two of the circuits connect to the substation, they must cross one another. The preferred method to facilitate a crossing of two circuits is to terminate one of these into a cable sealing end compound. This compound allows for high voltage overhead lines to transition to cable in a secure fenced off area with necessary insulation. A cable from that compound, into the substation, would then installed whilst keeping the other circuit above ground.

Pylon Choice

7.8.14 Section 7 of the Project primarily comprises the proposed new Walpole B Substation and only a very short section of the overhead line from the new Walpole B Substation towards the Refined Weston Marsh Substation Siting Zone, extending to pylon SW82. The assessment of pylon choice in Section 6 is therefore assumed to also cover this short stretch of the overhead line, as any pylon choice selected for the southernmost portion of the overhead line in Section 6 would also apply in Section 7. Therefore, pylon choice was not considered for Section 7 in isolation.

8. Draft Order Limits Development

nationalgrid

8. Draft Order Limits Development

8.1 Overview

8.1.1 This chapter describes the further considerations made by National Grid in developing the Draft Order Limits associated with the proposed alignment and substation sitings presented in Chapter 7.

8.1.2 This chapter discusses the temporary works proposals, including the overall transport strategy, access strategies for construction, temporary compounds and other temporary works requirements.

8.1.3 It also describes the approach to works by third parties, which may include existing overhead and underground third-party services that would need to be diverted, removed, undergrounded, or protected in order to mitigate impacts of the Project; access strategies for maintenance; and the development of environmental mitigation areas.

8.1.4 Finally, it will summarise how the design evolution presented in Chapter 5 and Chapter 7 and the other works and land required for the Project described in this chapter (8) inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the final DCO Order Limits will define all the land required to construct, operate and maintain the Project.

8.1.5 The Draft Order Limits and the temporary works elements described in this chapter can be viewed on the **Consultation Plans**.

8.2 Overall Transport Strategy

8.2.1 The Transport Strategy for the Project is informed by the requirement for the movement of materials (such as stone, concrete, steelwork, conductors and cables), equipment and construction personnel. It is also influenced by the nature and location of existing transport infrastructure, including roads suitable for two-way Heavy Goods Vehicle (HGV) movements and/or Abnormal Indivisible Loads (AIL), ports with appropriate water depth and offloading facilities, and available rail paths and offloading facilities. Construction programmes may cause these requirements to change if plant and material can be re-used between Project route sections.

8.2.2 Locally, the deliveries and movement to the overhead line locations and substations would be by HGVs, light goods vehicles (LGVs) and private vehicles for site personnel. AILs would only be used for the transport of the super grid transformers to the two new substation locations at either end of the Project, the new Grimsby West Substation and the new Walpole B Substation.

8.2.3 Local deliveries and movements, between the ports, rail and/or strategic road network (SRN) to the site access points, are the focus of the Project design and assessment, with the movement requirements and nature of the road network informing the strategy set out in the next section.

8.2.4 The specific siting of different elements facilitating local access has been informed by highway safety and environmental and socio-economic considerations. The

avoidance of adverse transport effects forms an inherent part of the Project's design development approach.

8.2.5 Multi-modal considerations are relevant to the long-distance movement of material from source to the SRN and are also influenced by commercial considerations in the context of a potentially global supply chain, and to some extent by contractor preference. National Grid are investigating the potential use of material and plant import facilities at ports within the region, which will support the Project. Details will be presented within the Development Consent Order (DCO) application.

8.3 Access Strategies for Construction

Construction Haul Road

8.3.1 The linear nature of the Project and characteristics of the road network within which it is routed present constraints to the construction of the Project. The Project is crossed by a number of roads suitable for HGV traffic but also by many that are not appropriate for potentially two-way HGV movements, for example due to narrow carriageway widths. Additional constraints such as field drains, existing street furniture and weak bridges need to be considered. There are also locations where the local road is not suitable for HGV traffic due to substandard pavement construction and/or strength.

8.3.2 This has led to the conclusion that the most appropriate transport solution is to identify a series of primary access routes (PAR) to the SRN, connected along the Project corridor by new site access points (bellmouths) leading to off-highway haul roads. Primary Access Routes are formed of one or more roads within the road network between the SRN/classified road network and the site access bellmouths. The PARs are made up of core routes, which are the main A roads providing connections across the roads providing local access to the individual bellmouth accesses.

8.3.3 Where road closures are required, the period of the closure would be kept to a minimum and diversions would be via the most appropriate alternative route. Access to properties would be maintained at all times. Any route diversions or closures will be discussed with the Local Highway Authority.

8.3.4 Haul road routes aim to reduce the volume of construction traffic required to use the existing local road network. HGVs would cross unsuitable parts of the highway network at crossover points (using suitable bellmouths with restricted left and right turns) to and from the haul road. LGVs and private vehicles for site personnel would use these haul road routes but would also be expected to use the wider road network where use of the haul road would not be practicable or appropriate.

8.3.5 Where there is a requirement to use the local road network, a review has been conducted to ensure roads are wide enough to cater for large construction vehicles, identifying indicative locations for temporary highway improvements (for example passing places) on roads only suitable for single lane running (see Paragraphs 8.3.15 to 8.3.16). At pinch point locations such as sharp bends with street furniture or drainage ditches, these have been avoided. Where they are unavoidable, proposals would be put in place to either temporarily remove such features, protect or bridge them, to allow construction vehicles to pass. Settlements and sensitive locations such as schools or hospitals have been avoided where possible to reduce potential effects on receptors.

8.3.6 Existing bridges need to be assessed for weight, width and height restrictions to establish if there is a need to avoid, widen or strengthen, before they are used by HGVs and AILs.

8.3.7 Environmental and socio-economic considerations have influenced the proposed alignment of the haul road connecting between the bellmouths. It is preferred for haul roads to predominantly be parallel to the proposed overhead line alignment, which has inherently sought to avoid areas of environmental sensitivity, and to seek to minimise adverse effects. Their alignment also considers the length of the haul roads, to achieve the shortest length where practicable. Consideration of appropriate siting of bellmouths on existing roads has also influenced the alignment of the haul road (see Paragraph 8.3.13). Shorter available routes between the SRN and classified road network and access points have been selected where possible, balancing distance and the suitability of links to accommodate construction traffic.

8.3.8 Where practicable, the haul roads terminate at navigable watercourses and drainage ditches, to avoid crossing these features. Where crossing such features cannot be avoided, structures would be placed perpendicular to the water flow wherever possible. Some environmentally sensitive locations are avoided by longer diversions of the haul road, for instance avoiding bridging the River Welland and South Forty Foot Drain.

Bellmouths and Visibility Splays

8.3.9 The proposed new access points for the haul roads and substations require bellmouth junctions to be installed.

8.3.10 The Project has sought to locate bellmouths as close to the proposed works as possible to reduce the overall requirement for construction traffic movements on site. They will also be sited on the Primary Access Routes along the local road network. Siting has also been informed by highway safety considerations, including distance from bends and junctions, and visibility splay requirements, and environmental and socio-economic considerations. Where possible, proposed bellmouths use or widen existing gates or are positioned at gaps in boundary vegetation and seek to minimise effects on other existing or proposed land-use activities.

8.3.11 Within the visibility splays at bellmouths, vegetation may need to be cut to a specified height and obstacles removed, depending on local conditions, the speed limit of the road and whether traffic management would be in place. The design and location of bellmouths may also require the removal and relocation of street furniture.

8.3.12 Where the local highway network is not appropriate for the use of HGVs, crossover points (with associated bellmouths) will be developed to allow construction vehicles to access or exit the haul roads.

8.3.13 A number of considerations have influenced the siting of bellmouths, including but not limited to:

- use of existing field boundary entrances;
- use of existing watercourse crossing points;
- topographical constraints;
- the existing geometry of the local highway network and visibility considerations;
- limiting sharp bends in the haul road route; and

- limiting multi-crossing of the overhead lines.

Through these considerations, the siting of bellmouths has influenced the development of the overall alignment of the haul road.

8.3.14 The Project's proposed bellmouths may require a realignment, protection and/or diversion of existing underground services.

Works to Existing Public Highways

8.3.15 To facilitate HGV access for the construction of the Project, temporary highway improvement works are required at some locations where existing carriageway widths are narrow.

8.3.16 The Project has adopted a generic worst-case approach to the identification of these possible works by identifying areas where a carriageway may be used to access the Project and is less than 6 m in width. For such routes, sections have been identified along the highway boundary which could be widened to create an HGV passing place. These are placed at regular intervals along the narrower carriageways. However, this work is currently ongoing, and further details will be discussed with the relevant Local Highway Authority and landowners so that a final design layout can be agreed. The Project will not require the full extents of the indicative areas identified for highway improvements and these will be further refined within the draft Order Limits.

Temporary Public Right of Way Management

8.3.17 Public rights of way (PRoWs) affected by the works will be assessed to identify whether it is preferable to divert away from the affected area or have control measures put in place, such as manned gates, to segregate PRoW users from the construction works. The safest option for both PRoW users and construction workers would be considered at each location.

8.3.18 Any potential temporary closures or diversions will be detailed in the DCO application. Any required temporary diversions would be clearly marked at both ends with signage explaining the diversion and the duration of the diversion.

Substation Access

New Grimsby West Substation

8.3.19 The most appropriate route to access the new Grimsby West Substation is via the A180, which is a main traffic route with suitable space for construction traffic. It is envisaged that adjustments would be required between the A road and substation location to allow construction traffic passage to the site. The temporary access road to the substation would become a permanent access following construction. Access is proposed off Aylesby Road and is approximately 500m long.

8.3.20 AILs would be required at this location due to the requirement for super grid transformers (SGTs). They are envisaged to start their journey from Immingham Docks, taking the most appropriate route along the A180 to the site location. Similar movements have recently taken place into the existing Grimsby West Substation and will be considered for the transportation of plant to the new substation. Consideration

needs to be given to bridges and local roads, such as the Great Coates Railway Bridge, Little London Bridge and Aylesby Road mini roundabout.

New Lincolnshire Connection Substations A and B (LCS A and LCS B)

8.3.21 The most appropriate route to access the proposed LCS A would be via the A16, which is a main traffic route with suitable space for construction traffic. It is envisaged that adjustments would be required between the A road and the substation location to allow construction traffic passage to the site. The temporary access road to the LCS A substation would become a permanent access following construction. Access is proposed off Rye Lane and is approximately 1km long.

8.3.22 With LCS B being near to LCS A, the intention is to use the same route, with access into the substation taken off the A1111 Sutton Road. The access to the substation will be less than 500m long and would become a permanent access following construction.

8.3.23 AILs would not be required for either location, due to there being no requirement for super grid transformers (SGTs). It is envisaged only HGVs and LGVs would use this route.

Refined Weston Marsh Siting Zone

8.3.24 Works are ongoing to confirm the requirements and locations infrastructure in the Refined Weston Marsh Siting Zone. The most appropriate route to allow free access of construction vehicles to the substations will be developed as part of this work.

New Walpole B Substation

8.3.25 The most appropriate route to access the new Walpole B Substation is from the south via the A47, which is a main traffic route with suitable space for construction traffic. It is envisaged a new access road to the substation will be required from the local highway to allow construction traffic passage to the site. The temporary access road to the substation would become a permanent access following construction. Access is proposed off West Drove North and is approximately 500m long.

8.3.26 AILs would be required for this location. They are envisaged to start their journey from the Port of Sutton Bridge, taking the A47 to the site location. Consideration needs to be given to bridges and local roads, such as structural assessments on key bridge structures.

8.4 Temporary Compounds

8.4.1 Temporary construction compounds are required to support the construction of the Project. These have a variety of uses which may include, but are not limited to:

- material loading/unloading;
- material storage;
- vehicle parking;
- fencing and lighting;
- siting of construction cabins/modular offices;

- siting of welfare facilities;
- electricity supplies from local grid where feasible (alternatively fueled generators or other generation sources will be used);
- fuel and lubricants storage; and
- to complete construction activity.

8.4.2 Main compounds, approximately 2.7 ha to 3.6 ha, are proposed at each of the substation locations, with main and satellite compounds strategically placed close to the works areas for the construction of the overhead line, particularly near the main road network, such as the SRN.

8.4.3 The proposed main overhead line compounds are approximately 5 ha (200 m by 250 m), comprising essential facilities such as welfare, office space, material laydown and storage and a car park.

8.4.4 The proposed satellite compounds are approximately 1.4 ha (130 m by 110 m), suitable for laying down and storage of some material, and a welfare area with a small car park.

8.4.5 All compounds are proposed to be serviced with electricity, clean water and foul water, either by connection to the main services or remote facilities such as generators, water tankers and septic tanks.

8.4.6 To enable the installation of the pylons and overhead lines, compounds are proposed at the following locations:

- one main compound and two satellite compounds between the new Grimsby West Substation and LCS A;
- two main compounds and one satellite compound between LCS B and the Refined Weston Marsh Siting Zone; and
- two satellite compounds between the new Refined Weston Marsh Siting Zone and the new Walpole B Substation.

8.4.7 Siting of the compounds has been informed by the location of project elements, the specific construction needs that each compound is required to serve, and proximity to the SRN. The compound locations seek to avoid or reduce the potential for environmental and socio-economic adverse effects whilst being close to a bellmouth with access to a PAR. This reduces travel distances for greater efficiency and reduced construction effects.

8.5 Other Temporary Works Requirements

8.5.1 This section continues to describe the further considerations made by National Grid in developing the Draft Order Limits associated with the proposed alignment and substation sitings presented in Chapter 7. This includes accommodating:

- other temporary works such as pylon working areas, pulling positions, protection strategies for crossings of sensitive features and temporary overhead line drainage areas;
- works to third party overhead line assets;
- access for maintenance of the overhead line;

- areas for environmental mitigation and biodiversity net gain (BNG); and
- overhead line limits of deviation.

8.5.2 This section then summarises how these features inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the Order limits will define all the land require to construct, operate and maintain the Project.

Pylon Working Areas

8.5.3 Pylon working areas would typically be 60 m by 60 m for a suspension pylon and 70m by 70m for a tension pylon, or 70m by 70m for low height suspension pylons and 80m by 80m for low height tension pylons, due to the latter requiring wider crossarms. They would either be stone laid on geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. Soil stabilisation[4] techniques could be considered subject to local conditions. Further detail on pylon working areas and construction methodology can be found in **PEI Report Volume 2 Part A Chapter 5 Project Description**.

Pylon Stringing Positions

8.5.4 For each angle, terminal or in line tension pylon, an indicative pylon stringing position is also defined. These are broadly uniform in shape, although a bespoke design is applied for each pylon, based on its angle and any constraining features that may restrict stringing activities. Stringing positions are displayed as 'bowtie' shaped zones, extending from the pylon centre point. This extends to a distance of 180m from the pylon centre point, at a 1:3 ratio for an average assumed maximum height for most towers of 60m (most towers will be lower than 60m in height, but this assumption ensures sufficient space is provided even where slightly larger towers may be required). These zones may be larger where there are changes in the direction of the overhead line to provided sufficient room and the correct angle for positioning of equipment. These zones define the area in which the pulling of conductors will take place, as described in the general methodology set out below. Other than the siting of plant and equipment in these zones, no physical development, such as the construction of a hardstanding, is proposed to take place, unless defined for other reasons.

8.5.5 The general methodology adopted in relation to pylon stringing comprises the following:

- The conductors are usually installed from tension pylon to tension pylon along intermediate suspension pylons, often termed a 'section', with machine sites required at either end of the section.
- The machine sites for conductor stringing would normally be located within the pylon conductor pulling positions, sited on earthed interlocking panels laid directly onto the ground surface reducing disturbance to the underlying soils.

[4] Soil stabilisation refers to the techniques and methods used to alter the physical properties of soil, making it more suitable for construction or other purposes. Soil stabilisation is commonly used in road construction, foundation work, and other civil engineering projects to ensure a stable and working area and typically to reduce the volume of stone required (which would otherwise be needed to provide the same stability).

- A conductor pulling position would be established at each end of the section with a pulling machine ('puller') and empty steel reels to accept pilot wires at one end. At the other end of the section the full conductor drums would be arranged in close proximity to the tensioning machine ('tensioner').
- The conductors would be delivered to pulling positions on large cable drums. Depending on the conductor type and length of section to be strung, a typical completed drum could weigh up to 8 T, although larger and heavier drums are possible depending on the supplier and the length of conductor. The drums containing the conductors would typically be delivered to the construction compound, or satellite compound, first, and would be distributed from there.
- Light pilot wires (sometimes referred to as pilot bonds) would be laid at ground level (and over temporary scaffolding protecting assets such as roads and railway lines) along the length of the section between the pulling positions. Some vegetation management, including removal as a worst case, would be required. The pilot wires would be lifted and fed through running wheels on the cross arms of all the pylons in the section, and then fed around the puller or tensioner at the pulling position. The light pilot wires are used to pull through heavier, stronger pilot wires which are in turn used to pull conductors through from their drums. The tensioning machine would keep the wires off the ground and prevent the conductors running freely when the pulling machine pulls the pilot wire. When the conductor is fully 'run out', it would be fastened at its finished tension and height above ground by linespersons working from platforms on the tension pylons which are suspended beneath the crossarms. The conductors would be connected to the suspension insulators at any intermediate suspension pylons along the stringing section. Additional fittings, such as spacers, vibration dampers and arcing horns would also be fitted.
- To counterbalance the out of balance loading at the tension pylons at the end of a conductor stringing section, it is normal to install temporary backstays or concrete blocks for safety of installation. The temporary backstays or concrete blocks would be removed as the conductor stringing process starts on the next section. Temporary backstays might also be required at other locations such as connecting new conductor to existing conductor, temporary diversions, and temporary spans.
- This process continues along the overhead line route, stringing section after section until conductors have been installed throughout the route. At this point the individual conductor lengths are connected together by clamping a short length of conductor between each, hanging below the cross arms of each of the tension pylons between sections. These short lengths of conductor are known as 'jumpers'.
- A drone/helicopter may also be utilised in the construction of the overhead line, typically for the process of running out the pilot bond along the stringing section and/or transportation of equipment to the Project site.

8.5.6 Animations summarising how National Grid builds its projects are available on the Project website.

Crossing Protection Strategies

8.5.7 Temporary scaffolding netting would be installed during construction where required as a safety measure to protect assets which would be crossed by the proposed 400

kV overhead line, such as roads, railways, existing distribution network overhead lines (where not already moved underground) and potentially hedgerows.

8.5.8 During conductor stringing this netting will protect against dropping of conductors or and any of the associated equipment due to equipment malfunction. Temporary closures of some affected assets, such as roads, may be required during these works to install the protective netting, or may be implemented instead of installing scaffolding.

8.5.9 Alternative methods are available where the use of scaffold towers is not technically viable or where their use would give rise to particularly significant effects, such as catenary support systems, where feasible.

Drainage Areas

8.5.10 An outline sustainable drainage system (SuDS) drainage strategy has been designed, taking account of the reduced natural drainage as a result of the temporary construction impermeable areas, such as haul roads and stone working areas. The drainage design is based on a very conservative impermeable area. Drainage strategies are not being provided for pylon foundations and bases on the assumption the area will be less than 50 m^2.

8.5.11 The SuDS basins are proposed to be three sequential filtration basins in order to manage sediment pollution. At this stage, it is assumed all SuDS will outfall to an existing watercourse however, infiltration testing will be undertaken to confirm this assumption. If the infiltration rate is good the basins will very likely be smaller than those currently proposed.

8.6 Third Party Works

8.6.1 Prior to the construction of the Project, several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected in order to mitigate impacts of the Project. This is largely where they interface with the Project, for example, with proposed new overhead line crossings, along PARs or at bellmouth locations. The scale of the works for third parties would be significantly less than the construction of the new overhead line works, as it is envisaged there will be minimal adjustments to existing services.

8.6.2 The required mitigation methods and duration of mitigation works (permanent or temporary) need to be confirmed with the asset owners prior to any works being carried out.

8.6.3 For the removal, undergrounding and diversion of existing distribution network operator (DNO) 132 kV overhead lines and pylons, works would typically include site set up and access requirements similar to the construction of the new 400 kV overhead line, but reduced in scope due to the smaller scale of the assets.

8.6.4 For the removal, undergrounding and diversion of existing DNO 33 kV or 11 kV overhead lines and pylons or existing wood pole telecommunications infrastructure, typical vehicles and equipment might include a loader crane, and an excavator or equivalent, but these would be far less significant than the 132 kV overhead line works in terms of the scope of work, due to the smaller, low voltage nature of the infrastructure.

8.6.5 Within the Draft Order Limits, land is provided for third party overhead line asset mitigation/clearance. For 66 kV and below, typically connected to a wooden pole, a 25 m working width is provided, whereas for 132 kV suspended on a steel lattice pylons, a 200 m working width is provided.

8.6.6 The need for any cathodic protection to existing metallic pipelines, to reduce the risk of induced voltage from the overhead lines, will be determined at future design stages. Should this be required, typical vehicles and equipment might include a loader crane, excavator or equivalent.

8.7 Access Strategies for Maintenance

8.7.1 The National Grid overhead line would typically be subject to annual inspection from the ground by foot patrol, small van, or by air using a drone or helicopter to check for visible faults or signs of wear. Access would also be required for regular maintenance activities and vegetation management.

8.7.2 Access for these activities would be located along operation and maintenance access routes which have been defined for each pylon. Temporary interlocking track mat panels may be required along these routes during maintenance activities, but these inspection activities would not take place until after the Project has been commissioned.

8.8 Environmental Mitigation Areas

Additional Mitigation

8.8.1 Areas of temporary habitat loss would be reinstated, wherever practicable, following the completion of construction. Such reinstatement would be returned to the type of habitat affected wherever possible. An Outline Landscape and Environmental Mitigation Plan (LEMP) will be produced, which will set out the measures to protect existing vegetation and details regarding reinstatement and additional planting. The LEMP will form part of the Environmental Statement submitted as part of the DCO application.

8.8.2 Areas of permanent habitat loss would be calculated and considered during the Biodiversity Net Gain (BNG) assessment (see Biodiversity Net Gain subheading below).

8.8.3 Areas of planting have been included around each of the substation locations. This has been included in the design to reduce the visual effects and would also help with integration of the substations into the surrounding landscapes. Detailed mitigation plans for the substations will be presented in the Environmental Statement. This will include proposals for planting including indicative species mixes and will be presented as part of the Outline LEMP.

8.8.4 National Grid is committed to deliver the mitigation measures identified to avoid and reduce the likely significant effects that would be experienced during implementation of the Project. Currently identified mitigation measures are described in the **PEI Report Volume 2 Part B Sections 1 to 7**.

Biodiversity Net Gain

8.8.5 National Grid will seek to implement habitat enhancement and creation through delivery of BNG.

8.8.6 BNG is a way of making sure the habitat for wildlife is in a measurably better state than it was before development. It requires a minimum 10% gain calculated using the Government's Biodiversity Metric. BNG must be managed, monitored and reported on to the Local Planning Authority for 30 years.

8.8.7 National Grid has committed to 10% Net Gain in environmental value, including as a minimum 10% biodiversity net gain across all its construction projects (Ref 19). While the 10% target for the Project is not currently mandated for Nationally Significant Infrastructure Projects until introduced by the Government, National Grid has set out commitments to deliver BNG within its Environmental Action Plan.

8.8.8 Therefore, National Grid is working with appointed technical specialists, environmental organisations and landowners to identify potential opportunities for delivering areas of BNG, and where practicable also linked to wider environmental gains such as recreation improvement.

8.9 Draft Order Limits Development

Limits of Deviation

8.9.1 As acknowledged by the Planning Inspectorate's Advice Note Nine (Ref 20) a necessary and proportionate degree of flexibility needs to be incorporated into the design of a development so that unforeseen issues encountered after a development has been consented can be addressed. To allow for this proportionate degree of flexibility, limits of deviation (LoD) have been developed for the Project components which will be specified in the DCO. The LoDs will provide a maximum distance or measurement of variation within which every component of the Project would be located. LoDs will be applied both horizontally and vertically for the Project.

8.9.2 The horizontal LoD is, in general, 100 m (50 m either side of the centre line of the overhead line). In some exceptional circumstances, the LoD is decreased to less than 100 m to avoid a particular receptor. Where the LoD is 100 m the extent of movement of any pylon is limited by the span length and conductor swing. At a maximum span length, the conductors would require a swing distance of around 30 m, resulting in a potential lateral movement from the centreline of approximately 20 m either side, subject to topography and local conditions. There is no limit placed on the placement of a pylon along the centreline (longitudinal LoD); however, movement would be limited by the need to maintain appropriate span length between pylons.

8.9.3 The upwards vertical LoD for a typical standard lattice pylon is approximately 6 m which would allow for two extension panels (typically 3 m per extension panel but this varies between pylon types). This is to provide design flexibility to ensure that vertical clearance distances can be maintained. Crossings of the River Nene and the River Welland would require bespoke pylons due to the increased clearance requirements above these rivers, and therefore require a larger vertical LoD to maintain an appropriate level of design flexibility to ensure clearance requirements are achieved.

8.9.4 There is no limit placed on the maximum depth of below ground works. Whilst a standard below ground LoD is not proposed, the Project would never go deeper than

necessary for technical or environmental reasons as this would add engineering operational complexity and cost.

Land Ownership

8.9.5 During the development of the Draft Order Limits, careful consideration is given to the design of both temporary and permanent land take, ensuring the Draft Order Limits are aligned with identified land ownership boundaries. Wherever feasible, access works are planned along field boundaries or make use of existing tracks to minimise disruption to landowners and avoid unnecessary division of land.

Draft Order Limits

8.9.6 The Draft Order Limits, presented on the **Consultation Plans**, outline the geographical extent of land affected by a proposed development and includes land needed for the Project, such as:

- main development area, including permanent and temporary works;
- access routes and visibility splays;
- environmental mitigation, landscaping and some areas that are capable of delivering BNG (subject to BNG strategy); and
- third party mitigation.

8.9.7 The final Order Limits pursuant to the DCO will define the extent of land proposed to be acquired, as described in the Book of Reference, whilst also defining the geographical scope of environmental and stakeholder impacts to ensure they are considered and mitigated as appropriate.

8.9.8 Multiple disciplines including (but not limited to) engineering, traffic and transport, ecology, landscape and visual all feed into justifying the land required to construct, mitigate and maintain the Project.

8.9.9 From a technical perspective, and generally described in the sections above, the Project considers the following parameters in the defining of the land take required for the temporary works (unless otherwise stated as permanent) (approximate figures):

- overhead line lateral LoD (50 m either side of the centre line of the overhead line, with a total of 100 m);
- pylon stringing positions (180 m ‘bow tie’ shaped zones for the pulling of conductors; sized to be approximately 3 x the height of the pylon);
- pylon working areas (60 m x 60 m rectangle hard standing area, increasing to up to 80 x by 80 m, dependent on pylon type);
- construction compounds (130 m x 110 m land take area for a satellite compound and 200 m x 250 m for a main compound);
- permeant operational and maintenance access for pylons (6 m width access route);
- third party overhead line asset mitigation (for 66kV and below, a 25 m swathe working width is provided, and for 132kV and above, a 200 m working width is provided).

- third party access (below 132 kV a 4 m width access route and for 132 kV a 12.5 m wide access route);
- construction (haul road) accesses (21 m swathe to allow for haul road construction, soil storage and drainage);
- bellmouths & visibility splays (60 m wide junction access at the highway edge; visibility splays individually sized subject to road conditions); and
- drainage design (SuDS, outfall pipes and outfall points all individually sized subject to site specifics).

8.9.10 Following the collation of all the proposed land take, a natural outer edge of the Project starts to become defined. This outer edge of the land take required is generally followed in defining the Draft Order Limits. On some occasions, minimal buffers are applied to the parameters above (between 5 m and 20 m) to allow a small margin of additional flexibility. Additionally, on some occasions, natural rounding-off of land parcels and unviable 'slithers' of land which are enclosed by the surrounding Order Limits are also included within the Draft Order Limits, from a practical standpoint.

8.9.11 At some of the substation locations the Draft Order Limits extend to the nearest field boundaries, beyond the typical parameters set out above. This is to include added flexibility during the construction process and allow safe working if the overhead line and substation elements are being constructed at the same time.

9. Next Steps

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9. Next Steps

9.1 Introduction

9.1.1 The feedback from the Stage 1 consultation together with further technical and environmental work has led to the development of the proposed alignment which is the subject of Stage 2 consultation.

9.2 Next Steps

9.2.1 The Project continues to be the subject of ongoing consultation with stakeholders and members of the public.

9.2.2 National Grid is undertaking a statutory consultation on its current proposals between June and August 2025. Further targeted statutory consultation on Section 5 (Weston Marsh) will also be undertaken at a future date when the additional design work has been completed for this Section.

9.2.3 All feedback submitted during the Stage 2 consultation and targeted statutory consultation will be reviewed and considered in further development of the design, where practicable.

9.2.4 Further detailed assessments and studies will continue along the proposed alignment, including technical and environmental assessments and ongoing survey works. The outcomes of this work, together with consideration of feedback from the Stage 2 consultation and targeted statutory consultation, may further inform and refine the design where practicable, including proposed locations of permanent and temporary infrastructure.

9.2.5 Ongoing environmental impact assessments will therefore continue to inform further design development and the mitigation measures required, and this progress and assessment will be presented in the Environmental Statement which will form part of the DCO application submission.

9.2.6 National Grid expects to apply to the Planning Inspectorate for a DCO in 2027. Once submitted, the Planning Inspectorate will assess whether the application will be accepted within the statutory determination period of 28 days. If accepted, the pre-examination phase will commence before an examination begins in which members of the public (Ref 21), local authorities and others can participate.

Appendix A - Local Planning Policy of Relevance to Good Design

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Table A.1 is provided to outline local planning policies relating to good design and will continue to be reviewed throughout the evolution of the Project design. For completeness, where a policy relating to good design has been identified, the entire policy text has been included in **Table A.1**, although it should be noted some of the identified policies, or parts thereof, may not be relevant to the Project in their entirety. Other topic specific design considerations within local planning policy are set out in **Preliminary Environmental Information (PEI) Report Volume 2 Part A Chapter 2 Legislative Regulatory and Planning Policy Context**. The Project has been divided into seven sections. These sections and the local policy documents applicable to each section are listed below:

i. Section 1: New Grimsby West Substation

- Lincolnshire County Council
  - Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
  - A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.
- North East Lincolnshire Council
  - North East Lincolnshire Local Plan, adopted in 2018 (Ref 25); and
  - A Draft Local Plan Review is currently underway, and a Draft Local Plan with Options was subject to public consultation in January-March 2024 (Ref 26).
- West Lindsey District Council
  - Central Lincolnshire Local Plan adopted April 2023 (Ref 27);

ii. Section 2: New Grimsby West Substation to New Lincolnshire Connection Substation (LCS) A

- Lincolnshire County Council
  - Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
  - A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.
- North East Lincolnshire Council
  - North East Lincolnshire Local Plan, adopted in 2018 (Ref 25); and

- A Draft Local Plan Review is currently underway, and a Draft Local Plan with Options was subject to public consultation in January-March 2024 (Ref 26).

— East Lindsey District Council

- East Lindsey Local Plan, adopted in 2018 (the council is currently producing a Local Plan Partial Review) (Ref 28).

iii. Section 3: New LCS A and New LCS B

— Lincolnshire County Council

- Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
- A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.

— East Lindsey District Council

- East Lindsey Local Plan, adopted in 2018 (the council is currently producing a Local Plan Partial Review) (Ref 28).

iv. Section 4 New LCS B to Refined Weston Marsh Substation Siting Zone

— Lincolnshire County Council

- Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
- A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.

— East Lindsey District Council

- East Lindsey Local Plan, adopted in 2018 (the council is currently producing a Local Plan Partial Review) (Ref 28).

— South East Lincolnshire (covering South Holland District Council and Boston Borough Council)

- South East Lincolnshire Local Plan (South Holland District Council and Boston Borough Council joint plan), adopted 2019. (Ref 29).

v. Section 5: Refined Weston Marsh Substation Siting Zone

— Lincolnshire County Council

- Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
- A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.

— South East Lincolnshire (covering South Holland District Council and Boston Borough Council)

- South East Lincolnshire Local Plan (South Holland District Council and Boston Borough Council joint plan), adopted 2019. (Ref 29).

vi. Section 6 Refined Weston Marsh Substation Siting Zone to the New Walpole Substation (Walpole B Substation);

— Cambridgeshire County Council

- Cambridgeshire and Peterborough Minerals and Waste Local Plan adopted July 2021 (Ref 30) – No policies of relevance to the Project design.

— Norfolk County Council

- Norfolk Core Strategy and Minerals and Waste Development Management Policies Development Plan Document and Site Allocations 2010-2026
  (Ref 31). The Council is currently producing an up-to-date Minerals and Waste Local Plan (Ref 32) – no policies of relevance to the Project design.

— Lincolnshire County Council

- Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 22) and Minerals and Waste Site Locations, adopted 2017 (Ref 23) – No policies of relevance to the Project design; and
- A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 24) – No policies of relevance to the Project design.

— Kings Lynn and West Norfolk District Council

- Kings Lynn and West Norfolk Local Plan 2021- 2040, adopted March 2025 (Ref 33).

— South East Lincolnshire (covering South Holland District Council and Boston Borough Council)

- South East Lincolnshire Local Plan (South Holland District Council and Boston Borough Council joint plan), adopted 2019. (Ref 29).

- Fenland District Council
  - Fenland Local Plan (Adopted May 2014) (Ref 34).
  - Fenland Local Plan 2021-2040 Draft Local Plan Consultation (August 2022) (Ref 35).

vii. Section 7 Walpole B Substation

- Norfolk County Council
  - Norfolk Core Strategy and Minerals and Waste Development Management Policies Development Plan Document and Site Allocations 2010-2026 (Ref 31). The Council is currently producing an up-to-date Minerals and Waste Local Plan (Ref 32) – no policies of relevance to the Project design.
- Kings Lynn and West Norfolk District Council
  - Kings Lynn and West Norfolk Local Plan 2021- 2040, adopted March 2025 (Ref 33).

Table A.1 Local Planning Policy of Relevance to Good Design

Local Policy Document	Policy Reference	Policy Text
North East Lincolnshire Local Plan 2013 to 2032 (Adopted 2018) (Ref 25)	Policy 22 – Good Design in new developments	1. *"A high standard of sustainable design is required in all developments. The Council will expect the design approach of each development to be informed by:* *A. a thorough consideration of the particular site's context (built and natural environment, and social and physical characteristics);* *B. the need to achieve:* *i. protection and enhancement of natural assets;* *ii. resource efficiency;* *iii. climate change resilience;* *iv. sustainable transport;* *v. accessibility and social inclusion;* *vi. crime and fear of crime reduction;* *vii. protection and enhancement of heritage assets, including character and local distinctiveness;* *viii. high quality public realm; and,* *ix. efficient use of land.* *C. Design guidance for North East Lincolnshire published by the Council; and,* *D. where applicable and relevant:* *i. the objectives and expectations of the Lincolnshire Wolds Area of Outstanding Natural Beauty Management Plan 2013-2018 (and any subsequent updates);* *ii. Landscape Character Assessment; and,* *iii. Conservation Area Appraisals.* 2. *Where a Design and Access Statement is required, this should describe the specific considerations and rationale on which design proposals have been based.* 3. *Incorporation of elements of public art that serve to enrich the wider area will be encouraged in the development of sites within or adjoining*

Local Policy Document	Policy Reference	Policy Text
		prominent public locations, or sites which have significance in terms of local heritage. *Proposals for express consent to display advertisements will be permitted if the proposal respects the interest of amenity and public safety, taking account of cumulative impacts."*
North East Lincolnshire Local Plan Review (Ref 26)	Draft Strategic Policy 13 - Good Design in New Developments	No change to the Design principles policy is proposed, though it should be noted 1.D.i of Policy 13 refers to the updated 'Lincolnshire Wolds Area of Outstanding Natural Beauty Management Plan 2018-2023 (and any subsequent updates)'.
Central Lincolnshire Local Plan (Adopted April 2023) (Ref 27)	Policy S6 - Design Principles for Efficient Buildings	*"When formulating development proposals, the following design expectations should be considered and in the following order:* 1. *Orientation of buildings – such as positioning buildings to maximise opportunities for solar gain, and minimise winter cold wind heat loss;* 2. *Form of buildings – creating buildings that are more efficient to heat and stay warm in colder conditions and stay cool in warmer conditions because of their shape and design;* 3. *Fabric of buildings – using materials and building techniques that reduce heat and energy needs. Ideally, this could also consider using materials with a lower embodied carbon content and/or high practical recyclable content;* 4. *Heat supply – net zero carbon content of heat supply (for example, this means no connection to the gas network or use of oil or bottled gas);* 5. *Renewable energy generated – generating enough energy from renewable sources on site (and preferably on plot) to meet reasonable estimates of all regulated and unregulated total annual energy demand across the year.* *Energy statements, as required by Policies S7 and S8, must set out the approach to meeting each of the above principles."*
	Policy S20 – Resilient and Adaptable Design	*"**Heat resilience***

Local Policy Document	Policy Reference	Policy Text
		In order to prevent and minimise the impacts of overheating in the built environment, applicants must demonstrate, commensurate with the scale and location of the proposal, consideration of: 1. *How the design of the development minimises overheating and reduces demand on air conditioning systems, including considering:* a) *orienting buildings to maximise the opportunities for both natural heating and ventilation and to reduce wind exposure; and* b) *measures such as solar shading, thermal mass and appropriately coloured materials in areas exposed to direct and excessive sunlight;* *In considering the above, the balance between solar gain versus solar shading will need to be carefully managed.* 2. *The potential to incorporate a green roof and/or walls to aid cooling, add insulation, assist water management and enhance biodiversity, wherever possible linking into a wider network of green infrastructure; unless such roof space is being utilised for photovoltaic or thermal solar panels; or on a whole life cycle basis, it is demonstrated that a lower specification roof has a significantly lower carbon impact than a green roof; or the nature of the development makes it impracticable to incorporate a green roof.* ***Adaptable design*** *Applicants should design proposals to be adaptable to future social, economic, technological and environmental requirements in order to make buildings both fit for purpose in the long term and to minimise future resource consumption in the adaptation and redevelopment of buildings in response to future needs. To meet this requirement, applicants should undertake the following, where applicable:* 1. *Allow for future adaptation or extension by means of the building's internal arrangement internal height, detailed design and construction, including the use of internal stud walls rather than solid walls to allow easier reconfiguration of internal layout. Residential proposals which meet, as a minimum, Building Regulations M4(2) (accessible and*

Local Policy Document	Policy Reference	Policy Text
		adaptable dwellings) standard would be deemed to have complied with this criterion; 2. *Identification on floor plans of internal space with potential to accommodate 'home working': this may include bedrooms where there is more than 1 bedroom proposed;* 3. *Provision of electric car charging infrastructure (see Policy NS18);* 4. *Infrastructure that supports car free development and lifestyles;* 5. *Having multiple well-placed entrances on larger non-residential buildings to allow for easier subdivision; and* 6. *Is resilient to flood risk, from all forms of flooding (see Policy S21)."*
	Policy S53 – Design and Amenity	*"All development, including extensions and alterations to existing buildings, must achieve high quality sustainable design that contributes positively to local character, landscape and townscape, and supports diversity, equality and access for all.* *Good design will be at the centre of every development proposal and this will be required to be demonstrated through evidence supporting planning applications to a degree proportionate to the proposal. Design Codes may be produced for parts of Central Lincolnshire or in support of specific developments. The approach taken in these Design Codes should be informed by the National Model Design Code and where these codes have been adopted, developments will be expected to adhere to the Code.* *Proposals for new buildings should incorporate the Design Principles for Efficient Buildings in Policy S6 at the centre of design.* *All development proposals will be assessed against, and will be expected to meet the following relevant design and amenity criteria. All development proposals will:* ***1. Context*** *a) Be based on a sound understanding of the context, integrating into the surroundings and responding to local history, culture and heritage;*

b) Relate well to the site, its local and wider context and existing characteristics including the retention of existing natural and historic features wherever possible and including appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area;

c) Protect any important local views into, out of or through the site

2. Identity

a) Contribute positively to the sense of place, reflecting and enhancing existing character and distinctiveness;

b) Reflect or improve on the original architectural style of the local surroundings, or embrace opportunities for innovative design and new technologies which sympathetically complement or contrast with the local architectural style;

c) Use appropriate, high quality materials which reinforce or enhance local distinctiveness;

d) Not result in the visual or physical coalescence with any neighbouring settlement nor ribbon development;

3. Built Form

a) Make effective and efficient use of land that contribute to the achievement of compact, walkable neighbourhoods;

b) Be appropriate for its context and its future use in terms of its building types, street layout, development block type and size, siting, height, scale, massing, form, rhythm, plot widths, gaps between buildings, and the ratio of developed to undeveloped space both within a plot and within a scheme;

c) Achieve a density not only appropriate for its context but also taking into account its accessibility;

d) Have a layout and form that delivers efficient and adaptable homes in accordance with Policy S6 and Policy S20.

4. Movement

a) Form part of a well-designed and connected travel network with consideration for all modes of transport offering genuine choices for

non-car travel and prioritising active travel and where relevant demonstrate this through evidence clearly showing connectivity for all modes and a hierarchy of routes (also see Policy S47 and Policy S48);

b) Maximise pedestrian and cycle permeability and avoid barriers to movement through careful consideration of street layouts and access routes both within the site and in the wider context contributing to the delivery of walkable and cyclable neighbourhoods in accordance with Policy S48;

c) Ensure areas are accessible, safe and legible for all including people with physical accessibility difficulties;

d) Deliver well-considered parking, including suitable electric vehicle charging points, with appropriate landscaping provided in accordance with the parking standards set out in Policy NS18 and Policy S49;

e) Deliver suitable access solutions for servicing and utilities;

5. Nature

a) Incorporate and retain as far as possible existing natural features including hedgerows, trees, and waterbodies particularly where these features offer a valuable habitat to support biodiversity, aligned with policies in the Natural Environment chapter of the Local Plan;

b) Incorporate appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area, maximising opportunities to deliver diverse ecosystems and biodiverse habitats, strengthening wildlife corridors and green infrastructure networks, and helping to achieve wider goals for biodiversity net gain, climate change mitigation and adaptation and water management;

6. Public Spaces

a) Ensure public spaces are accessible to all, are safe and secure and will be easy to maintain with clear definition of public and private spaces;

Local Policy Document	Policy Reference	Policy Text
		b) Form part of a hierarchy of spaces where relevant to offer a range of spaces available for the community and to support a variety of activities and encourage social interaction; *c) Be carefully planned and integrated into the wider community to ensure spaces feel safe and are safe through natural surveillance, being flanked by active uses and by promoting activity within the space;* *d) Maximise opportunities for delivering additional trees and biodiversity gains through the creation of new habitats and the strengthening or extending wildlife corridors and the green infrastructure network in accordance with policies in the Natural Environment chapter;* ***7. Uses*** *a) Create or contribute to a variety of complementary uses that meet the needs of the community;* *b) Be compatible with neighbouring land uses and not result in likely conflict with existing uses unless it can be satisfactorily demonstrated that both the ongoing use of the neighbouring site will not be compromised, and that the amenity of occupiers of the new development will be satisfactory with the ongoing normal use of the neighbouring site;* *c) Not result in adverse noise and vibration taking into account surrounding uses nor result in adverse impacts upon air quality from odour, fumes, smoke, dust and other sources;* ***8. Homes and Buildings*** *a) Provide homes with good quality internal environments with adequate space for users and good access to private, shared or public spaces;* *b) Be adaptable and resilient to climate change and be compatible with achieving a net zero carbon Central Lincolnshire as required by Policies S6, S7 and S8;*

Local Policy Document	Policy Reference	Policy Text
		c) Be capable of adapting to changing needs of future occupants and be cost effective to run by achieving the standards set out in Policy S20; *d) Not result in harm to people's amenity either within the proposed development or neighbouring it through overlooking, overshadowing, loss of light or increase in artificial light or glare;* *e) Provide adequate storage, waste, servicing and utilities for the use proposed;* ***9. Resources*** *a) Minimise the need for resources both in construction and operation of buildings and be easily adaptable to avoid unnecessary waste in accordance with Policies S10 and S11;* *b) Use high quality materials which are not only suitable for the context but that are durable and resilient to impacts of climate change in accordance with the requirements of Policy S20;* ***10. Lifespan*** *a) Use high quality materials which are durable and ensure buildings and spaces are adaptive; and* *b) Encourage the creation of a sense of ownership for users and the wider community with a clear strategy for ongoing management and stewardship.* *Development proposals will be expected to satisfy requirements of any adopted local design guide or design code where relevant to the proposal."*
East Lindsey Local Plan Core Strategy (Adopted July 2018) (Ref 28)	Strategic Policy 10 (SP10) - Design	*"The Council will support well-designed sustainable development, which maintains and enhances the character of the District's towns, villages and countryside by:-* *1. Where possible supporting the use of brownfield land for development, unless it is of high environmental value, seeking to use areas of poorer quality agricultural land in preference to that of a higher quality.*

Local Policy Document	Policy Reference	Policy Text
		2. *The use of high quality materials and where the layout, scale, massing, height and density reflect the character of the surrounding area.* 3. *Ensuring it is easy for everyone to get around by incorporating safe and attractive roads, cycleways and footways that enable people of all abilities to access shops, jobs, schools and other community facilities.* 4. *Providing on-site landscaping to integrate the development into its wider surroundings and make provision for open space.* 5. *Development will be supported if it is designed to minimise glare and light spillage, it does not unacceptably harm the rural or dark-sky character of a settlement or landscape or any nearby residential amenity; it respects the local historic environment; and it does not unacceptably harm or reduce the safety of highways, cycleways and footways.* 6. *The design of new and altered buildings or areas will be supported where they adequately take into account the safety and security of the users of the facilities both during the day and at night and that of neighbouring residents.* 7. *Development will be supported where it can demonstrate that its design incorporates sustainable features and/or renewables and that the development could be adapted in the future for other uses in that it is development that will become a high quality integrated part of the built environment over many generations.* 8. *Supporting development that includes measures to recycle, re-use or reduce the demand for finite resources. New development should be designed to Building Regulation water consumption standard for water scarce areas, to not exceed 110 litres per day per person.* 9. *Development around water sources will only be supported if it contains adequate protection preventing pollution from entering into the water source.* 10. *Development will only be supported around hazardous uses if it contains adequate provision to mitigate against threat from the hazardous use and does not conflict with that use.*

Local Policy Document	Policy Reference	Policy Text
		11. *The following developments will be supported on design grounds if they satisfy a site-specific design brief.* • *Gateway sites into a settlement* • *All retail applications over 0.25ha* • *Applications over 0.5ha within a designated town centre* • *Applications on sites over 4ha"*
South East Lincolnshire Local Plan 2011-2036 (Adopted March 2019) (Ref 29)	Policy 3: Design of New Development	*"All development will create distinctive places through the use of high quality and inclusive design and layout and, where appropriate, make innovative use of local traditional styles and materials. Design which is inappropriate to the local area, or which fails to maximise opportunities for improving the character and quality of an area, will not be acceptable.* *Development proposals will demonstrate how the following issues, where they are relevant to the proposal, will be secured:* 1. *creating a sense of place by complementing and enhancing designated and non designated heritage assets; historic street patterns; respecting the density, scale, visual closure, landmarks, views, massing of neighbouring buildings and the surrounding area;* 2. *distinguishing between private and public space;* 3. *the landscape character of the location;* 4. *accessibility by a choice of travel modes including the provision of public transport, public rights of way and cycle ways;* 5. *the provision of facilities for the storage of refuse/recycling bins, storage and/or parking of bicycles and layout of car parking;* 6. *the lighting of public places;* 7. *ensuring public spaces are accessible to all;* 8. *crime prevention and community safety;* 9. *the orientation of buildings on the site to enable the best use of decentralised and renewable low-carbon energy technologies for the lifetime of the development;*

Local Policy Document	Policy Reference	Policy Text
		10. *the appropriate treatment of facades to public places, including shop frontages to avoid visual intrusion by advertising, other signage, security shutters, meter boxes and other service and communication infrastructure;* 11. *residential amenity;* 12. *the mitigation of flood risk through flood-resistant and flood-resilient design and sustainable drainage systems (SuDS);* 13. *the use of locally sourced building materials, minimising the use of water and minimising land take, to protect best and most versatile soils;* 14. *the incorporation of existing hedgerows and trees and the provision of appropriate new landscaping to enhance biodiversity, green infrastructure, flood risk mitigation and urban cooling;* 15. *the appropriate use or reuse of historic buildings."*
Kings Lynn and West Norfolk Local Plan 2021-2040, adopted March 2025 (Ref 33)	Policy LP04 - Presumption in Favour of Sustainable Development	1. *Proposals that accord with the policies in this Local Plan (and, where relevant, with policies in made neighbourhood plans) will be approved without delay.* 2. *Where there are no development plan policies relevant to the application or the policies which are most important for determining the application are out of date at the time of making the decision, the Council will grant permission unless:* a. *the application of policies in the National Planning Policy Framework that protect areas or assets of particular importance provides a strong reason for refusing the development proposed; or* b. *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole, having particular regard to key policies for directing development to sustainable locations, making effective use of land, securing well-designed places and providing affordable homes, individually or in combination*

Local Policy Document	Policy Reference	Policy Text
	Policy LP18 - Design and Sustainable Development	1. *All new development in the borough must be of high quality design.* 2. *Where relevant new development will be required to demonstrate its ability to:* a. *conserve and enhance the historic and natural environment and reduce environmental risks;* b. *enrich the attraction of the borough as an exceptional place to live, work and visit;* c. *respond to the context and character of places in West Norfolk by ensuring that the scale, density, layout, materials and access will enhance the quality of the environment;* d. *where possible, enhance the special qualities and local distinctiveness of the area (including its historical, biodiversity and cultural character), gaps between settlements, landscape setting, distinctive settlement character, landscape features and ecological networks;* e. *optimise site potential, making the best use of land including the use of brownfield land;* f. *enhance community wellbeing by being accessible, inclusive, locally distinctive, safe and by promoting healthy lifestyles (see Policy LP38 Community & Culture);* g. *achieve high standards of sustainable design.* 3. *To promote and encourage opportunities to achieve high standards of sustainability and energy efficiency, development proposals will be required to demonstrate:* a. *the use of construction techniques, layout, orientation, internal design and appropriate insulation maximised to improve efficiency;* b. *the innovative use of re-used or recycled materials of local and traditional materials to decrease waste and maintain local character;*

Local Policy Document	Policy Reference	Policy Text
		c. the reduction of on-site emissions by generation of cleaner energy where appropriate; *d. within larger developments of sufficient scale, the provision of green space to safeguard wildlife, provide recreation opportunities and improve the quality of life for people living in the area and the integration of the development into the GI network, or the creation of linkages to it wherever possible;* *e. the provision of good access links for walking and cycling;* *f. the provision of built-in nesting boxes (e.g. boxes for migratory bird species, bats, or bee bricks) and/ or safe road crossing methods (e.g. for hedgehogs), wherever possible;* *g. the promotion of water efficiency - all new housing must meet Building Regulation requirement of 110 l/h/d. Non-domestic buildings, where relevant, should as a minimum reach 'Good' BREEAM status:* *h. the incorporation of Sustainable Drainage Systems (SuDS) ;* *i. designs that exceed the present standards set by Building Regulations will be encouraged;* *j. water reuse and recycling and rainwater and stormwater harvesting, and other suitable measures have been incorporated wherever feasible to reduce demand on mains water supply;* *k. evidence that there is, or will be, sufficient wastewater infrastructure capacity to accommodate the development;* *l. at the design stage, that attention has been paid to the Homes England 'Building for a Healthy Life' standard for well-designed homes and neighbourhoods and the Borough Council will encourage all new schemes to be assessed against the Building for a Healthy Life criteria, or successor documents as appropriate*[5]

[5] Urban Design Group. Building for a Healthy Life. 2020. Source: https://www.udg.org.uk/publications/otherpub/building-healthy-life

Local Policy Document	Policy Reference	Policy Text

m. well-designed homes which provide good standard and quality internal environments for their users, promoting health and well-being, will be encouraged including those which meet the National Described Space Standards.

Density of development

4. *In seeking to make the most efficient use of land, the Council will expect proposals to optimise the density of development in the light of local factors such as:*
   - *a. the setting of the development;*
   - *b. the form and character of existing development; and*
   - *c. the requirement for any onsite infrastructure including amenity space.*

Flood Risk and Climate Change

5. *The Council's Strategic Flood Risk Assessment (SFRA) outlines potential flood risk throughout the borough. In order to ensure future growth within the borough is sustainable: the findings of the SFRA will be used to guide planned growth and future developments away from areas of high flood risk, including the coastal area. Development in any location will be expected to manage water sustainably and reduce surface water runoff using multifunctional Sustainable Drainage Systems (SuDS) where possible;*
6. *Shoreline Management Plans, Marine Plans and associated documents, will also serve to highlight the future needs and changes that may affect coastal communities arising from changes in climate and will be taken into account in decision making.*

Renewable Energy

7. *The Council and its partners will support and encourage the generation of energy from renewable sources. These will be permitted unless there are unacceptable locational or other impacts that could not be outweighed by wider environmental, social, economic and other benefits. Commercial and agricultural buildings with a significant area of flat/low pitch roofs (over 250m2) should make provision for solar panels*

Local Policy Document	Policy Reference	Policy Text
		within their detailed design to maximise the use of the roof area. (See also Policy LP24). ***Policy LP18 contributes to Strategic Objectives 5, Economy, 11, 12, 13, 15, Environment, 18, King's Lynn, 32, Coast***
	Policy LP21 – Environment, Design and Amenity	1. *Development must conserve and enhance the amenity of the wider environment including the historic environment.* 2. *Proposals will be assessed against their impact on neighbouring uses and their occupants as well as the amenity of any future occupiers of the proposed development. Proposals will be assessed against a number of factors including:* a. *impact on the historic environment;* b. *overlooking, overbearing, overshadowing;* c. *noise;* d. *odour;* e. *air quality;* f. *light pollution;* g. *contamination and soil quality;* h. *water quality;* i. *sustainable drainage; and* j. *visual impact.* 3. *The scale, height, massing, materials and layout of a development should respond sensitively and sympathetically to the local setting and pattern of adjacent streets including spaces between buildings through high quality design and use of materials.* 4. *Development that has a significant adverse impact on the amenity of others or which is of a poor design will be refused.* 5. *Development proposals should demonstrate that safe access can be provided, and adequate parking facilities are available.*

Local Policy Document	Policy Reference	Policy Text
		6. *Proposals for development adjacent to, or in the vicinity of, existing uses will need to demonstrate that both the ongoing use of the neighbouring site is not compromised, and that the amenity of occupiers of the new development will be satisfactory with the ongoing normal use of the neighbouring site, taking account of the criteria above.*
Fenland Local Plan (Adopted May 2014) (Ref 34)	Policy LP16 – Delivering and Protecting High Quality Environments across the District	*"High quality environments will be delivered and protected throughout the district. Proposals for all new development, including where appropriate advertisements and extensions and alterations to existing buildings, will only be permitted if it can be demonstrated that the proposal meets all of the following relevant criteria:* a) *protects and enhances any affected heritage assets and their settings to an extent commensurate with policy in the National Planning Policy Framework and in accordance with Policy LP18.* b) *protects and enhances biodiversity on and surrounding the proposal site, taking into account locally designated sites and the special protection given to internationally and nationally designated sites, in accordance with Policy LP19.* c) *retains and incorporates natural and historic features of the site such as trees, hedgerows, field patterns, drains and water bodies.* d) *makes a positive contribution to the local distinctiveness and character of the area, enhances its local setting, responds to and improves the character of the local built environment, provides resilience to climate change, reinforces local identity and does not adversely impact, either in design or scale terms, on the street scene, settlement pattern or the landscape character of the surrounding area.* e) *does not adversely impact on the amenity of neighbouring users such as noise, light pollution, loss of privacy and loss of light.* f) *provides adequate, well designed facilities for the storage, sorting and collection of waste that are user friendly and appropriate to the amount and type of development proposed (including taking account of any*

Local Policy Document	Policy Reference	Policy Text
		district or county Supplementary Planning Documents which are in force at the time of the proposal). *g) provides publicly accessible open space for play, sport, recreation and access to nature, in accordance with the standards set out in Appendix B, or a financial contribution of equivalent value where on-site provision is impracticable.* *h) provides sufficient private amenity space, suitable to the type and amount of development proposed; for dwellings other than flats, as a guide and depending on the local character of the area, this means a minimum of a third of the plot curtilage should be set aside as private amenity space.* *i) provides well designed hard and soft landscaping incorporating sustainable drainage systems as appropriate.* *j) provides safe environments and incorporates security measures to deter crime in accordance with Policy LP17.* *k) enables flexible use and adaptation to reflect changing lifestyles.* *l) identifies, manages and mitigates against any existing or proposed risks from sources of noise, emissions, pollution, contamination, odour and dust, vibration, landfill gas and protects from water body deterioration.* *m) the site is suitable for its proposed use with layout and drainage taking account of ground conditions, contamination and gas risks arising from previous uses and any proposals for land remediation, with no significant impacts on future users, groundwater or surface waters.* *n) complements and enhances the quality of riverside settings, including ecological value, renaturalisation where possible, and navigation.* *o) does not result in any unreasonable constraint(s) or threaten the operation and viability of existing nearby or adjoining businesses or employment sites by introducing "sensitive" developments.* *A Supplementary Planning Document to be adopted in 2014 will be used to further assess planning applications in relation to the criteria in this policy."*
Fenland Local Plan 2021-2040 Draft Local Plan	Policy LP7 – Design	*"All development, including the construction of new buildings, extensions and alterations to existing buildings, must achieve high quality sustainable design*

Local Policy Document	Policy Reference	Policy Text
Consultation (August 2022) (Ref 35)		*that contributes positively to local character, landscape and townscape, supports diversity, equality and access for all, and mitigates climate change. Development will be assessed against the following ten design principles. Proposals will be required to demonstrate to a degree proportionate to the proposal that they meet the following design principles. Proposals which fail to adequately address the design principles will not be supported. All development proposals will:* ***Part A: Context*** *a) Be based on a sound understanding of the context, integrating into the surroundings and responding to local history, culture and heritage;* *b) Relate well to the site, its local and wider context and existing characteristics, including the retention of existing natural and historic features wherever possible, and including appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area in accordance with Policies LP23 (Historic Environment) and LP28 (Landscape);* *c) Protect any important local views into, out of or through the site (LP28 Landscape);* ***Part B: Identity*** *a) Contribute positively to the sense of place, reflecting and enhancing existing character and distinctiveness;* *b) Reflect or improve on the original architectural style of the local surroundings, or embrace opportunities for innovative design and new technologies which sympathetically complement or contrast with the local architectural style;* *c) Use appropriate, high-quality materials which reinforce or enhance local distinctiveness;* *d) Not result in the visual or physical coalescence with any neighbouring settlement nor ribbon development;* ***Part C: Built Form*** *a) Make effective and efficient use of land that contributes to the achievement of compact, walkable neighbourhoods;*

Local Policy Document	Policy Reference	Policy Text
		b) Be appropriate for its context and its future use in terms of its building types, street layout, development block type and size, siting, height, scale, massing, form, rhythm, plot widths, gaps between buildings, and built footprint-to-plot ratio; *c) Achieve a density not only appropriate for its context but also taking into account its accessibility;* ***Part D: Movement*** *a) Form part of a well-designed and connected travel network with consideration for all modes of transport offering genuine choices for non-car travel and prioritising active travel and where relevant demonstrate this through evidence clearly showing connectivity for all modes and a hierarchy of routes;* *b) Maximise pedestrian and cycle permeability and avoid barriers to movement through careful consideration of street layouts and access routes both within the site and in the wider context contributing to the delivery of walkable and cyclable neighbourhoods (see Policy LP20 Accessibility and Transport);* *c) Ensure areas are accessible, safe and legible for all including people with physical accessibility difficulties and people with conditions such as dementia or sight impairment for example;* *d) Deliver well-considered parking, including suitable electric vehicle charging points (see Policy LP22), with appropriate landscaping.* *e) Deliver suitable access solutions for servicing and utilities;* ***Part E: Nature*** *a) Incorporate and retain as far as possible existing natural features including hedgerows, trees, and ponds particularly where these features offer a valuable habitat to support biodiversity;* *b) Incorporate appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area, maximising opportunities to deliver biodiverse habitats and to strengthen wildlife corridors and green infrastructure networks;*

Local Policy Document	Policy Reference	Policy Text
		c) *Be sufficiently green to help achieve wider goals for climate change mitigation and adaptation (Policy LP6 Renewable and Low Carbon Energy Infrastructure), to manage water, or support diverse ecosystems or deliver biodiversity net gain (see Policy LP25 Biodiversity Net Gain);*
		Part F: Public Spaces
		a) *Ensure public spaces are accessible to all, are safe and secure and will be easy to maintain with clear definition of public and private spaces;*
		b) *Form part of a hierarchy of spaces where relevant to offer a range of spaces available for the community and to support a variety of activities and encourage social interaction;*
		c) *Be carefully planned and integrated into the wider community to ensure spaces feel safe and are safe through natural surveillance, being flanked by active uses and by promoting activity within the space;*
		d) *Maximise opportunities for delivering additional trees (Policy LP27 Trees and Planting) and biodiversity gains through the creation of new habitats and the strengthening or extending wildlife corridors (Policies LP24 Natural Environment and LP25 Biodiversity Net Gain) and the green infrastructure network (Policy LP29 Green Infrastructure);*
		Part G: Uses
		a) *Create or contribute to a variety of complementary uses that meet the needs of the community;*
		b) *Be compatible with neighbouring land uses and not result in likely conflict with existing 'bad neighbour' uses unless it can be satisfactorily demonstrated that both the ongoing use of the neighbouring site will not be compromised, and that the amenity of occupiers of the new development will be satisfactory with the ongoing normal use of the neighbouring site;*
		c) *Not result in adverse noise and vibration taking into account surrounding uses nor result in adverse impacts upon air quality from odour, fumes, smoke, dust and other sources;*

Local Policy Document	Policy Reference	Policy Text
		Part H: Homes and Buildings a) *Provide homes with good quality internal environments for users and adequate access to private, shared or public spaces;* b) *Make the best use of site orientation, building form, layout, landscaping and materials to maximise natural light and heat, whilst avoiding internal overheating by providing passive cooling and ventilation;* c) *Minimise space heating and cooling demand and total energy demand by adopting a 'fabric first' approach to construction;* d) *Aspire towards water neutrality by meeting high water efficiency standards of 110 litres per person per day and incorporating facilities to recycle, harvest and conserve water resources (Policy LP32 Flood and Water Management);* e) *Be adaptable to changing needs of future occupants and be cost effective to run;* f) *Not result in harm to people's amenity either within the proposed development or neighbouring it through overlooking, overshadowing, loss of light or increase in artificial light or glare (Policy LP8 Amenity Provision);* g) *Provide adequate storage, waste, servicing and utilities for the use proposed (see Minerals and Waste RECAP35SPD);* ***Part I: Resources*** a) *Minimise the need for resources both in construction and operation of buildings and be easily adaptable to avoid unnecessary waste;* b) *Use high quality materials which are not only suitable for the context but that are durable and resilient to impacts of climate change;* ***Part J: Lifespan*** a) *Ensure that buildings are durable, flexible and adaptable over their planned lifespan, taking into account potential future social, economic, technological and environmental needs, through the structure, layout and design of buildings and places; and M4(2) and wheelchair homes in accordance with Policy LP12 (Meeting Housing Needs);*

Local Policy Document	Policy Reference	Policy Text
		b) Encourage the creation of a sense of ownership for users and the wider community with a clear strategy for ongoing management and stewardship. *Development proposals will be expected to satisfy requirements of any adopted local design guide or design code where relevant to the proposal.''*

Appendix B - Chapter 7 (Development of the Proposed Alignment and Substation Sitings) Inset Images

nationalgrid

The following images are full size versions of the proposed alignment and substation siting image insets in Chapter 7 of this report and include:

Image 7.1 Proposed siting of the new Grimsby West Substation

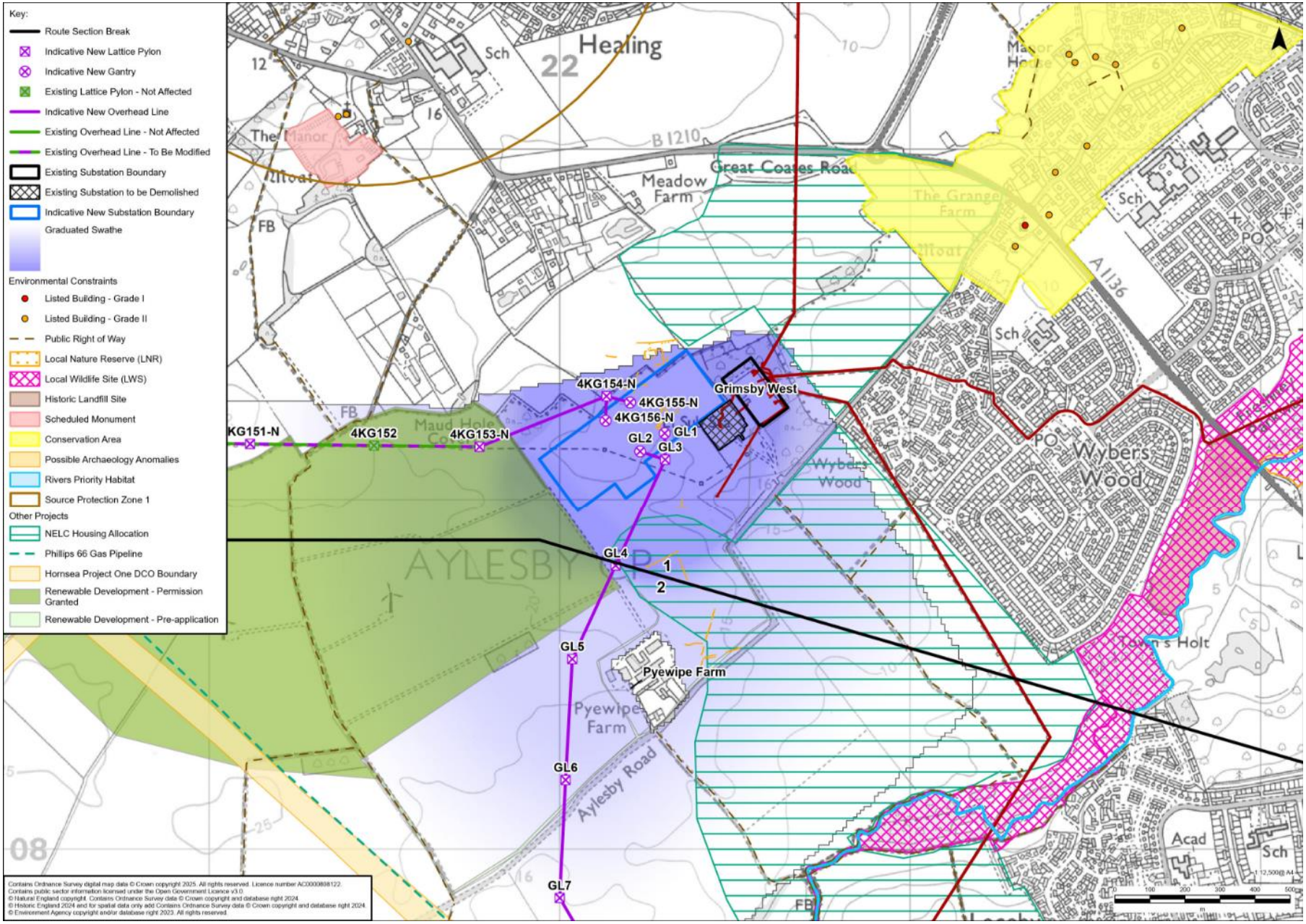


Image 7.2 Proposed overhead line alignment between the new Grimsby West substation and Barnoldby le Beck

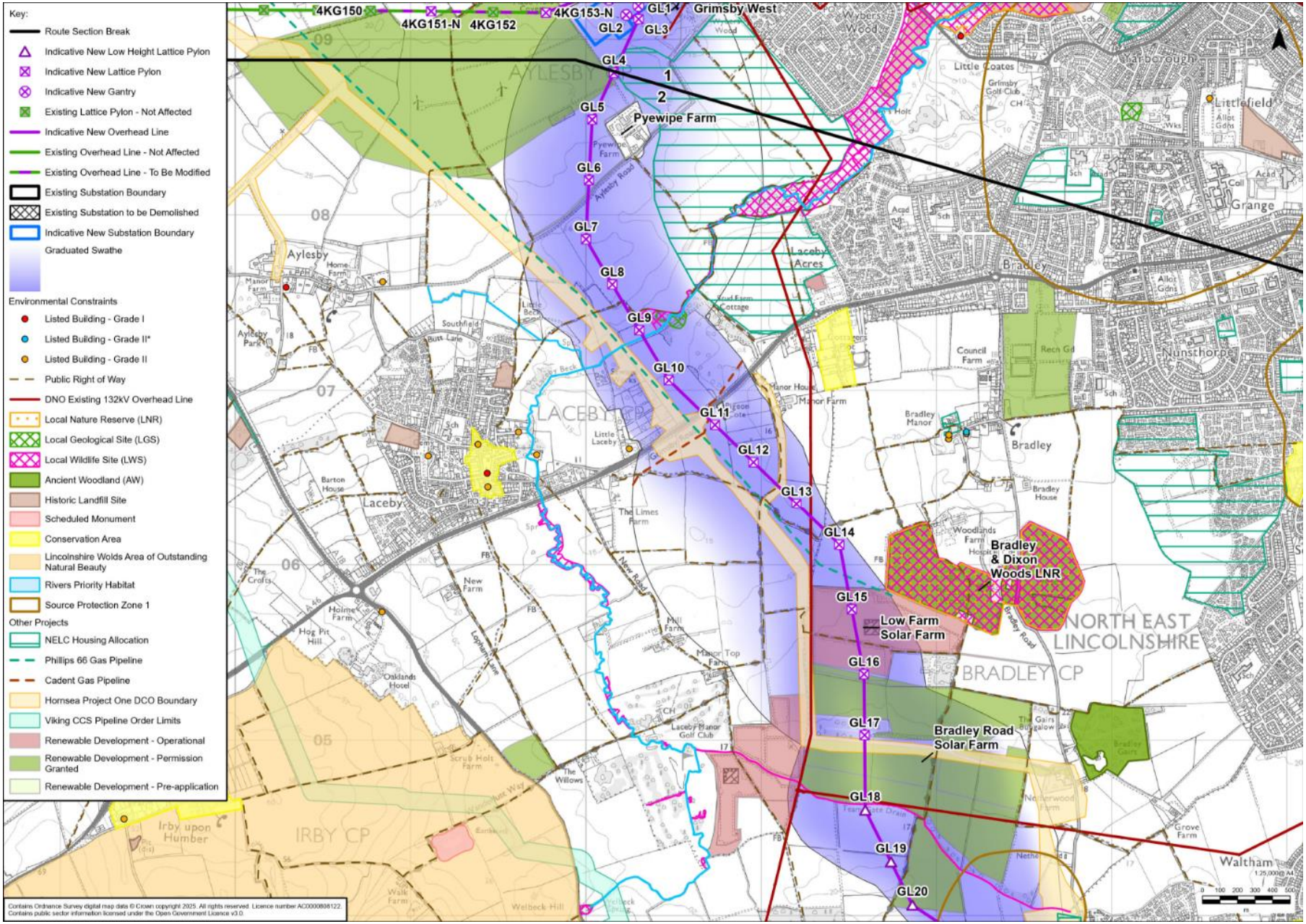


Image 7.3 Proposed overhead line alignment between Barnoldby le Beck and Grainsby

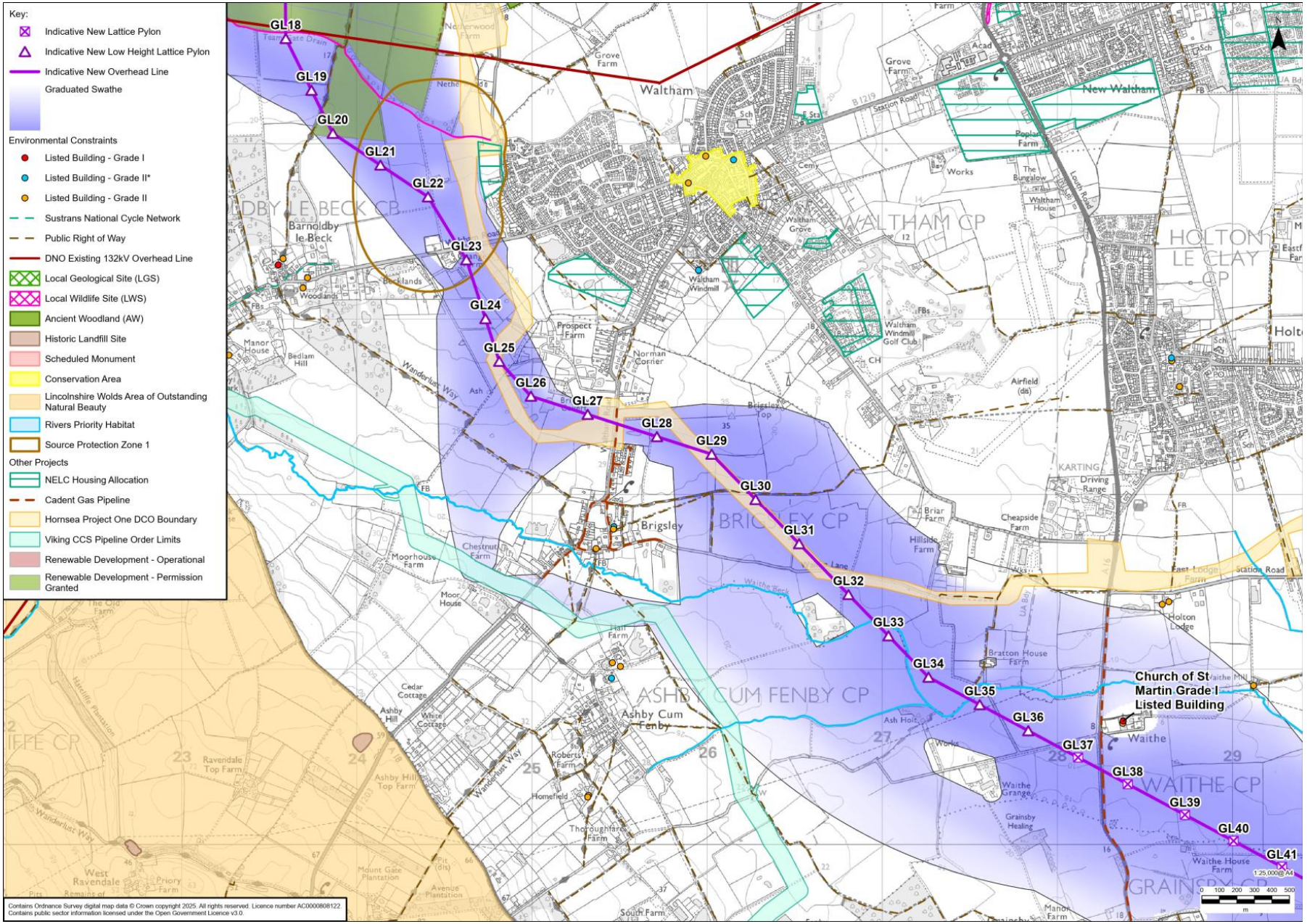


Image 7.4 Proposed overhead line alignment between Grainsby and Covenham St Bartholomew

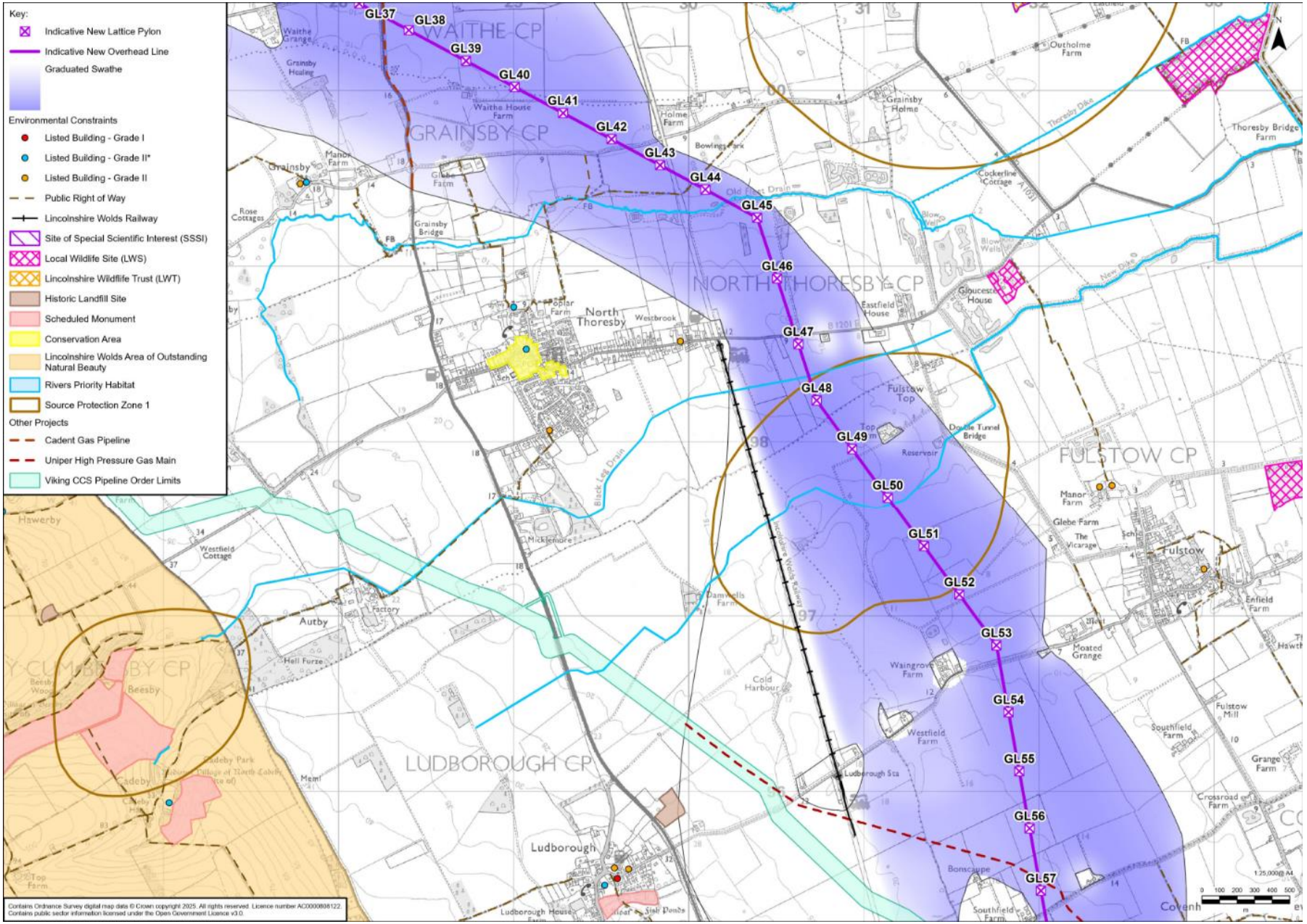


Image 7.5 Proposed overhead line alignment between Covenham St Bartholomew to Alvingham

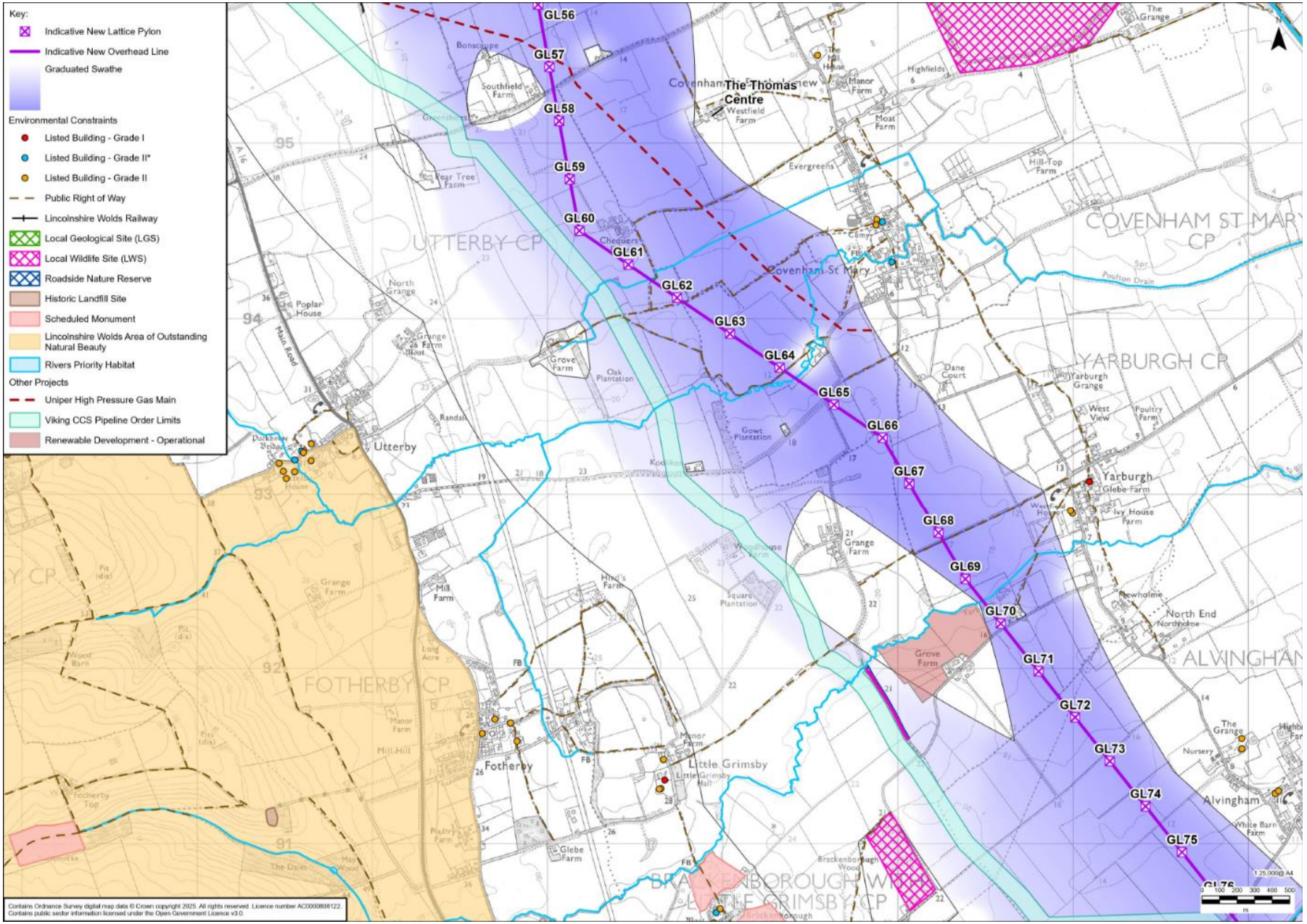


Image 7.6 Proposed overhead line alignment between Alvingham to Manby

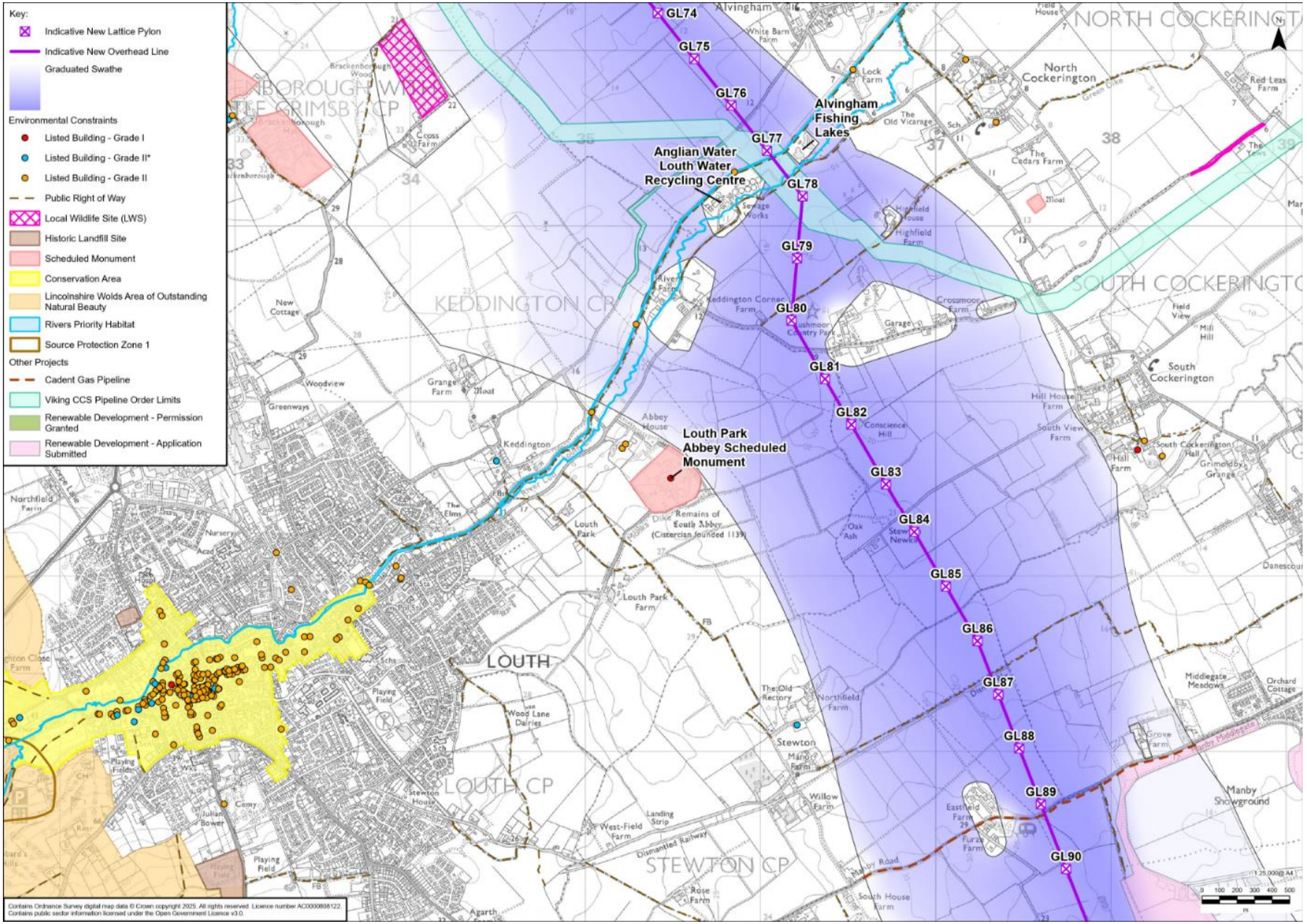


Image 7.7 Proposed overhead line alignment between Manby and Withern

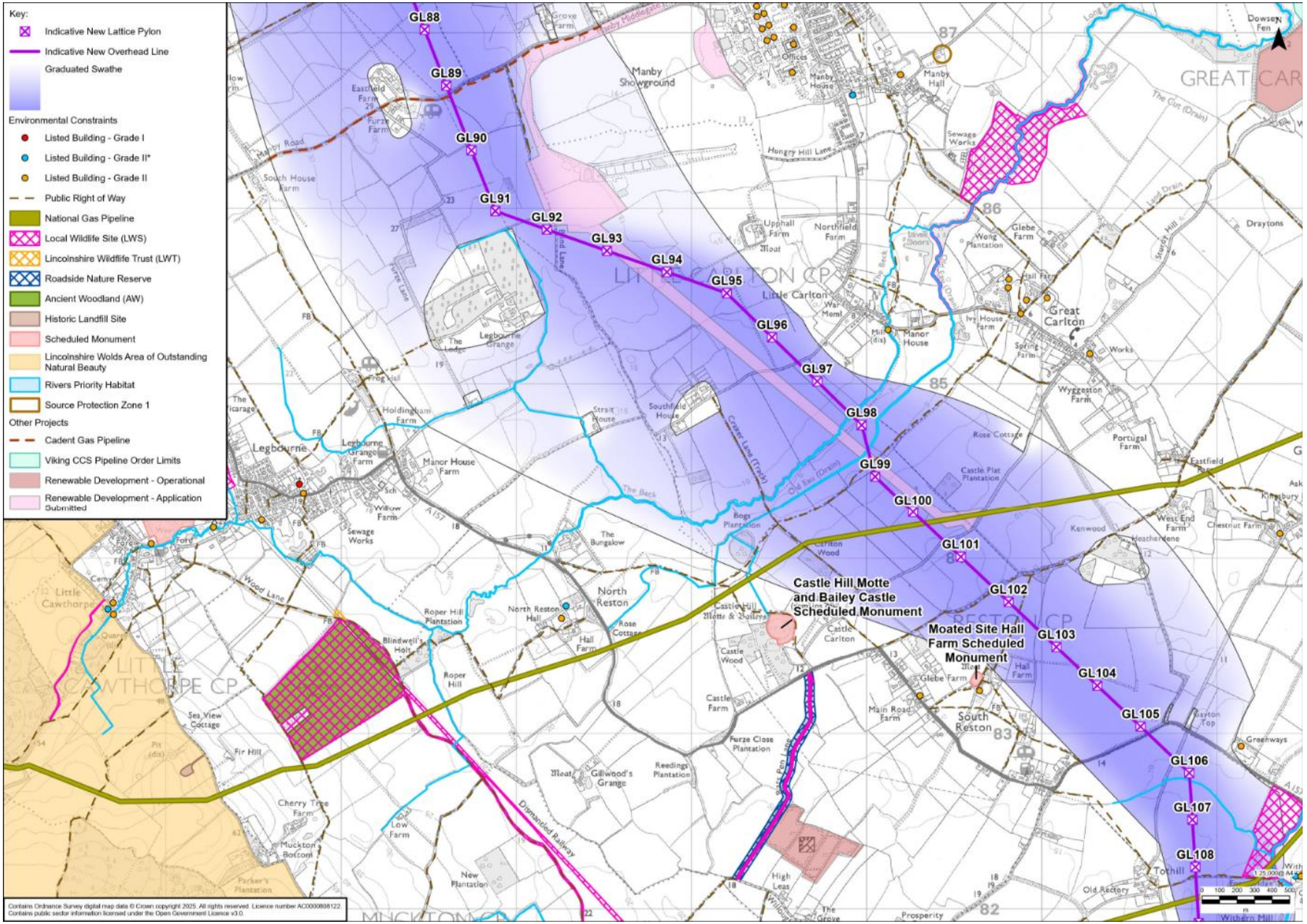


Image 7.8 Proposed overhead line alignment between Withern to the new Lincolnshire Connection Substation A

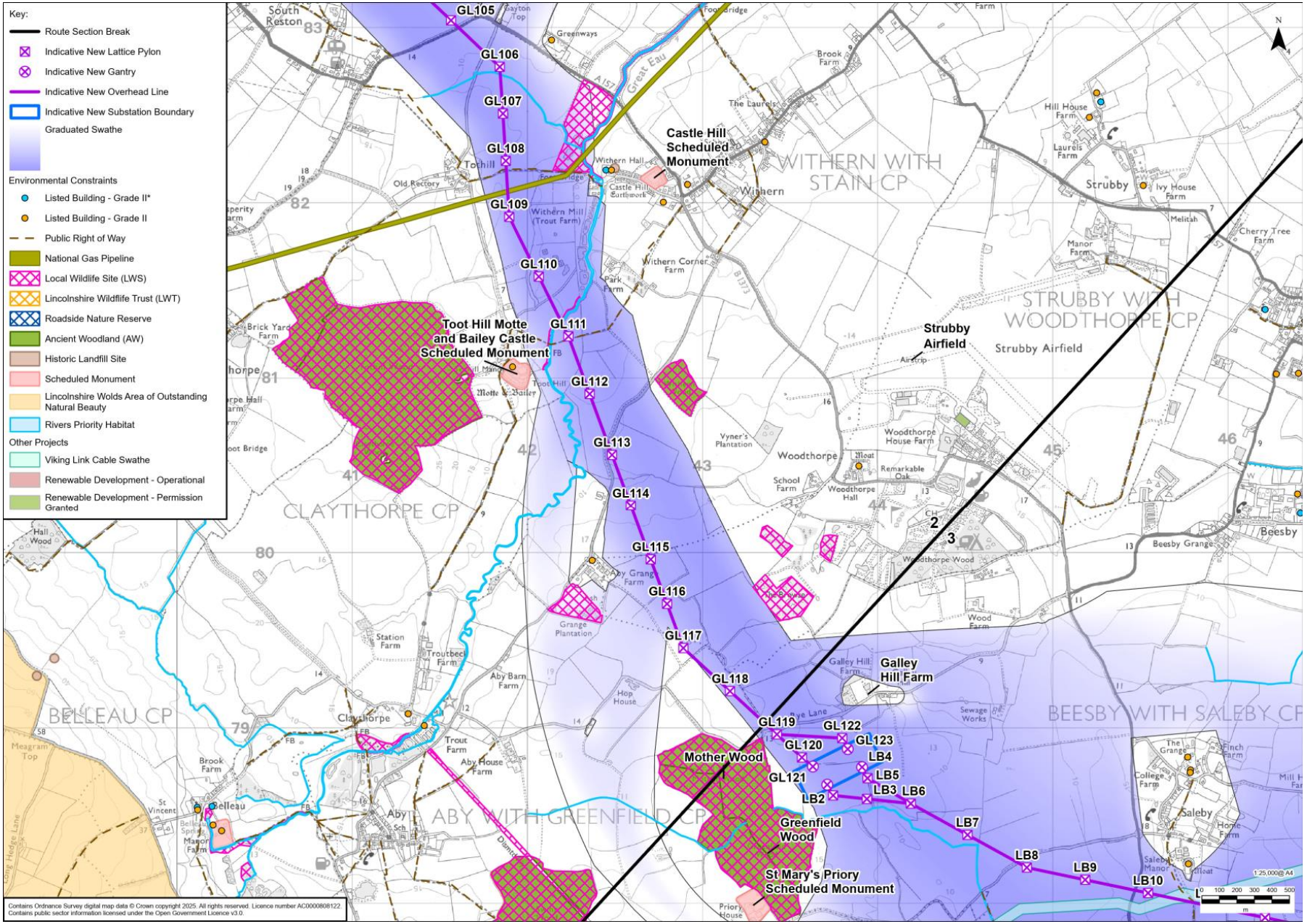


Image 7.9 Proposed siting of the new Lincolnshire Connection Substation A

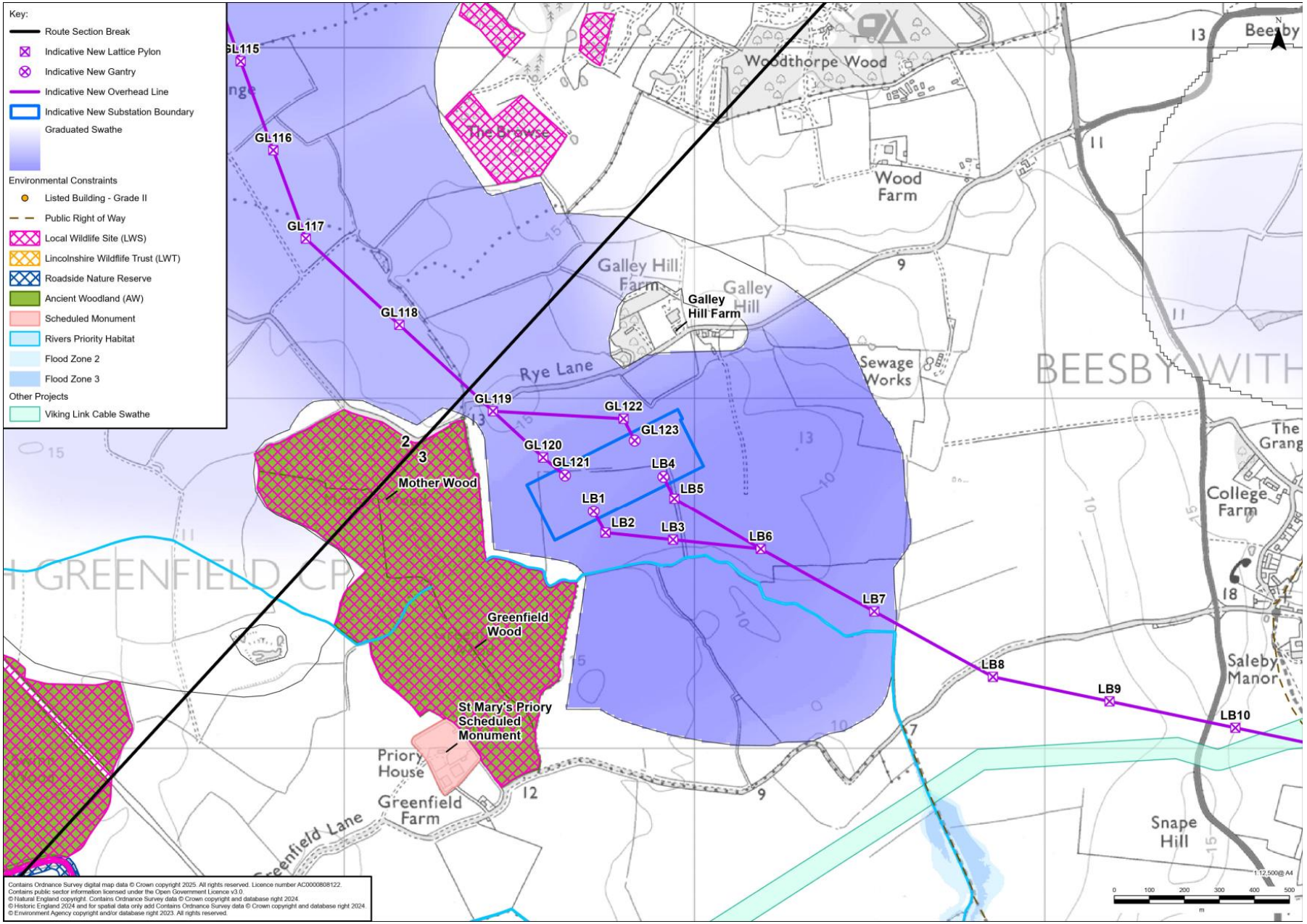


Image 7.10 Proposed siting of the new Lincolnshire Connection Substation B

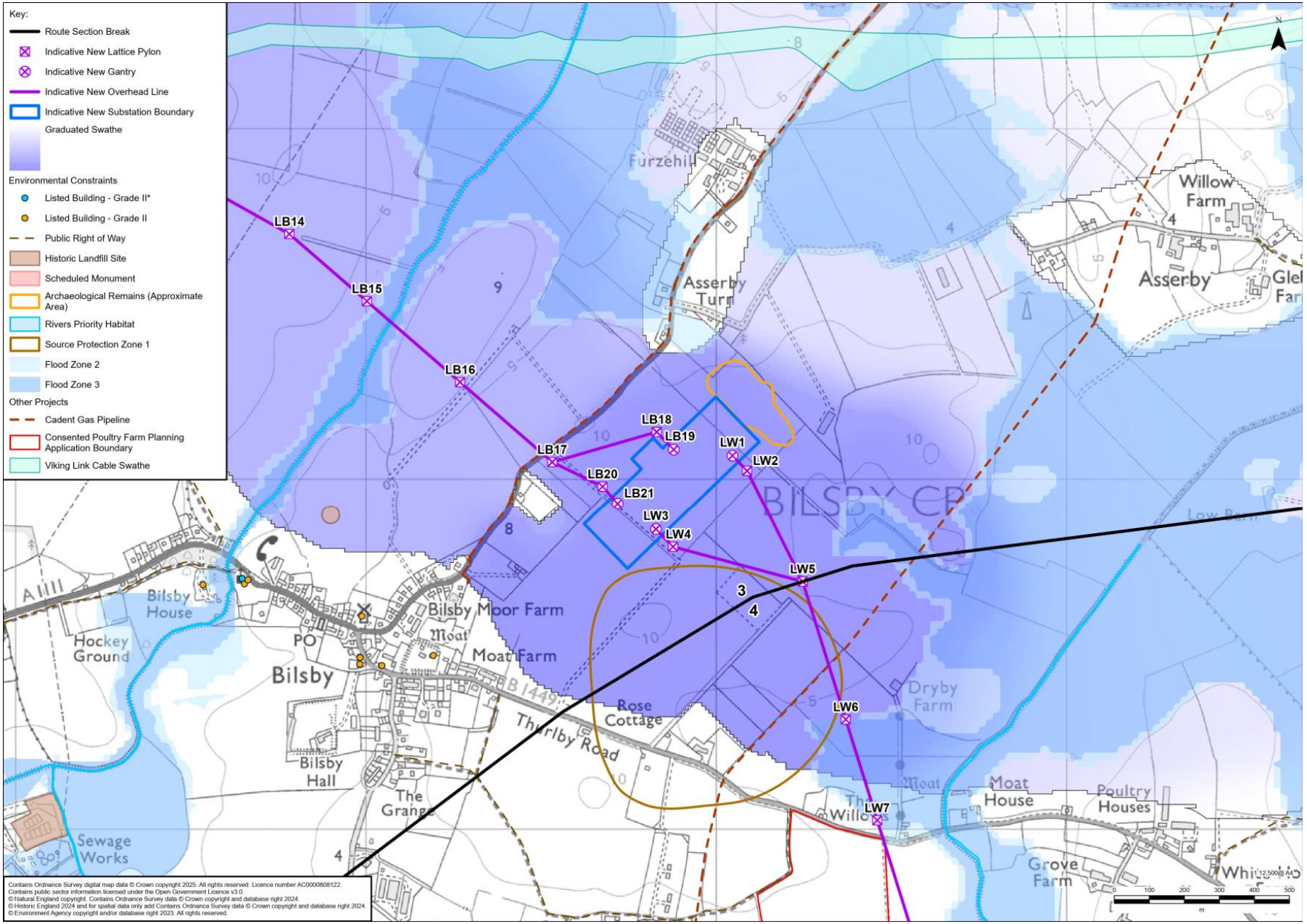


Image 7.11 Proposed overhead line alignment between the new Lincolnshire Connection Substations A and B

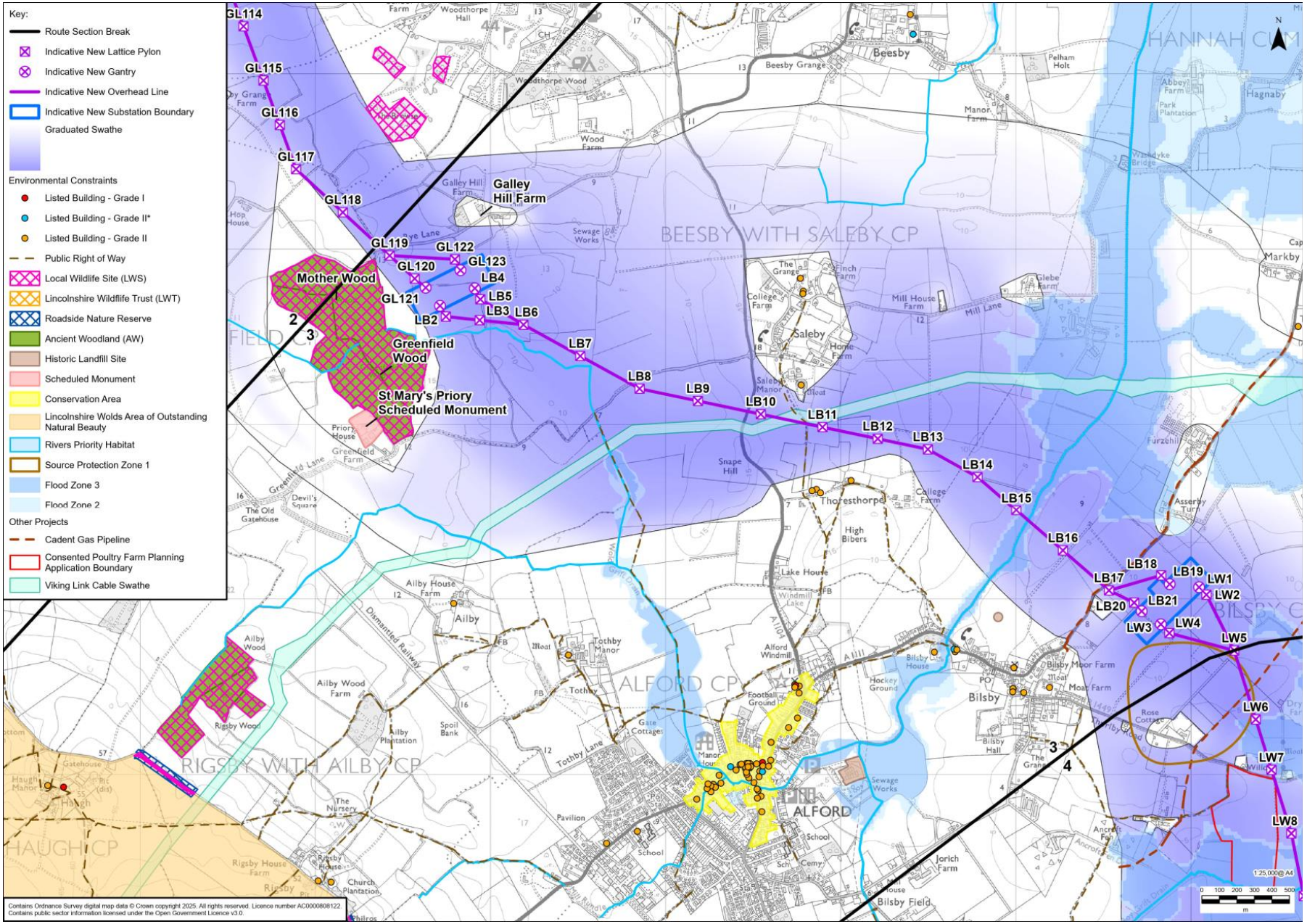


Image 7.12 Proposed overhead line alignment between the new Lincolnshire Connection Substation B and Sloothby

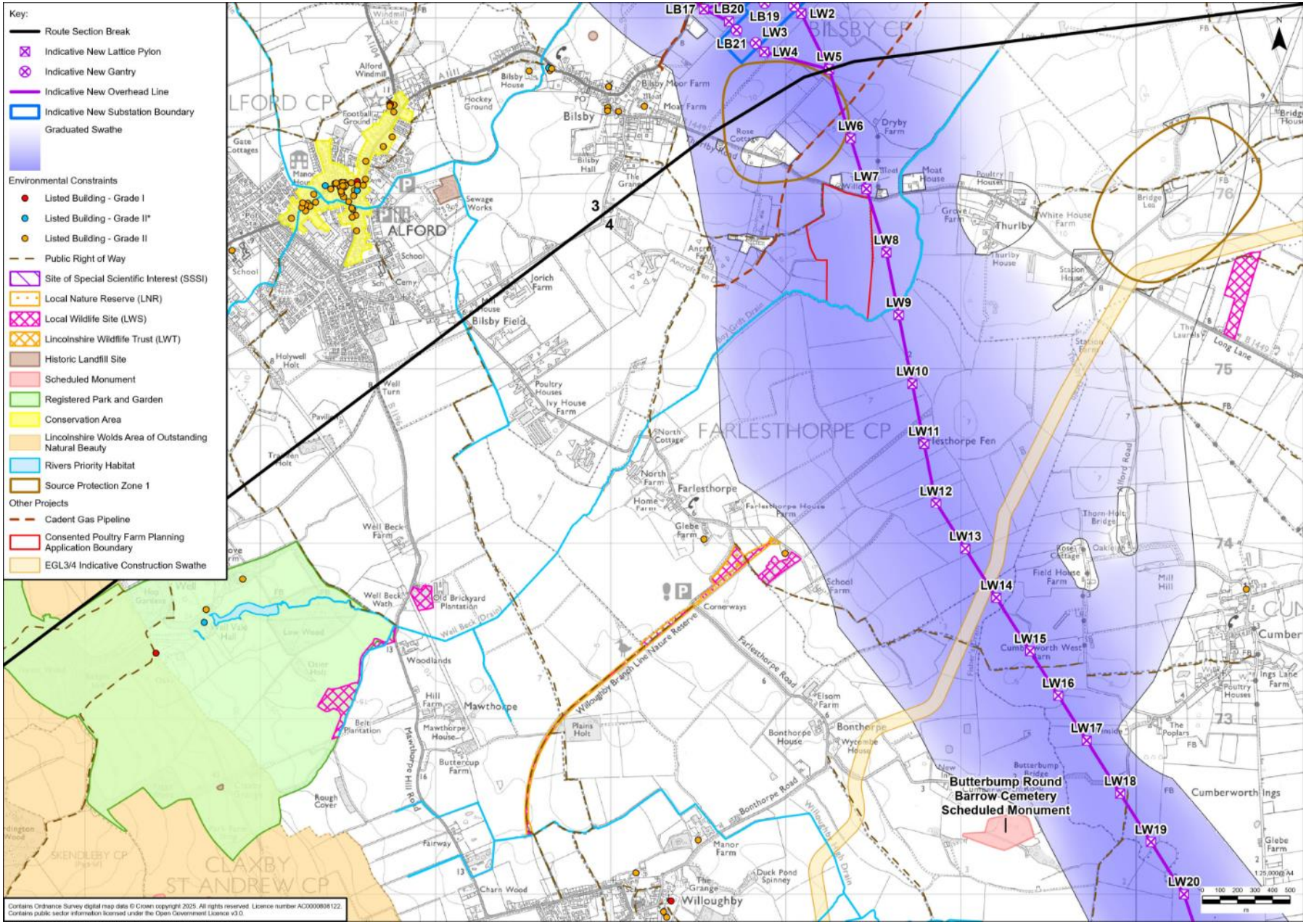


Image 7.13 Proposed overhead line alignment between Sloothby and Marsh Lane

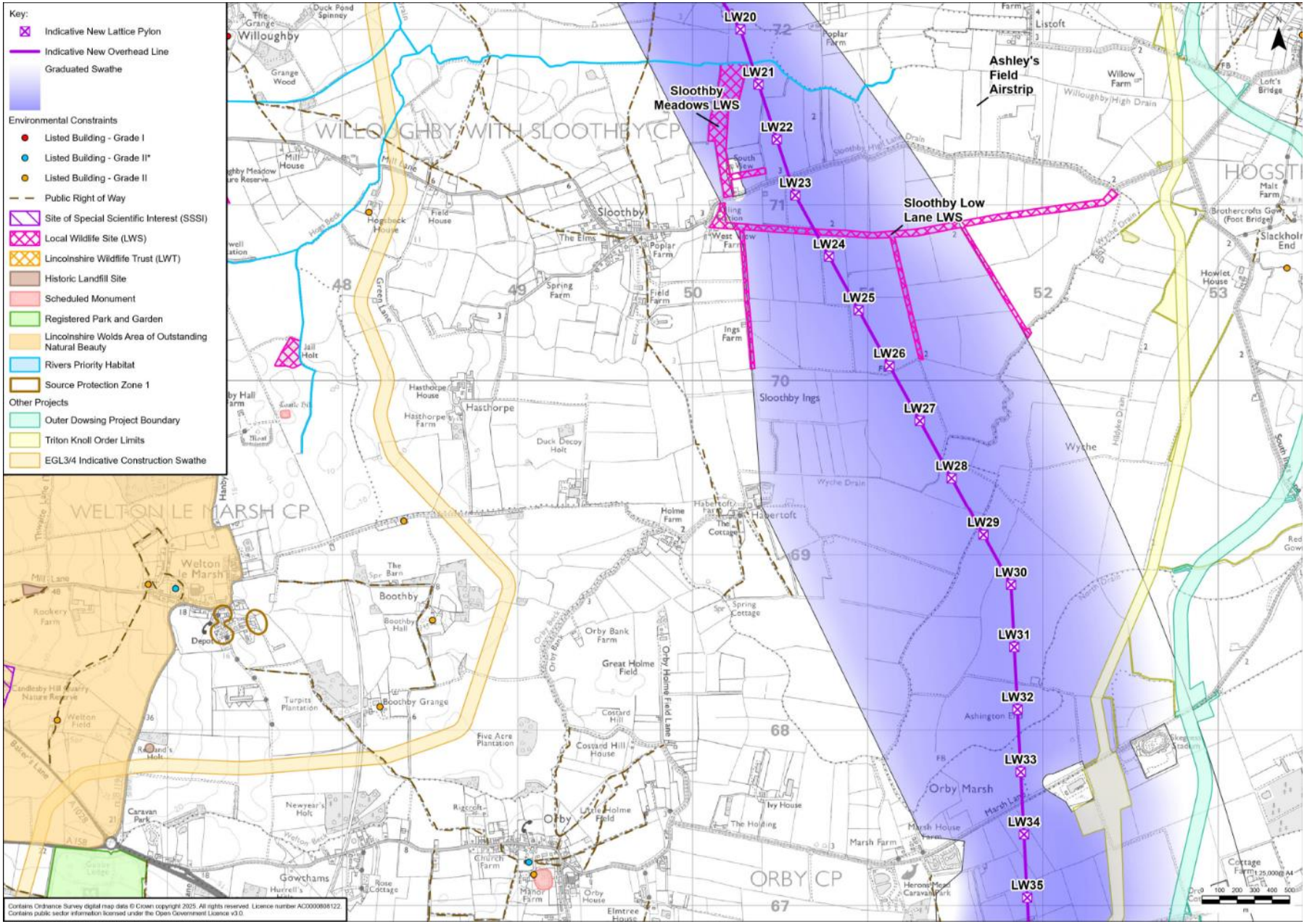


Image 7.14 Proposed overhead line alignment between Marsh Lane and Thorpe St Peter

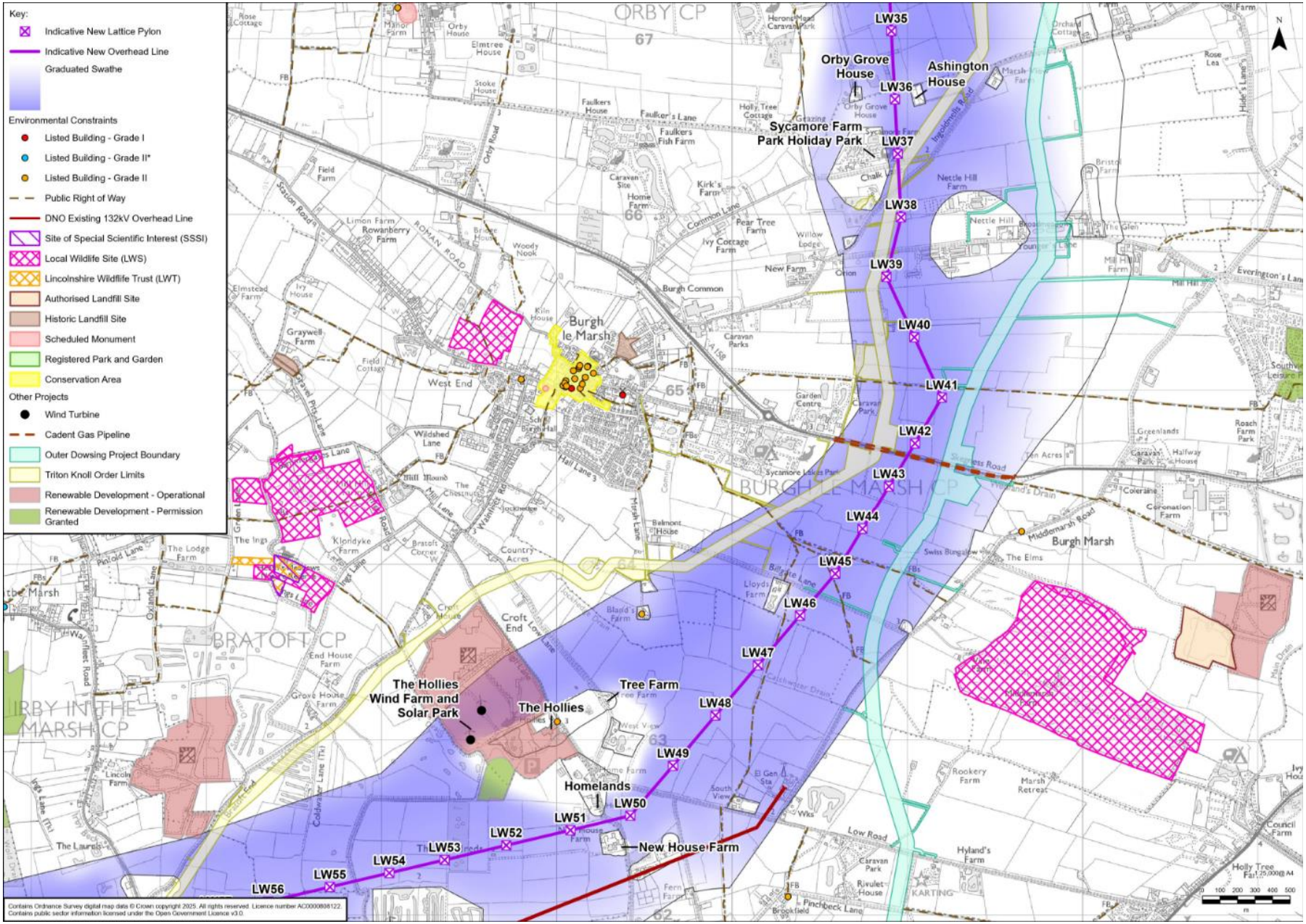


Image 7.15 Proposed overhead line alignment between Thorpe St Peter and Bell Water Bridge

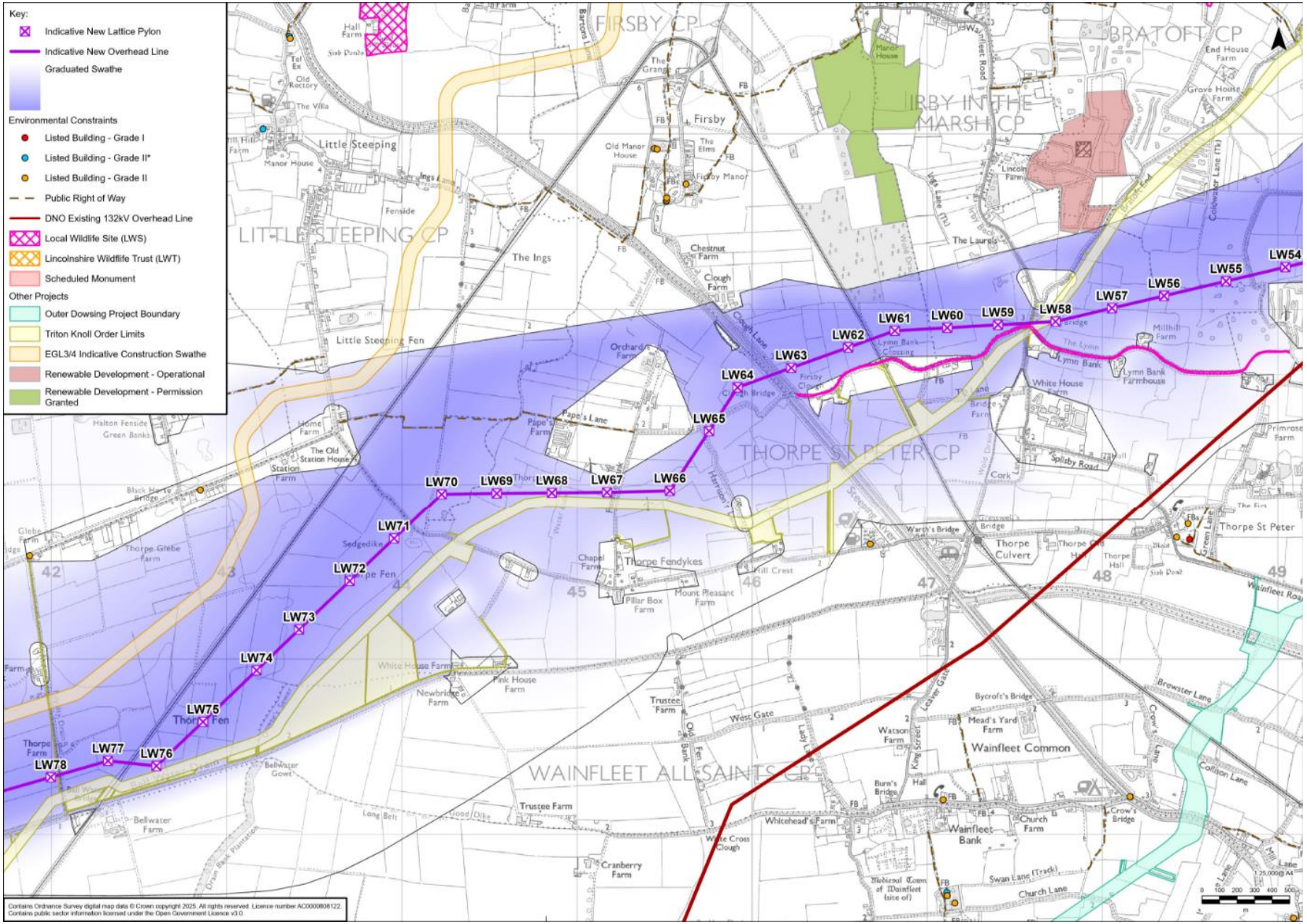


Image 7.16 Proposed overhead line alignment between Bell Water Bridge and Midville

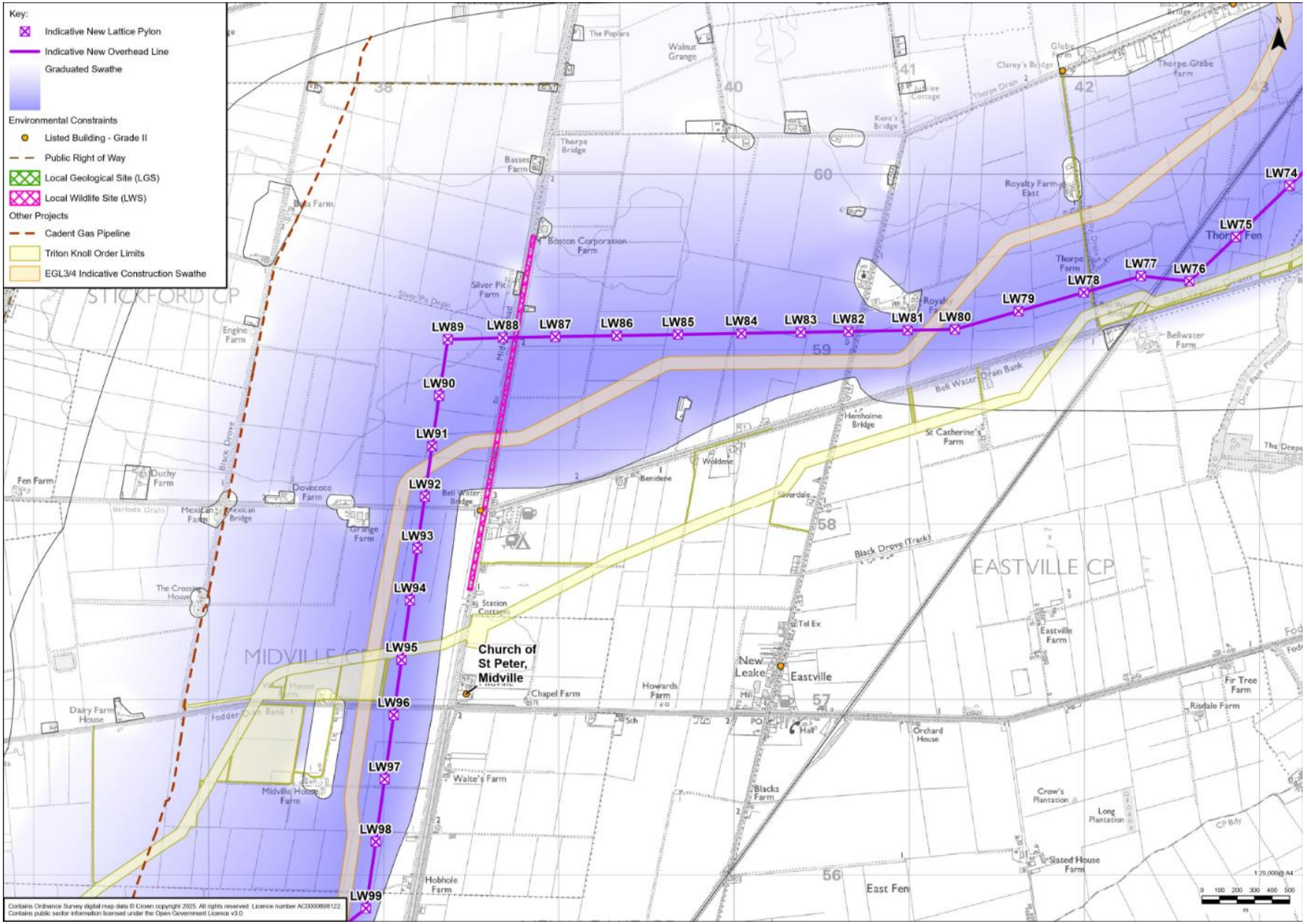


Image 7.17 Proposed overhead line alignment between Midville and Carrington Road

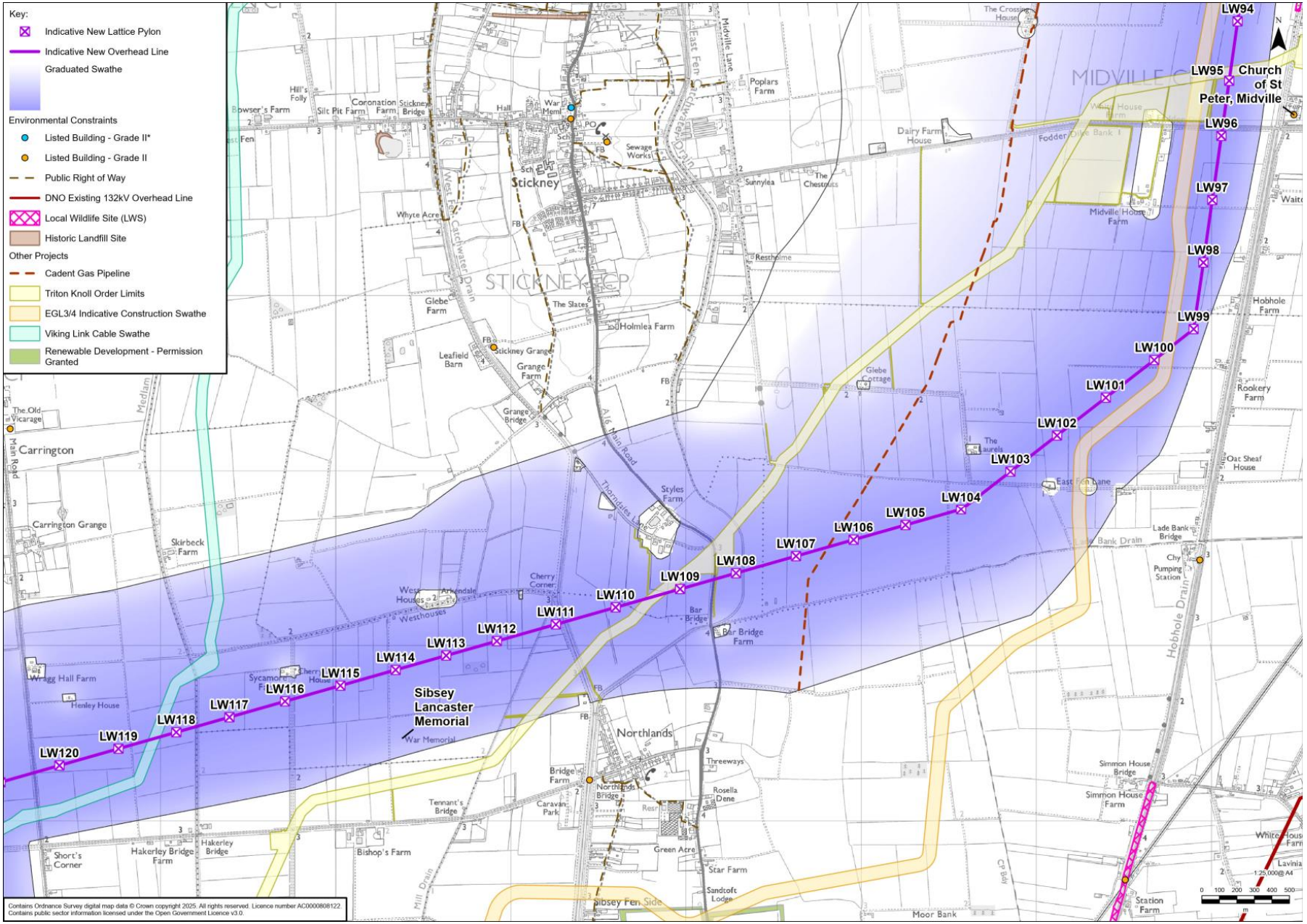


Image 7.18 Proposed overhead line alignment between Carrington Road and Gipsey Bridge

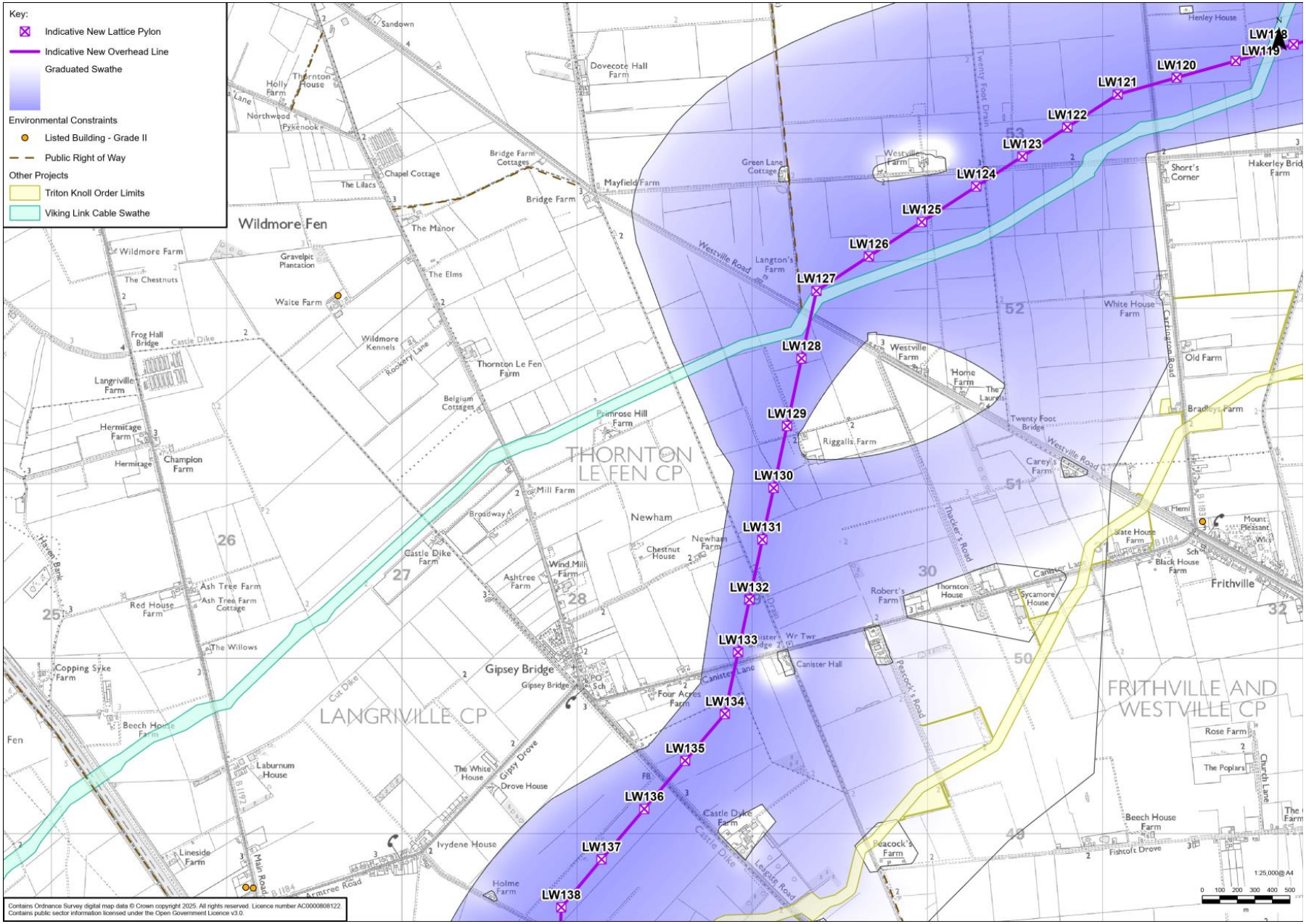


Image 7.19 Proposed overhead line alignment between Gipsey Bridge and Hubbert's Bridge

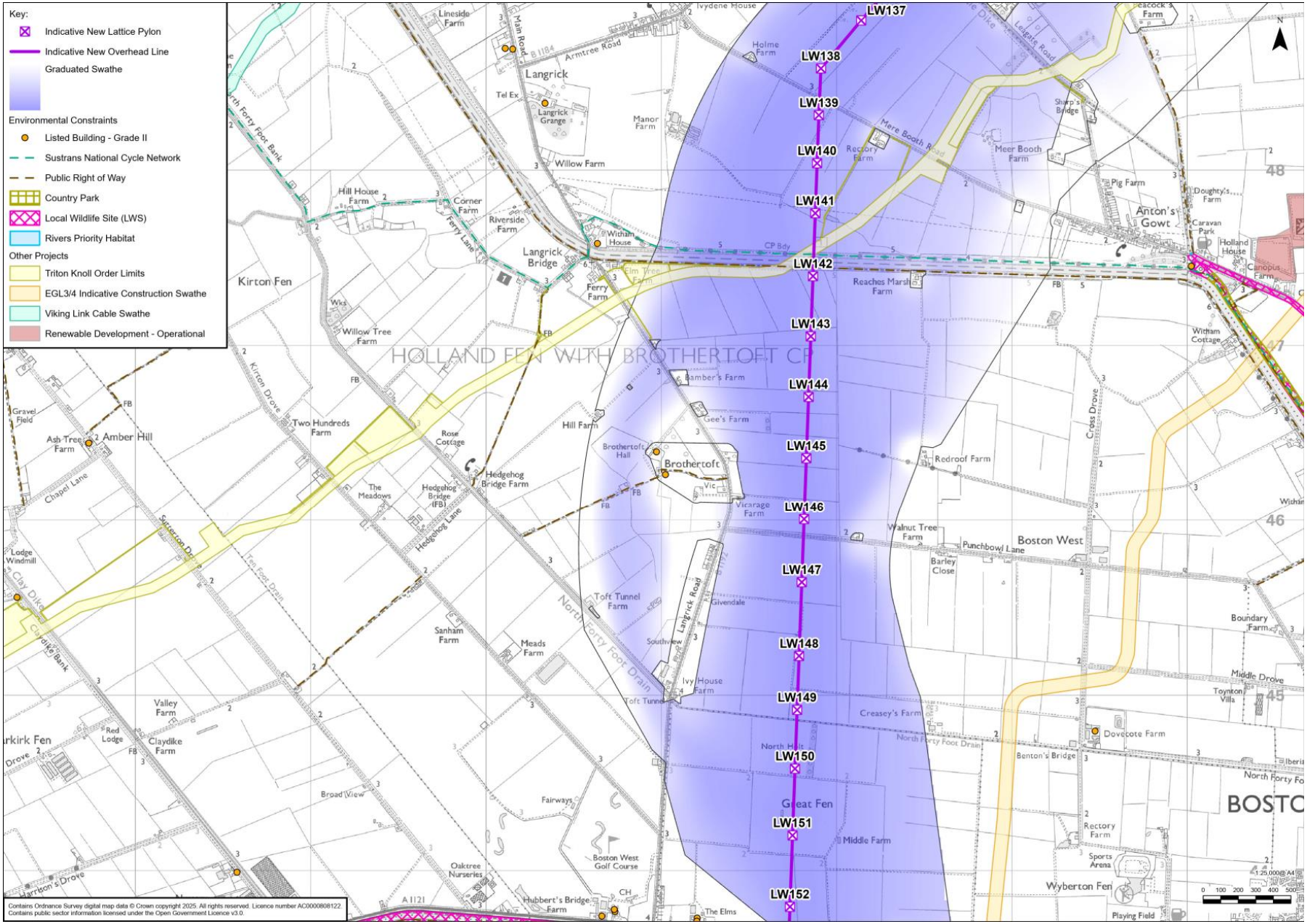


Image 7.20 Proposed overhead line alignment between Hubbert's Bridge and Kirton End

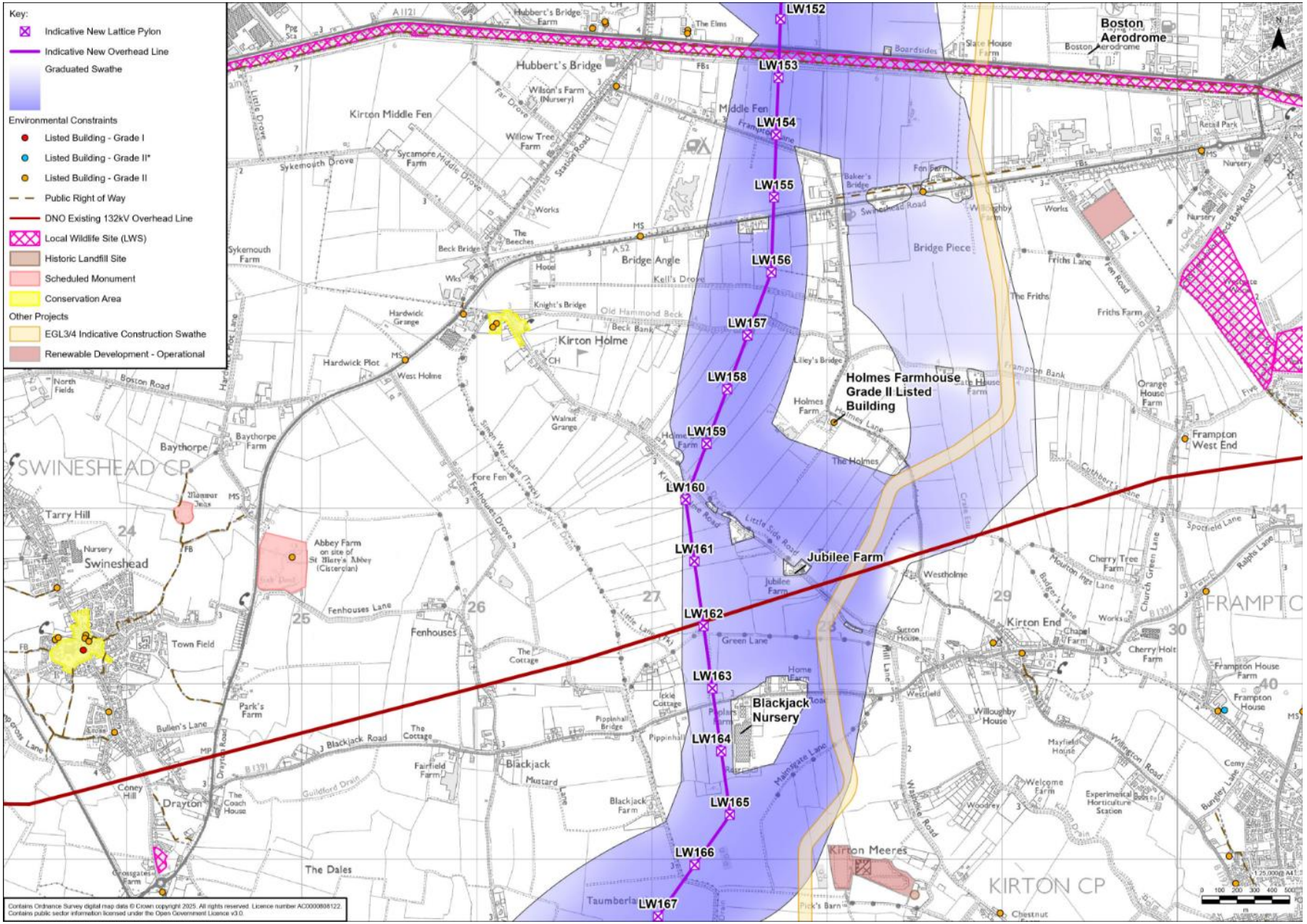


Image 7.21 Proposed overhead line alignment between Kirton End and Sutterton Dowdyke

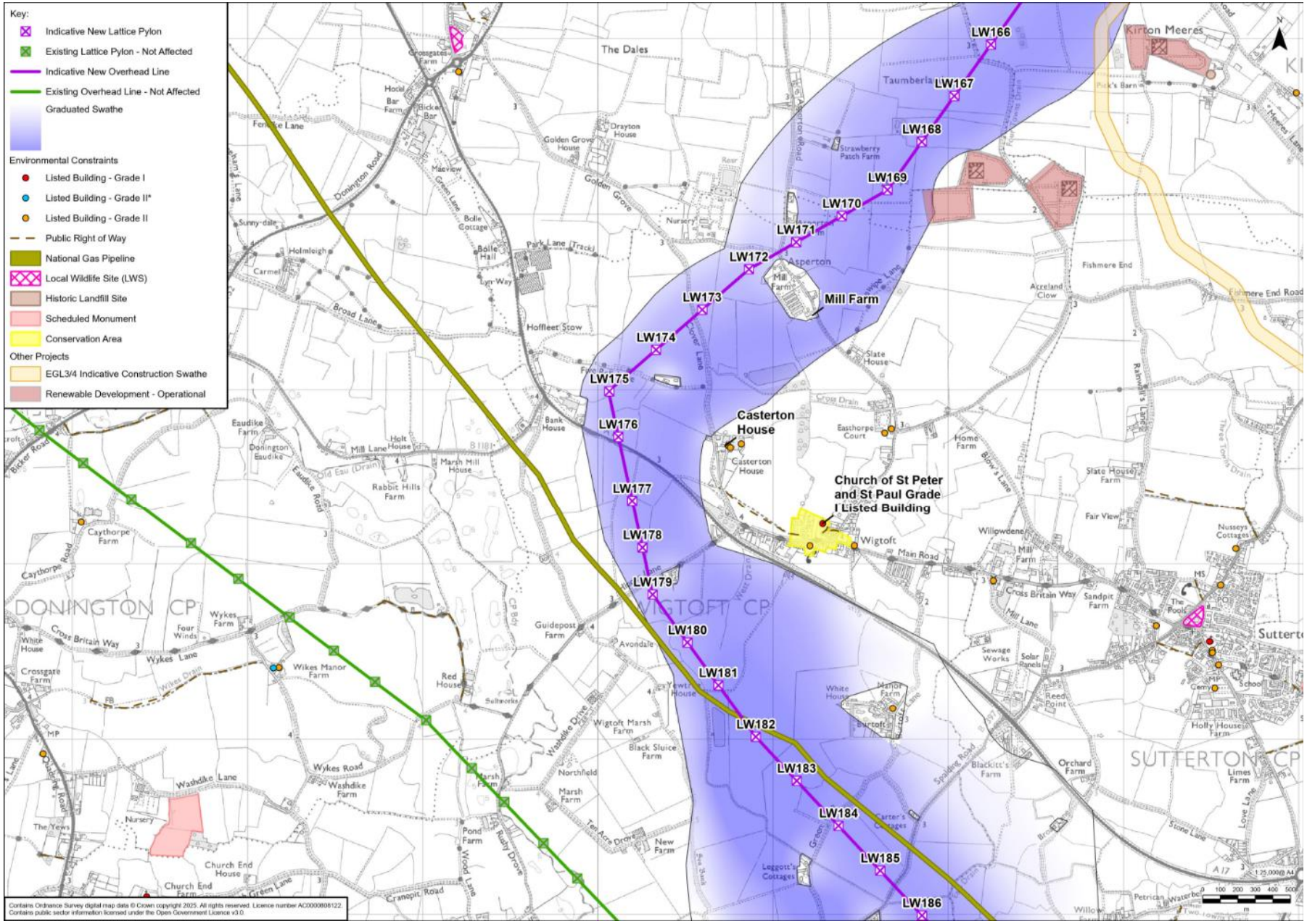


Image 7.22 Proposed overhead line alignment between Sutterton Dowdyke and Refined Weston Marsh Substation Siting Zone

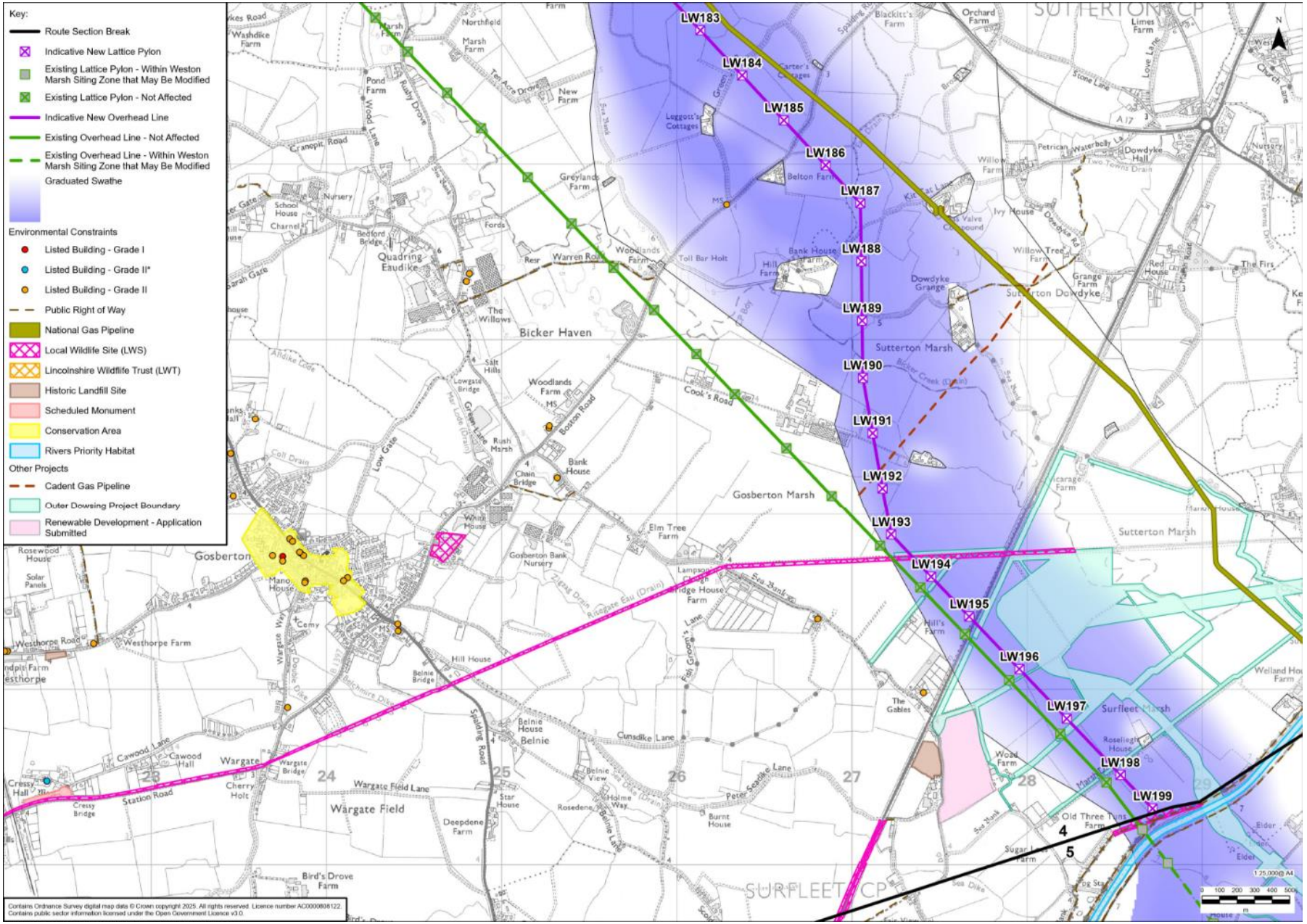


Image 7.23 Refined Weston Marsh Substation Siting Zone

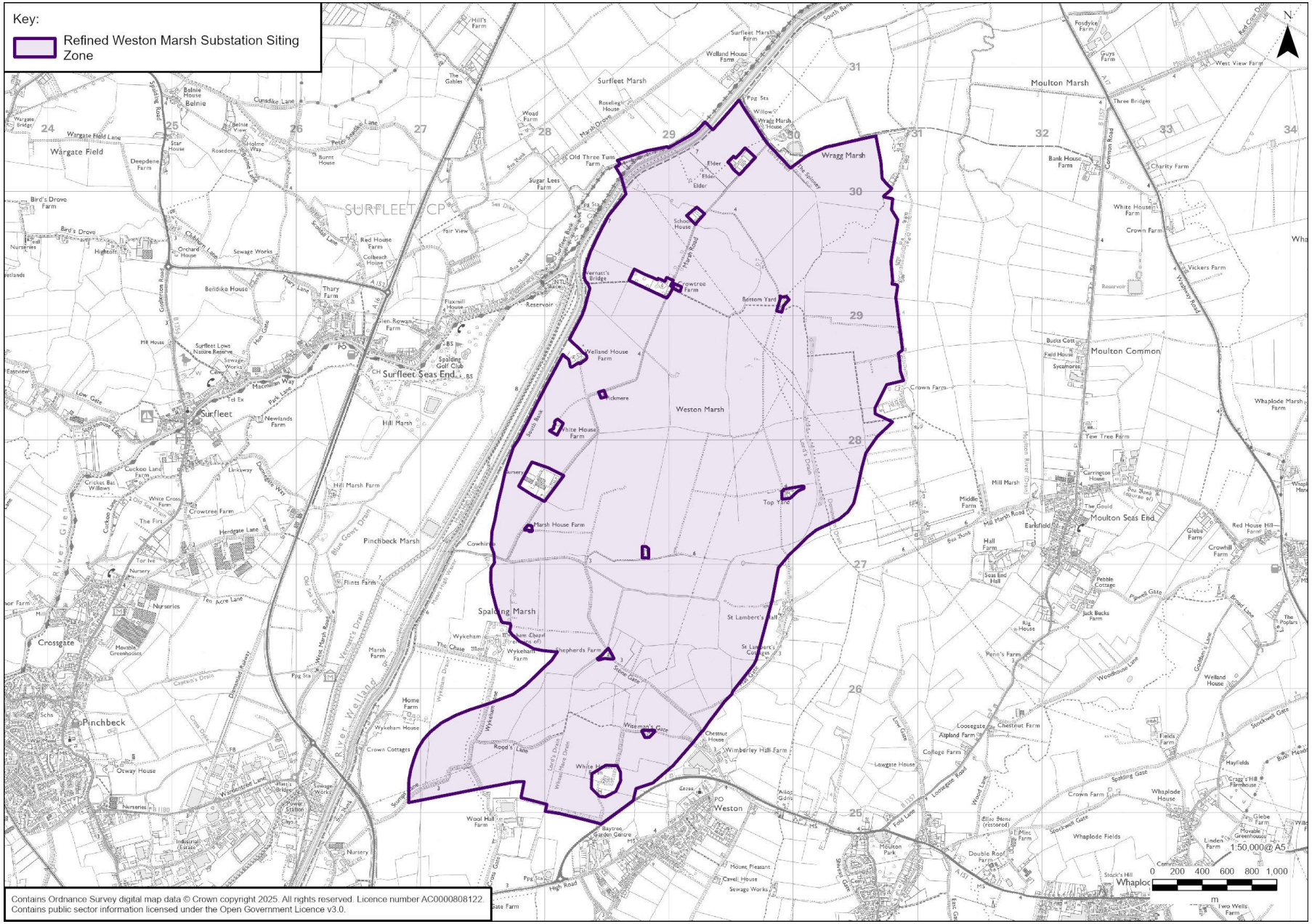


Image 7.24 Proposed overhead line alignment between Refined Weston Marsh Substation Siting Zone and Whaplode

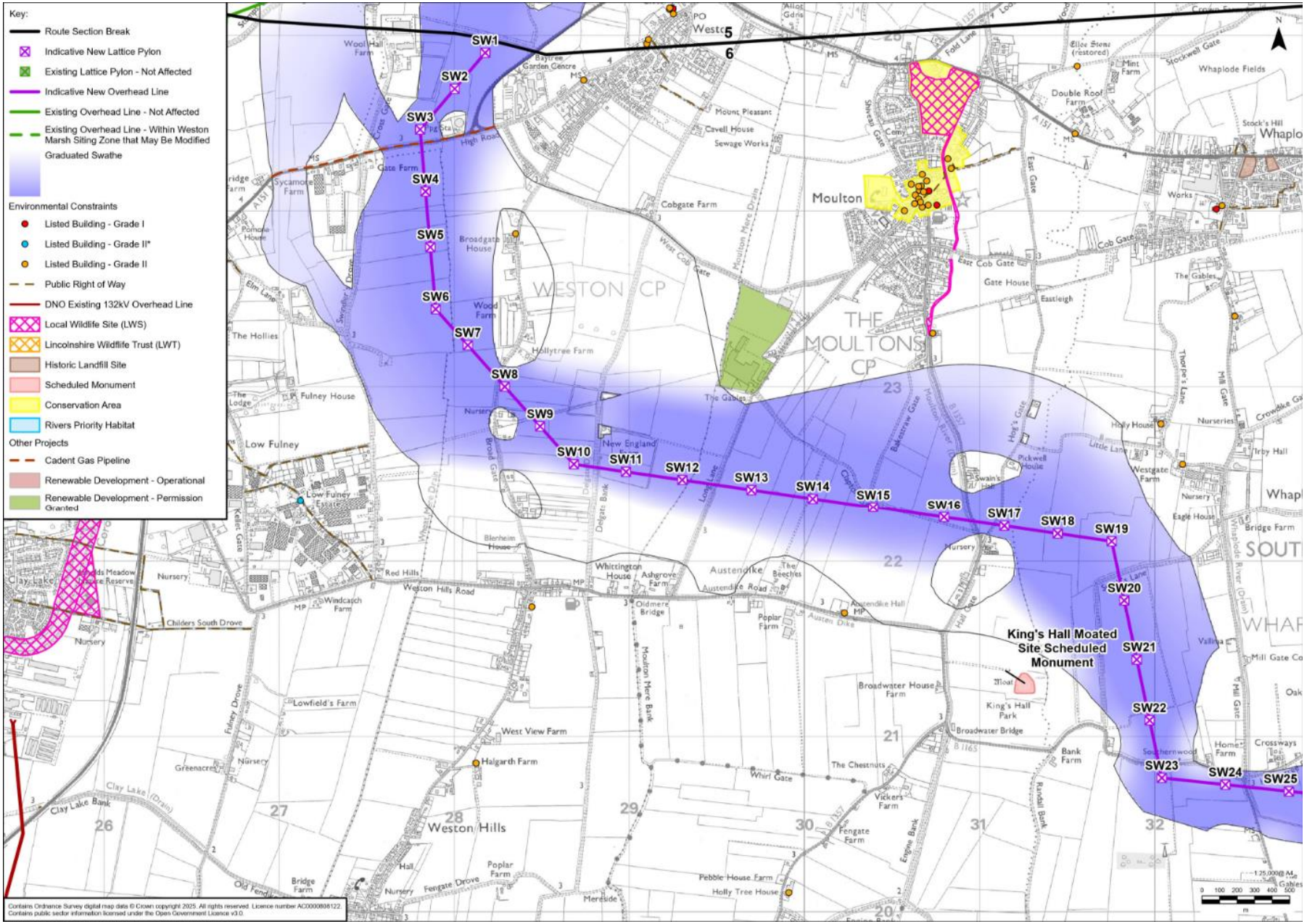


Image 7.25 Proposed overhead line alignment between Whaplode and New Fen Dike

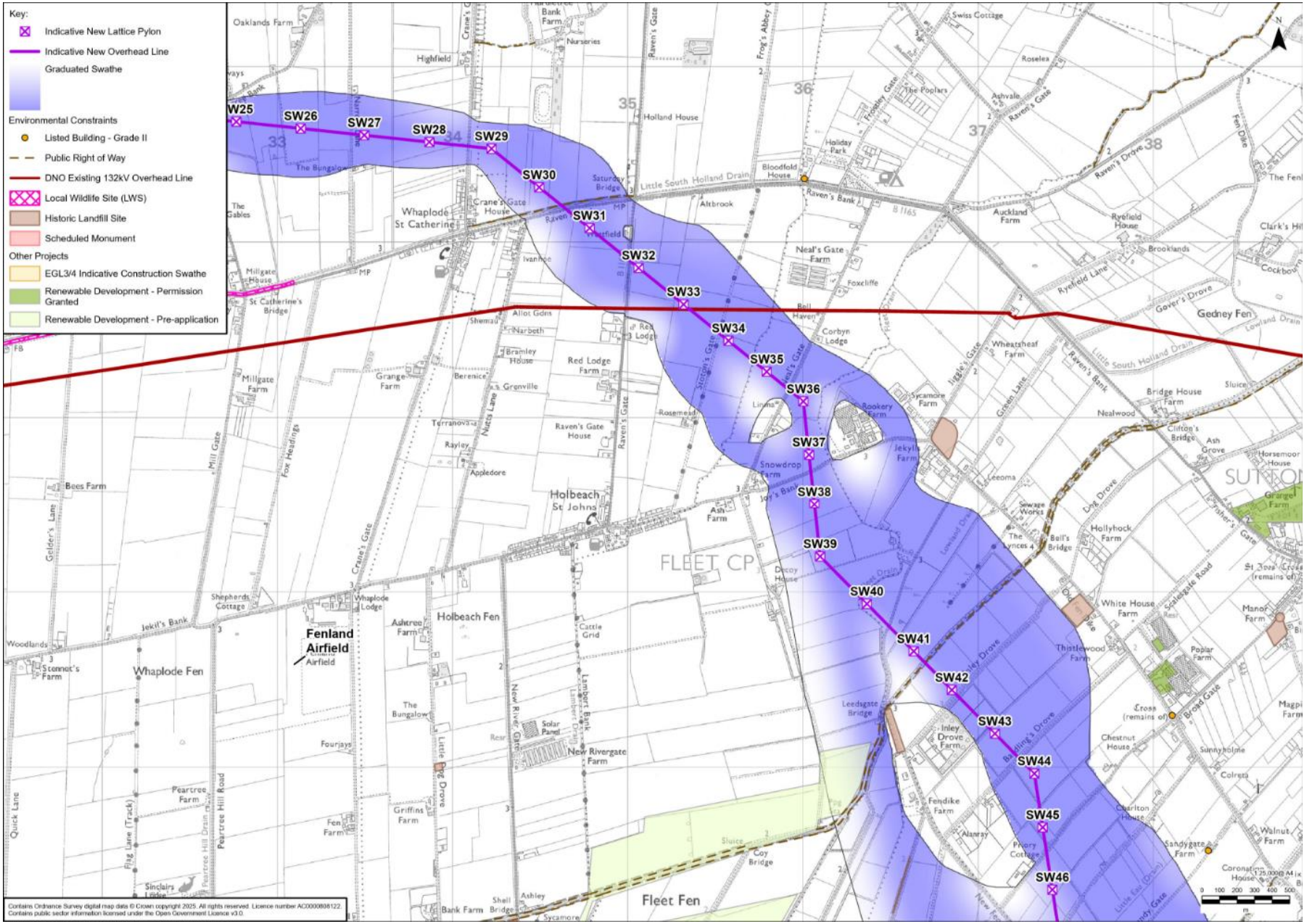


Image 7.26 Proposed overhead line alignment between New Fen Dike and Tydd St Giles

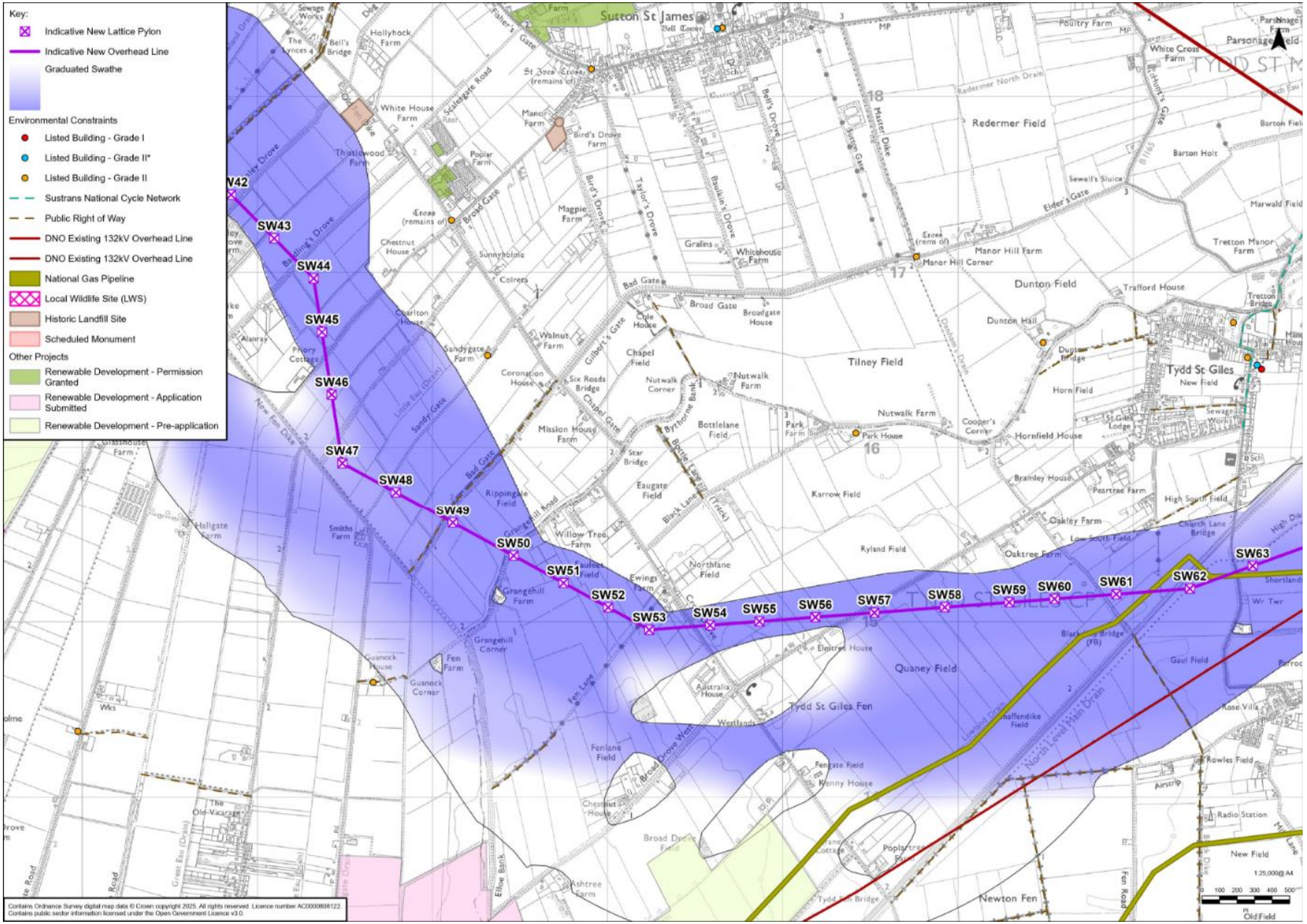


Image 7.27 Proposed overhead line alignment between Tydd St Giles and New Walpole B Substation

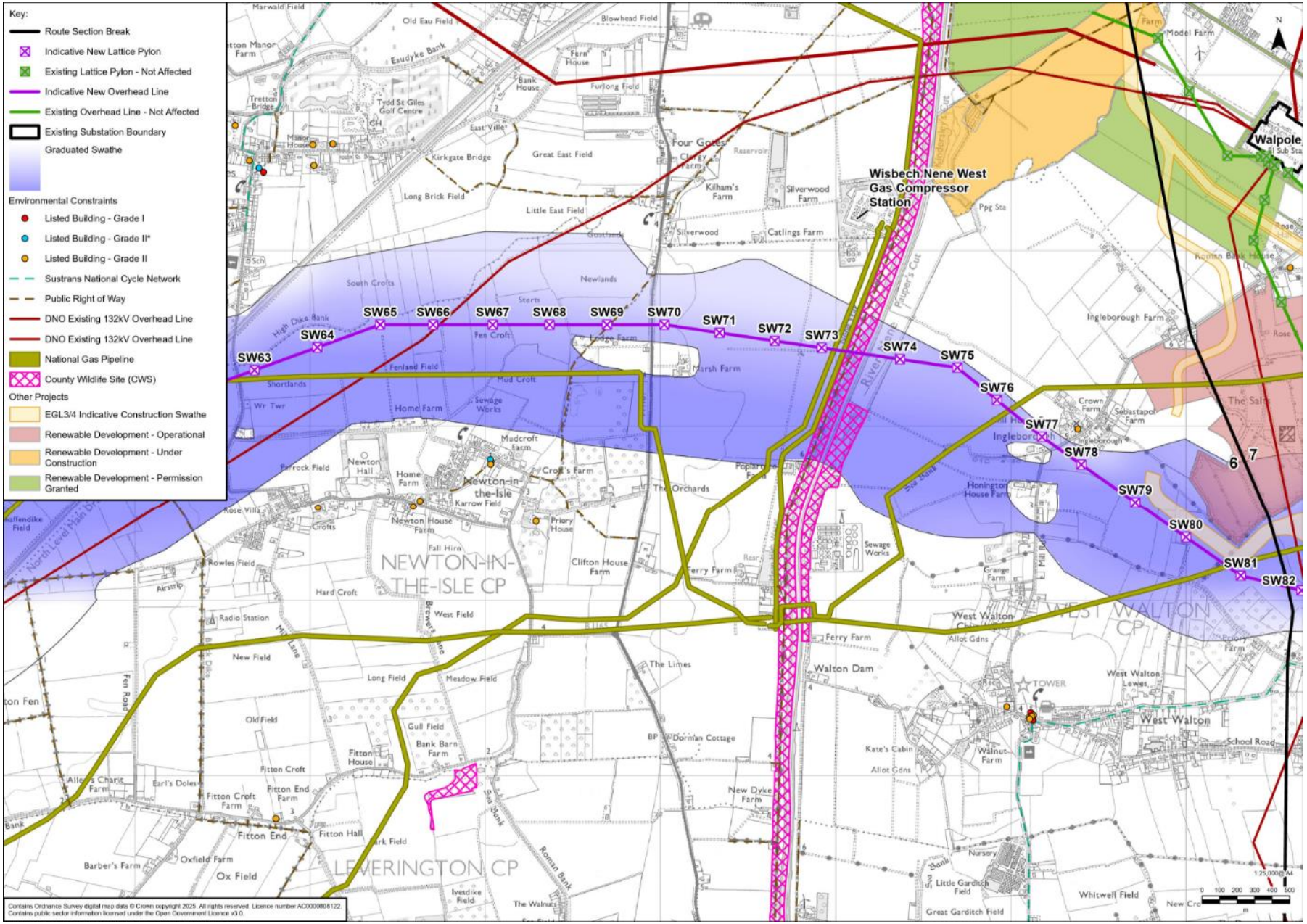
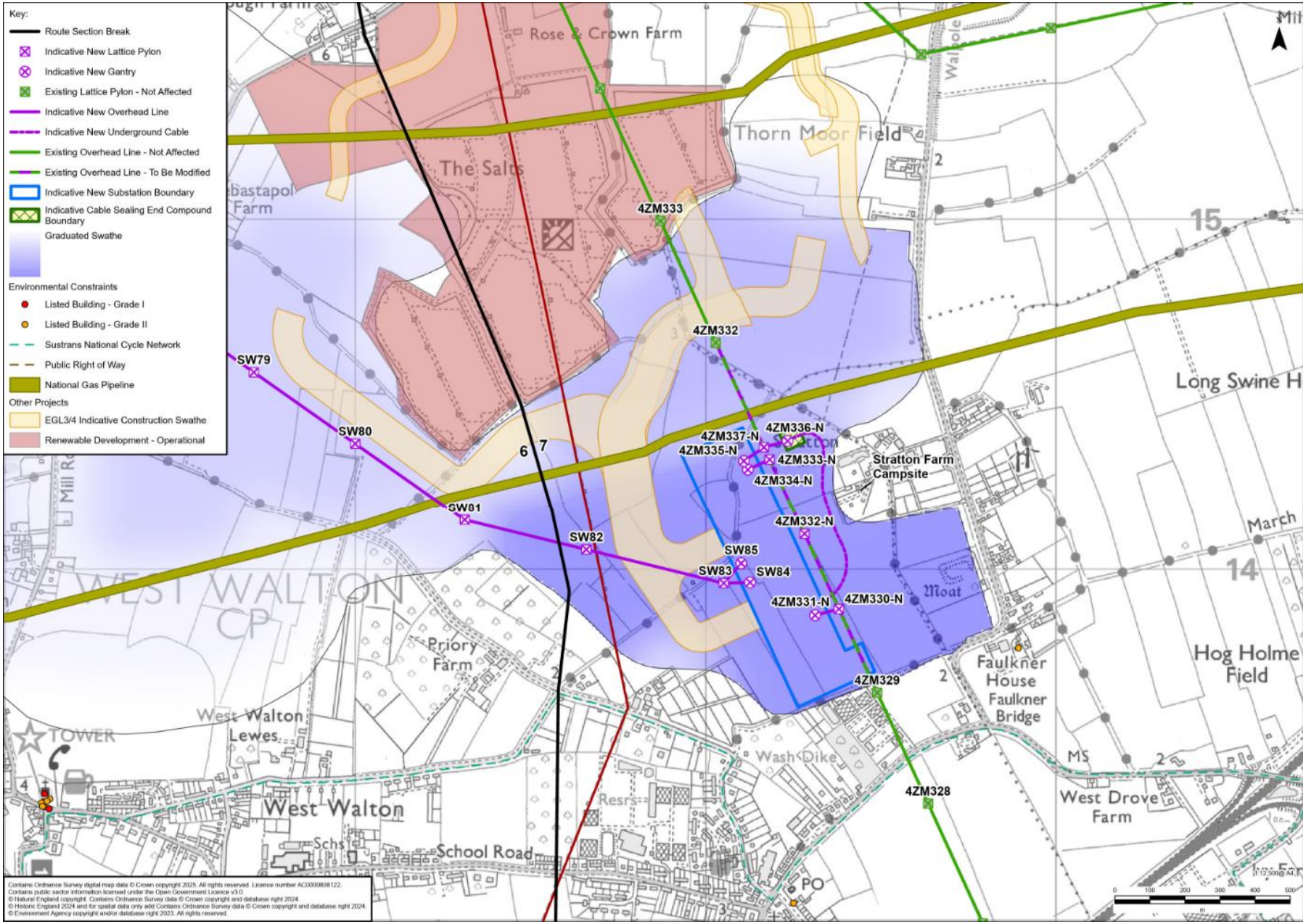


Image 7.28 Proposed siting of the new Walpole B Substation



Appendix C - Pylon Comparison Images

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Contents

Introduction

The following visualisations have been used to illustrate the differences between standard lattice pylons, low height lattice pylons and T pylons from viewpoints along the Project. These are not fully verifiable photomontages, but wirelines to help with decision making. Each pylon is presented in the same location to provide a comparison, but it should be acknowledged that positions and numbers of pylons could vary between the pylon types.

The views presented have been chosen from the viewpoints selected for the visual impact assessment which have been agreed with stakeholders. A brief description of location and reason why these viewpoints were chosen is listed below along with the relevant viewpoint reference number. For full baseline descriptions and reasoning for selection of viewpoints refer to **PEI Report Part B Appendix 3A Proposed Viewpoints**.

* Note - Each image represents a single frame from a full frame sensor 50mm lens and is presented at 50% scale for presentation purposes. Wirelines have been placed on top of baseline photography and do not take account of screening elements such as vegetation.

View 1 (VP16)

Located in Section 2 on the boundary of the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) (AONB) adjacent to a popular visitor venue, the Landmark Cafe, and close to the Wanderlust Way. Used to illustrate views along the boundary of the Lincolnshire Wolds National Landscape (AONB) towards the lower elevations where pylons would skyline in views towards Grimsby. The Project would be approximately 2.3 km from this viewpoint location.

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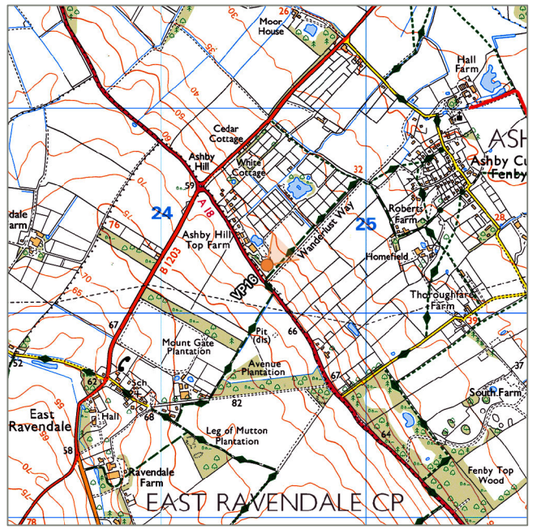

View 2 (VP192)

Located in Section 2 at Covenham Reservoir, this elevated viewpoint look towards the Lincolnshire Wolds National Landscape (AONB). Used to illustrate views towards the Lincolnshire Wolds National Landscape (AONB) from this elevated location which is popular for recreational use. The Project would be approximately 2 km from this viewpoint location.

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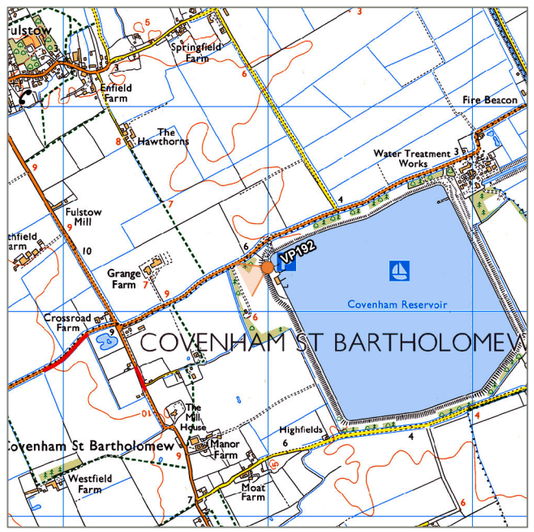
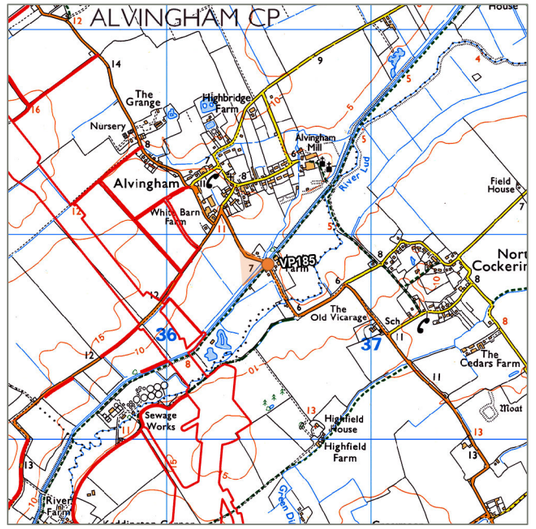


View 3 (VP185)

Located in Section 2 between Alvingham and North Cockerington at the Louth Canal. Used to illustrate views along the Louth Canal and for people walking the Louth Canal Walk towards the Lincolnshire Wolds National Landscape (AONB). Also a view towards St James's Church in Louth which is a feature on the skyline in views west from this area. Viewpoint used to show a closer proximity view of the Project. The Project would be approximately 600 m from this viewpoint location.



View 4 (VP34)

Located in Section 2 within the Lincolnshire Wolds National Landscape (AONB). Used to illustrate the long distance elevated views to the east towards the coast and the effect of woodland which filters views from the Lincolnshire Wolds National Landscape (AONB) to the south of Louth. Also illustrates how the Project would be backclothed from more elevated locations. The Project would be approximately 4.3 km from this viewpoint location.

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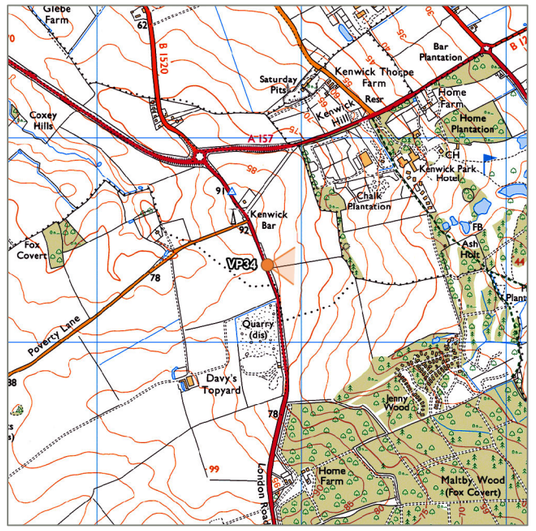
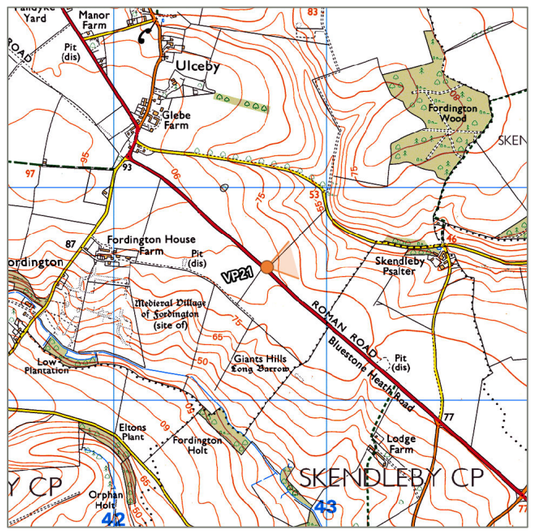


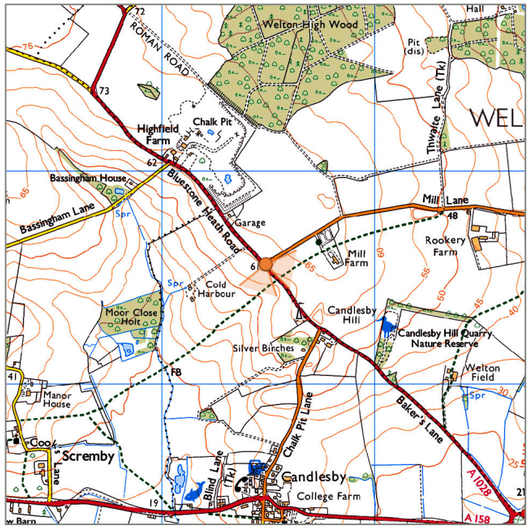
View 5 (VP21)

Located in Section 4 within the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) (AONB) and on the Bluestone Heath Road which is mentioned in the special qualities of the designation. Used to illustrate the long distance elevated views to the east towards the coast and the effect of woodland which filters views from the Lincolnshire Wolds National Landscape (AONB) to the south of Louth. Also illustrates how the Project would be backclothed from more elevated locations. The Project would be approximately 6.6 km from this viewpoint location.



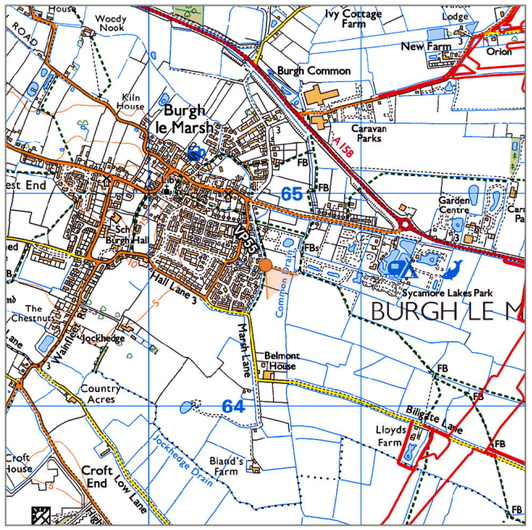
View 6 (VP56)

Located in Section 4 within the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) (AONB) and on the Bluestone Heath Road which is mentioned in the special qualities of the designation. Used to illustrate the long distance elevated views to the south and west from the south of the Lincolnshire Wolds National Landscape (AONB). Also illustrates how the Project would be backclothed from more elevated locations. The Project would be approximately 5.6 km from this viewpoint location at its closest point.



View 7 (VP55)

Located in Section 4 on the edge of Burgh le Marsh. Used to illustrate a view where the Lincolnshire Wolds National Landscape (AONB) does not form a distant skyline and pylons would be seen almost entirely against the sky. The Project would be approximately 1200 m from this viewpoint location.



View 8 (VP157)

Located in Section 4 close to Skegness this is a typical view across the flat fenland landscape with the Lincolnshire Wolds National Landscape (AONB) on the distant horizon. Used to illustrate a more distant view of the pylon types. The Project would be approximately 2 km from this viewpoint location.

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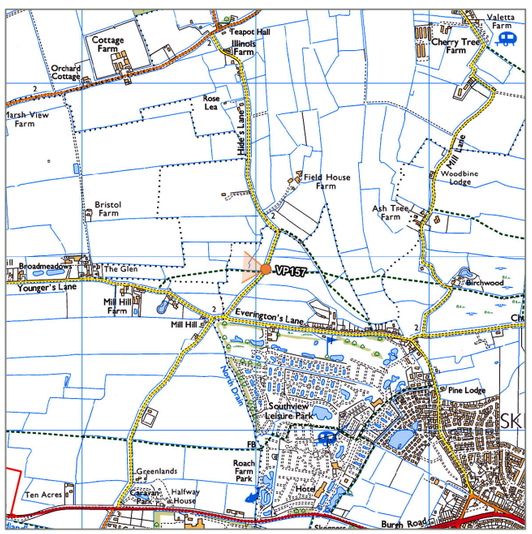
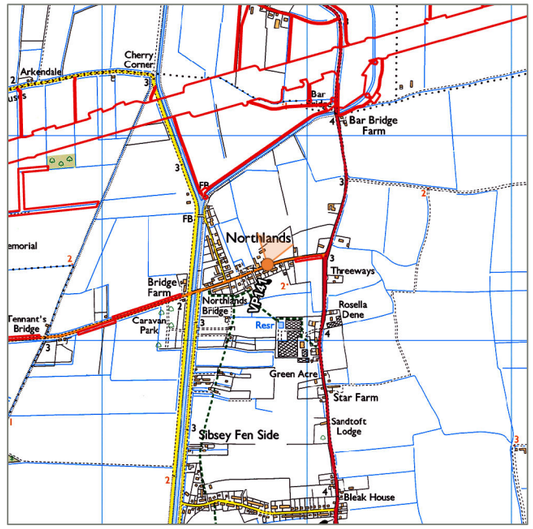


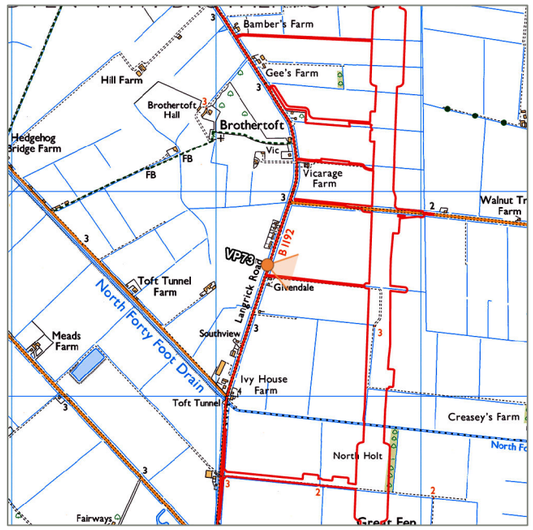
View 9 (VP141)

Located in Section 4 looking north from Northlands, this is a typical view across the flat fenland landscape with the Lincolnshire Wolds National Landscape (AONB) on the distant horizon. Used to illustrate how the different pylon types would look when seen in these views typically seen against the sky with little backcloth. The Project would be approximately 820 m from this viewpoint location.



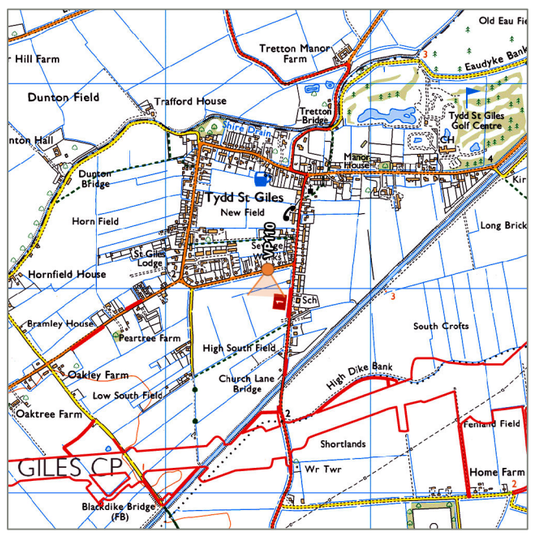
View 10 (VP73)

Located in Section 4 in the parish of Holland Fen with Brothertoft. Used to illustrate how the different pylon types would look when seen with existing lower voltage lines and in views towards St Botolph's Church in Boston, which is a feature on the skyline in many views in this area. The Project would be approximately 500 m from this viewpoint location.



View 11 (VP110)

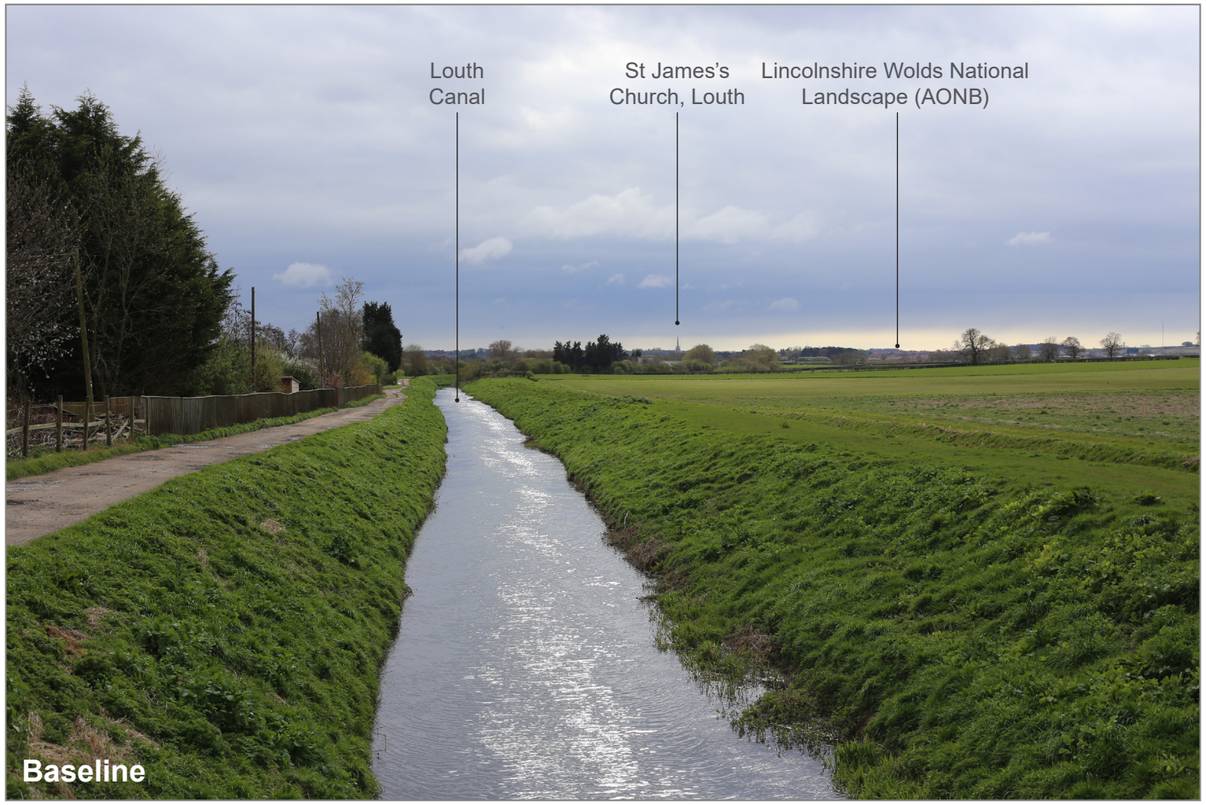
Located in Section 6 looking south from Tydd St Giles in an area where existing overhead lines are present in views. Used to illustrate how the different pylon types would look when seen in combination with existing overhead lines. The Project would be approximately 700 m from this viewpoint location.



View 1: View from the boundary of the Lincolnshire Wolds National Landscape (AONB) at the Landmark Cafe (VP16)

View 2: View from Covenham Reservoir towards Lincolnshire Wolds (VP192)

View 3: View from Alvingham along the Louth Canal (VP185)



View 4: View from Lincolnshire Wolds National Landscape (AONB) A16 near Poverty Lane to south of Louth (VP34)

View 5: View from Lincolnshire Wolds National Landscape (AONB) south of Ulceby on Skegness Road (VP21)

View 6: View from Lincolnshire Wolds National Landscape (AONB) at Bluestone Heath Road (VP56)

View 7: View from Burgh le Marsh looking east (VP55)

View 8: View from edge of Skegness looking towards Lincolnshire Wolds National Landscape (AONB) (VP157)

View 9: View from Sibsey looking north (VP141)

View 10: View from Langrick Road towards Boston (VP73)

Baseline

L6

L13 Low Height

T Pylon

View 11: View from Tydd St Giles (VP110)

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