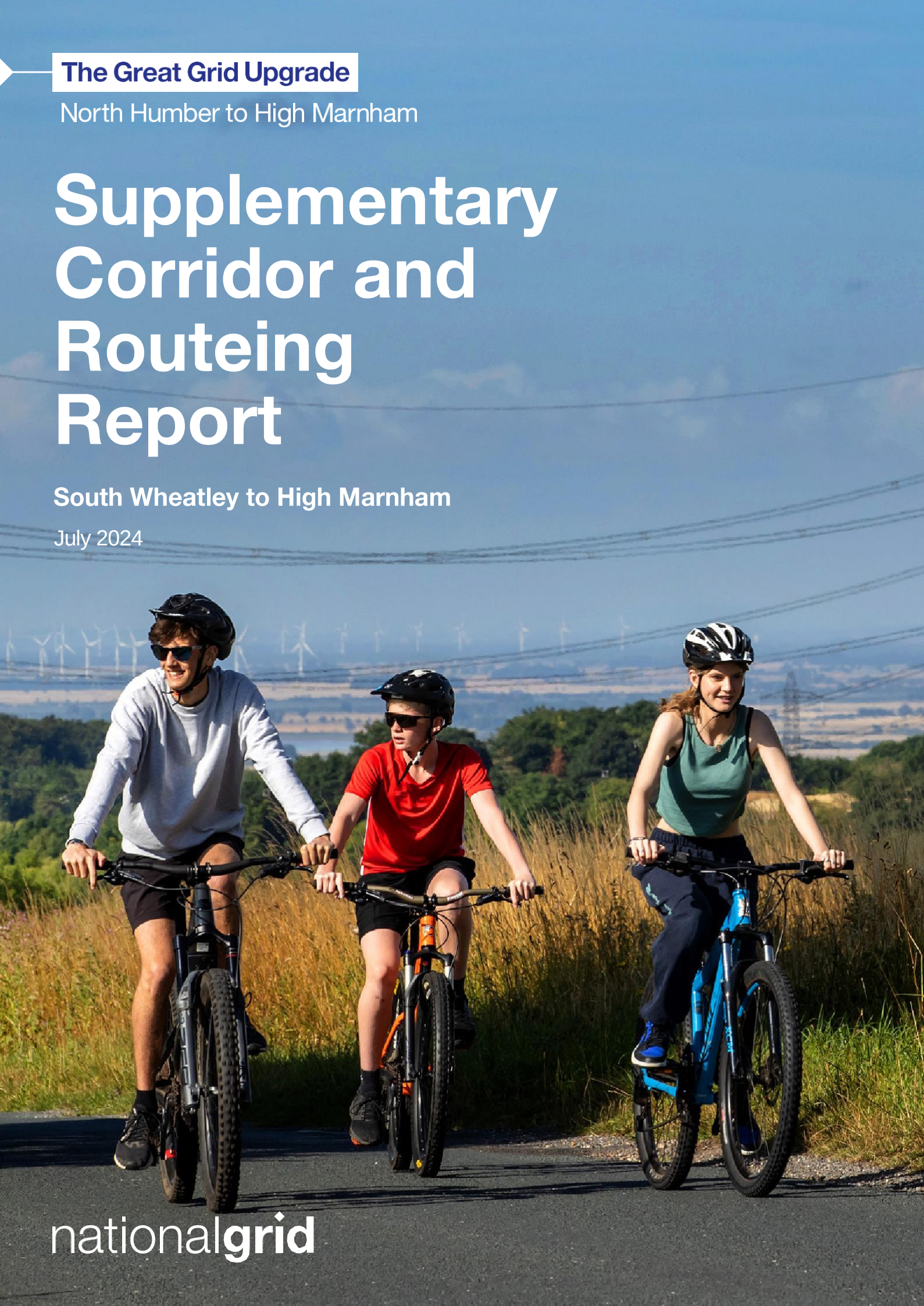
The Great Grid Upgrade

North Humber to High Marnham

Supplementary Corridor and Routeing Report

South Wheatley to High Marnham

July 2024



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Executive summary

National Grid Electricity Transmission plc (NGET) own, build and maintain the high-voltage electricity transmission network in England and Wales. For the purposes of this report NGET is referred to as National Grid. National Grid is responsible for making sure electricity is transported safely and efficiently from where it's produced to where it's needed.

The North Humber to High Marnham Project (the 'Project') is a proposed network reinforcement that is currently being developed by National Grid. The Project, located in the Humber and East Midlands regions, will support the UK's net zero target by reinforcing the electricity transmission network between the north of England and the Midlands and facilitate the connection of planned offshore wind generation and interconnectors with other countries, allowing low carbon energy to be carried on the network.

The reinforcement is needed because National Grid's existing power lines do not have sufficient capacity for all the new sources of electricity that we expect to connect to the network over the next ten years and beyond. Building North Humber to High Marnham, together with other proposals, will help meet this future energy requirement.

National Grid continue to assess and refine the options available in delivery of the Project as a result of feedback received from the non-statutory consultation conducted between 1 June 2023 to 27 July 2023. Consideration of consultation feedback and a subsequent review of the Corridor and Preliminary Routeing and Siting Study (CPRSS) 2023 have led to the identification of a potential alternative corridor between South Wheatley and High Marnham, now referred to as the eastern corridor. This eastern corridor is comprised of some areas of Corridors 2 and 3 from the CPRSS 2023.

This report is the Supplementary Corridor and Routeing Report and has been prepared to support a localised non-statutory consultation on the eastern corridor. To avoid confusion, the section of the 'emerging preferred corridor' located between South Wheatley and High Marnham which was previously consulted on in 2023 is referred to in this report as the 'western corridor'.

For the avoidance of doubt, National Grid has made no decision as to which of the two corridors (eastern or western) in this southern most section of the route should be taken forward. Feedback from both the non-statutory consultation 2023, localised non-statutory consultation 2024 as well as further technical assessments including environmental surveys will be considered when making a decision on the overall preferred corridor and identification of the route alignment ahead of the subsequent statutory consultation.

A graduated swathe has been prepared for the eastern corridor which represents where the Project infrastructure is likely to be located. This will be informed by feedback received during localised non-statutory consultation and therefore there remains the potential for the final design of the Project to extend beyond the graduated swathe. This will be fully considered through the development of the Project, whilst maintaining the principles used to develop the current graduated swathe.

During the localised non-statutory consultation period, National Grid will be inviting feedback from local communities and stakeholders about our work to date, the proposed corridor and graduated swathe and matters that they would like National Grid to have regard to as they further develop more detailed proposals. The feedback from localised non-statutory

consultation, along with information from surveys undertaken to obtain baseline data and ongoing design studies, will inform the further development of the Project.

North Humber to High Marnham is a Nationally Significant Infrastructure Project which means an application for a Development Consent Order will need to be prepared and submitted to the Planning Inspectorate. Ultimately the Secretary of State will be responsible for making the final decision on the application.

1. Introduction

1.1 Overview

1.1.1 National Grid Electricity Transmission Plc (NGET) owns and maintains the high-voltage electricity transmission system in England and Wales, for the purposes of this report NGET is referred to as National Grid.

1.1.2 National Grid is responsible for making sure electricity is transported safely and efficiently from where it's produced to where it's needed, and for developing upgrades to the network as agreed with the industry regulator – the Office of Gas and Electricity Markets (OfGEM). The National Grid Electricity System Operator (ESO) controls and operates the high voltage electricity transmission system in England and Wales. National Grid ESO is a legally separate business, balancing supply and demand to ensure homes and businesses in Great Britain have the electricity they need 24/7.

1.1.3 National Grid's transmission system in England and Wales consists of approximately 7,250 kilometres (km) of overhead lines and a further 1,450km of underground cabling, operating at 400 Kilovolt (kV) and 275kV. The 275kV grid was developed in the 1950s to provide a national transmission system and then further developed from the mid-1960s, at 400kV to increase the power carrying capacity. The overhead lines and cables connect to around 300 substations to form a highly interconnected network. The substations provide points of connection to local distribution networks, which operate at voltages from 132kV down to 240V (the voltage at which the power is distributed to domestic consumers).

1.1.4 The distribution networks in this area are owned by Distribution Network Operators (DNOs), Northern Power Grid and National Grid Electricity Distribution Plc (NGED).

1.1.5 The North Humber to High Marnham Project (the 'Project') is being developed by National Grid. The Project, located in the Yorkshire and Humber and East Midlands regions, is required to reinforce the electricity transmission system to help deliver the United Kingdom (UK) Government's Net Zero targets. It forms part of The Great Grid Upgrade[1] a major programme of reinforcement of the electricity transmission system to accommodate substantial increases in north-south power flows, helping take power generated from low-carbon sources (especially from offshore wind) to areas of consumer demand. The Project location is shown in Figure 1-1.

[1] https://www.nationalgrid.com/the-great-grid-upgrade

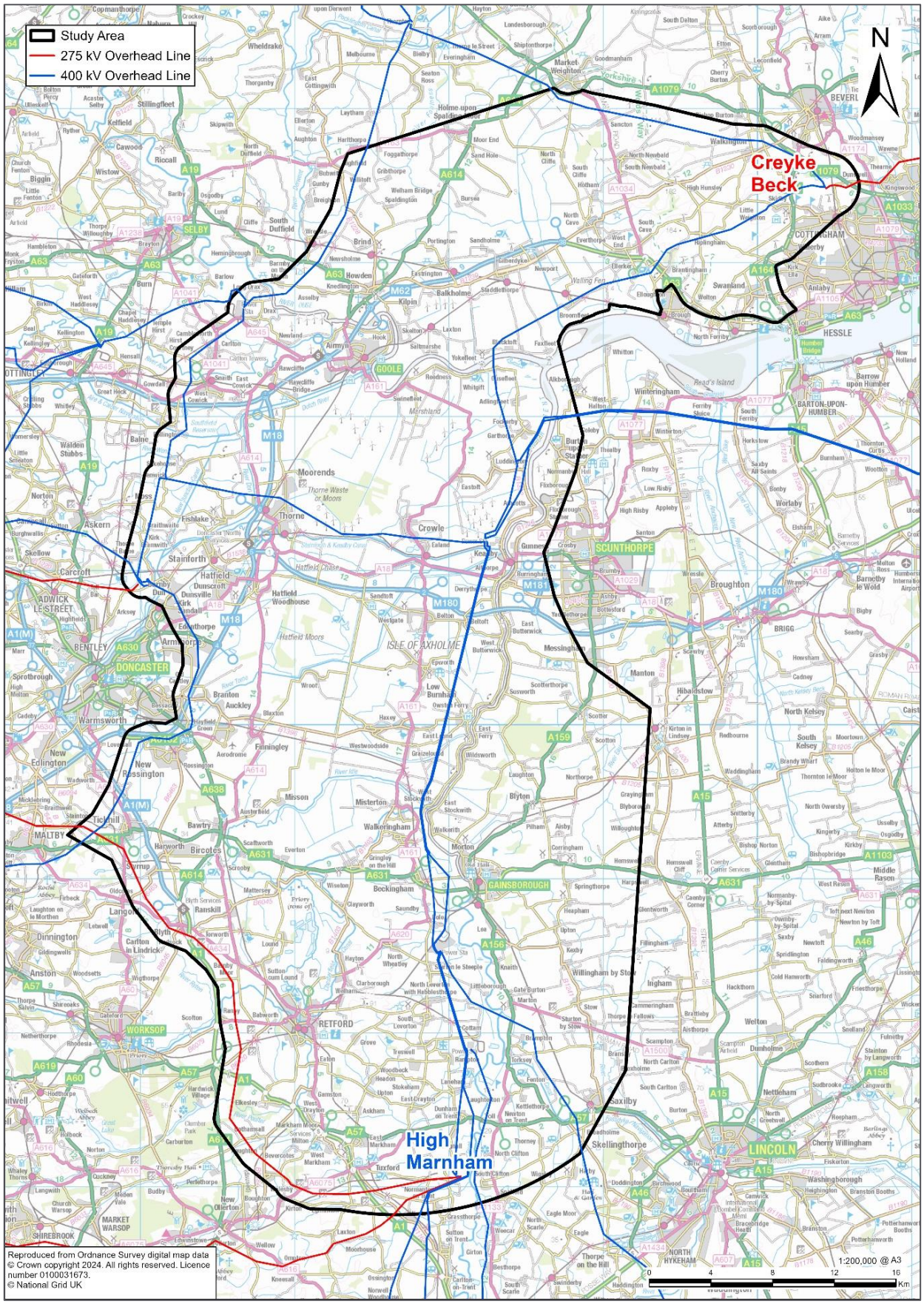


Figure 1-1: North Humber to High Marnham project location

1.1.6 National Grid's Approach to Consenting for major infrastructure projects[2] outlines the Project development and delivery process. This is divided into six sections; Strategic Proposal (Stage 1), Options Identification and Selection (Stage 2), Defined Proposal and Statutory Consultation (Stage 3), Assessment and Land Rights (Stage 4), Application, Examination and Decision (Stage 5) and Construction (Stage 6). Figure 1-2 presents an overview of National Grid's Approach to Consenting.

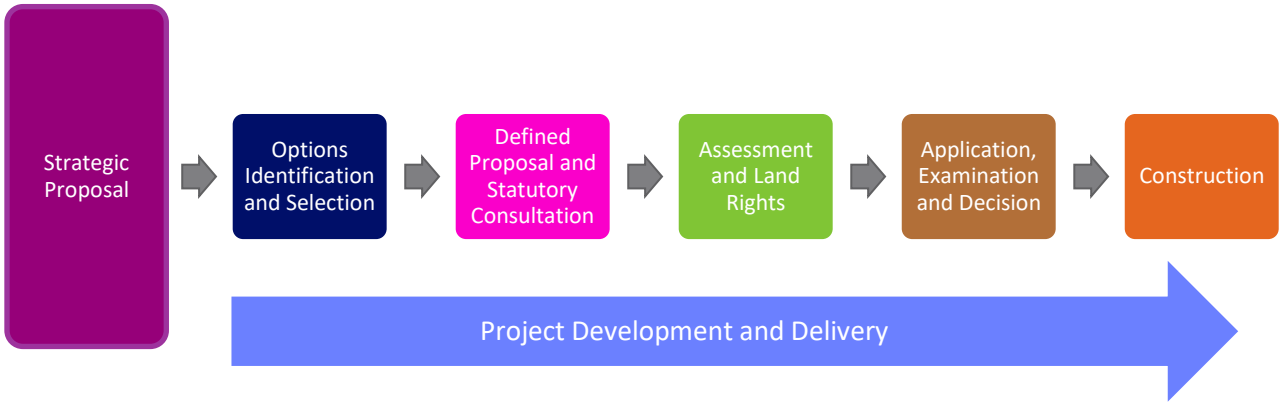


Figure 1-2: National Grid's approach to project development and delivery

1.1.7 A Corridor and Preliminary Routeing and Siting Study (CPRSS) for the Project was published in June 2023 – this detailed the work undertaken at the initial Options Identification and Selection Stage (Stage 2) and described the 'emerging preferred corridor' for the Project.

1.1.8 National Grid's first stage of public consultation (non-statutory consultation) relating to the Project took place between 1 June 2023 to 27 July 2023, which played an important part in developing the Project as local knowledge and feedback shaped the evolution of the Project design and routeing.

1.1.9 Following non-statutory consultation in 2023, National Grid reviewed all consultation feedback and undertook a backcheck and review of the CPRSS 2023, taking into account new information, including consultation feedback and design and assessment work.

1.1.10 As a result of this further work National Grid have identified a potential alternative corridor in the southernmost section of the route, between the villages of South Wheatley and High Marnham.

1.1.11 The proposed alternative alignment is referred to throughout this report as the 'eastern corridor.' The identified eastern corridor partially falls within previous alternative corridor 3[3] and corridor 2 set out within the CPRSS 2023.

1.1.12 Corridor 3 was discounted at the time of the original assessment because it was considered to be highly constrained in the area around West Burton, Cottam and High Marnham due to a combination of existing development, the River Trent and several existing overhead lines which converge and diverge in this area. It was considered that any new line would have to deviate away from a route closely parallel to the existing lines and that this, in combination with the existing overhead lines, could result in

[2] National Grid. 'Our Approach to Consenting'. April 2022.

[3] The proposed alternative corridor is comprised of areas including a Combination of Corridor 2 & 3 - C3q, C3-C2 Link 4, C2pe previously identified in the CPRSS 2023.

adverse landscape and visual Impacts, outweighing any benefits of routeing close to the existing lines.

1.1.13 Corridor 3 as originally appraised has been reviewed and refined as part of the supplementary work undertaken. This resulted in a potential alternative corridor option emerging between South Wheatley and High Marnham now referred to as the 'eastern corridor'.

1.1.14 National Grid are proposing to undertake a localised non-statutory consultation on the eastern corridor to provide the opportunity for stakeholders to review and provide feedback, prior to a decision being made on the overall preferred corridor and identification of the route alignment for the subsequent statutory consultation.

1.1.15 This report details the identification and development of the eastern corridor, along with an options appraisal exercise which has been used to develop the graduated swathe[4] for the eastern corridor, please see Appendix C.

1.2 Purpose of this document

1.2.1 This report documents the outcome of a localised corridor and routeing study for the southernmost section of the proposed North Humber to High Marnham overhead line which has been carried out following non-statutory consultation held in June and July 2023. This report is presented as a supplement to the CPRSS 2023 and has been published to support and inform localised non-statutory consultation on the eastern corridor.

1.2.2 This report has been prepared to provide information to local communities and stakeholders. It summarises the environmental, socio-economic (including community), cost, programme and technical considerations that could influence design and routeing if an overhead line were developed within an eastern corridor in the area between the village of South Wheatley and High Marnham.

1.2.3 This report should be read to enable an understanding of the eastern corridor as part of localised non-statutory consultation in summer 2024, where National Grid are holding in-person consultation and online events and will be seeking feedback on the eastern corridor and associated graduated swathe.

1.2.4 National Grid has already sought and considered feedback on the initial 'emerging preferred corridor' located further to the west as part of the non-statutory consultation held in June and July 2023. To avoid confusion, the section of the 'emerging preferred corridor' located between South Wheatley and High Marnham which was previously consulted on is referred to in this report as the 'western corridor' (Figure 1-3).

[4] Graduated Swathe – shaded areas within the emerging preferred corridor within which Project infrastructure is considered more or less likely to be located, shown by the varying levels of shading. Darker shaded areas represent where infrastructure at this stage is likely to be better located, in National Grid's emerging view, within the corridor.

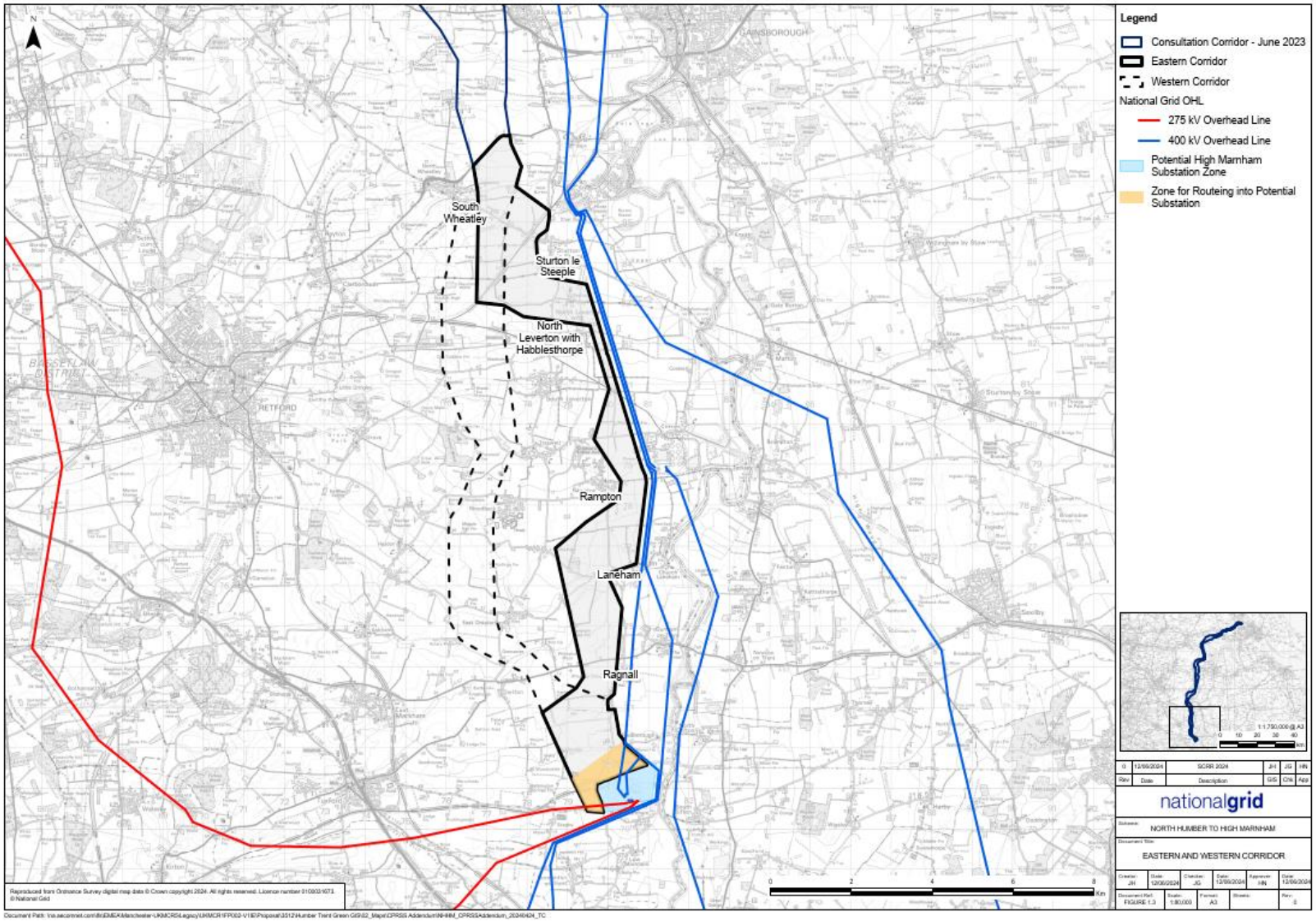


Figure 1-3: Eastern and Western corridors

1.2.5 Having previously consulted on the western corridor, National Grid is not actively seeking feedback on the unchanged western corridor or remainder of the previously presented emerging preferred corridor to the north (as presented in the CPRSS 2023).

1.2.6 For the avoidance of doubt, National Grid has made no decision as to which of the two corridors (eastern or western) in this southern most section of the route should be taken forward. Feedback from both the non-statutory consultation 2023, localised non-statutory consultation 2024 as well as further technical assessments including environmental surveys will be considered when making a decision on the overall preferred corridor and identification of the route alignment ahead of the subsequent statutory consultation.

1.3 Background and summary of need

1.3.1 The need for the Project was first identified by the National Grid ESO. National Grid then undertook a Strategic Options Appraisal at the Strategic Proposal Stage (Stage 1) which identified the most appropriate strategic solution to bring forward. This considered a wide range of options for providing the necessary north-south power flows and concluded that the establishment of a new electricity transmission route between East Yorkshire and Nottinghamshire represented the most appropriate solution. The Strategic Options Appraisal is reported in the Strategic Options Report 2023[5].

1.3.2 The Project will establish a new 400kV transmission connection between new substations to be built in the vicinity of the existing Creyke Beck Substation and the former High Marnham Power Station site. The connection is expected to wholly or largely comprise of a new overhead line. National Grid will also need to commission local changes to the lower voltage distribution networks in order to facilitate the construction of the new overhead line.

1.4 Structure of this report

1.4.1 This report is structured as follows:

- **Section 1 Introduction** – summarises the Project background and need case, in addition to the purpose of this document.
- **Section 2 Aspects of the North Humber to High Marnham Project** – describes the key design components of the Project.
- **Section 3 Legislation and national policy context** – presents an overview of National Grid's guidance, its statutory duties and relevant policies.
- **Section 4 Summary of work previously presented and related updates** – provides a high-level summary of the CPRSS 2023, non-statutory consultation 2023 and feedback received for the Project corridor between South Wheatley and High Marnham. Section 4 continues to introduce the eastern corridor.
- **Section 5 Approach to corridor and graduated swathe identification** – details the methodology and refinement of the eastern corridor.

[5] National Grid, (2023), Strategic Options Report.

- **Section 6 Appraisal** – provides the key environmental, socio-economic and technical constraints for the eastern corridor, and details the description of the graduated swathe.
- **Section 7 Conclusion and next steps** – provides the conclusions of this report and outlines the next steps of the localised non-statutory consultation.

2. Aspects of the North Humber to High Marnham Project

2.1 Introduction

Overhead lines, pylons and conductors

2.1.1 Pylons are overhead line structures which carry overhead electrical conductors, insulators and fittings. The main components of an overhead line are shown in Figure 2-1 below, which shows a typical steel lattice pylon. Other pylon types are discussed further in this section.

2.1.2 Like most overhead lines owned and maintained by National Grid Electricity Transmission plc, the Project will operate at a voltage of 400kV. The overhead line for the Project will carry two discrete electrical circuits that can be operated independently of one another, increasing the resilience of the transmission system.

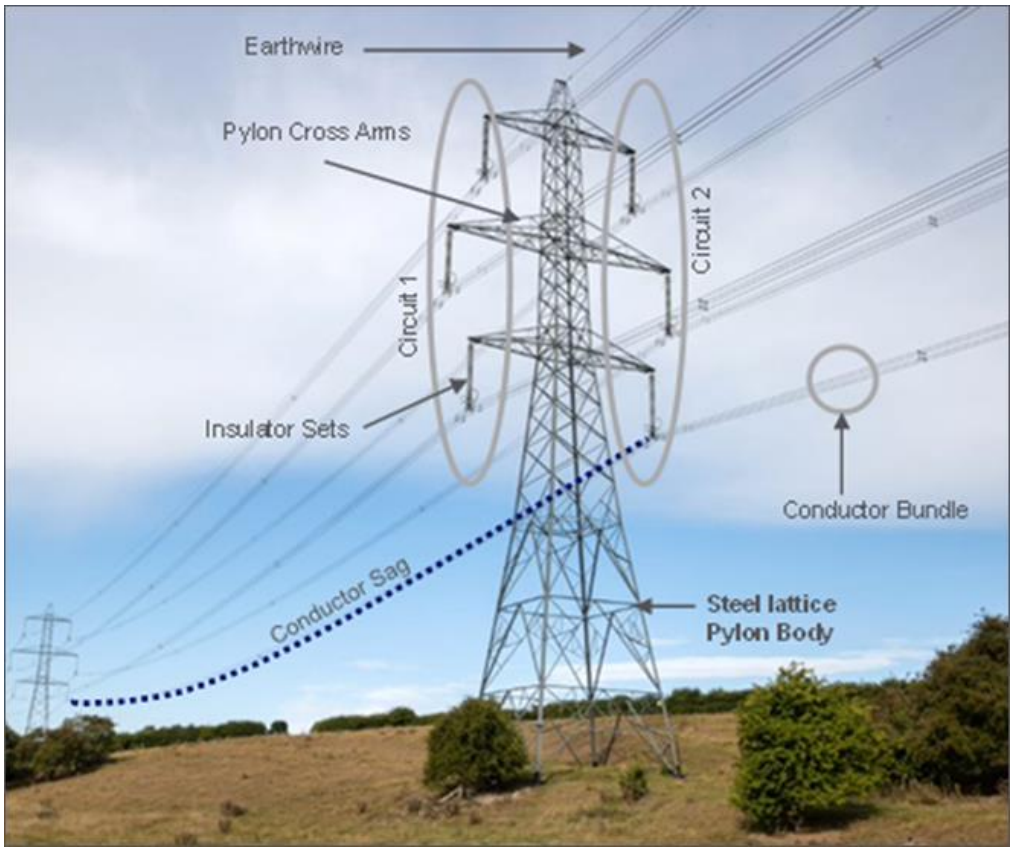


Figure 2-1: Components of a typical transmission connection

2.1.3 Electrical power will be transmitted through conductors (often referred to as ‘wires’). The conductors are attached to the end of a set of insulators that hang from the pylon cross arms and electrically isolate the conductors from the pylon cross arms and the main structure. On a typical pylon, as shown in Figure 2-1, three pylon cross arms are stacked above each other, and each supports a bundle of conductors which together form a single electrical circuit. Two circuits are therefore carried, with one on either side of the pylon (indicated by ‘Circuit 1’ and ‘Circuit 2’ in Figure 2-1). The top of the pylon supports a single smaller earthwire that carries data between substations and also provides shielding from lightning strikes for the conductors below. The Project is likely to comprise a maximum of three conductors per bundle, a total of 18 conductors per pylon, in addition to the earthwire.

2.1.4 The conductors will be installed so as to maintain a safe height above the ground at all times, regardless of the amount of power being carried.

2.1.5 The minimum heights between the conductors, the ground and various other features must be maintained to ensure safe operation. The minimum clearance required between the conductors and the ground is typically between 7-8m at the maximum sag, as shown in Figure 2-1. In order to maintain these sags, pylons need to be a minimum height at the point that the lowest conductor is attached to the pylon arms. This height is dependent upon a range of factors including the distance between pylons, planned operating temperature and conductor wire composition, the intervening topography and the use of the land being crossed. For example, crossings of the rail lines south of West Burton may require greater clearances (and hence greater pylon heights) to meet Network Rail’s future requirements.

2.1.6 To a lesser extent, the overall pylon height will also be influenced by pylon types. The pylon illustrated in Figure 2-1 above is a suspension pylon, with the conductors hanging on insulator sets beneath the pylon arms. Where the route of the overhead line changes direction the use of such a pylon would see the conductors deviate from vertical arrangement. Where this occurs angle pylons are required to accommodate the additional sideways strains with the insulators tensioning the conductors horizontally to keep conductors aligned. At the end of overhead lines where they connect with substations it is necessary to use terminal pylons. These are of greater bulk in order to ensure stability, due to large forces acting on the pylon structure and foundations.

2.1.7 Figure 2-2 below illustrates the difference between these three main pylon types.

2.1.8 A typical pylon operating at 400kV is approximately 50m in height. A typical span distance between pylons is approximately 350m. These measurements are related because longer spans between pylons require taller pylons to support the greater sag of conductors over longer distances. In broad terms there are typically three pylons for every kilometre of overhead line.

2.1.9 Major construction activities tend to be focussed at the base of each pylon and to either side of tension pylons from where the conductors are winched into position. Accesses will be constructed to facilitate movement of construction plant and personnel from existing highway networks to the work sites.

Figure 2-2: Suspension Pylon (Left) and Angle Pylon (Right)

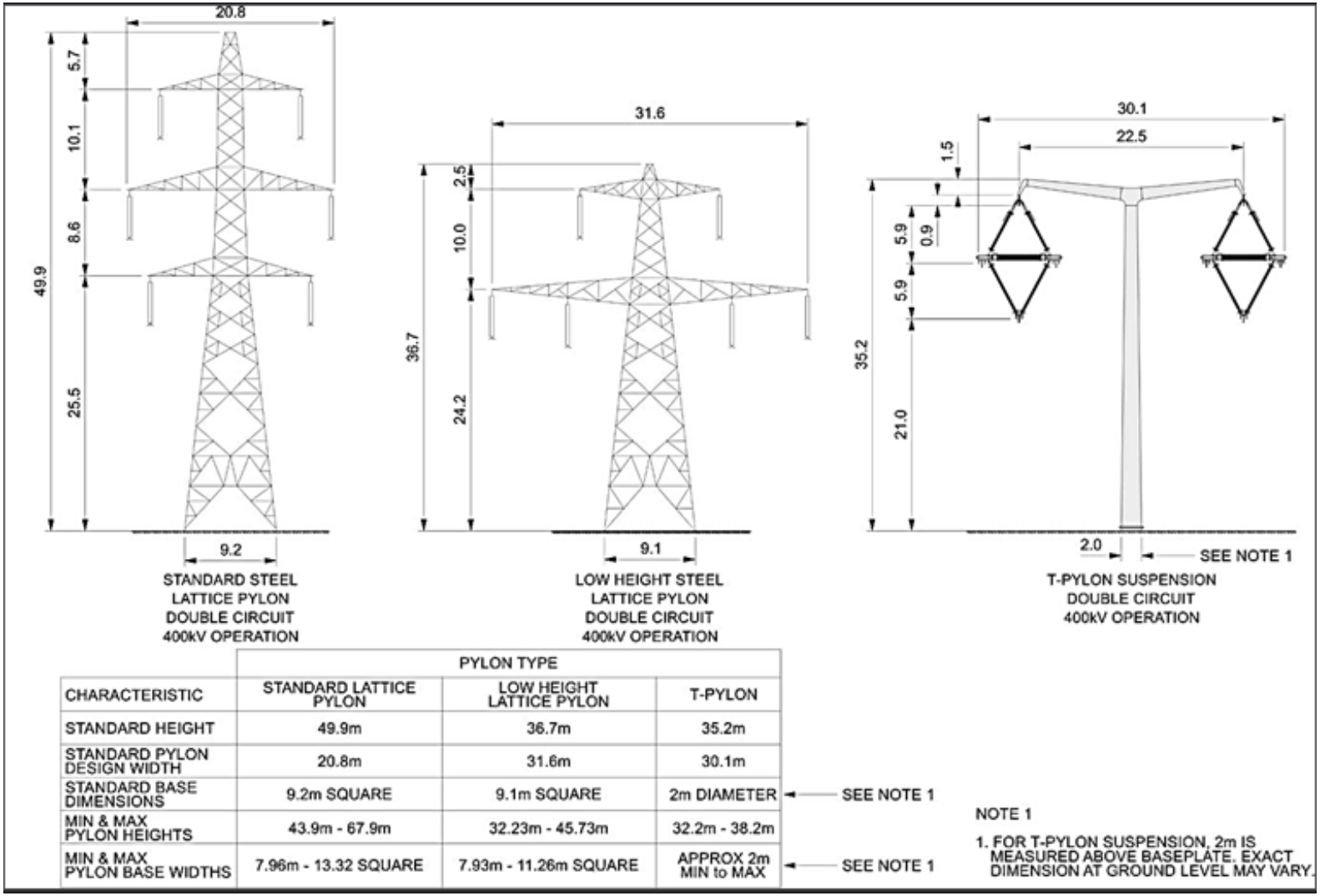
Pylon form and design

2.1.10 Whilst the vast majority of transmission lines in Britain use lattice steel pylons with three sets of cross arms (as shown in Figure 2-2), alternative pylon types have been approved for use which may achieve the technical performance required for the Project[6]. These two alternative types are illustrated in Figure 2-3.

2.1.11 The first alternative pylon type is a lower height form of lattice steel pylon. This removes the top cross arm, with two bundles of conductors then being supported on the lowest cross arm. This requires the widening of the lowest cross arm resulting in a shorter but wider pylon when compared to the standard lattice steel pylons. The overall height of this type of pylon is approximately 37m. This pylon type has tended to be used in proximity to airports and airfields, to avoid flight paths. This pylon type can also help to reduce visual impacts, especially in rolling or wooded landscapes.

2.1.12 The second alternative pylon type is the ‘T-pylon’. Rather than being of lattice steel construction the ‘T-pylon’ is formed from a single steel monopole (similar to a modern wind turbine) supporting a single cast cross arm at the top, which together form a ‘T’ shape. The conductors are hung from this cross arm in two larger groups of three bundles, kept apart by solid insulating rods that together form a diamond configuration. These pylon types are also lower in height than the standard lattice steel pylons, at approximately 35m. The monopole is a solid structure, approximately 2m in diameter, in contrast to the less striking and more open lattice form of the two lattice steel pylons.

[6] With the potential exception of localised requirements, such as major river crossings.



	PYLON TYPE			
CHARACTERISTIC	STANDARD LATTICE PYLON	LOW HEIGHT LATTICE PYLON	T-PYLON	
STANDARD HEIGHT	49.9m	36.7m	35.2m	
STANDARD PYLON DESIGN WIDTH	20.8m	31.6m	30.1m	
STANDARD BASE DIMENSIONS	9.2m SQUARE	9.1m SQUARE	2m DIAMETER	SEE NOTE 1
MIN & MAX PYLON HEIGHTS	43.9m - 67.9m	32.23m - 45.73m	32.2m - 38.2m	
MIN & MAX PYLON BASE WIDTHS	7.96m - 13.32 SQUARE	7.93m - 11.26m SQUARE	APPROX 2m MIN to MAX	SEE NOTE 1

NOTE 1

1. FOR T-PYLON SUSPENSION, 2m IS MEASURED ABOVE BASEPLATE. EXACT DIMENSION AT GROUND LEVEL MAY VARY.

Figure 2-3: Alternative Pylon Types

2.1.13 In previous projects the visual benefits of utilising standard lattice steel pylons have been recognised, especially when siting a new overhead line close to existing lines that use this pylon type. This would be the case in the lower Trent Valley between South Wheatley and High Marnham.

2.1.14 The type of pylons proposed for the Project will be determined through feedback from non-statutory consultation, information from surveys and ongoing design studies.

2.2 'Close parallel' opportunities and constraints

The opportunity of a close parallel alignment

2.2.1 In general terms, a close parallel route has the potential to reduce the overall extent of environmental impacts arising from the Project by intensifying the degree of impact on receptors already affected by existing overhead lines, rather than spreading impacts to areas not currently affected.

2.2.2 Whilst the efficacy of close paralleling in reducing environmental impacts is strongly influenced by local factors (e.g. topography, settlement pattern, woodland cover etc.), the optimum level of benefit is likely to result from lines that, as stated in Holford[7] Rule 6, are planned with pylon types, spans and conductors forming a coherent appearance. In most circumstances, this is likely to be more achievable the closer the overhead lines are to each other, as local conditions are likely to be similar for both overhead lines.

2.2.3 The minimum distance between lines is determined by technical and safety constraints and would typically be 85m. When routeing a new line parallel to two existing lines that are already sited close together, a greater separation between the new line and the closest existing line would be required. This is in order to allow space for maintenance and refurbishment activities to be carried out on (what would become) the middle line of the three. In these instances, a minimum separation distance of 150 metres would normally be required between the new and closest existing line.

2.2.4 The maximum distance at which the benefits of close paralleling might be achieved depends on local factors. Whilst this maximum cannot be precisely defined, it is considered unlikely to be more than approximately 200m in most circumstances. Please refer to Section 6.3.2 for discussion around paralleling overhead lines.

Challenges with a close parallel alignment

2.2.5 The benefit of a close parallel alignment is realised when the pylon types, spans and conductors form a coherent appearance. This is difficult to achieve, as the appearance of the infrastructure can change depending on many factors, including the orientation of the view and the elevation it is being viewed from (whether the pylons are above or below the viewer). It is not always feasible to site pylons adjacent to each other if there are constraints present alongside the existing overhead line corridor, and this can also result in an inconsistent span length and clearance level for the overhead line.

2.2.6 There are technical challenges associated with construction of a close parallel alignment, including difficulties with achieving the required offset from the existing

[7] https://www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf

overhead line and access where the existing overhead line is already within a relatively constrained working area.

2.2.7 There are locations within the Project Study Area (refer to Section 4.2) where there are already two overhead lines running close parallel. As mentioned above, in these locations, the separation between a new line and the existing would have to be greater than when running alongside a single line. This greater separation makes it more difficult to ensure that the arrangement of pylons, conductors and spans achieves a coherent appearance, and increases the risk of creating a wirescape.

2.2.8 Localised features that might constrain the routeing of a new overhead line, such as residential properties or settlements, are often located off to the side of an existing overhead line. Such features may mean that achieving a truly parallel alignment for the new line is not possible over a long distance. Local deviations away from a parallel alignment, whilst reducing the potential benefits of a more synchronised and parallel route, may not fully negate the potential benefits of a close alignment. This is likely to depend upon the significance of any effects upon the feature that is routed around and the form and extent of the route deviation away from the existing line.

2.3 New transmission substations

New Creyke Beck substation

2.3.1 The proposed new substation at Creyke Beck Substation near Cottingham, North of Hull is addressed in greater detail in the CPRSS 2023 as it is located within the northern most area of the Project, and not within the potential alternative corridor[8].

New High Marnham substation

2.3.2 To the south of the Project the proposed 400kV overhead line will connect into the proposed new 400kV substation at High Marnham which is currently being progressed under a different scheme called Brinsworth to High Marnham[9]. This scheme will increase the capacity of the electricity transmission network between the North of England and the Midlands. The new substation will also facilitate a number of customer connections to the electricity transmission system in the area.

2.3.3 A consultation on the proposals for the new High Marnham substation took place in April - May 2024 ahead of the intended submission of a planning application under the Town and Country Planning Act 1990, in early 2025.

2.3.4 The new 400kV substation is proposed to be located in proximity to the old High Marnham Power Station site near Normanton on Trent as shown in Figure 2-4. It is currently expected that the substation will be approximately 490m x 220m currently proposed to be comprised of 20 functional segments (bays), two of which are required for the connection of the new North Humber to High Marnham overhead line. The substation will include supergrid transformers, network stability equipment, standard substation plant and control infrastructure.

2.3.5 The Brinsworth to High Marnham Project will require diversions of existing overhead lines into the proposed new substation. Should consent be granted for the substation,

[8] Refer to the CPRSS 2023 for further information on the proposed Birkhill Wood Substation.

construction is expected to start in Summer 2026 and take approximately three years to complete. Further information on the Brinsworth to High Marnham Project can be found on its project website[10].

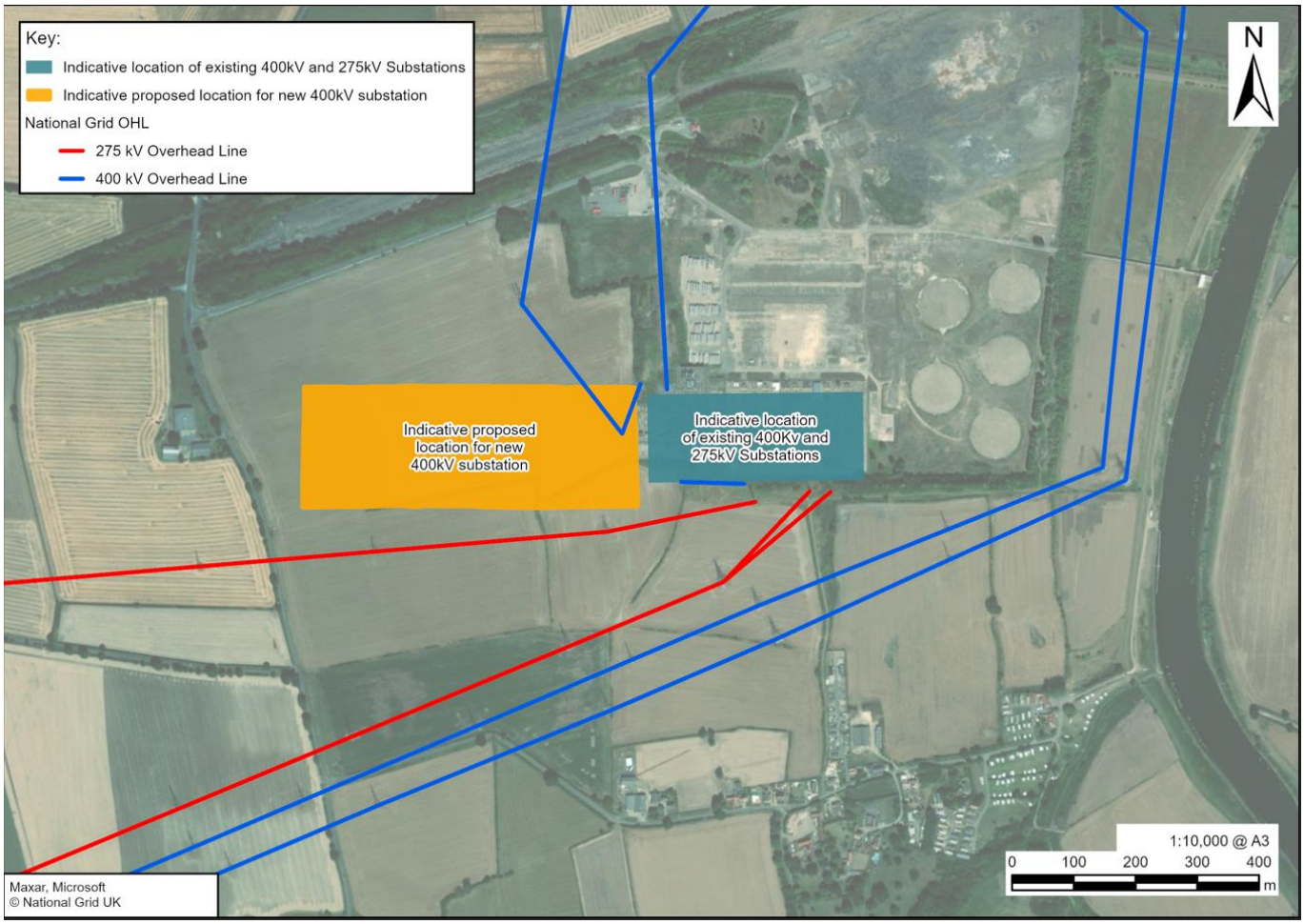


Figure 2-4: Proposed High Marnham Substation location

2.4 Other unrelated National Grid works

2.4.1 In addition to the works required to deliver this Project and the development of the new substation at High Marnham, National Grid will also be replacing the conductors (wires) on existing 400kV overhead lines between Keadby-Cottam and West Burton-Ratcliffe as well as works within the substations at West Burton and Cottam to allow further increases to network capacity between the North of England and the Midlands. Where appropriate they will be considered during the ongoing design studies and when assessing cumulative effects as part of the Environmental Impact Assessment (EIA) process.

[10] https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/brinsworth-high-marnham-uprating

3. Legislation and national policy context

3.1 Overview

3.1.1 This section provides an overview of the key legislation, policy and guidance applicable to National Grid's routeing and siting, a summary of National Grid's approach to routeing and siting and the technology options considered for this Project.

3.2 National Grid's statutory duties (Electricity Act 1989)

3.2.1 National Grids' statutory obligations are set out in the Electricity Act 1989 (the Electricity Act) and in its Transmission Licence (regulated by Ofgem).

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

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

3.2.3 In addition, Section 38 and Schedule 9 of the Electricity Act requires National Grid, when formulating proposals for new lines and other works, to:

"*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 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*."

3.2.4 National Grids' Stakeholder, Community and Amenity Policy, published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the aforementioned legislation.

3.2.5 National Grid has had due regard to other relevant statutory obligations and requirements, where relevant, and to National Grid's approach to consenting, in the undertaking of this supplementary stage of Options Identification and Selection (Stage 2).

3.3 British Energy Security Strategy (2022)

3.3.1 In response to concerns over the security, affordability and sustainability of the UK's energy supply, the UK Government published the British Energy Security Strategy in April 2022.

3.3.2 The British Energy Security Strategy proposes to accelerate the UK towards a low carbon, energy independent future with a focus expanding domestic UK energy supply, accelerating the connecting network infrastructure to support an expansion in domestic UK energy supply and to work with international partners to maintain stable energy markets and prices.

3.3.3 The British Energy Security Strategy recognises that: *"Accelerating our domestic supply of clean and affordable electricity also requires accelerating the connecting network infrastructure to support it. Within this decade, our modern system will prioritise two key features: anticipating need because planning ahead minimises cost and public disruption; and hyper-flexibility in matching supply and demand so that minimal energy is wasted. This more efficient, locally responsive system could bring down costs by up to £10 billion a year by 2050."*

3.3.4 To support this, the British Energy Security Strategy includes several aims, including to:

- set out a "blueprint for the whole system by the end of 2022 in the Holistic Network Design (HND) and Centralised Strategic Network Plan (CSNP). The HND will identify strategic infrastructure needed to deliver offshore wind by 2030"; and
- "Dramatically reduce timelines for delivering strategic onshore transmission network infrastructure by around three years. We will work with Ofgem, network operators and the supply chain to find further savings, for example in the procurement, manufacture and construction stages. Overall, we aspire to halve the end-to-end process by the mid-2020s."

3.3.5 When considering new electricity infrastructure, National Grid has regard to the British Energy Security Strategy where appropriate.

3.4 Planning Act 2008

3.4.1 The Project is defined as a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(b) of the Planning Act 2008 (PA 2008) (as amended) as it consists of the installation of an electric line above ground, is of more than 132kV and longer than 2km in length. Therefore, permission for construction of the Project must be sought via a Development Consent Order (DCO).

3.4.2 The PA 2008 provides the primary legislative basis for applications under which a DCO for a NSIP is sought. It also defines the process in applying for, examining and determining these applications, in accordance with the requirements of relevant published National Policy Statements (NPSs).

3.4.3 The PA 2008 was amended through the Localism Act 2011, through which the decision-making responsibilities were transferred to the relevant Secretary of State (SoS), with the power to appoint an Examining Authority to examine the application. The Examining Authority, usually appointed through the Planning Inspectorate, is responsible for managing the NSIP planning process and providing the SoS with a recommendation on whether to grant or refuse consent. Following receipt of the recommendation from the Planning Inspectorate, the SoS would then make a final decision on whether to grant the DCO.

3.5 National Policy Statements

Energy infrastructure policy

3.5.1 The UK Government's energy infrastructure policy for the delivery of major energy infrastructure is outlined within a number of NPSs. NPSs also set out the Critical National Priority (CNP) and need for certain forms of new infrastructure, and guidance for determining applications for DCOs. Specific guidance and criteria that applicants should consider when assessing the environmental effects of their proposal is set out

within the NPSs, along with how the SoS should consider these effects in decision-making and any mitigation measures that should be applied.

3.5.2 NPSs EN-1 and EN-5 set the regulatory context within which the routeing and siting for electricity infrastructure networks is undertaken. Taken together these NPSs provide the primary national policy context for decisions on applications for electricity transmission projects classified as NSIPs. The type of energy technology incorporated by the Project is specifically referenced within the following NPSs (updated since the CPRSS 2023), which are of direct relevance to the Project and are considered in the sections below:

- Overarching NPS for Energy (EN-1) (NPS EN-1) (published November 2023), (designated January 2024); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (published November 2023), (designated January 2024).

Overarching NPS for Energy EN-1 (2023)

3.5.3 NPS EN-1 sets out the UK Government's overarching policy with regard to the development of NSIPs in the energy sector. It outlines high-level objectives, policy and the regulatory framework. EN-1 emphasises the need for new energy projects to contribute to a secure, diverse and affordable energy supply. This is to support the UK Government's policies on sustainable development, in particular by mitigating and adapting to climate change.

3.5.4 It is recognised in paragraph 3.3.3 of NPS EN-1 that demand for electricity is likely to increase significantly over the coming years, and as large parts of transport, heating and industry decarbonise by switching to low carbon electricity, demand could double by 2050. It is also recognised that *"to ensure that there is sufficient electricity supply to meet demand, new electricity infrastructure will have to be built to replace output from retiring plants and to ensure we can meet increased demand*". Paragraph 3.3.7 acknowledges electricity networks are needed to connect the output of other types of electricity infrastructure with consumers and each other.

3.5.5 As outlined in paragraph 3.3.62, the government had concluded there is a CNP for the provision of nationally significant low carbon infrastructure. Paragraph 3.3.63 states:

"Subject to any legal requirements, the urgent need for CNP Infrastructure to achieving our energy objectives, together with the national security, economic, commercial, and net zero benefits, will in general outweigh any other residual impacts not capable of being addressed by application of the mitigation hierarchy. Government strongly supports the delivery of CNP Infrastructure, and it should be progressed as quickly as possible."

3.5.6 NPS EN-1 highlights that if energy objectives are to be achieved, there is an urgent need for new electricity network infrastructure to be brought forward at pace.

3.5.7 Paragraph 3.3.66 states:

"The security and reliability of the UK's current and future energy supply is highly dependent on having an electricity network which will enable renewable electricity generation, storage, and interconnection infrastructure that our country needs to meet the rapid increase in electricity demand required to transition to net zero while maintaining energy security".

3.5.8 Section 4.7 of EN-1 sets out the principles for good design that should be applied to all energy infrastructure and notes the importance which the PA 2008 places on good design and sustainability. Part 5 of NPS EN-1 sets out generic impacts that can arise from the development of all types of energy infrastructure - such as air quality and emissions, biodiversity, dust and odour, flood risk, historic environment, landscape and visual, land use, noise and vibration, socioeconomics, traffic and transport and waste management.

NPS for Electricity Networks Infrastructure EN-5 (2023)

3.5.9 NPS EN-5 emphasises the recognition by Government through NPS EN-1 that there is a CNP for nationally significant low carbon infrastructure. This includes a CNP for *"electricity grid infrastructure, all power lines in the scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations"*. As development of this nature is viewed by the Government as CNP infrastructure, NPS EN-5 paragraph 1.1.5 notes it "*should be progressed as quickly as possible*", demonstrating the urgent need for new electricity infrastructure.

3.5.10 EN-5 acknowledges that an applicant may not have substantial control over the siting and routeing of new electricity networks infrastructure (paragraph 2.2.1). Instead, it recognises that siting may be determined by the location of generating stations, infrastructure requiring connection to the grid and/or system capacity and resilience requirements. Paragraph 2.2.7 also recognises that engineering, environmental or community constraints may often mean that electricity lines do not follow the most direct route, instead adopting the most feasible route.

3.5.11 Part 2 of NPS EN-5 includes assessment and technology-specific information that must be considered by applicants when submitting proposals for infrastructure covered by this NPS. This includes demonstrating how their proposals meet the requirements in NPS EN-1, NPS EN-5, application of the mitigation hierarchy, as well as any other legal and regulatory requirements.

3.5.12 Paragraph 2.2.10 of NPS EN-5 reiterates the duties under Section 9 of the Electricity Act 1989, both in relation to development 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 physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic, or archaeological interest; and …do what [they] reasonably can 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."

3.5.13 Section 2.4 of NPS EN-5 outlines the need for the SoS to consider good design for energy infrastructure, in accordance with the requirements of the PA 2008. Paragraph 2.4.3 recognises that applicants may be limited in their ability to influence the aesthetic appearance of electricity networks infrastructure, ensuring in the first instance that it is safe and secure.

3.5.14 NPS EN-5 at paragraph 2.9.16 references the Holford Rules (see section 3.6), stating that they "*should be embodied in the applicants' proposals for new overhead lines"*. The SoS should be satisfied that development complies with the requirements of the Holford Rules so far as reasonably possible to limit the effects of development on the surrounding landscape and visual receptors.

3.5.15 NPS EN-5 sets out that the Government's position that overhead lines should be the strong starting presumption for electricity network developments, and this is only reversed where a development will cross part of a nationally designated landscape. Additionally, EN-5 recognises at paragraph 2.9.23 that cases will arise where *"though no part of the proposed development crosses a designated landscape – a high potential for widespread landscape and significant adverse landscape and/or visual impacts"*, which may result in recommendations to underground certain sections. NPS EN-5 goes on at paragraph 2.9.23 to state that the SoS should only grant consent to undergrounding in favour of overhead lines if *"…the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environmental impacts that it presents, the mitigation hierarchy has been followed, and that any technical obstacles associated with it are surmountable"*. In this context it should consider:

- the landscape and visual baseline characteristics of the setting of the proposed route;
- the additional cost of proposed undergrounding;
- the potential environmental and archaeological effects of undergrounding; and
- the applicant's commitment to mitigate potential detrimental effects of undergrounding work.

3.5.16 It is evidenced in NPS EN-5 that 'associated infrastructure', such as substations, are considered to be CNP infrastructure. EN-5 acknowledges at paragraph 2.9.9 that *"new substations, Sealing End Compounds (SEC) (including terminal towers), and other above-ground installations that serve as connection, switching, and high voltage transformation points on the electricity network may also give rise to adverse landscape and visual impacts"*.

3.5.17 Paragraph 2.2.8 of EN-5 adds that "*there will usually be a degree of flexibility in the location of the development's associated substations, and applicants should consider carefully their location, as well as their design*". This includes consideration of characteristics such as the local topography, the possibilities for screening the infrastructure and/or other options to mitigate any impacts.

3.6 The Holford and Horlock Rules

3.6.1 National Grid consistently employs two sets of rules/guidelines for the routeing and siting of new energy transmission infrastructure:

- Holford Rules – these provide guidelines for the routeing of new high voltage overheard transmission lines[11]; and
- Horlock Rules – provide the approach to, and guidelines for, the design and siting of SECs (amongst substations and line entries)[12].

[11] The National Policy Statement for Electricity Networks Infrastructure EN-5 in Paragraph 2.9.16 confirms that the Holford Rules "*should be embodied in the applicant's proposals for new overhead lines*".

[12] The National Policy Statement for Electricity Networks Infrastructure EN-5 has incorporated the Horlock Rules. At Paragraph 2.9.18 it 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*".

3.6.2 When considering new electricity infrastructure, National Grid has regard to the degree to which routeing and siting options comply or deviate from these rules.

Holford Rules

3.6.3 Guidelines on overhead line routeing were first formulated in 1959 by Sir William (later Lord) Holford, as advisor to the Central Electricity Generation Board. Holford developed a series of planning guidelines in relation to amenity issues, which have subsequently become known as the 'Holford Rules' and remain a valuable tool in selecting and assessing potential route options as part of an options appraisal process. These have been a fundamental consideration during the development of the Project. The Holford Rules are also expressly considered as part of NPS EN-5. The Holford Rules state that applicants for development of overhead lines 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.

Horlock Rules

3.6.4 National Grid devised the Horlock Rules in 2003, and these were subsequently updated in 2006. 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. In summary, like the Holford Rules, they facilitate consideration of environmental and amenity considerations within the design and siting of new substation infrastructure.

3.7 National Planning Policy Framework

3.7.1 The National Planning Policy Framework (2023) (NPPF) sets out the Government's environmental, economic and social planning policies for England and how these should be applied. Paragraph 5 outlines that the:

"*Framework does not contain specific policies for nationally significant infrastructure projects. 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). National policy statements form part of the overall framework of national planning policy and may be a material consideration in preparing plans and making decisions on planning applications*".

3.7.2 When considering new electricity infrastructure, National Grid has due regard to the NPPF, where appropriate.

3.8 National Grid's Approach to Consenting

3.8.1 National Grid's Approach to Consenting[13] (refer to Figure 1-2) outlines the development process for major infrastructure projects, from initial inception through to consent and construction. National Grid's Approach to Consenting is divided into six stages:

- Stage 1: Strategic Proposal;
- Stage 2: Options Identification and Selection;
- Stage 3: Defined Proposal and Statutory Consultation;
- Stage 4: Assessment and Land Rights;
- Stage 5: Application; and
- Stage 6: Examination, Decision and Construction.

3.8.2 A staged approach has been adopted to identify potential routeing and siting options for the Project. This has considered potential impacts on the environment, the local community, relevant planning policy, other existing and proposed developments, as well as technical and engineering design information.

3.8.3 The aim of the approach is to balance consideration of these factors and identify an emerging preferred corridor within which the Project overhead line could be routed.

3.8.4 The Project is at the Options Identification and Selection Stage (Stage 2), and this report has been prepared as part of that stage.

3.8.5 For the Project, the activities identified in National Grid's Approach to Consenting as being required at Stage 2 were broken down into the following nine steps:

- Step 1 – Definition of the study area/s and data gathering;
- Step 2 – Scoping of environmental topics and baseline data-gathering;
- Step 3 – Weight, agree and heat map features;

[13] National Grid, (2022), Network and Infrastructure. Available at https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure. Accessed 16 April 2024.

- Step 4 – Identifying and defining corridors;
- Step 5 – Agree end-to-end corridors for appraisal;
- Step 6 – Undertake site visits and refinement of corridors;
- Step 7 – Options appraisal of corridors;
- Step 8 – Confirm western corridor and develop graduated swathe for consultation; and
- Step 9 – Undertake non-statutory consultation.

3.8.6 Steps 1-9 were undertaken and reported in the CPRSS 2023. This report revisits Steps 6-9 on an eastern corridor between South Wheatley and High Marnham, and will inform subsequent localised non-statutory consultation, Step 9.

4. Summary of work previously presented and related updates

4.1 Strategic Proposal

4.1.1 The electricity industry in Great Britain is undergoing unprecedented change. Closure of fossil fuel burning generation and end of life nuclear power stations means significant additional investment in new generating and interconnection capacity will be needed to ensure existing minimum standards of security and supply are maintained.

4.1.2 National Grid must comply with Section 9 of the Electricity Act and Standard Condition D3 (transmission system security standard and quality of service) of its Transmission Licence. This means that where the boundary capacity of the Main Interconnected Transmission System (MITS) is exceeded against the standards, National Grid must resolve the capacity shortfall under the terms of its Transmission Licence. The standards against which National Grid assesses these shortfalls are set out in the 'Design of the Main Interconnected Transmission System' section of the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).

4.1.3 The need for the Project was first identified by the National Grid ESO. The broad location for the proposed reinforcement was identified through a Strategic Options Appraisal undertaken at the Strategic Proposal Stage. The Strategic Options Appraisal considered a wide range of options for providing the necessary north-south power flows and concluded that the establishment of a new electricity transmission route between East Yorkshire and Nottinghamshire represented the most appropriate solution. The Strategic Options Appraisal is reported in the Strategic Options Report[14].

4.1.4 The industry regulator OfGEM, has determined that the Project is required to deliver the Government's 2030 net zero ambitions and should therefore form part of their Accelerated Strategic Transmission Investment (ASTI) framework, allowing National Grid earlier access to project funding in order to accelerate the delivery of the Project.

4.2 Corridor and Preliminary Routeing and Siting Study 2023

Overview

4.2.1 The CPRSS 2023 reported the process undertaken as part of the Options Identification and Selection Stage to identify a western corridor within which the required infrastructure for the Project may be located. The CPRSS 2023 sets out the routeing and siting activities undertaken to include the identification, refinement and assessment of options for preliminary corridors between the proposed new substation in the Creyke Beck area, and the proposed new substation at High Marnham and explains the emerging preferred corridor National Grid consulted on in 2023. A graduated swathe was also produced within the emerging preferred corridor 2023, illustrating the area

[14] National Grid, (2023), Strategic Options Report.

where it might be more appropriate to route the new transmission line. To avoid confusion, the section of the 'emerging preferred corridor' located between South Wheatley and High Marnham which was previously consulted on is referred to in this report as the 'western corridor'.

Study Area

4.2.2 The Study Area defines the area within which the Project infrastructure could be located and also the area within which detailed environmental and socio-economic data was gathered to inform the CPRSS 2023.

4.2.3 The Study Area developed for the Project was informed by:

- the connection points (start/end points) identified in the Strategic Proposal Stage (Stage 1);
- the distribution of extensive areas of the highest amenity value or environmental constraint (for example, internationally designated sites);
- the nature of the physical and human geography. The presence of major geographical features such as estuaries or hills, or major settlements may represent a natural boundary to the Study Area or dictate a need for the area to extend to support routes around such features;
- consideration of the likely balance of environmental impacts between direct and indirect routes; and
- consideration of the Holford Rules (for routeing of an overhead line) and Horlock Rules (for siting of SECs).

4.2.4 The Study Area for the Project is shown in Figure 1-1. The Study Area encompasses the maximum extent within which a Project design that satisfies the statutory duties and obligations of National Grid and meets the Project objectives is likely to be located. Areas have been excluded which are considered unlikely to be feasible. The Study Area was defined by Holford Rule 1 and allows for the application of the principles of the Holford and Horlock Rules as described in Section 3.

Identifying and defining corridors

4.2.5 The identification of preliminary routeing and siting options within the Study Area was led by landscape and environmental specialists who had due regard to environmental and socio-economic considerations alongside the Project's required technical parameters.

4.2.6 To start, heat maps were produced to undertake a Geographical Information System (GIS) 'corridor analysis'. This is a GIS tool that takes the weight applied to each cell as the 'cost' of crossing it and calculates the total cost of every possible path between the defined start and end points. From this it is possible to identify potential corridors that minimise the environmental 'cost', where the environmental 'cost' is determined by the combination of distance and the sensitivity weighting applied by the heat map.

4.2.7 The GIS tool helps identify potential corridors with the least likely potential for adverse impacts on those aspects of the environment that can be mapped, by finding routes across the heat map surface to connect the start and end points of the Project which have the least environmental 'cost' – i.e. the least interaction with mapped environmental constraints.

4.2.8 The corridors generated through the GIS analysis provided a starting point for the Project landscape and environmental specialists, working with the wider Project team as appropriate, and employing professional judgement and their understanding of routeing considerations to identify technically feasible preliminary corridors.

4.2.9 The preliminary corridors identified were then subject to review by National Grid, Front End Engineering Design (FEED) Contractors and the Project team, to confirm technical feasibility and ensure that key issues and the interaction of constraints, had been appropriately considered. Professional judgement during review led to recommended amendments to the corridors (i.e. to park, refine or expand the corridors). These recommendations were reviewed and implemented by the landscape and environmental specialists to ensure that changes were made in a manner consistent with landscape and environmental considerations.

4.2.10 Following identification of preliminary corridors, links and loops[15], site visits were undertaken by landscape, heritage and ecology specialists, along with the FEED Contractor and National Grid. Following some site visits, further refinement to the corridors, link and loops occurred before progressing to Options Appraisal.

4.2.11 For the Project, four preliminary overhead line corridors were identified following the process as described above, as illustrated in Figure 4-1.

[15] A link being a connection between two corridors and a loop being where a corridor splits into an eastern or western section to loop around a feature, like a settlement.

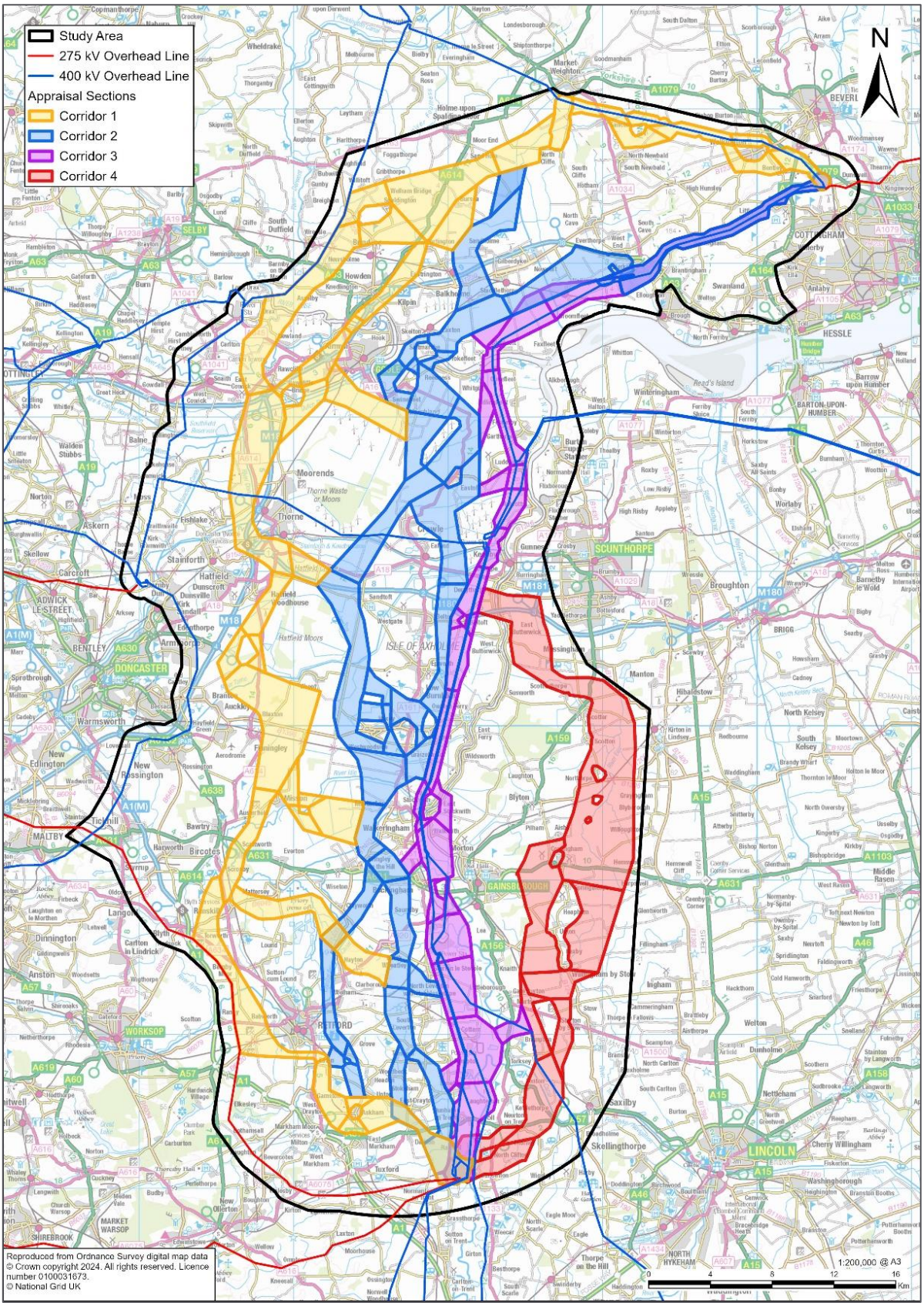


Figure 4-1: Four Preliminary corridors devised and strategically appraised within the CPRSS

Emerging preferred corridor – CPRSS 2023

4.2.12 The four preliminary corridors, links and loops illustrated in Figure 4-1, were subject to an Options Appraisal in accordance with National Grid's Approach to Consenting. The overall objective throughout the Options Appraisal was to take full consideration of all known environmental factors to minimise the risk of significant adverse impacts on the environment and communities, whilst taking into account engineering and economic considerations.

4.2.13 Following the Options Appraisal of the four preliminary corridors, links and loops in isolation, an end-to end solution review was then undertaken between Creyke Beck and High Marnham. A challenge and review workshop was held and attended by National Grid, the FEED contractor and the landscape and environmental specialists. The purpose of the workshop was to review environmental preferences and in accordance with policy and guidance including NPSs EN-1 and EN-5 and the Holford Rules, balance these against technical and cost inputs to reach a conclusion on the emerging preferred corridor from the CPRSS 2023 that provides the optimum balance of efficiency and economy, whilst having appropriate regard to environmental and socio-economic impacts.

4.2.14 The emerging preferred corridor from the CPRSS 2023 is illustrated in Figure 4-2, and comprises a corridor within which a new overhead line could be sited.

4.2.15 The emerging preferred corridor follows closely parallel to the existing 4ZQ 400kV overhead line from the edge of the Yorkshire Wolds to near Luddington (Lincolnshire) including crossing the River Ouse alongside the existing overhead line river crossing. It then continues from Luddington to near Beltoft, looping west around Keadby Windfarm to pass east of Ealand and then runs parallel to two existing 400kV overhead lines to near the Warping Drain, south-east of Haxey. Beyond this, it then continues to loop west of Misterton, then south, passing west of the line of villages along the edge of the Trent valley (Wallingham, Beckingham, Sturton le Steeple, North and South Leverton, Treswell and Woodbeck) to pass west of East Drayton, before approaching High Marnham from the north-east.

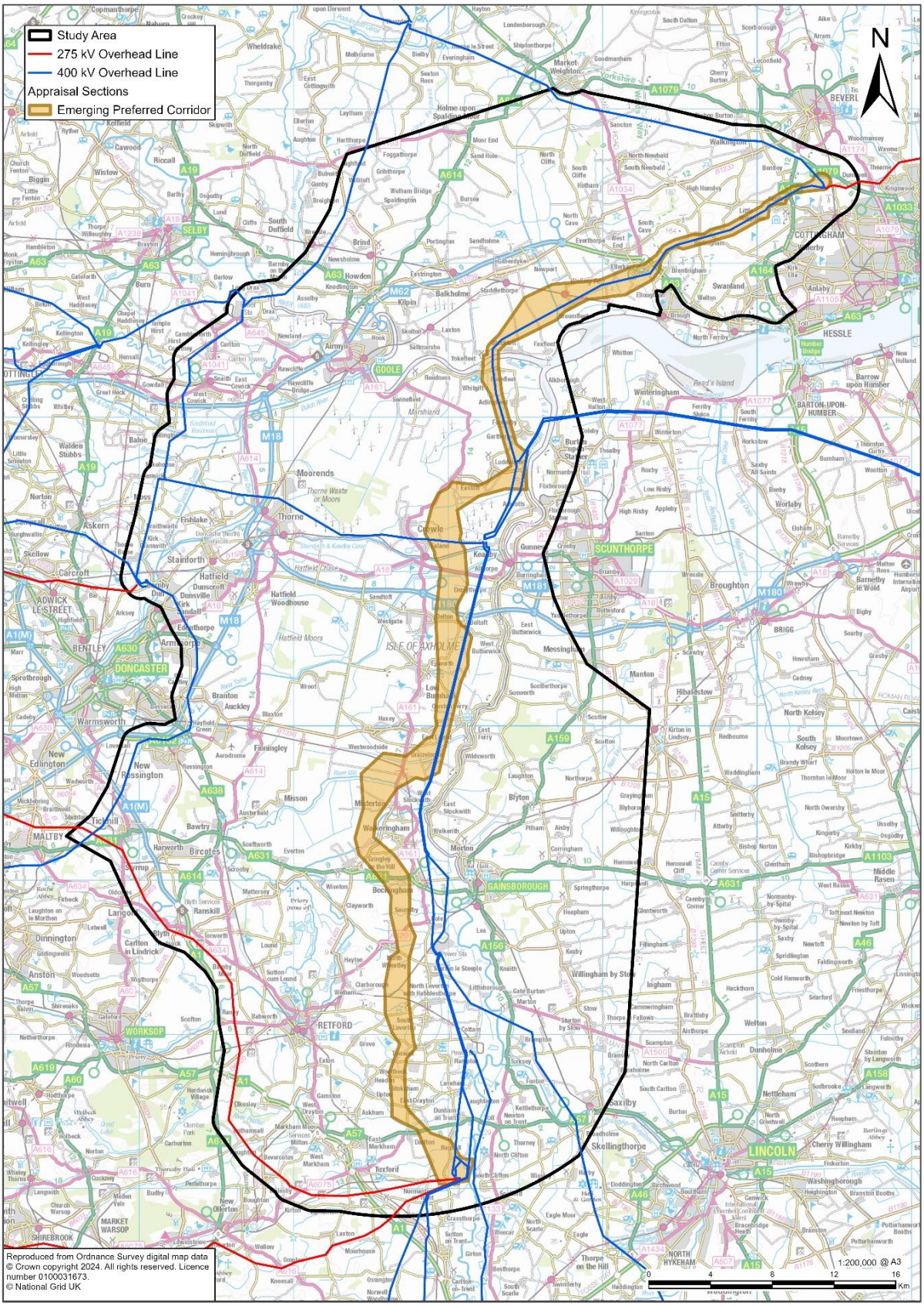


Figure 4-2: Emerging preferred corridor – CPRSS 2023

4.3 Non-Statutory Consultation 2023

4.3.1 National Grid's first stage of public consultation (non-statutory consultation) took place between 1 June 2023 to 27 July 2023. The overarching objectives of the non-statutory consultation process for the Project were to:

- seek to identify and understand the views and opinions of all the stakeholders and communities who may be affected by the works.
- consult with relevant local authorities and prescribed consultees at an early stage to ensure technical advice and local knowledge is taken into account in the early development of the Project.
- provide opportunities for engagement from the early stages of the process, where options and alternatives are being considered and there is the greatest scope to influence the design of the works.
- endeavour to enable constructive debate to take place, allowing for effective and meaningful two-way dialogue.
- ensure that benefits, constraints and adverse impacts of proposed works are communicated openly for meaningful stakeholder and community comment and discussion.
- utilise appropriate methods and effort in engaging stakeholders and communities, proportionate to the scale and impact of the works.
- provide feedback on how views expressed have been considered and the outcomes of any engagement process or activity.
- deliver a robust non-statutory consultation that contributes to, and supports, the DCO process.
- analyse all responses received through non-statutory consultation and consider these in the development of the Project, and to inform the future DCO application for the Project.
- use feedback to inform the statutory phase of consultation.

Public information events

4.3.2 Nine in-person public information events were organised to take place during the non-statutory consultation period. These events were organised to be accessible to as many stakeholders as possible and held at suitable community hubs along the emerging preferred corridor.

4.3.3 The in-person events provided an opportunity for consultees to view the latest Project information and speak to Project team representatives.

4.3.4 The in-person information events were held at suitable, accessible venues (within or near the public consultation zone[16]) and people were encouraged to attend and provide feedback on the information presented.

[16] The route is divided into geographical areas, and public consultation events take place within these public consultation zones.

4.3.5 The first stage of the non-statutory consultation split the proposed route into 11 sections to assist stakeholders with reviewing proposals and providing feedback.

4.3.6 As explained previously, this Report focuses on a specific part of the Project between South Wheatley to High Marnham. The Sections of the emerging preferred corridor presented in 2023 that lie between South Wheatley and High Marnham are:

- Section 10: A620 east of North Wheatley to Fledborough
- Section 11: Fledborough to High Marnham

4.3.7 Table 4.1 provides details of the in-person consultation events accessible to stakeholders in the southern part of the Project, which covered Sections 10 and 11.

Table 4.1: In-person Information Events Held During the 2023 Non-statutory Consultation accessible to stakeholders in the southern part of the Project Sections 10 and 11 of the route

Date and time	Venue
Sections 8, 9, 10 & 11	
Tuesday 6 June 2023, 12pm-7pm	Dunham on Trent Centre, Low Street, Dunham, Newark, Nottinghamshire NG22 0FJ
Saturday 10 June 2023, 10am-4pm	North and South Wheatley Village Hall, Sturton Rd, South Wheatley, Retford, Nottinghamshire DN22 9DL
Monday 26 June 2023, 1pm-6pm	Gringley on the Hill Community Centre, West Wells Lane, Gringley on the Hill, Doncaster DN10 4QY

4.3.8 Other consultation events were held within Sections 1 to 7, during the same consultation period.

Webinars

4.3.9 Eight webinar sessions were also organised to take place during the stage one consultation.

4.3.10 The webinars were held online and presented the same information as available at the public information events. The webinars included a presentation by the Project Team and sometime afterwards for questions and answers. The online webinars provided interested stakeholders, who may have been unable to attend our public information events, another opportunity to hear about the Project and ask the Project team questions.

4.3.11 Table 4.2 provides details of the webinars covering the Project as a whole, and the southern part of the Project, specifically Sections 10 and 11. Please note other webinars were held, covering the other sections of the Project route.

Table 4.2: Webinar events held during the 2023 Non-statutory Consultation, focussing on both the Project as a whole, and specifically to stakeholders in the southern part of the Project in Sections 10 and 11 of the route

Webinar session	Date	Time
Webinars focussing on the Project as a whole		
Introduction to North Humber to High Marnham Project proposals – general overview.	Monday 5 June 2023	2pm
Introduction to North Humber to High Marnham Project proposals – general overview.	Wednesday 19 July 2023	2pm
Webinars focussing specifically on Sections 8, 9, 10 &11		
Our proposals in Sections 8 (Graizelound to Chesterfield Canal), 9 (Chesterfield Canal to A620), 10 (A620 to Fledborough) and 11 (Fledborough to High Marnham)	Saturday 15 July 2023	10am
Our proposals in Sections 8 (Graizelound to Chesterfield Canal), 9 (Chesterfield Canal to A620), 10 (A620 to Fledborough) and 11 (Fledborough to High Marnham)	Tuesday 18 July 2023	7pm

4.3.12 Events were advertised and promoted through a range of methods, including:

- project newsletter – issued to 11,919 properties;
- Newspaper advertisements – two rounds of newspaper advertisements, undertaken between 1st and 29th June (list in document);
- digital advertisements – two rounds of digital advertisements undertaken between 1st and 18th June (list in document);
- social media advertising – Facebook advertising undertaken between 1st June and 27th July; and
- National Grid asked relevant local authorities and other identified groups to use their own social media to advertise the consultation.

4.3.13 The non-statutory consultation event banners[17] were displayed at all of the in-person information events.

4.3.14 In addition to this, information provided at the public information events included:

- copies of the newsletter to take away;
- copies of the Project Background Document to take away;
- copies of the Strategic Options Report to read; and
- copies of the Corridor Preliminary Routeing and Siting Report (CPRSS 2023) to read.

[17] https://www.nationalgrid.com/electricity-transmission/document/148811/download

4.3.15 Feedback forms were available at all events for attendees to record their comments. These could be completed at the event or taken home and posted to National Grid via a freepost address.

4.3.16 National Grid representatives from relevant technical disciplines were available at all events to explain the Project and answer questions from members of the local community attending the events.

4.4 Summary of relevant consultation feedback

4.4.1 Following non-statutory consultation in 2023, National Grid reviewed all consultation feedback.

4.4.2 This part of the Report summarises the feedback received between South Wheatley and High Marnham which has informed the decision to consider the eastern corridor. National Grid will produce and publish a report summarising and responding to all feedback from both the non-statutory consultation 2023 and the localised non-statutory consultation 2024. This will be published during the statutory consultation in early 2025 (Stage 3).

4.4.3 A proportion of the feedback received regarding the proposals between South Wheatley and High Marnham (consultation Sections 10 and 11) suggested that the new overhead line should be routed further to the east, placing it closer to the existing overhead lines, and further from villages that would otherwise be located closer to the proposed overhead line, as a result of the Project. There were also suggestions that the new overhead line should be routed in close parallel with the existing overhead lines wherever possible, as respondents believed this would reduce the impact of the new infrastructure in the area.

4.4.4 In addition, feedback from residents of a number of villages noted that the new overhead line corridor would result in their encirclement by the new overhead line to the west, and the existing 400kV overhead lines to the east. Some respondents noted this concern including residents of the villages Saundby, Bole, Sturton le Steeple, North Leverton, South Leverton, Habblesthorpe, Treswell, Rampton, East Drayton, Laneham, Dunham on Trent and Ragnall. Some respondents suggested that the new overhead line should be routed further to the east, or in close parallel with existing overhead lines, to prevent the new overhead line being routed on the opposite side of the village/s to the existing overhead lines. A number of requests were made in consultation feedback to route the overhead line further from several unlicenced airstrips, including the Forwood Farm Airfield, Headon Airfield, Grove Moor Farm Airfield, Treswell Airfield and Darlton Gliding Club. The feedback requested that the new overhead line be routed further to the east, in order to reduce potential safety and operational impacts on the unlicenced airstrips.

4.4.5 Concerns were also raised regarding the Project's potential to impact on North Leverton Windmill, a popular local Grade II* Listed cultural heritage asset in the area. Consultees indicated that routeing the overhead lines further to the east, in close parallel with the existing overhead lines in this area, would reduce the impact of the Project on the North Leverton Windmill and its setting, preventing the spread of infrastructure.

4.4.6 Further concerns were raised around the potential negative impacts of routeing the overhead line in close proximity to the Treswell Woods Site of Special Scientific Interest (SSSI) and Nature Reserve.

4.5 Decision to identify eastern corridor

4.5.1 The consultation feedback received by National Grid following the 2023 non-statutory consultation plays an important role in developing the Project as local knowledge and feedback helps shape the evolution of the Project design and routeing.

4.5.2 In light of additional information received, including feedback from the 2023 non-statutory consultation, a review was undertaken of the CPRSS 2023. As a result of this review a potential alternative corridor option, referred to as the ‘eastern corridor’, has been identified. This is a refined corridor largely based on the previously identified Corridor 3 and Corridor 2 in the CPRSS 2023.

5. Approach to corridor and graduated swathe identification

5.1 National Grid's approach to consenting

5.1.1 As detailed in Section 3.8, this report has been prepared with reference to National Grid's Approach to Consenting (refer to Figure 1-2). Steps 1-9 were undertaken in the CPRSS 2023, with Steps 6-9 being revisited on the eastern corridor between South Wheatley and High Marnham.

5.2 Step 6: Back-check and refinement of potential alternative corridor between South Wheatley and High Marnham.

5.2.1 Following a review of the CPRSS 2023 taking account of additional information received, including feedback from the 2023 non-statutory consultation, it was decided to undertake an exercise to consider a potential alternative corridor between South Wheatley and High Marnham, now referred to as the eastern corridor.

5.2.2 A robust and transparent process was used to assess the potential impacts that the eastern corridor may have across a wide range of criteria, incorporating environmental, socio-economic, technical and cost factors.

Environmental assessment methodology

5.2.3 The following guidelines and legislation were used to aid in the assessment and refinement of the eastern corridor:

- National Grid's Statutory Duties (Electricity Act 1989) to develop an economic network (refer to Section 3.2 for further information);
- NPS EN-1 (refer to Section 3.5);
- NPS EN-5 (refer to Section 3.5);
- Holford Rules (refer to Section 3.6); and
- Horlock Rules (refer to Section 3.6).

Refinement of the eastern corridor

5.2.4 In 2023 National Grid identified a possible corridor within the Trent valley that broadly follows the route of the existing overhead transmission lines that are routed to the south and south-east from the substations at West Burton and Cottam. This corridor was referred to in the CPRSS 2023 as 'Corridor 3'. CPRSS Corridor 3 extends both to the east and west of existing overhead transmission lines as illustrated in Figure 4-2.

5.2.5 A review of Corridor 3 helped to inform identification and refinement of the eastern corridor which predominantly lies within the western edge of Corridor 3 between South Wheatley and High Marnham see Figure 5-1.

5.2.6 The extent of the eastern boundary of Corridor 3 in the CPRSS was defined, having regard to the possibility of approaching Corridor 3 from the eastern direction in the Cottam area as shown in Figure 5-1. This corridor option was appraised in conjunction with a second corridor (referred to as 'Corridor 4' in the CPRSS 2023). Based upon these appraisals, National Grid concluded that a route from Corridor 4 into Corridor 3 did not represent the most appropriate route for the new line, as explained in the CPRSS 2023.

5.2.7 Whilst not favouring a route from the east into Corridor 3, it would be technically possible to route a new line on the eastern side of the existing overhead lines even if approaching Corridor 3 from the west i.e. from the 'western corridor'. In order to achieve this arrangement, the existing overhead lines would need to be crossed by the new line. Dependent upon where the crossing to the east of the existing lines was made, up to six existing transmission lines might need to be crossed.

5.2.8 Given the number and importance of the transmission routes involved, any crossing would need to be achieved through the use of underground cables. This could require the use of up to five separate sections of cable depending upon the location where the new line first crosses the existing routes. Each section of cable would generally need two separate secure compounds; one at either end, to allow the ends of the buried cables to safely connect onto the overhead line. Given the capacity requirements, it is estimated that a single one-kilometre section of underground cabling would cost between £40-£50 million. The works that would be associated with underground cables of the capacity required for the new North Humber – High Marnham route is summarised in Appendix A of this report for information.

5.2.9 To help define the eastern consultation corridor, National Grid considered which design solutions required detailed assessment. Following this assessment, it is considered that routeing to the east of the existing overhead lines from the 'eastern corridor' in Section 9 or from the western side of the existing lines in Section 10 of the route would not be appropriate. This assessment had regard to the environmental effects, technical complexity and significant additional costs that would likely result when considered in the context of available alternatives, relevant policy tests and National Grid's statutory duties.

5.2.10 A summary of the reasons informing this judgement is set out in Appendix A of this report.

Summary of the eastern corridor

5.2.11 The eastern corridor utilises a refined section of Corridor 2 in the South Wheatley area before following the existing C2-C3 link as reported in the CPRSS 2023, to Corridor 3 south of West Burton Power Station. The C2-C3 link is located between Sturton le Steeple in the north and North Leverton with Habblesthorpe in the south.

5.2.12 The eastern corridor utilises Corridor 3 from the C2-C3 link south to Cottam Power Station, east of the existing overhead lines. The eastern corridor has been widened west to allow for more flexibility and routeing options west of the existing overhead line in proximity to the three solar developments connecting at Cottam Power Station and the woodland at Rampton Thornes.

5.2.13 Corridor 3 south of Cottam Power Station remains discounted following the backcheck and review exercise, due to challenges associated with routeing in proximity of the existing 400kV overhead lines, settlements and the River Trent. Further explanation can be found in Appendix A.

5.2.14 From Cottam Power Station to High Marnham Power Station the eastern corridor utilises the eastern Corridor 2 options as reported in the CPRSS 2023 (this includes C3-C2 Link4, section C2p(e) and section C2q section – refer to the CPRSS 2023 for details). For clarification, the emerging preferred corridor in CPRSS 2023 utilised the eastern Corridor 2 options. The eastern corridor is located to the west of settlements Laneham and Ragnall. The refined eastern corridor is shown in Figure 5-2: Refined Eastern Corridor.

5.2.15 Figure 5-1 added shows which sections of Corridors 2 and 3 were used in defining the eastern corridor.

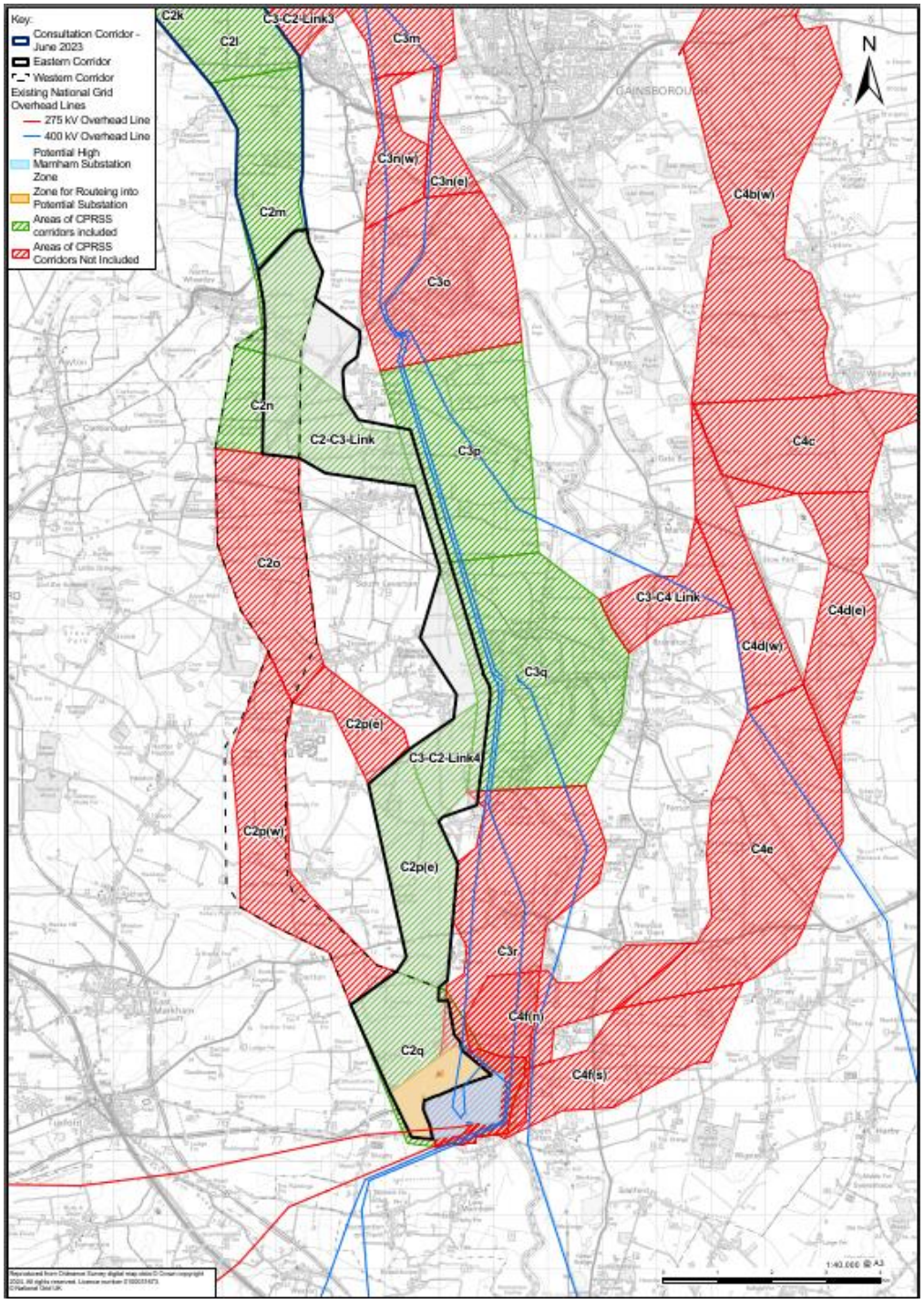


Figure 5-1: Areas of CPRSS corridors used in the Eastern Corridor

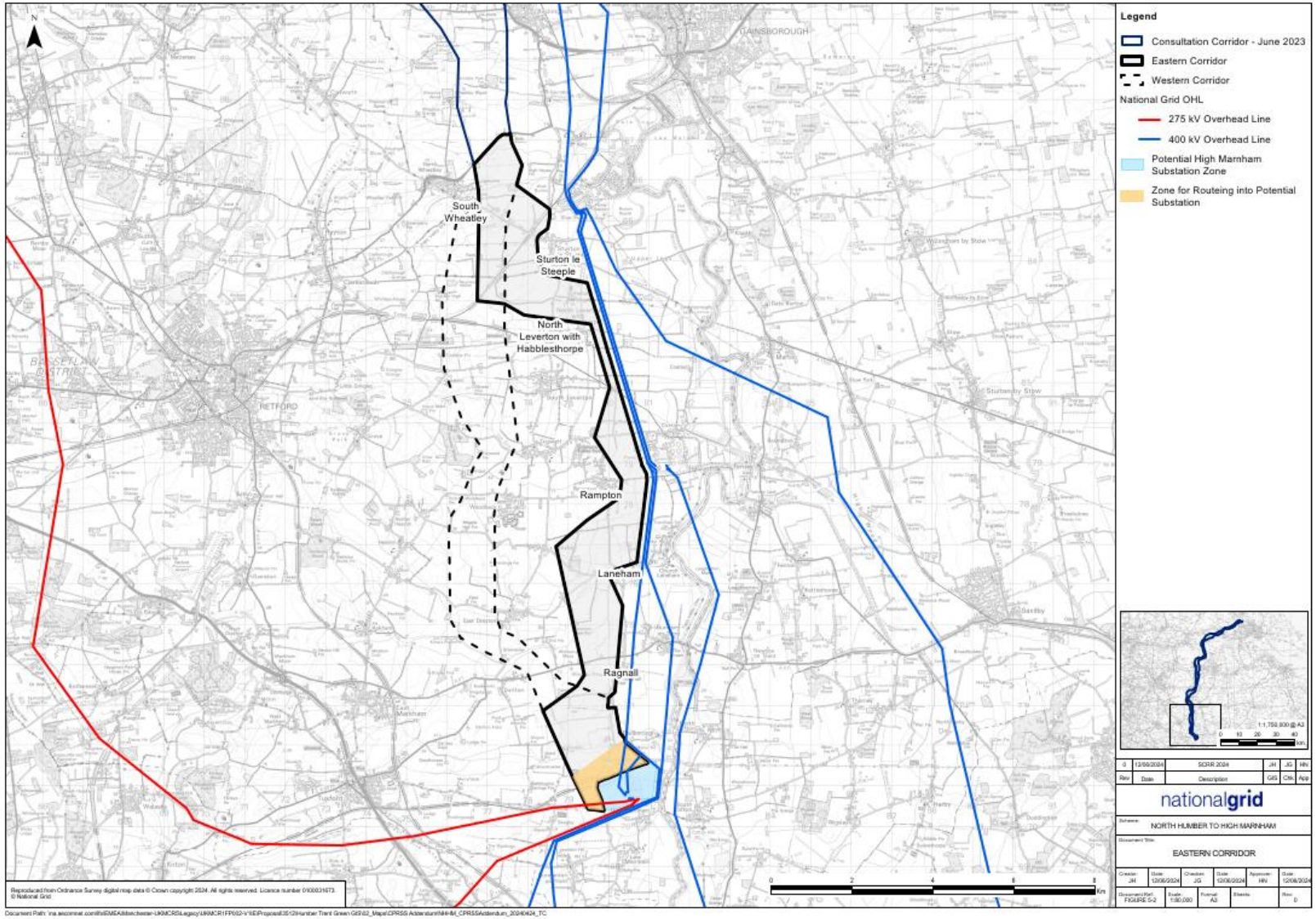


Figure 5-2: Refined Eastern Corridor

5.3 Step 7: Options Appraisal

5.3.1 Options Appraisal is a structured process by which the environmental, socio-economic, technical, cost and programme implications of defined options are identified, reported and compared. It is a tool to aid objective and justified decision making and it enables National Grid to document in a transparent manner the information on which judgements have been based. Options Appraisal is, therefore, focussed on those sub-topics which assist in distinguishing between options.

5.3.2 For the environmental, socio-economic and technical issues, the appraisal considers the potential impacts on relevant receptors, and whether such effects could be avoided or mitigated through careful routeing or siting. Where impacts cannot be avoided or mitigated by careful routeing, other forms of mitigation have been considered in accordance with National Grid's mitigation hierarchy, including:

- different lattice pylon design/conductor configuration;
- alternative pylon design (such as low height pylons);
- reduction of wirescape through distribution network rationalisation or undergrounding;
- reduction of wirescape through transmission network rationalisation; and
- alternative transmission technology (such as undergrounding).

5.3.3 The residual impacts considered in the Options Appraisal do not take account of Project-specific environmental, socio-economic or technical mitigation measures which are likely to be defined as part of the EIA process undertaken at the Defined Proposal and Statutory Consultation Stage (3).

5.3.4 The environmental, socio-economic and technical appraisals for the eastern corridor to date are described in Section 6. Technical assessments, including ongoing environmental surveys. These will be considered when making a decision on the overall preferred corridor and identification of the route alignment ahead of the subsequent statutory consultation.

5.4 Step 8: Develop Graduated Swathe within refined corridor

5.4.1 A preliminary exercise utilising environmental and technical expertise was undertaken to identify where it might be appropriate to route the Project within the eastern corridor.

5.4.2 This exercise took account of the Holford Rules, having regard of local sites and features. These included residential properties and environmental assets such as woodlands, areas of ecological importance and existing infrastructure. The outcome of this exercise is shown by a 'graduated swathe' with coloured shading of varying intensity to indicate areas more likely (darker colour) or less likely (lighter colour) to be the location of proposed Project infrastructure.

5.5 Step 9: Undertake localised Non-Statutory Consultation

5.5.1 National Grid is committed to engaging and consulting with communities and stakeholders at an early stage of their projects, giving people the opportunity to provide

feedback and insight at a formative stage ahead of more detailed design work being carried out.

5.5.2 Following the above process and identification of the eastern corridor (which differs from the emerging preferred corridor consulted on in 2023), National Grid are undertaking a localised non-statutory consultation in 2024 to enable local communities and stakeholders to provide feedback on this option.

5.5.3 During the localised non-statutory consultation National Grid will seek feedback on the eastern corridor and graduated swathe.

5.5.4 Following this, National Grid will review all feedback received. Feedback from both the non-statutory consultation 2023 and localised non-statutory consultation 2024 will be used to inform a decision on the overall preferred corridor and route ahead of statutory consultation.

6. Appraisal

6.1 Introduction

6.1.1 The eastern corridor went through an Options Appraisal in accordance with National Grid's Approach to Consenting. National Grid's guidance provides a thorough and consistent framework to inform the appraisal of Project options and decision making. Its aim is to ensure that decisions regarding the location or technology of a given project are based on a full understanding of the technical, socio-economic, environmental, and cost implications of identified options. It also enables National Grid to document in a transparent manner the information on which judgements have been based.

6.1.2 National Grid's approach to the refinement of the eastern corridor considered the following topics and sub-topics:

- **Environmental**: Landscape and Visual Amenity; Ecology, Historic Environment; Air Quality; Noise and Vibration; Soil and Geology; Water; Greenhouse Gas Emissions;
- **Socio-economic:** Economic Activity; Traffic and Transport; Aviation and Defence;
- **Technical:** Technical Complexity; Construction/Delivery issues; Technology issues (which include sustainability issues); Capacity issues; Network efficiency/benefits (which includes energy efficiency); and
- **Cost:** Capital cost; Lifetime cost; and Constraint costs (where applicable).

6.2 Preliminary route judgement

6.2.1 Electricity can be transmitted through buried cables as well as through overhead conductors. However, at a transmission voltage of 400kV the use of buried cables represents a significant technical complexity.

6.2.2 The size and complexity of the underground cables required is far greater than those that operate at lower voltages[18] . As a result, direct buried transmission cables at the capacity required for the Project would have a significantly greater estimated capital cost when compared to an equivalent overhead line[19].

6.2.3 For these reasons the National Planning Policy (EN-5)[20] relating to transmission routes supports, in most instances, the development of overhead lines rather than underground cables[21].

[18] More information can be found in National Grid's publication 'Undergrounding high voltage electricity transmission lines. The technical issues'.

[19] More information on the estimated capital costs between overhead lines and underground cables for The Project can be found in Table 7.1 of National Grid's publication 'North Humber to High Marnham and Grimsby to Walpole Strategic Options Report' May 2023.

[20] NPS for Electricity Networks Infrastructure (EN-5) (published in November 2023), (designated January 2024).

[21] S2.9.20 NPS for Electricity Networks Infrastructure (EN-5) (published in November 2023), (designated January 2024).

6.2.4 Further information on technical methodology and complexity relating to undergrounding of electricity infrastructure can be found in Section 2.1 to 2.3 of the CPRSS 2023[22].

6.3 Description of the eastern corridor

6.3.1 The eastern corridor lies to the east of South Wheatley and then routes in a south-easterly direction, passing to the south of Sturton le Steeple. The route avoids West Burton Power Station. From here, it routes south alongside the two existing overhead lines passing to the east of Rampton.

6.3.2 It is recognised that a close parallel alignment with the two existing overhead lines is an opportunity within the eastern corridor between the east of Sturton le Steeple and Ragnall. The corridor is narrow between North Leverton with Habblesthorpe and South Leverton and widens to the village edges of South Leverton, Treswell and Rampton.

6.3.3 South of Ragnall close parallel opportunities with existing overhead lines were discounted on the grounds of technical and socio-economic effects; this included avoiding the over-sail of residential properties. From Ragnall the route passes in a south-easterly direction to the west of villages Laneham and Ragnall and to the east of Stokeham and East Drayton.

6.3.4 The southern extent of the eastern corridor overlaps with the southern extent of the western corridor between Ragnall and the former High Marnham Power Station.

6.4 Environmental and socio-economic factors

6.4.1 All descriptions are given moving from north to south along the eastern corridor. Environmental constraints figures and planning application figures are provided in Appendix B.

Landscape and visual amenity

6.4.2 The eastern corridor is located within the Trent and Belvoir National Character Area, characterised by a gently undulating open landscape. This corridor is positioned on lower ground within the landscape. The presence of the existing 400kV overhead lines and other infrastructure within the Trent Valley reduces the sensitivity of the landscape to adverse impacts from new infrastructure.

6.4.3 However, the presence of existing overhead line infrastructure, including the three existing overhead lines which converge and diverge in the areas around the former power stations[23], also suggests that there is the potential for a cumulative impact on the landscape and visual amenity within this area due to the potential combined impact of that infrastructure or wirescape.

6.4.4 There is also the potential for adverse visual impacts on people living and moving around their communities including South Wheatley, Sturton le Steeple, North Leverton with Habblesthorpe, South Leverton, Treswell, Rampton, Laneham and Ragnall.

[22] Corridor and Preliminary Routeing and Siting Study, published June 2023, National Grid.

[23] West Burton and Cottam Power Stations.

6.4.5 There is the potential for adverse impacts on views available from scattered residential properties and farms, recreational receptors along the River Trent, and National Cycle Network (NCN) Route 647.

Ecology

6.4.6 Throughout and adjacent to the eastern corridor, there are large swathes of floodplain grazing marshes and several areas of deciduous woodland and traditional orchard habitat. There is the potential for direct and indirect impacts on this priority habitat as a result of pylon siting and construction access routes; however, such impacts could be reduced as the Project develops through careful routeing.

6.4.7 Local Wildlife Sites (LWS) are a consideration for the corridor. South-west of West Burton Power Station and approximately 150m east of the eastern corridor is West Burton Meadow (features include an unimproved ridge and furrow grassland with an excellent species content). South of Treswell and positioned approximately 1.5km east of the eastern corridor are two LWSs, namely the Retford Road Wood LWS (features include mature deciduous woodland with a valuable ground flora) and the Bushstocks Lane Meadow LWS (features include little-improved meadow with a noteworthy flora).

6.4.8 At High Marnham the corridor extends over Marnham Railway Yard LWS (features include dry grassland with notable species) and the Fledborough to Harby Dismantled Railway LWS (features include a rich diversity of characteristics and notable herbs), as shown on Figure 6-1 below. There is the potential for direct and indirect impacts on these LWSs should the siting of the pylons and construction access routes take place in close proximity to them; however, careful routeing would seek to reduce or avoid such an impact where possible.

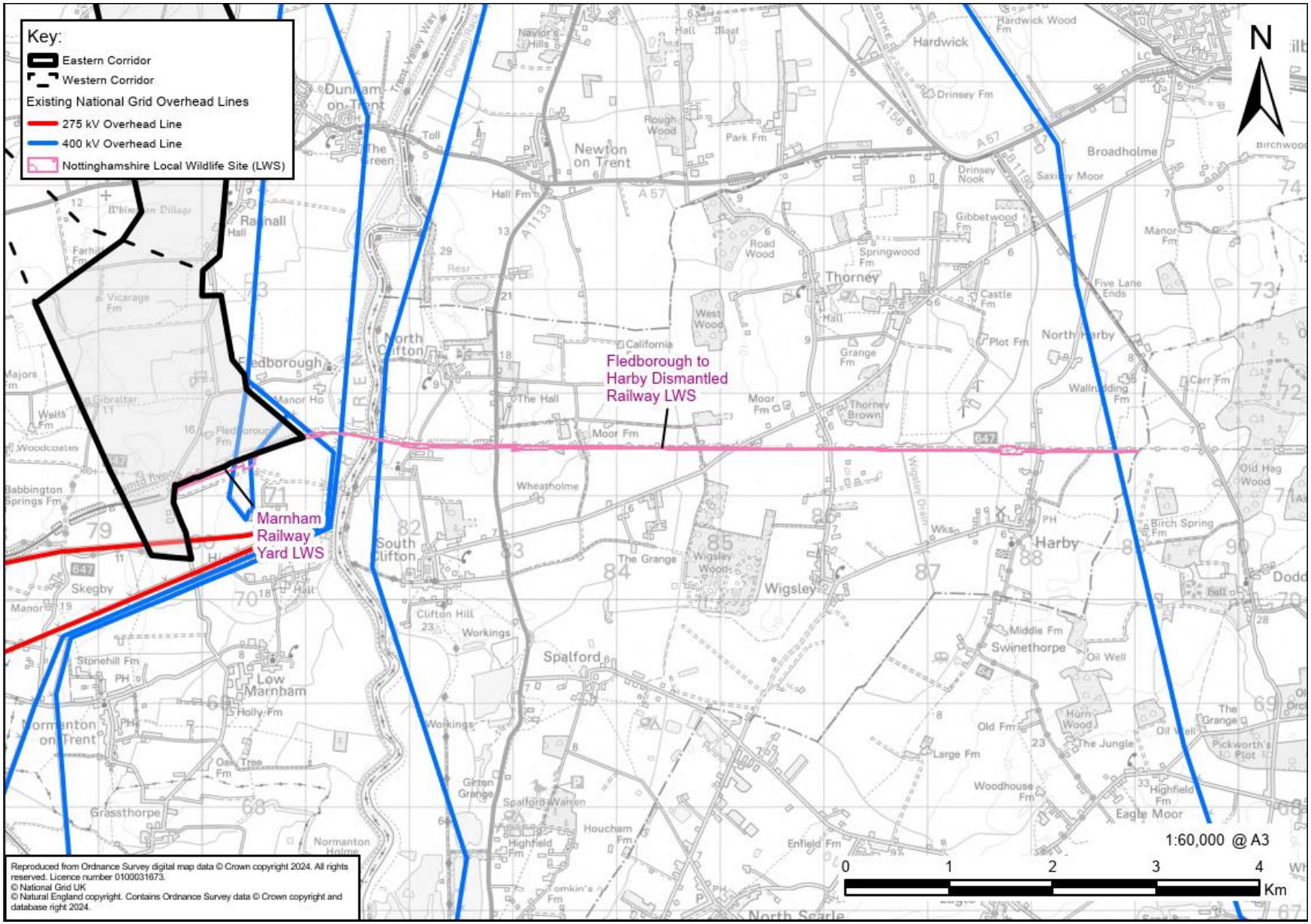


Figure 6-1: Ecology receptors

Water environment

6.4.9 There are constraints associated with water, specifically fluvial flood risk, as the majority of the eastern corridor is located within the floodplain of the River Trent, defined by Environment Agency Flood Zones 2 and 3. Flooding within the corridor was experienced in early January 2024, with analysis providing a flood frequency estimate for this event of between the 1 in 20 (5% chance in any year) and 1 in 25 (4% annual chance).

6.4.10 National planning policy[24] places strong emphasis on directing development to areas that are at low risk of flooding, however, acknowledges that, particularly for linear development of essential infrastructure, some development in the floodplain may be unavoidable where no suitable alternatives are available. EN-1 addresses Flooding and applies a two level approach to allowing development to go ahead, the sequential and exception test are detailed under Section 5.8.9. and 5.8.10[25].

6.4.11 Overhead lines can remain operational and safe from flooding over the course the overhead line's lifetime and account for changes anticipated as a result of climate change. Working within a flood zone can pose additional construction challenges and/or risks, and maintenance challenges once operational.

6.4.12 The Project will be designed so that there will be no detrimental impacts on flood risk to neighbouring land as a consequence of the Project.

[24] NPS for Electricity Networks Infrastructure (EN-5) S 2.3 (published in November 2023), (designated January 2024), EN-1 NPS Overarching National Policy Statement for Energy 2024 (EN-1), S5.8

[25] NPS Overarching National Policy Statement for Energy 2024

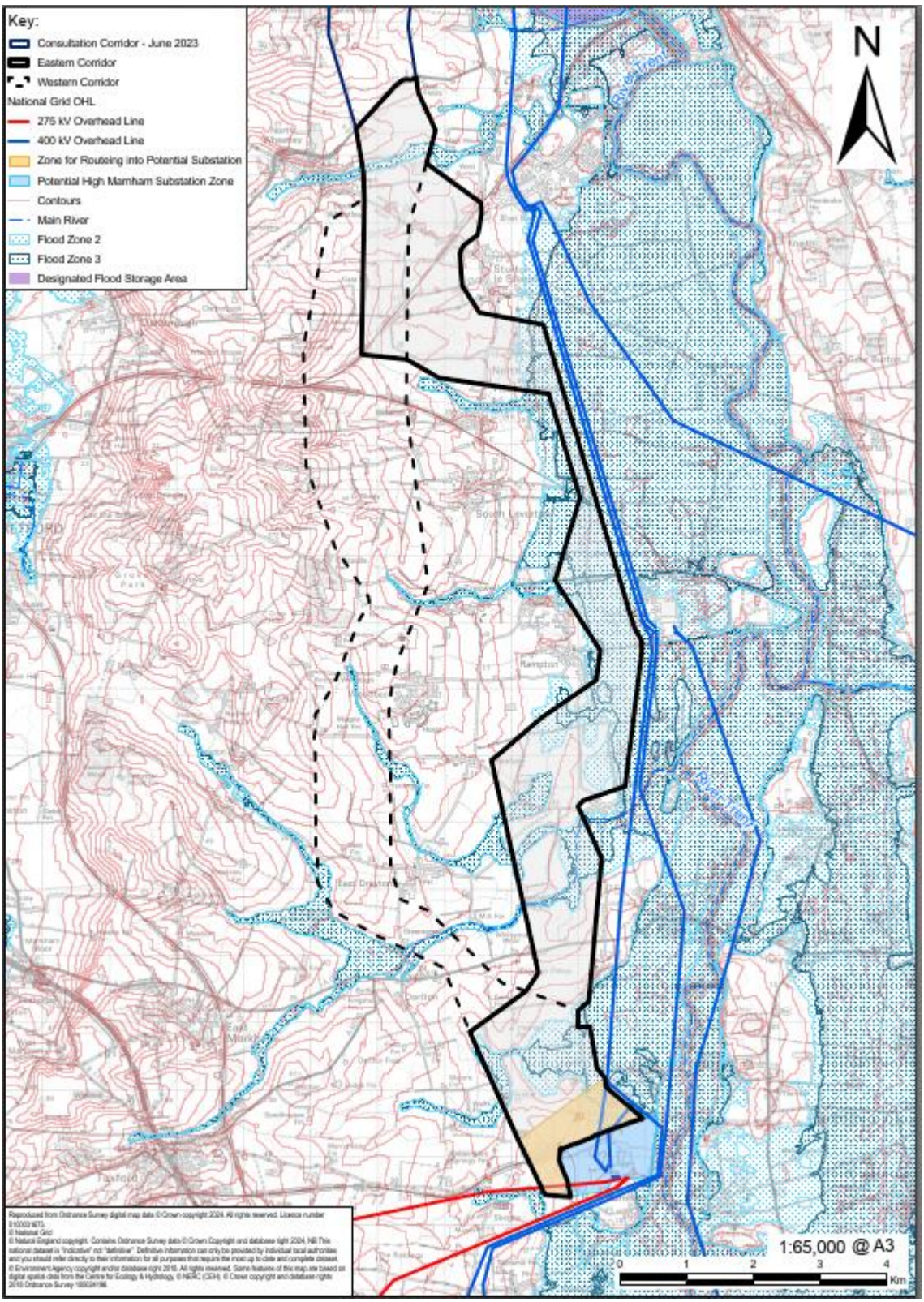


Figure 6-2: Flood Zone areas

Cultural heritage

6.4.13 Two assets are located within the eastern corridor, namely Manor Farm House (a grade II listed building to the north of North Leverton), and Ragnall Hall and attached outbuildings (a grade II listed building). Potential impacts could be minimised by careful routeing of the overhead line and siting of pylons.

6.4.14 There are a number of listed buildings (grade(s) I, II and II*) located within 1km of the corridor and these are primarily located within the settlements South Wheatley, Sturton le Steeple, North Leverton with Habblesthorpe, South Leverton, Treswell, Rampton, Laneham and Ragnall. There is the potential for the Project to have adverse impacts on the setting of these heritage assets – such impacts could be minimised by careful routeing of the overhead line and siting of pylons.

6.4.15 Two Scheduled Monuments are located within close proximity of the eastern corridor, namely the Church of St Helens located at South Wheatley and Whimpton Moor medieval village and moated site, located between Darlton and Ragnall. The Church of St Helens is also designated as a Grade I listed building, named ‘Remains of Church of St Helens’. Although the Church of St Helens is considered a constraint, it should be possible to avoid impacts on the setting of this designated heritage asset given the width of the corridor and through the careful routeing of the overhead line in the north of the corridor. However, at Whimpton Moor medieval village and moated site Scheduled Monument, the corridor is narrower and there is the potential for the Project to have an adverse impact on the setting of this heritage asset.

6.4.16 Further consideration during routeing would be given to how a new overhead line may impact on the setting and views of nearby heritage assets.

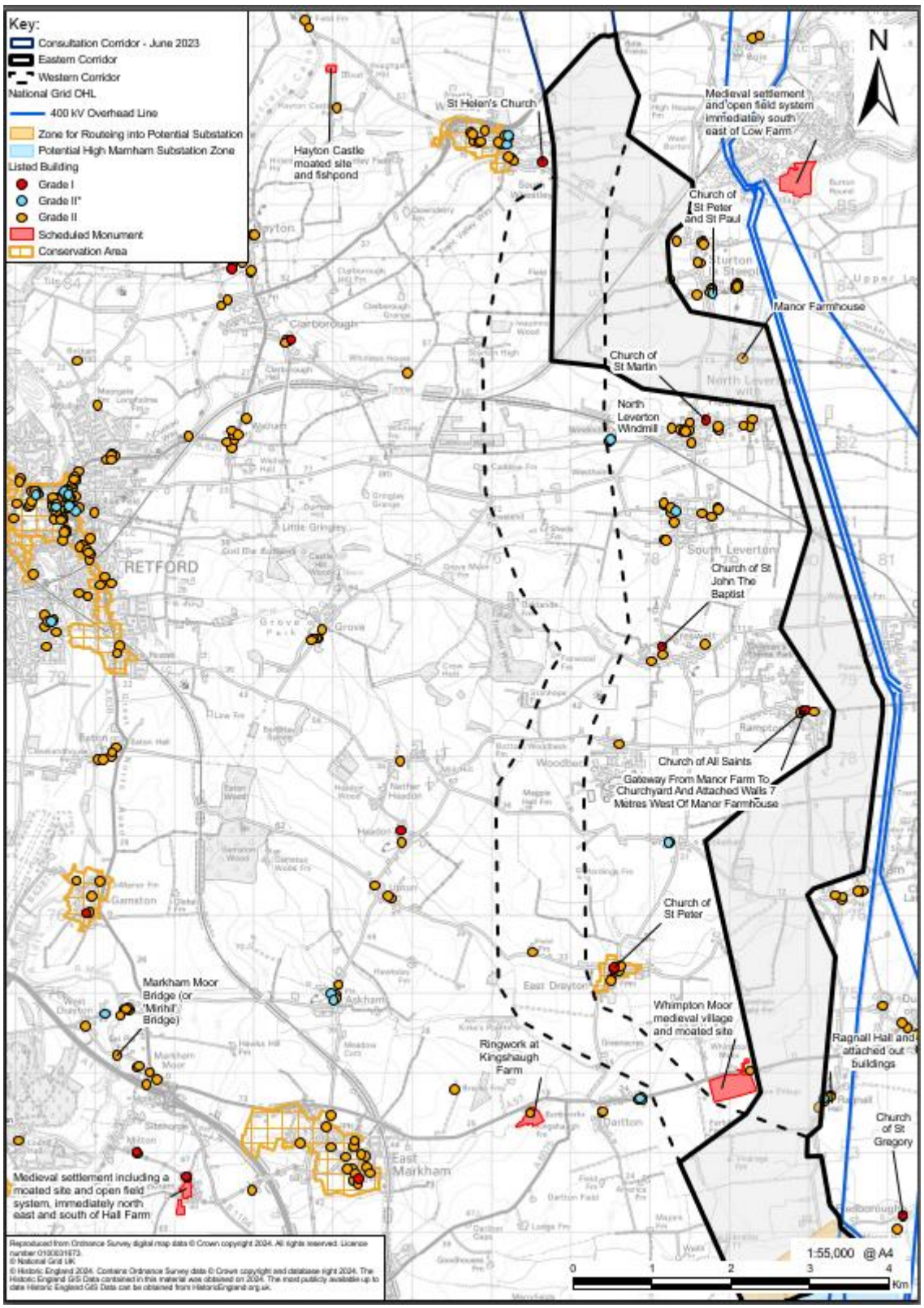


Figure 6-3: Cultural Heritage receptors

Socioeconomics

6.4.17 There are several proposed developments and associated planning applications in the vicinity of West Burton and Cottam Power Stations. These include the West Burton Solar Project, Steeples Renewables Project, Cottam Power Station (demolition works), Tillbridge Solar Farm, One Earth Solar Farm, Cottam Solar Project and Gate Burton

Energy Park (solar farm and energy storage). All of these projects are partially or fully within the eastern corridor. Consideration will be given to the routeing of the new overhead line and the potential for impacts and interactions with these developments.

6.4.18 The eastern corridor fully extends over the proposed Darlton Road Holiday Lodges development, located along Darlton Road, north-west of Ragnall. This proposed development should be avoided through careful routeing of the overhead line and pylon siting.

6.4.19 Commercial businesses within or surrounding the immediate vicinity of the eastern corridor include Sundown Adventureland and Foxcovert Fisheries and Caravan Park. Careful routeing will be considered to avoid direct impacts upon such businesses.

6.4.20 Traffic and transport constraints associated with the eastern corridor include the crossing of multiple unavoidable transport routes, including the A57 and a railway line (Sheffield to Lincoln Line). Routeing in proximity and over transport routes may result in temporary disruption to services during Project construction; however, this will not be the case during operation. Suitable clearance levels will be established for crossings of roads and the onward design of railway crossings will seek to avoid sections where there is a raised embankment present.

6.4.21 The entire eastern corridor is located on Agricultural Land Classification Grade 3 (good) land. There may be land take as a result of the Project, but this is likely to be a small percentage of the overall agricultural land. This is not considered a differentiating factor for routeing and siting of overhead line infrastructure.

6.4.22 It is acknowledged that the eastern corridor extends over the unlicenced West Burton Airstrip in the north, located east of South Wheatley. National Grid have consulted with the airstrip and will continue to engage with the owner to identify any impacts on existing activities associated with the eastern corridor.

6.4.23 Consultation with the Ministry of Defence (MoD) will be required to identify potential impacts on the existing MoD Met Radar Zone which covers a substantial part of the southern extent of the eastern corridor.

Other considerations

6.4.24 Other environmental topics have been considered as part of the options appraisal – these include air quality, geology and soils and noise. Relevant considerations associated with these topics are summarised below.

6.4.25 There are scattered, sparsely distributed residential, commercial and agricultural properties throughout the eastern corridor and thus there is a potential risk of temporary impacts limited to localised changes in air quality and noise and vibration during Project construction. There may also be localised changes in air quality and noise and vibration on local settlements adjacent to the corridor during construction. No potential adverse air quality or noise and vibration impacts are anticipated during Project operation.

6.4.26 No known areas of peaty soils, historic landfill sites and permitted waste sites are located within the eastern corridor.

6.4.27 The disused railway line located at High Marnham in the southern section of the eastern corridor has been identified as having possible contaminated land. With careful routeing this area should be avoided. However, if this area is unavoidable, further site investigation will be required which may indicate the need for potential remediation works.

6.5 Engineering and cost factors

6.5.1 There are several constraints located throughout the eastern corridor considered likely to reduce routeing flexibility and/or increase the technical complexity of the corridor. Such constraints also have associated construction and delivery impacts.

6.5.2 The following description of the eastern route area has been divided into sections to enable a clear engineering description of the eastern corridor. These sections are:

- The A620 to Sturton le Steeple (Leverton Road);
- Sturton le Steeple (Leverton Road) to Laneham (Broadings Lane); and
- Laneham to High Marnham Substation.

The A620 to Sturton le Steeple (Leverton Road)

6.5.3 Routeing west or centrally through this section of the corridor would require a crossing of the National Grid Energy Distribution (NGED) 132kV steel lattice overhead line, which would likely require removal of existing pylons and replacement with underground cable and terminal towers including permanent cable sealing end platforms, or permanent re-configuration of the existing overhead line. Current estimated costs of such works range from £1m-£3m, subject to agreement of scope with the asset owner. The 132kV overhead line passes through the consented Wood Lane Solar Project, connecting into a proposed new substation associated with the Wood Lane Solar Project. As a result, modifications to the existing 132kV overhead line may impact upon the proposed design of the Wood Lane Solar Project.

6.5.4 Routeing eastwards, whilst likely requiring larger changes in direction to navigate the railway and the village of Sturton Le Steeple, would avoid the interaction with the 132kV overhead line and would avoid routeing through the Wood Lane Solar Project site.

6.5.5 Throughout the eastern corridor, the Steeples Renewables Solar development will be unavoidable due to the extensive nature of the proposed boundary across the northern section. Similarly, a crossing of the Sheffield – Lincoln railway line is unavoidable as it dissects the corridor from north-east to south-west. A perpendicular crossing is likely to be achievable, although additional angle towers may be required depending on the chosen route which could result in increased volumes of construction materials and construction traffic.

6.5.6 A small strip of Flood Zone 2 and 3 crosses the eastern corridor from east to west near Wheatley Beck. Depending on the proposed alignment, infrastructure is likely to be required within the defined flood zones. As detailed in Section 6.3, the Project will be designed so that there will be no detrimental impacts on flood risk to neighbouring land as a consequence of the Project.

Sturton le Steeple (Leverton Road) to Laneham (Broadings Lane)

6.5.7 South of Sturton le Steeple, the eastern corridor progresses eastwards towards the existing 4VE and ZDA 400kV overhead lines and then southwards alongside the existing Cottam Power Station.

6.5.8 To the east of North Leverton, the eastern corridor narrows in proximity to the existing overhead lines. This section of the corridor requires triple parallel routeing, which would be for a maximum of 7km if routeing entirely in the eastern part of the corridor.

6.5.9 If routeing in close parallel with the existing 4VE and ZDA overhead lines near Cottam power station, the route would need to pass through areas associated with several applications for NSIPs which are currently progressing through different stages of the DCO examination procedure; these include the Tillbridge Solar Farm, the Gate Burton Energy Park and the Cottam Solar Farm. These developments could increase the technical and construction complexity due to the potential presence of underground assets associated with these planning proposals and the requirement to coordinate construction works between the different developments depending on programme.

6.5.10 Near Cottam Road, there is opportunity to route away from triple close parallel and avoid the planning developments in proximity to Cottam Power Station.

6.5.11 Whilst routeing in triple close parallel is likely to be feasible with sufficient stand-off (minimum 150m), it does introduce operational and maintenance issues as it restricts space for future works such as temporary diversions or the positioning of plant and equipment (e.g. cranes) for any future maintenance works.

6.5.12 Irrespective of routeing east, west or centrally within the eastern corridor, the entirety of this section is within Flood Zone 2 and partially within Flood Zone 3. Infrastructure will be required within the flood zones and as such will need to be designed accordingly. There is potential for construction and access limitations due to waterlogging which may have construction programme implications.

6.5.13 Multiple NGED overhead line assets will need mitigating in this section of the corridor, and a crossing of the Torksey Branch railway line will be necessary. Additional angle towers and deviation away from triple parallel may be required to facilitate a perpendicular crossing. Further investigations are required to confirm the activity status of this railway line as it appears to solely service the decommissioned power station.

Laneham to High Marnham substation

6.5.14 To the west of Laneham, the eastern corridor deviates west away from triple close parallel, routeing between Stokeham and Laneham, and west of Ragnall near the A57. A crossing of the A57 is required, which is likely to be perpendicular due to orientation of the road.

6.5.15 South of the A57, three potential paths exist within the graduated swathe.

6.5.16 Routeing to the east of the corridor would provide opportunities to parallel with the existing ZDA 400kV overhead line. On approach to the substation site both the eastern and central paths would cross the disused railway and existing substation access. Utilising these sections of the corridor would likely require a shorter route with fewer changes in direction to avoid any localised constraints, when compared to a western path.

6.5.17 Routeing through the western part of the corridor would likely require more changes in direction to avoid local constraints and would include crossing a Network Rail testing track which would likely need crossing protection and coordination with the asset owners.

6.5.18 The One Earth Solar proposal occupies a significant proportion of the available corridor. Routeing through this development is likely to be unavoidable, therefore, necessitating coordination with these developers. Routeing on the eastern side of the corridor may somewhat reduce the extent of infrastructure within One Earth Solar development site.

6.5.19 In addition, Flood Zones 2 and 3 are present across the corridor, with a larger area southwest of Laneham. In some areas these flood zones will be unavoidable which poses a risk to construction and maintenance of the route, namely through potential waterlogging, access restrictions and programme delays.

6.5.20 Pylon foundations will need to be designed to suit, as will temporary and permanent drainage mitigation and access routes.

6.6 Holford Rules

6.6.1 The eastern corridor has been drafted to exclude major areas of the highest amenity value and interest in accordance with Holford Rule 1.

6.6.2 Where there are smaller areas of high amenity value, for instance SSSIs and listed buildings, sufficient space has been included within the corridor to enable routeing to avoid them and thus to minimise impacts, potentially by local deviation, in accordance with Holford Rule 2.

6.6.3 The corridor largely allows for the overhead line to follow a direct line, with limited sharp changes in direction, in accordance with Holford Rule 3. The eastern corridor was developed to avoid highly constrained areas, and specific constraints including oversailing residential properties in Laneham and Rampton, and thus the corridor deviates in a south-westerly direction from Ragnall to avoid these constraints.

6.6.4 The route is largely in an area already affected by existing overhead lines and therefore would not alter the character or perception of the landscape nor erode tranquillity or rurality. Holford Rule 6, which considers wirescape, has been considered and balanced against spreading the effects of infrastructure across a wider area including areas of unspoilt rural countryside.

6.6.5 The balance required by Holford Rule 6 when considering close parallel alignments (planning for pylons, spans and conductors to form a coherent appearance, but allowing sufficient separation to limit visual impacts), is addressed by the inclusion of wider sections of corridor. One exception is a narrow corridor section between North Leverton and South Leverton where it is constrained by the settlements of South Leverton, Treswell and Rampton to the west and the existing 400kV overhead lines to the east.

6.7 Description of the graduated swathe

6.7.1 During the previous non-statutory consultation undertaken between 1 June 2023 to 27 July 2023 the Project was split into 11 different route Sections to help stakeholders provide feedback on the section/s of the Project most relevant to them. These sections remain the same and this report addresses the eastern corridor in the area between South Wheatley and High Marnham.

6.7.2 The eastern corridor between South Wheatley and High Marnham corresponds with Sections 10: A620 east of North Wheatley, and Section 11: Fledborough to High Marnham.

6.7.3 A graduated swathe has been prepared for the eastern corridor which represents where the Project infrastructure is likely to be located. A decision on the proposed alignment will be informed by consultation feedback and therefore there remains the potential for the final design of the Project to extend beyond the graduated swathe. The location of the proposed graduated swathe for the eastern corridor is illustrated in Figure 6-4.

6.7.4 The start of the graduated swathe within the eastern corridor sits within Section 10: A620 east of North Wheatley and starts on the southern side of the A620 Gainsborough Road, and to the east of North Wheatley and South Wheatley. The swathe passes to the west of the area of woodland adjacent to Wheatley Beck and to the west of St Helen's Church, a Scheduled Monument, then continues past the unlicenced West Burton Airstrip. At that point the swathe splits into two paths as it approaches its crossing of Wheatley Road, either to the west or to the east to avoid properties on Wheatley Road.

6.7.5 The western path of the swathe here crosses close to an area of traditional orchard adjacent to Wheatley Road and another area of traditional orchard further south adjacent to Wood Lane. Both these areas of orchard are on the periphery of the swathe. Through careful routeing, we would seek avoid and mitigate any impacts.

6.7.6 Where the eastern path of the swathe crosses Wheatley Road, it crosses the Sheffield to Lincoln Railway Line, travelling south adjacent to Sturton le Steeple.

6.7.7 The swathe then comes together as one wide path to the south-east, passing under the southern extent of Sturton le Steeple. Before the swathe crosses Leverton Road it splits into a northern and southern path to avoid Fenton. Once past Fenton the swathe re-joins and narrows to travel to the south and pass to the east of North Leverton with Habblesthorpe, following in close parallel to the existing 400kV overhead line. This parallel path continues as the swathe moves south passing close to Cottam Power Station and moving slightly west to avoid the proposed Cottam Solar Project, Tilbridge Solar and Gate Burton Energy Park developments. The swathe passes to the east of Sundown Adventure Land and Rampton.

6.7.8 As the swathe approaches Laneham, it moves to the west to avoid crossing within the village. Moving the swathe to the west means that it crosses four areas of woodland, although with careful routeing we would seek to avoid or mitigate any impacts. The swathe splits into an eastern and western path briefly north of Laneham to avoid properties on Broadings Lane.

6.7.9 The swathe passes to the east of Fox Covert Farm and then continues to travel south crossing Stokeham Road. The swathe then continues to travel south, splitting into two paths as it passes Field House Farm either to the east or west, whilst avoiding the Whimpton Moor Medieval Village and Moated site, a Scheduled Monument to the west of the corridor. It then crosses the A57 Darlton Road continuing south and passing to the west of Ragnall and Ragnall Hall, a Grade II listed building, crossing Farhill Lane and then Fledborough Beck.

6.7.10 As the swathe moves into Section 11: Fledborough to High Marnham, it has the option to take three different paths as it approaches the Former High Marnham Power Station site.

6.7.11 Firstly, an option to take a route along the eastern edge of the swathe to pass Fledborough House to the east before re-joining and crossing Crabtree Lane, passing over the NCN path 647, Marnham Railway Yard LWS and the Fledborough to Harby Dismantled Railway LWS, as it approaches the proposed location for the new High Marnham substation.

6.7.12 Secondly there is a central path which passes to the south of Fledborough house, to then across Crabtree Lane, passing over NCN path 647 and Marnham Railway Yard LWS and the Fledborough to Harby Dismantled Railway LWS, as it approaches the proposed location for the new High Marnham substation. Both approaches to the new

High Marnham substation which utilise the eastern side of the swathe are constrained by the existing overhead line to the east.

6.7.13 Thirdly there is a western path passing to the west of Fledborough house and crossing the NCN path further north than central and eastern paths. This continues to cross the edge of the Network Rail High Marnham Test track before passing over the western edge of the Marnham Railway Yard LWS and the Fledborough to Harby Dismantled Railway LWS (at a narrower point than the previous eastern side of the swathe options) as it approaches the proposed location for the new High Marnham Substation.

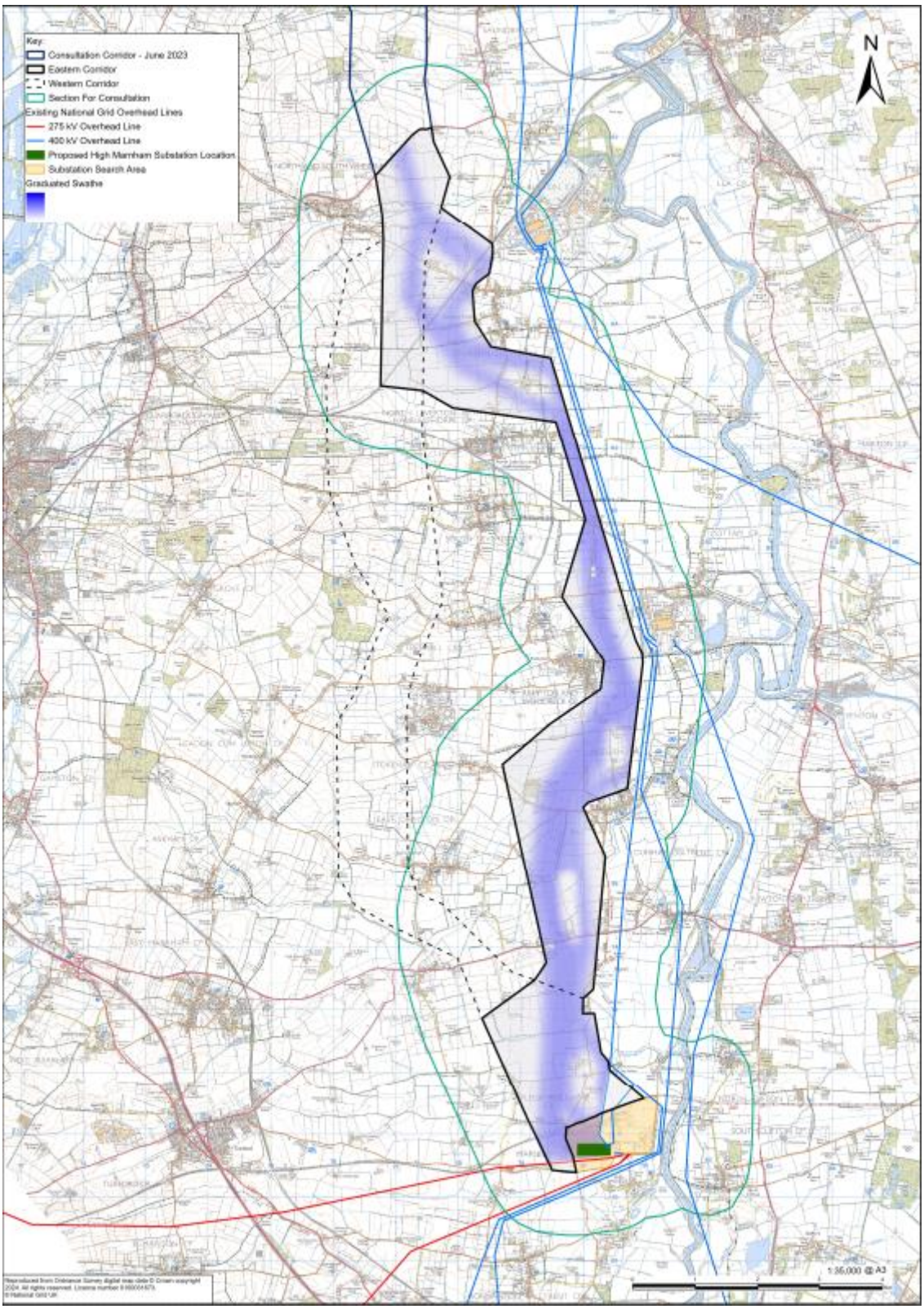


Figure 6-4: Graduated swathe within the eastern corridor

6.8 Appraisal conclusion

6.8.1 On a linear scheme, the Holford Rules may be applied with some flexibility across different locations but must be supported by robust justification. The eastern corridor would position the route in an area already affected by multiple overhead lines and would therefore not alter the character or perception of the landscape and would not

erode tranquillity or rurality. Rule 6, which addresses wirescape, was considered and balanced against spreading the effects of infrastructure across a wider area including areas of unspoilt rural countryside when identifying and appraising the eastern corridor.

6.8.2 The eastern corridor has the potential to have adverse impacts in relation to visual amenity due to the scale of the infrastructure and the potential combination of a new overhead line with existing electricity transmission infrastructure between Sturton le Steeple and Ragnall. However, views are already affected by the existing infrastructure in the Trent Valley.

6.8.3 The Project has the potential to have adverse impacts on historic and ecological sites; however, such impacts could be minimised by careful routeing of the overhead line and siting of pylons.

6.8.4 The majority of the eastern corridor is located within the floodplain of the River Trent, defined by the Environment Agency Flood Zones 2 and 3. Overhead lines can remain operational and safe from flooding over the course the overhead line's lifetime and (accounting for changes anticipated as a result of climate change). Working within a flood zone can pose additional construction challenges and maintenance challenges once operational, namely through potential waterlogging, access restrictions and thus programme delays. Foundations would need to be designed accordingly, as would temporary and permanent drainage mitigation and access routes. The Project can be designed so that there will be no detrimental impacts on flood risk to neighbouring land as a consequence of the Project. National policy EN-1 addresses Flooding and applies a two level approach to allowing development to go ahead, the sequential and exception test are detailed under S5.8.9. and S5.8.10[26].

6.8.5 There may be potential temporary disruption during construction for users of the A57 road network, the Sheffield to Lincoln railway and recreational routes within the corridor. The unlicenced West Burton Airstrip and several proposed solar developments are located partially or fully within the corridor.

6.8.6 Consideration will need to be given to the routeing of the new overhead line and the potential for impacts and interactions with environmental receptors, residential properties, farms and other proposed developments. Consultation with the airstrip and MoD will be required.

6.8.1 From a technical perspective, there are a number of complexities within the eastern corridor including the potential crossing of a NGED 132kV steel lattice overhead line, which would likely require removal of existing pylons and replacing with underground cable and terminal towers with permanent cable sealing end platforms, or permanent re-configuration of the existing overhead line, subject to agreement with NGED.

6.8.2 Triple close parallel routeing may increase technical risk and complexity through restricting the available space for additional infrastructure such as temporary diversions or the placement of machinery to facilitate maintenance of the OHLs.

6.8.3 Foundations would need to be designed accordingly, as would temporary and permanent drainage mitigation and access routes.

6.8.4 Additionally, there are up to two railway crossings which may require additional angle towers to facilitate perpendicular crossings.

[26] NPS Overarching National Policy Statement for Energy 2024.

6.8.5 Access limitations may exist for the majority of the eastern corridor due to the absence of main A-roads (excluding the A620 and A57 at the northern and southern ends respectively), the two railway lines and multiple field drains and watercourses.

7. Conclusion and next steps

7.1 Summary of eastern corridor

7.1.1 Since the CPRSS 2023 and non-statutory consultation between 1 June 2023 to 27 July 2023, further data gathering and technical assessment has been undertaken by environmental, socio-economic and FEED specialists, supported by National Grid. All consultation feedback has been reviewed and a backcheck of the CPRSS 2023 has been completed.

7.1.2 As a result of this additional work and consultation feedback, an eastern corridor has been identified between South Wheatley to High Marnham seeking to broadly identify where it could be technically feasible and environmentally suitable to parallel the existing 4VE and ZDA 400kV overhead lines to the eastern edge of the eastern corridor.

7.1.3 The eastern corridor presents an opportunity in some locations for parallel routeing with the existing overhead lines. From the east of Sturton le Steeple and Ragnall, the corridor is narrow as it is bound by the existing overhead lines to the east and the villages of North Leverton with Habblesthorpe and South Leverton Treswell and Rampton. South of Ragnall, close parallel opportunities with existing overhead lines remain discounted on the grounds of technical and socio-economic effects, including avoiding the over-sail of residential properties.

7.1.4 The eastern corridor is located further east than the emerging preferred corridor previously presented in the CPRSS 2023. To avoid confusion, the section of the 'emerging preferred corridor' located between South Wheatley and High Marnham which was previously consulted on is referred to in this report as the 'western corridor'. The eastern corridor adjoins the western corridor to the north. The southern extent of the eastern corridor overlaps with the southern extent of the western corridor between Ragnall and the former High Marnham Power Station.

7.2 Localised non-statutory consultation

7.2.1 Feedback from public consultation, alongside ongoing surveys and design studies all helps to inform the further development of the Project. A non-statutory consultation previously took place between 1 June 2023 to 27 July 2023.

7.2.2 Following this, National Grid reviewed all consultation feedback and undertook a backcheck and review of the CPRSS 2023, taking into account new information, including consultation feedback. This informed the decision to undertake an exercise to identify and consider a potential alternative corridor[27] option between South Wheatley and High Marnham - the eastern corridor.

7.2.3 National Grid is undertaking this localised non-statutory consultation on the eastern corridor to provide the opportunity for stakeholders to review and provide feedback prior to a decision being made on the overall preferred corridor and the identification of a route alignment and subsequent statutory consultation.

[27] Comprised partly of the CPRSS 2023 corridor 2 and 3.

7.2.4 National Grid is continuing to assess both the eastern and western corridors between South Wheatley and High Marnham. The localised non-statutory consultation (summer 2024) on the eastern corridor, will enable feedback to be gathered on the eastern corridor option which has not previously been consulted on. Both the eastern and western corridor options remain under consideration and further assessment by National Grid prior to a decision being made.

7.2.5 This report will be published as part of the localised non-statutory consultation 2024 to inform engagement with stakeholders.

7.3 Analysing localised non-statutory consultation feedback

7.3.1 The feedback from localised non-statutory consultation planned for Summer 2024 will be reviewed, analysed and used to inform development of the Project.

7.3.2 Consultation feedback from both the non-statutory consultation 2023 and localised non-statutory consultation 2024 will be summarised and reported in a Consultation Feedback Report which will be published as part of the future statutory consultation. The Consultation Feedback Report will also set out National Grid's response to consultation feedback.

7.4 Decision between the eastern or western corridors between South Wheatley and High Marnham

7.4.1 Once all the localised non-statutory consultation feedback has been analysed, a decision will be made to take forward either the eastern corridor or the western corridor between South Wheatley and High Marnham to the Defined Proposal and Statutory Consultation Stage.

7.4.2 Feedback from both the non-statutory consultation 2023 and localised non-statutory consultation 2024 along with information from ongoing surveys and design studies, will inform a decision on the preferred corridor and the further development of the Project design.

7.5 Defined proposal and statutory consultation

7.5.1 Following the completion of localised non-statutory consultation in Summer 2024, National Grid will develop a detailed design for the proposed overhead line within the selected preferred corridor (whether eastern or western).

7.5.2 This design proposal will be informed by the feedback received during both the 2023 and 2024 non-statutory consultations, ongoing survey findings and further technical assessment work.

7.5.3 Preliminary information relating to the likely significant environmental effects of the detailed design proposal will be collated in a 'Preliminary Environmental Information Report'. This report and other details relating to the proposed design, will be consulted upon in early 2025 as part of the statutory consultation process.

7.5.4 The Project design will be subject to the process of EIA, and an iterative design development prior to submission of the DCO application in 2026.

7.6 Review of statutory consultation feedback, further assessment and land rights

7.6.1 The feedback from the statutory consultation will be considered and further changes will be made to the overhead line design where appropriate. Changes may, for example, be made to reduce the potential environmental or socio-economic effects of the overhead line, or in response to individual landowners' suggestions or the outcomes of further technical assessments to reduce impacts.

7.6.2 National Grid will develop a final detailed design for the proposed overhead line and complete the assessment of the environmental effects likely to be caused by its development. In addition, the rights over land that National Grid will require will be identified and negotiations to agree those rights will be held with affected landowners with a view to reaching voluntary agreements wherever possible.

7.7 DCO application

7.7.1 As the North Humber to High Marnham Project is a NSIP, National Grid will need to submit an application for a DCO to the Planning Inspectorate. This will be undertaken using the prescribed form and procedures for DCO applications in England and Wales.

7.7.2 Submission of the DCO application is anticipated in 2026.

7.7.3 Once submitted the Planning Inspectorate, acting on behalf of the SoS for Energy Security & Net Zero, then has 28 days to decide whether to accept the application for examination.

7.7.4 More information regarding how the application will be examined and determined can be found on the Planning Inspectorate's website[28].

[28] https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/

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Appendix A Summary of the appraisal relating to possible alignments east of the existing overhead transmission lines within 'CPRSS Corridor 3'

This appraisal had regard to the effects, technical complexity and significant additional costs that would likely result when considered in the context of available alternatives, relevant policy tests and National Grid's statutory duties.

To facilitate routeing the proposed overhead line east of the existing transmission lines it is necessary to cross the existing lines utilising underground cables. The following options have been appraised and localised effects associated with the options summarised below:

- crossing the Existing Lines from the West, North of the Former West Burton Power Station
- crossing the Existing Lines from the West, South of the Former West Burton Power Station
- crossing the Existing Lines from the West of the Existing Lines, South of the Former Cottam Power Station

Dependent upon the crossing locations set out above, the effects likely to arise from routeing the new overhead line east of the existing lines have also been considered from the following locations:

- an Overhead Line Route East of the Existing Lines, South of West Burton
- an Overhead Line Route East of the Existing Lines, South of Laneham

The localised effects associated with connecting into the new High Marnham Substation from the east of the existing transmission line have also been considered. Appraisal of each of these options is set out under the headings below.

Notable localised effects crossing the existing lines from the west, north of the former West Burton Power Station

Crossing the existing lines north of West Burton would require the construction of two permanent sealing end compounds and at least a 1km section of high-capacity underground cables. The overhead line approach to this location would likely impact views north from the village of Bole.

From the eastern cable compound the overhead line would need to be routed eastwards, away from the existing lines, to avoid development sites at the former West Burton Power Station site (West Burton 'B' and the STEP Fusion proposal) and poor ground conditions (former power station lagoons). This would also likely entail siting the eastern compound within Flood Zone 3 which would require ground raising and the creation of related compensatory flood storage. The overhead line south from such a location would then likely need to twice cross the River Trent before having to cross a further overhead transmission line between West Burton and Walpole (in Norfolk) that runs south-eastwards from West Burton Substation, together with a similarly aligned 132kV overhead line to Lincoln that is operated by NGED.

Notable localised effects crossing the existing lines from the west, south of the former West Burton Power Station

Crossing the existing overhead lines immediately south of West Burton would entail a shorter (and therefore lower cost and potentially less impactful) section of underground cables and remove the need to cross the West Burton – Walpole transmission line. However, due to the route of the existing overhead lines that would need to be crossed, the eastern sealing end compound would likely need to be sited within Flood Zone 3. Again, this would require ground raising and the creation of related compensatory flood storage. In addition, there are multiple pipelines in this area, including an abandoned water pipeline, foul sewer line and multiple fuel pipelines, which increase the engineering complexity of routeing underground cable and siting of cable sealing end compounds.

It is likely that the western compound would be located in farmland between the West Burton Power Station site and the village of Sturton le Steeple. This would reduce the length of buried cable and avoid the need to tunnel or drill beneath the Sheffield - Lincoln railway line which would add technical complexity, risk and further cost. Whilst in the longer-term landscaping could help to screen the compound in views from the village, the permanent presence of the compound site would affect views northwards from the settlement.

Alternatively, the crossing of the two existing overhead lines could be made to the south-east of the village of Sturton le Steeple. A new overhead line approaching this location from the north-west would impact views from the southern edge of the village and would pass to the north of the hamlet of Fenton, again adversely affecting views. Whilst this could be mitigated by siting the compound further to the west, this would substantially increase the overall length of buried cables by a further kilometre or so, adding some £30-£40 million of estimated additional cost.

Notable localised effects likely to arise from an overhead line route east of the existing lines, south of West Burton

An isolated residential property on Northfield Road, Habblesthorpe means that a closely parallel route from the West Burton area southwards, on the eastern side of the existing overhead lines, would need to cross the residence – as such it is likely that a wider parallel path would need to be taken. Such a path would cross a field used by the Retford Model Flying Club, meaning that the club would likely need to close or relocate.

Further south the route would need to deviate from a parallel route, eastwards, in order to bypass the site of the Cottam Power Station, which is allocated in the Bassetlaw local plan for mixed-use redevelopment following the closure of the former coal-fired power station. Such a route would pass to the north and east of the hamlet of Cottam, again affecting views from the settlement.

South of Cottam the route would again need to be connected onto underground cables in order to cross beneath the existing overhead lines that run in a southerly direction from Cottam to Eaton Socon (Bedfordshire) and from Cottam to Staythorpe. This could be done at any point between Cottam and High Marnham, but unless a crossing of the Eaton Socon line were achieved within approximately 1km of Cottam, the new overhead line would need to cross the River Trent and then run closer to villages on the eastern side of the Trent valley, including Laughterton, Newton on Trent and North Clifton resulting in adverse effects to views looking westwards. Crossing the lines further south in this way would likely result in the need to use trenchless crossing techniques beneath the River Trent, increasing the technical complexity and costs associated with any such section of underground cables.

Alternatively crossing the lines closer to Cottam could entail a longer section of underground cable to reach an area to the south-east of the village of Laneham where the widening separation distance between the existing overhead lines provides sufficient space for the construction of the new overhead line. This longer section of cable could be around 3km in length and is estimated to cost between £100-£110 million. Alternatively, the length of this section of cable might be reduced if the section of existing line to Staythorpe located between Laneham and Church Laneham were to be diverted further to the east. This would allow the new line to connect with the then redundant section of the Staythorpe line before again requiring a new line of pylons to be constructed from a point south-east of Laneham. The diversion of the Staythorpe line in this way would bring it substantially closer to the village of Church Laneham in order to achieve the required separation distances between the lines. Such an arrangement might reduce the cost of the cable section by around £65 million but would add some £10-£15 million of cost associated with the diversion of the Staythorpe line. It would also result in significant impact to views westwards from Church Laneham and likely affect the setting of heritage assets within the village, including the Grade I listed Church of St. Peter.

Any section of the above-described cables, and their associated compounds, would likely need to be sited within an area of Flood Zone 3, requiring ground raising and compensatory flood storage.

Notable localised effects likely to arise from crossing the existing lines from the west of the existing lines, south of the former Cottam Power Station

It would be possible to cross the western-most existing overhead line using a section of buried cables at a point south of Cottam. The issues relating to separation distance between lines would be as described above, meaning that the overhead line section could not begin until a point south-east of Laneham, unless a section of the existing Staythorpe line were first to be diverted eastwards towards Church Laneham. Crossing the westernmost existing line at a point south of Laneham would result in less than 5km of the overall route being sited to the east of the existing lines in the Trent valley. However, any cable sections south of the village could be sited beyond Flood Zone 3, unlike any cable section and associated compounds located to the north of the village.

Notable localised effects likely to arise from an overhead line route east of the existing lines, south of Laneham

South of Laneham, any new line could largely be routed parallel to, and on the eastern side of, the existing transmission line to High Marnham. However, residential properties on the western edge of the village of Dunham are located close to the existing line, such that the available space to construct a new line between the village and the existing line is extremely limited. This may either prevent the new line from being constructed in this location or require the acquisition of residential property in order to construct a line through the residential curtilage. Slightly further south an isolated residential property located on the A57 Darlton Road would likely require any parallel route to ‘dog-leg’ eastwards, in order to avoid the property. In both locations any new line would likely give rise to significant adverse effects upon residential amenity.

Notable localised effects connecting into the new High Marnham substation from the east of the existing transmission line

National Grid, as part of the separate Brinsworth – High Marnham Uprating project, is proposing to develop a new substation at High Marnham, as discussed in section 2.3 of this report.

Subject to the final configuration of this substation and the associated changes to the position of the existing transmission line in the High Marnham area, a further section of underground cable could be required in order to connect any new line routeing east of the existing ZDA 400kV overhead line into the new substation. It may be possible to significantly limit the length of any such cable, avoid the need for the second of two possible compounds and only place underground one of the two transmission circuits that would be carried by the new line. Nevertheless, it is likely that any such arrangement would add a minimum of £15-£20 million of additional costs compared with an alternative entry into the new substation from the west of the existing lines.

Overall Conclusion

Routeing to the east of the existing transmission lines within CPRSS 2023 'Corridor 3' would potentially result in significant visual effects upon settlements within the Trent Valley and effects upon the settings of cultural heritage assets.

Many of the sections of cables discussed above, together with the associated secure compounds would be located within Flood Zone 3 in the Trent Valley. Given the availability of alternative designs and the sensitivity to flooding of the equipment involved in the use of underground cables, it is unlikely that a strong case could be made for development of Sealing End Compounds and the associated permanent access roads within the identified Flood Zone when the sequential test[29] is applied.

The introduction of one or more sections of underground cable would add technical complexity and risk to the construction and operation of the new route and dependent upon the configuration could add hundreds of millions of pounds to the overall capital costs of the Project.

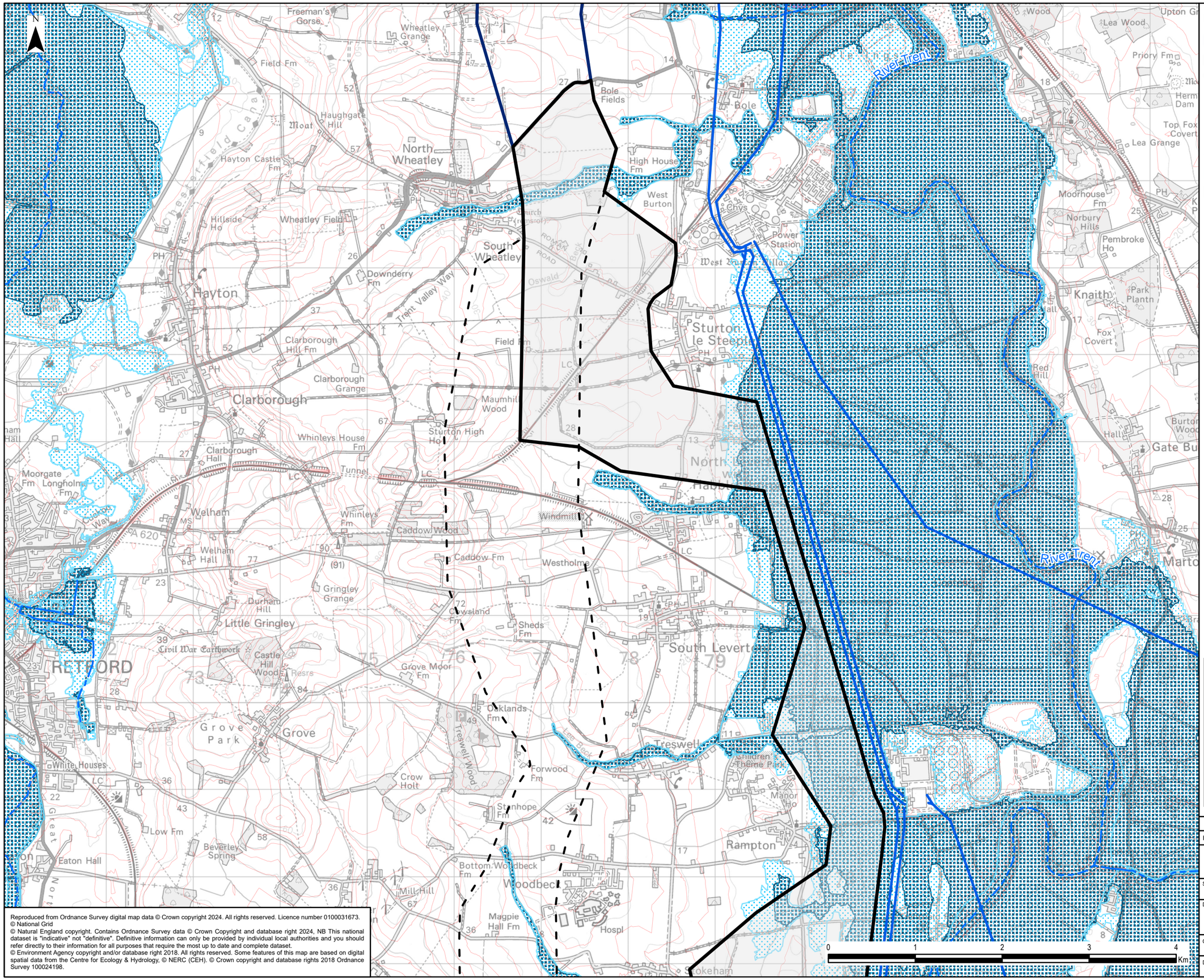
National Policy Statement (NPS) EN-5 makes clear that *"the Government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Parks, The Broads, or Areas of Outstanding Natural Beauty)"*. EN-5 also confirms that widespread and significant adverse landscape and/or visual impacts in other locations may also justify the use of undergrounding. Whilst National Grid may adopt underground cables in other circumstances such as to cross existing 400kV overhead line infrastructure as considered within this appraisal. National Grid has a statutory duty to develop proposals that are economic and efficient. Given the high additional costs associated with underground cables required to route to the east of the existing lines within Section 10 of the route, and the anticipated ability to secure a DCO for a wholly overhead line route to the west of the existing lines, options to the east of the lines have not been taken forward.

This conclusion has helped inform the design progression of the eastern corridor.

[29] EN-1 NPS Overarching National Policy Statement for Energy 2024 (EN-1)

Appendix B Environmental figures

- Hydrology and landform sites and features
- Cultural heritage sites and features
- Ecological sites and features
- Socio-economic sites and features
- Landscape and visual sites and features
- Other proposed major energy infrastructure developments
- Agricultural land classification

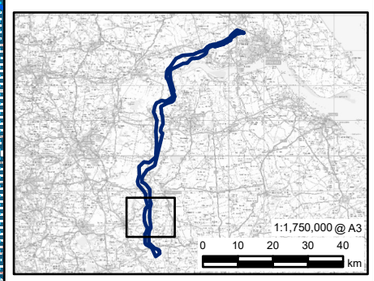


Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 400 kV Overhead Line
- Contours
- Main River
- Flood Zone 2
- Flood Zone 3
- Designated Flood Storage Area



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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: HYDROLOGY AND LANDFORM SITES AND FEATURES

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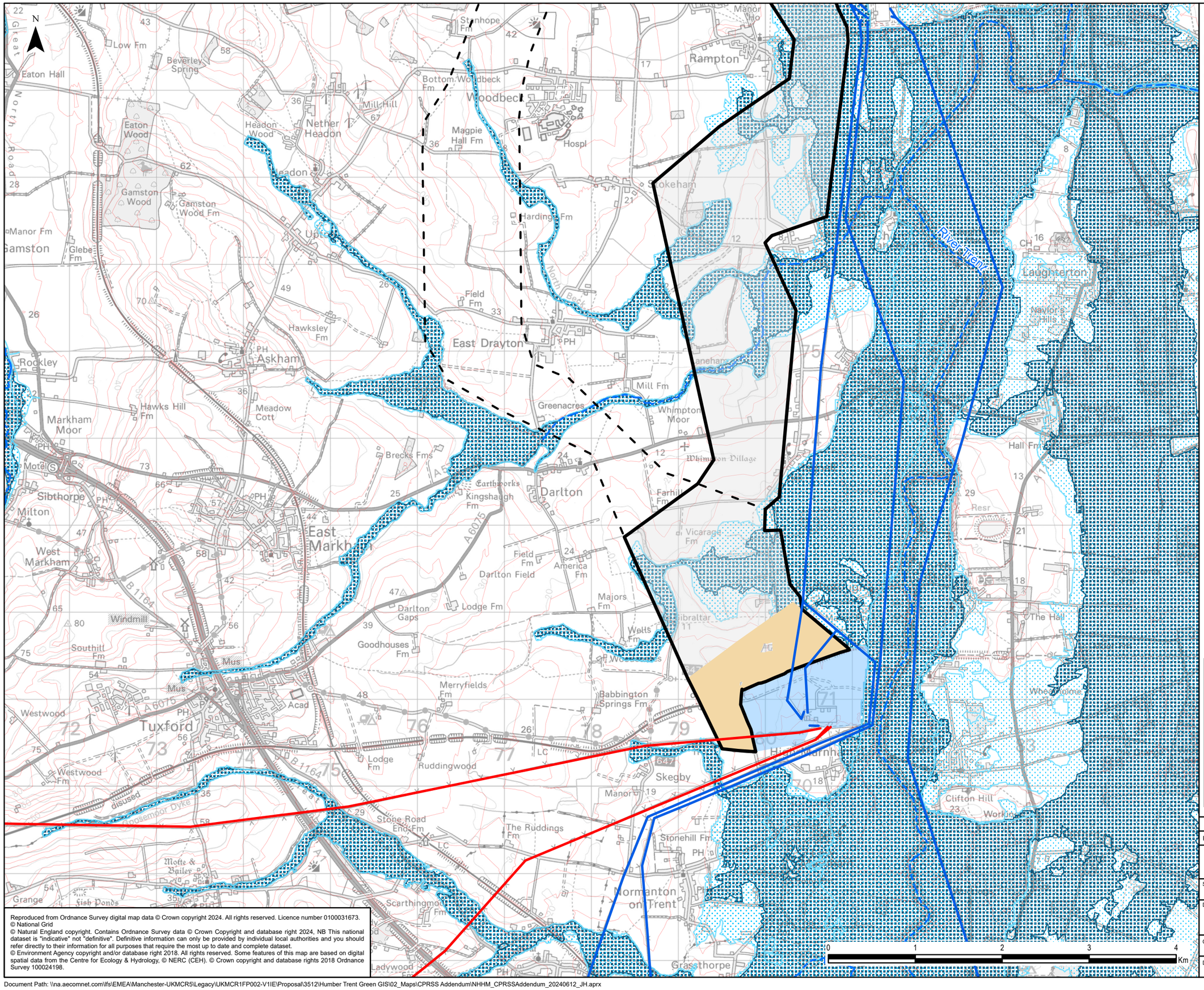

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Church of St Martin

St Helen's Church

Medieval settlement and open field system immediately south east of Low Farm

Church of St Helen

Hermit Dam moated site

Hayton Castle moated site and fishpond

Church of St Peter

Church of St Peter and St Paul

Church of St John The Baptist

Manor Farmhouse

Segelocum Roman town

Church of St Nicholas

Roman fort, south of Littleborough Lane

Site of Heynings Priory

North Leverton Windmill

Church of St Martin

Church of St. Margaret of Antioch

Church of St John The Baptist

Fleet Plantation moated site

Torksey Castle

Torksey Castle

Site of medieval town

Church of All Saints

Gateway From Manor Farm To Churchyard And Attached Walls

Church of St Peter

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 400 kV Overhead Line

Listed Building

- Grade I
- Grade II*
- Grade II

- Scheduled Monuments
- Conservation Area

1:1,750,000 @ A3

0 10 20 30 40 km

0 1 2 3 4 Km

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0	12/06/2024	SCRR 2024	JH	JG	HN

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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: CULTURAL HERITAGE SITES AND FEATURES

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Church of St Peter

Gateway From Manor Farm To Churchyard And Attached Walls

Church of All Saints

Site of medieval town

Church of St Peter

Church of St Peter

Markham Moor Bridge (or 'Mirihil' Bridge)

Whimpton Moor medieval village and moated site

Ringwork at Kingshaugh Farm

Church of St Oswald

Ragnall Hall and attached out buildings

Roman Vexillation Fortress, two Roman Marching Camps, and a Royal Observer Corps monitoring post, Newton on Trent

Church of All Saints (Milton Mausoleum)

Church of All Saints

Church of St John The Baptist

including a field north ll Farm

Church of St Gregory

Church of St Nicholas

Gaddick Hill medieval motte and bailey castle and post-medieval manor house

Moated fishpond complex with moat, fishstews, seven fishponds with sluices, ridge and furrow and a leat

Church Of St Mary

Church of St Wilfred

Church of All Saints

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 275 kV Overhead Line
- 400 kV Overhead Line
- Zone for Routeing into Potential Substation
- Potential High Marnham Substation Zone

Listed Building

- Grade I
- Grade II*
- Grade II

- Scheduled Monuments
- Conservation Area

1:1,750,000 @ A3

0 10 20 30 40 km

0 1 2 3 4 Km

Rev	Date	Description	GIS	Chk	App
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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: CULTURAL HERITAGE SITES AND FEATURES

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Sutton and Lound Gravel Pits SSSI
Wheatley Wood LWS
Mill Lane, Clayworth LWS
Chesterfield Canal SSSI
Chesterfield Canal (Welham to Misterton) LWS
North Wheatley Beck LWS
Muspitt Lane LWS
Blue Stocking Lane, Clarborough LWS
Clarborough Gypsum Pits LWS
Whinleys Road Woodland LWS
Clarborough Tunnel LWS
Clarborough Tunnel SSSI
Caddow Wood (Northern Assart) LWS
Caddow Wood (Southern Assarts) LWS
Plaster Hill Plantation LWS
Cowsland Stripe LWS
Retford Gate Green Lane LWS
Hutchinsons Holt LWS
Durham Hill Pasture LWS
Grove Road Woodland LWS
Castle Hill Wood SSSI
Castle Hill Wood, Horse Close Plantation and Swindell Spring Wood LWS
Grovefield Stripe LWS
Gamston & Eaton Woods & Roadside Verges SSSI
Headon Wood / School House Plantation LWS
Headon Verges LWS
Bushstocks Lane Meadow LWS
Maumhill Wood LWS
High House Road Verges, Sturton Le Steeple LWS
West Burton Meadow LWS
Treswell Wood LWS
Treswell Wood SSSI
Ashton's Meadow SSSI
Ashton's Meadow LWS
Retford Road Wood, Rampton LWS
Bole Ings LWS
West Burton Power Station LWS
Lea Marsh SSSI

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 400 kV Overhead Line

- Nottinghamshire Local Wildlife Site (LWS)
- Site of Special Scientific Interest (SSSI)

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- Lowland calcareous grassland
- Lowland fens
- Lowland meadows
- Reedbeds
- Traditional orchard

1:1,750,000 @ A3
0 10 20 30 40 km

0 0.75 1.5 2.25 3 Km

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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: ECOLOGY SITES AND FEATURES

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Grovefield Stripe LWS
Headon Wood / School House Plantation LWS
Treswell Wood LWS
Treswell Wood SSSI
Bushstocks Lane Meadow LWS
Retford Road Wood, Rampton LWS
Gamston & Eaton Woods & Roadside Verges SSSI
Upton Notified Roadside Verge LWS
Headon, Verges LWS
Askham Grassland LWS
Beast Wood Grassland LWS
Kingshaugh Farm Earthwork LWS
Dunham Dubs LWS
Dunham Oxbow LWS
Marnham Railway Yard LWS
Fledborough Holme LWS
North Clifton Church LWS
Fledborough to Harby Dismantled Railway LWS
South Clifton Grassland LWS
Old Trent, Marnham LWS
Old Trent Oxbow, Spalford LWS
Skegby Road Triangle LWS
Meadow Lane Grasslands, Normanton on Trent LWS
Spalford Warren SSSI

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 275 kV Overhead Line
- 400 kV Overhead Line
- Zone for Routeing into Potential Substation
- Potential High Marnham Substation Zone
- Nottinghamshire Local Wildlife Site (LWS)
- Site of Special Scientific Interest (SSSI)

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- Lowland calcareous grassland
- Lowland dry acid grassland
- Lowland fens
- Lowland heathland
- Lowland meadows
- Purple moor grass and rush pastures
- Traditional orchard

1:1,750,000 @ A3
0 10 20 30 40 km

0 Km 0.75 1.5 2.25 3

Rev	Date	Description			
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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: ECOLOGY SITES AND FEATURES

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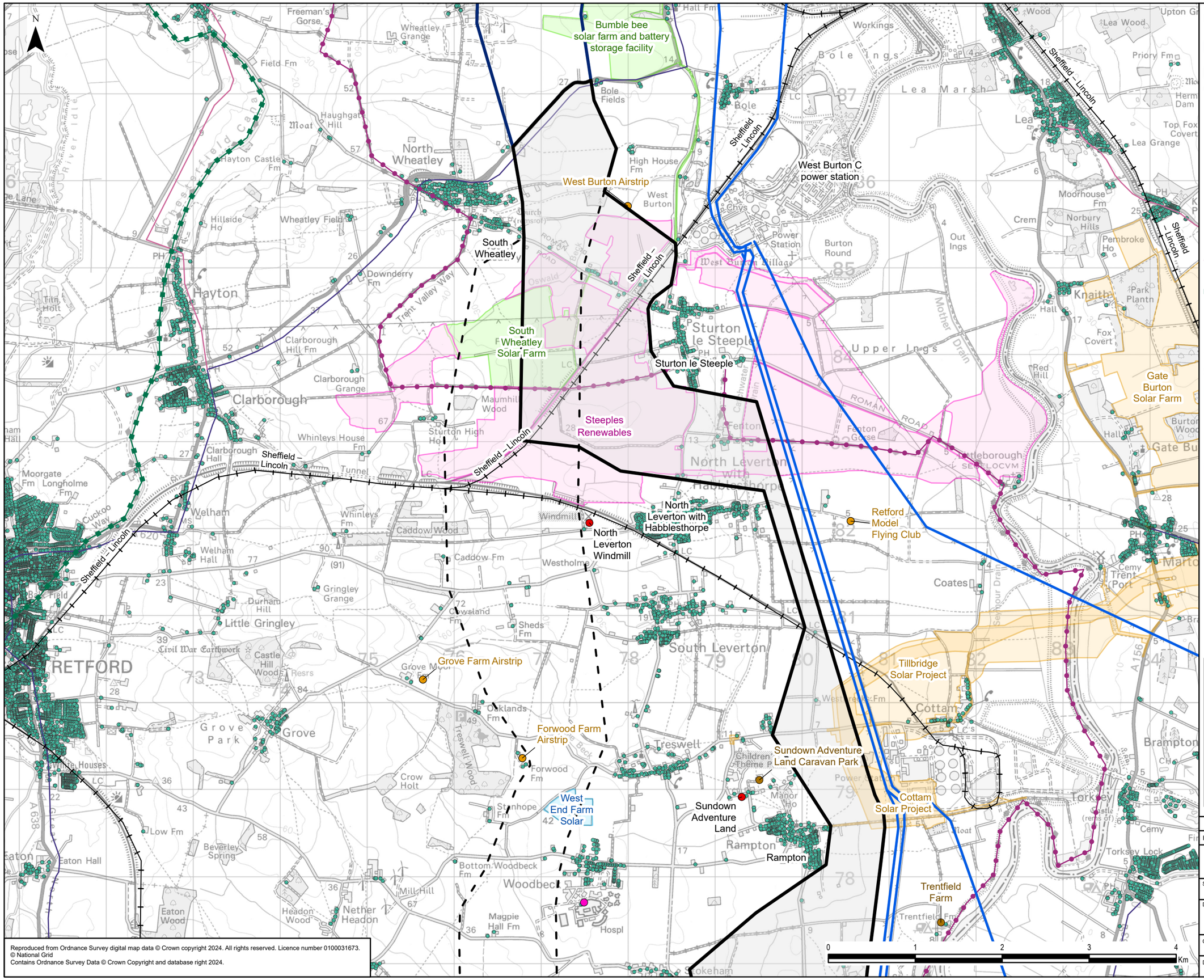


Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

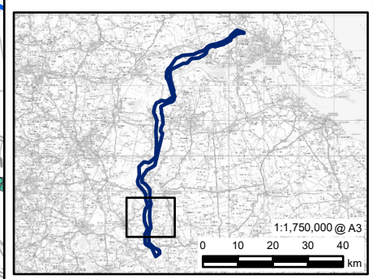
National Grid OHL

- 400 kV Overhead Line

- Address Base Points - Residential
- Unlicenced Airstrip
- Caravan and Camping Site
- Hospital
- Visitor Attraction
- Trent Valley Way Long Distance Footpaths
- Cuckoo Way Long Distance Footpaths
- Railway Line
- A Road
- B Road

Solar Farm

- Operational
- Consented
- Not Consented - Application Submitted
- Not Consented - Pre Application Proposal



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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: SOCIO-ECONOMIC SITES AND FEATURES

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West End Farm Solar
Sundown Adventure Land
Gate Burton Solar Farm
Trentfield Farm
Headon Airstrip
Foxcovert Fisheries and Caravan Park
Laneham
White Swan Lodges
Ragnall
One Earth Solar Farm
Darlton Gliding Club
Tuxford Solar Farm
High Marnham solar farm
Carr Farm Airstrip

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 275 kV Overhead Line
- 400 kV Overhead Line
- Zone for Routeing into Potential Substation
- Potential High Marnham Substation Zone
- Address Base Points - Residential
- Unlicenced Airstrip
- Caravan and Camping Site
- Hospital
- Visitor Attraction
- Sustrans National Cycle Network
- Trent Valley Way Long Distance Footpaths
- Railway Line
- A Road
- B Road

Solar Farm

- Operational
- Consented
- Not Consented - Application Submitted
- Not Consented - Pre Application Proposal

1:1,750,000 @ A3
0 10 20 30 40 km

Rev	Date	Description	GIS	Chk	App
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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: SOCIO-ECONOMIC SITES AND FEATURES

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0 1 2 3 4 Km

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Clayworth
Gainsborough
Floodplain Valleys
North Wheatley
Bole
Lea (West Lindsey)
Wooded Vales
Sturton le Steeple
Clarborough
Sandland Farmlands
Retford
Wooded Village Farmlands
Unwooded Vales
North Leverton with Habblesthorpe
Floodplain Valleys
Marton (West Lindsey)
South Leverton
Sandstone Forests and Heaths
Treswell
Cottam
Rampton
Woodbeck
Torksey Lock

Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 400 kV Overhead Line
- Cuckoo Way Long Distance Footpaths
- Trent Valley Way Long Distance Footpaths
- Contour
- Woodland
- Settlement

East Midlands Local Landscape Character Areas

- Built Up Area
- Floodplain Valleys
- Sandland Farmlands
- Sandstone Forests and Heaths
- Unwooded Vales
- Wooded Vales
- Wooded Village Farmlands
- A3_MapSheets_SouthernCorrido

1:1,750,000 @ A3
0 10 20 30 40 km

0 1 2 3 4 Km

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0	12/06/2024	SCRR 2024	JH	JG	HN

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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: LANDSCAPE AND VISUAL SITES AND FEATURES

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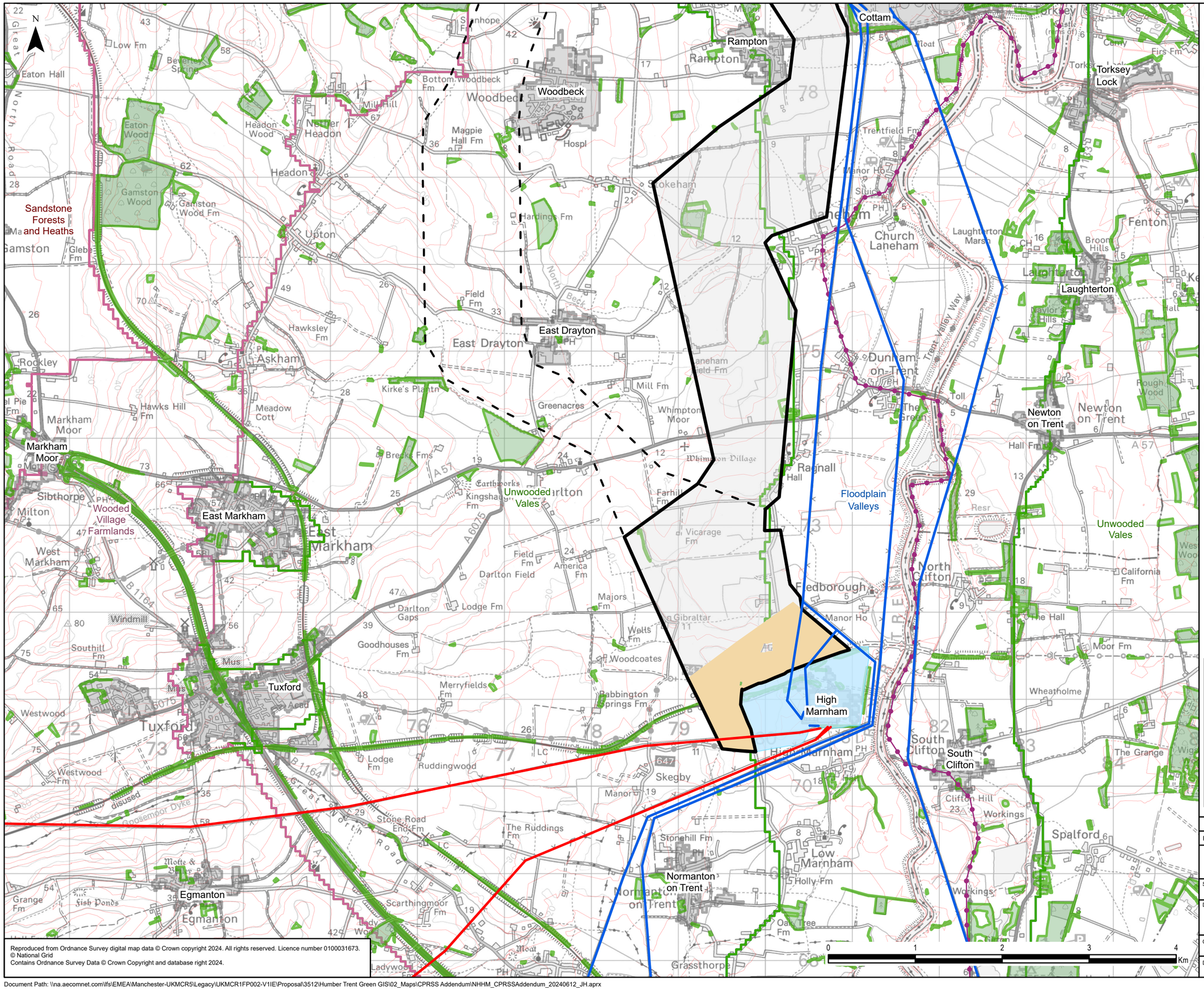

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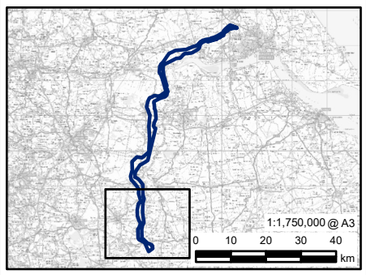
Legend

- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor
- Potential High Marnham Substation Zone
- Zone for Routeing into Potential Substation

Proposed Developments

- West Burton Solar Farm
- Steeples Renewables Project
- Cottom Solar Farm
- Tillbridge Solar Farm
- Gate Burton Energy Park
- One Earth Solar Farm
- Anesco Solar High Marnham



0 2 4 6 8 Km

Rev	Date	Description	GIS	Chk	App
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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: OTHER PROPOSED MAJOR ENERGY INFRASTRUCTURE DEVELOPMENTS

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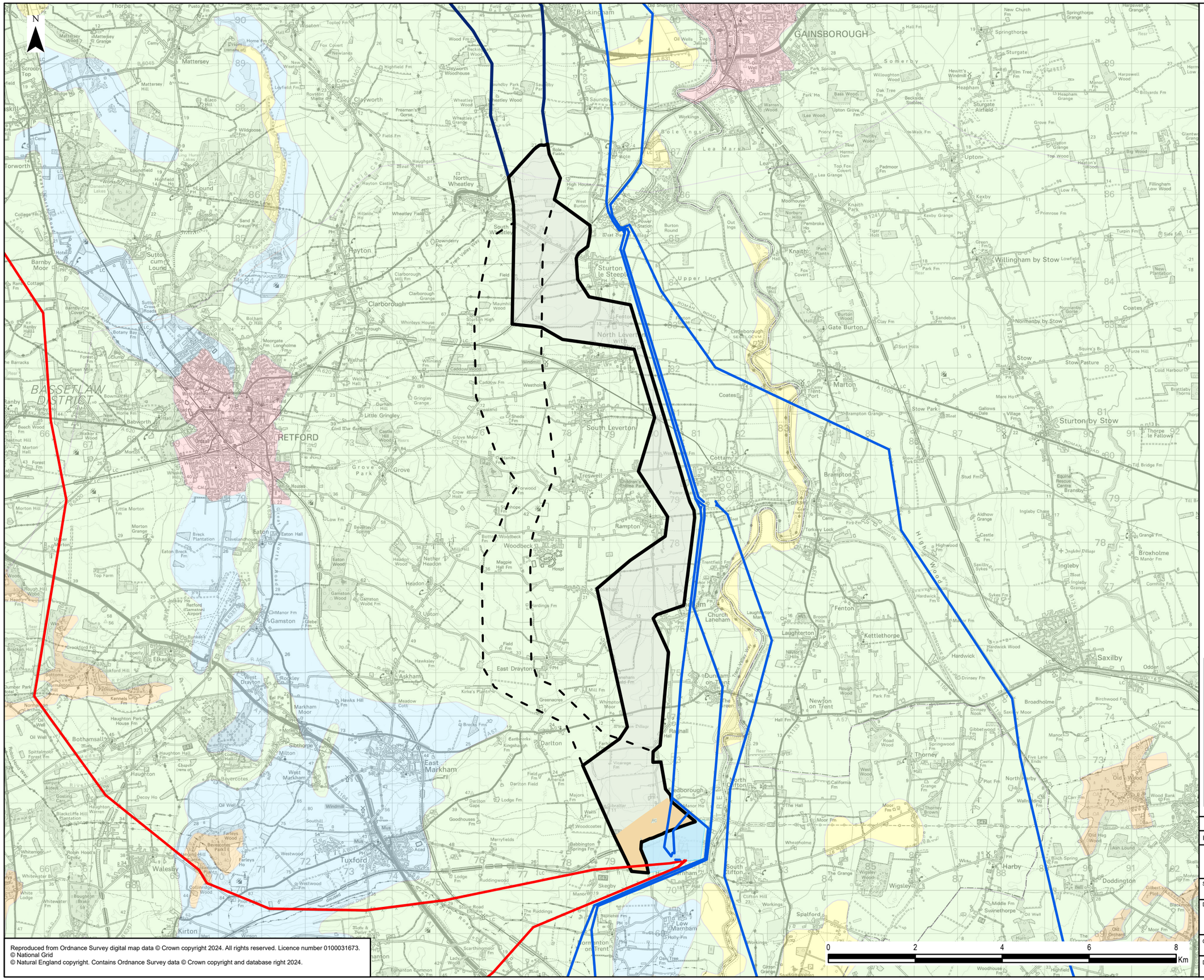


Legend

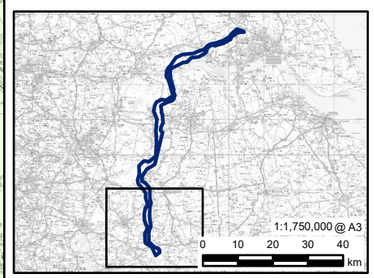
- Consultation Corridor - June 2023
- Eastern Corridor
- Western Corridor

National Grid OHL

- 275 kV Overhead Line
- 400 kV Overhead Line
- Potential High Marnham Substation Zone
- Zone for Routeing into Potential Substation

Agricultural Land Classification

- Grade 2
- Grade 3
- Grade 4
- Non Agricultural
- Urban



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Scheme: NORTH HUMBER TO HIGH MARNHAM

Document Title: AGRICULTURAL LAND CLASSIFICATION

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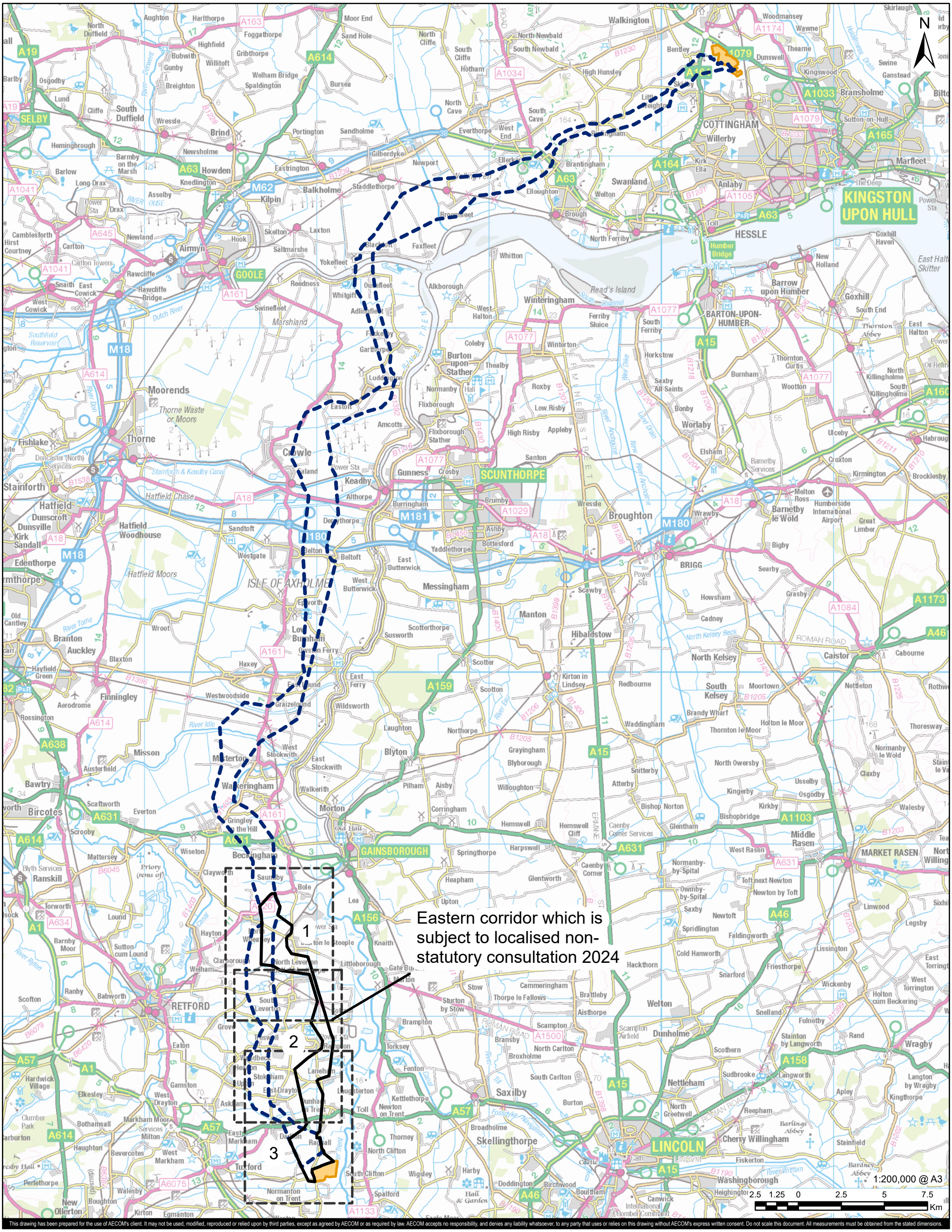
Appendix C Graduated swathe sheet plans

- North Humber to High Marnham Eastern Corridor - Key Plan
- Eastern Corridor and Graduated swathe sheet 1
- Eastern Corridor and Graduated swathe sheet 2
- Eastern Corridor and Graduated swathe sheet 3

Revision: 0 Drawn: JH Checked: JG Approved: HN Date: 2024-06-06



CLIENT

National Grid

PROJECT

North Humber to High Marnham

PROJECT NUMBER

60692631

ISSUE PURPOSE

Local Non-Statutory Consultation 2024

FIGURE TITLE

North Humber to High Marnham - Eastern Corridor - Key Plan

NOTES

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LEGEND

- Consultation Corridor - June 2023
- Eastern Corridor
- Substation Siting Zones

AECOM

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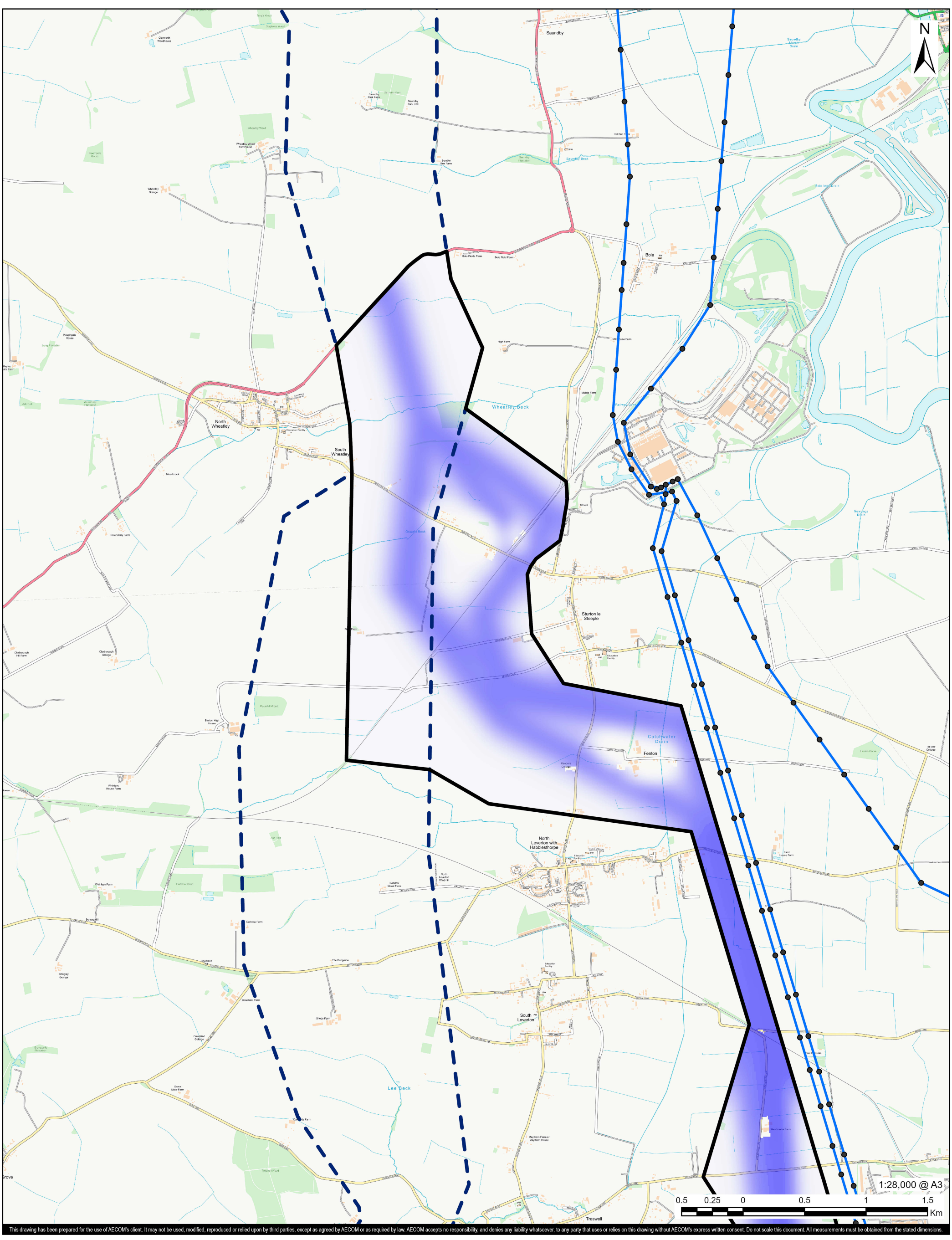

CLIENT

National Grid

PROJECT

North Humber to High Marnham

PROJECT NUMBER

60692631

ISSUE PURPOSE

Local Non-Statutory Consultation 2024

FIGURE TITLE

Eastern Corridor and Graduated Swathe Sheet 1

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LEGEND

- Western Corridor (Consultation Corridor June 2023)
- Eastern Corridor
- Graduated Swathe (Within Eastern Corridor)
- Existing National Grid Overhead Lines
  - 400 kV Overhead Line
  - Existing Towers

AECOM

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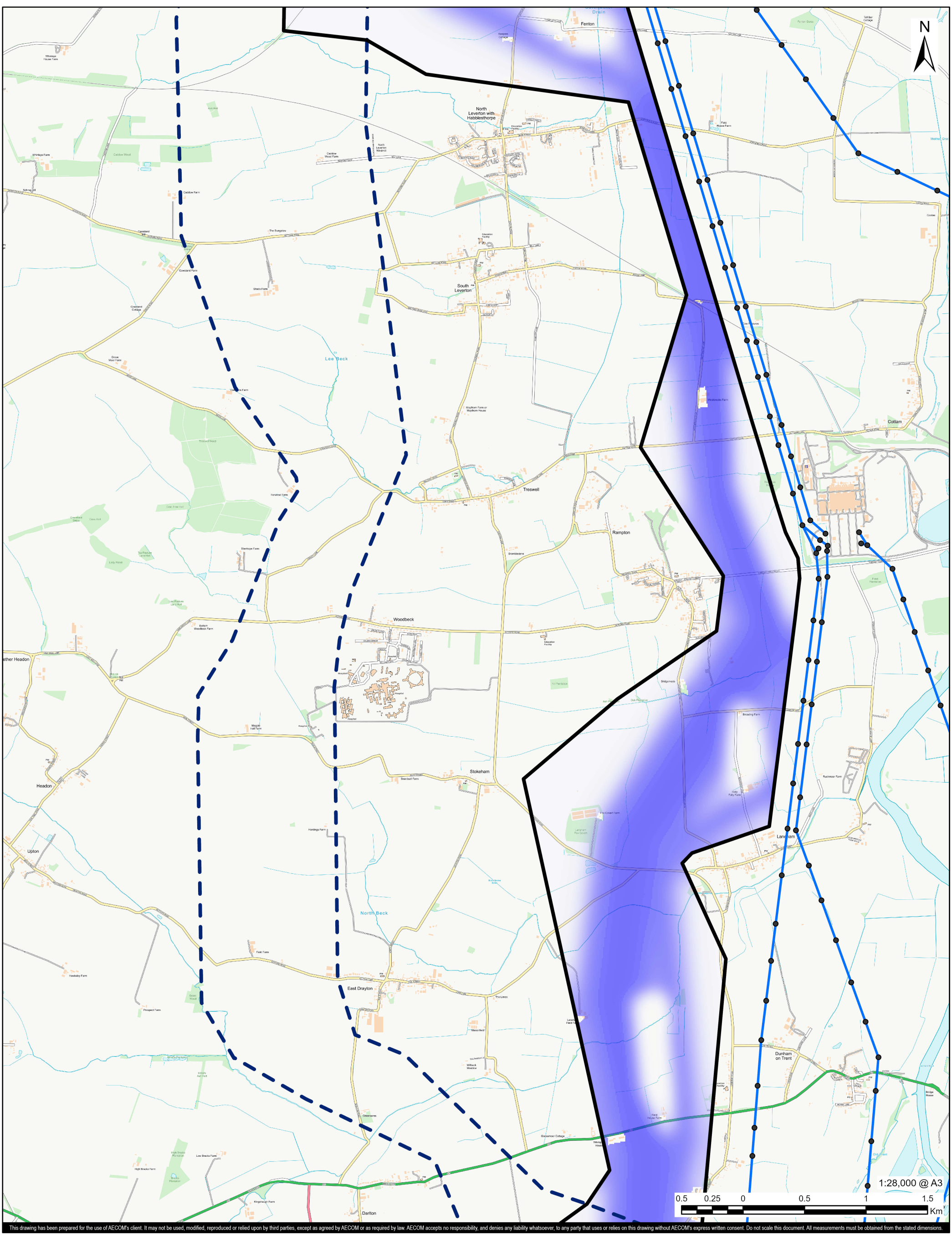
Revision: 0 Drawn: JH Checked: JG Approved: HN Date: 2024-06-12



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CLIENT

National Grid

PROJECT

North Humber to High Marnham

PROJECT NUMBER

60692631

ISSUE PURPOSE

Local Non-Statutory Consultation 2024

FIGURE TITLE

Eastern Corridor and Graduated Swathe Sheet 2

NOTES

LEGEND

- Western Corridor (Consultation Corridor June 2023)
- Eastern Corridor
- Graduated Swathe (Within Eastern Corridor)
- Existing National Grid Overhead Lines
  - 400 kV Overhead Line
  - Existing Towers

AECOM

nationalgrid

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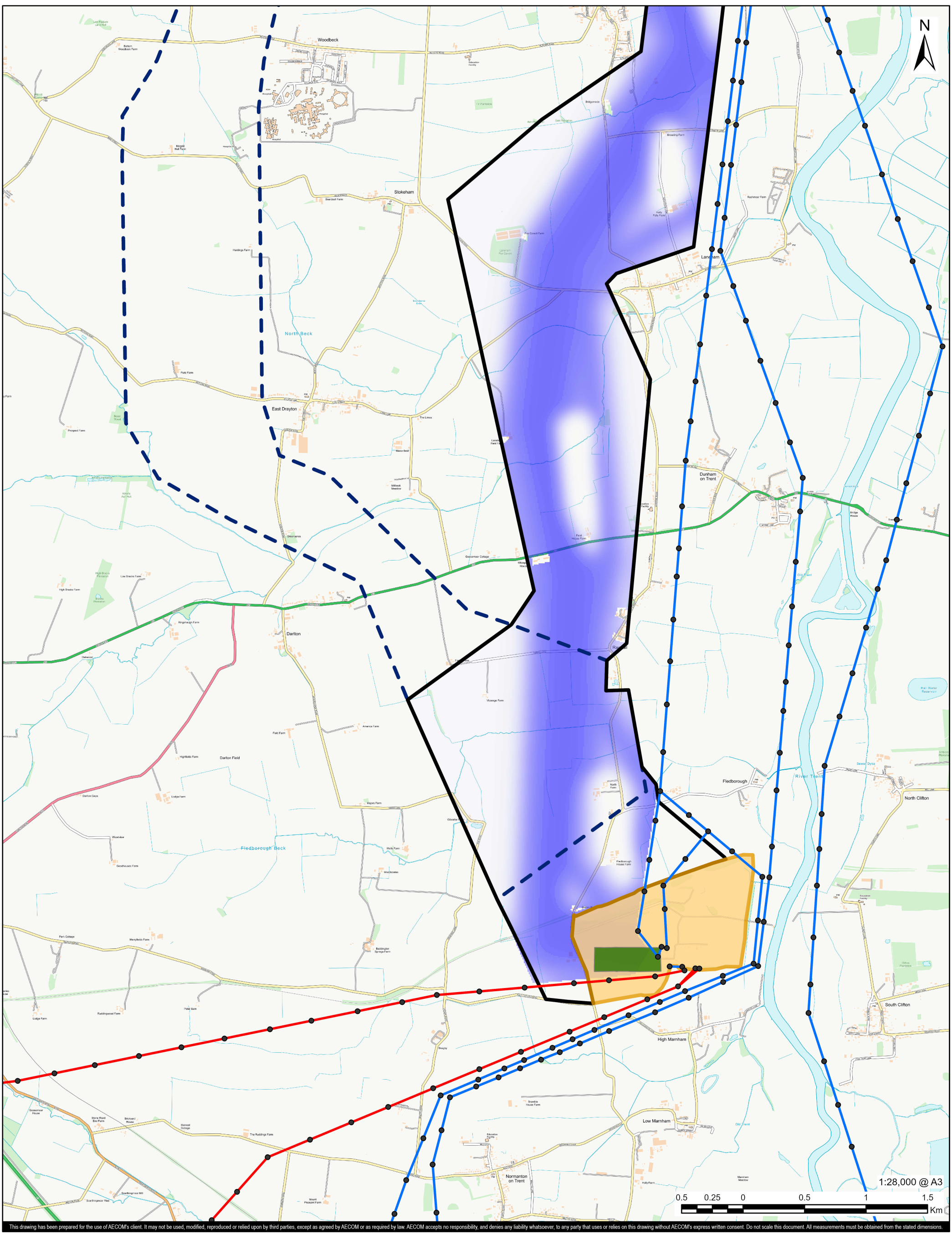

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National Grid

PROJECT

North Humber to High Marnham

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Local Non-Statutory Consultation 2024

FIGURE TITLE

Eastern Corridor and Graduated Swathe Sheet 3

NOTES

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LEGEND

- Western Corridor (Consultation Corridor June 2023)
- Eastern Corridor
- Graduated Swathe (Within Eastern Corridor)

Existing National Grid Overhead Lines

- 275 kV Overhead Line
- 400 kV Overhead Line
- Existing Towers
- High Marnham Substation Search Area
- High Marnham Proposed Substation Location

AECOM

nationalgrid