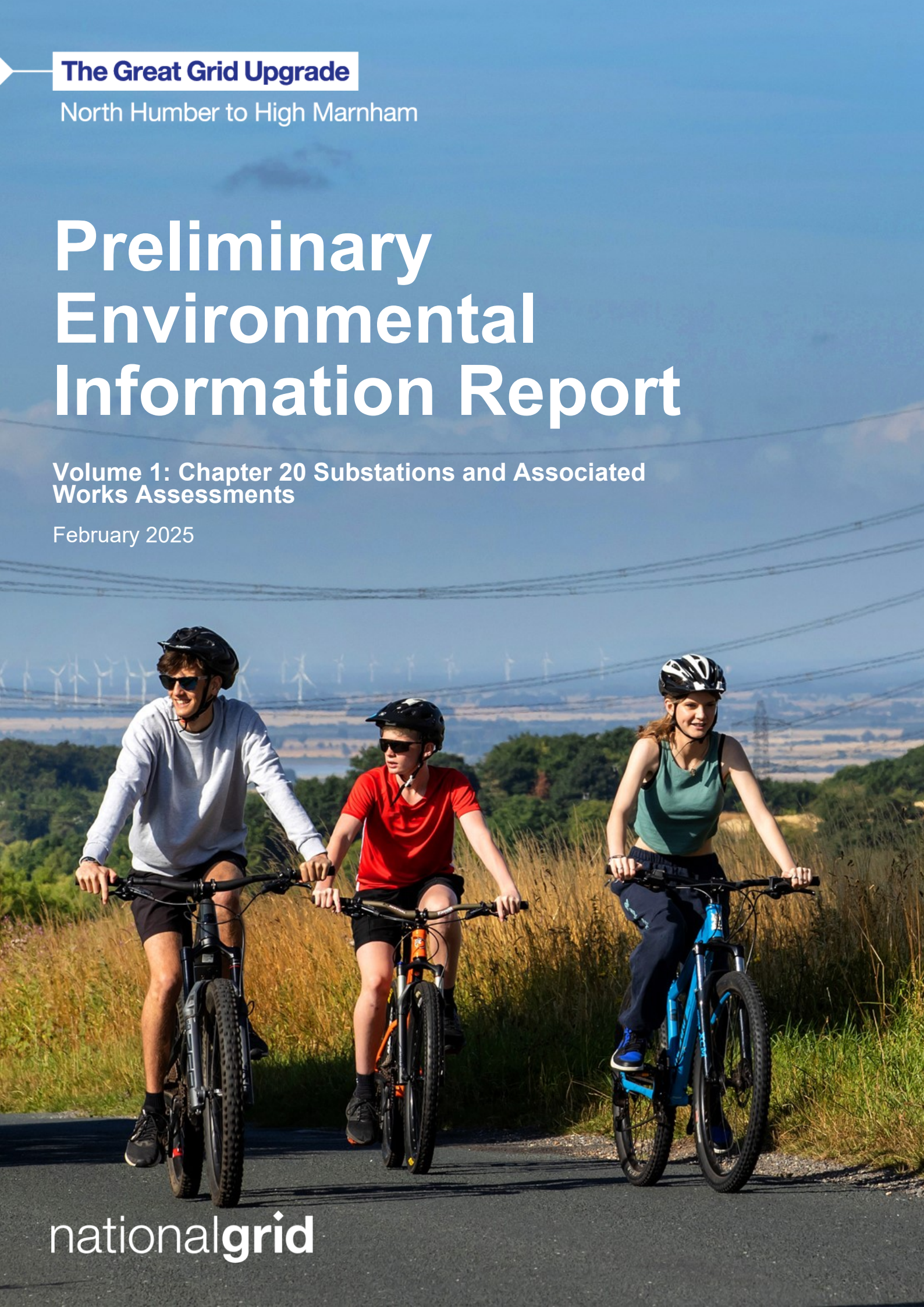
The Great Grid Upgrade

North Humber to High Marnham

Preliminary Environmental Information Report

Volume 1: Chapter 20 Substations and Associated Works Assessments

February 2025



nationalgrid

Contents

North Humber to High Marnham
Document control

Document Properties	
Organisation	AECOM
Author	AECOM
Approved by	National Grid
Title	Preliminary Environmental Information Report Chapter 20 Substations and Associated Works
Document Register ID	NHHM-NG-ENV-REP-001
Data Classification	Public

Version History

Document	Version	Status	Description / Changes
Chapter 20	1.0	Final	First Issue

20. Substations and Associated Works

nationalgrid

20. Substations and Associated Works

20.1 Introduction

20.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary environmental information identified to date for the proposed Birkhill Wood Substation, proposed High Marnham Substation and their associated overhead line reconfigurations, (hereafter referred to as the Proposed Substation Works) described in **Chapter 4 Description of the Project**.

20.1.2 The preliminary environmental assessment of the Proposed Overhead Line as described in **Chapter 4 Description of the Project** is presented in **Chapters 6 to 19**.

20.1.3 To ensure that the Project as a whole has been assessed a summary has been included within **Chapters 6 to 19** which brings together the assessment of the Proposed Substation Works with the Proposed Overhead Line.

20.1.4 At the time of EIA Scoping the proposed Birkhill Wood Substation and proposed High Marnham Substation (to which the overhead line is proposed to connect) where subject to separate applications made under the Town and Country Planning Act 1990 (TCPA) (Ref 20.1) procedures (and other required consent application procedures). Following submission of the EIA Scoping Report (Ref 20.1) the approach to the inclusion of the proposed Birkhill Wood Substation and proposed High Marnham Substation has altered. Whilst implementation of these two substations remains subject to achieving consent through separate TCPAs, in order to achieve a comprehensive consenting position for the Project these substations and their associated overhead line reconfigurations have been included as part of the Project.

20.1.5 Whilst the proposed Birkhill Wood Substation and proposed High Marnham Substation are intended to be subject to separate planning applications, some of the associated overhead line works for both of these proposed substations would fall under Section 37 of the Electricity Act 1989 (Ref 20.3) for which separate consent is to be sought from the Secretary of State..

20.1.6 The existing 275 kV substation located at High Marnham could be demolished. The demolition of the existing substation, if undertaken, will be progressed using permitted development rights and therefore it does not form part of the Project or the High Marnham Substation planning application for a new 400 kV substation.

20.1.7 In 2025, a planning application will be submitted to East Riding of Yorkshire Council for the new Birkhill Wood Substation. In 2025, a planning application will be submitted to Bassetlaw District Council for the new High Marnham Substation. Separate pre-application public consultations have been undertaken for the substation applications ahead of these planning applications being submitted.

20.1.8 This chapter has been split into the following subsections, which describe:

- The location of the Proposed Substation Works;
- Preliminary Environmental Information for the Proposed Substation Works at proposed Birkhill Wood; and
- Preliminary Environmental Information for the Proposed Substation Works at High Marnham.

20.1.9 This chapter should be read in conjunction with:

- **Chapter 4 Description of the Project**

20.1.10 This chapter is supported by the figures in Volume 2 which support **Chapters 6** to **19**. This chapter is also supported by the following figures:

- **Figure 4.5 Proposed Birkhill Wood Substation and Associated Works**; and
- **Figure 4.6 Proposed High Marnham Substation and Associated Works**.

20.2 Location of the Proposed Substation Works

Proposed Substation Works at Birkhill Wood

20.2.1 The proposed Birkhill Wood Substation and associated overhead line reconfiguration works are illustrated in **Figure 4.5 Proposed Birkhill Wood Substation and Associated Works**. The proposed Birkhill Wood Substation is located approximately 360 m to the east of Birkhill Wood and 400 m to the west of the A1079 centred on National Grid Reference 504284, 434875. A 1.2 km temporary and permanent access road is proposed from the A1079 which would require two new permanent culverts for the crossing of two field drains. A description of the proposed Birkhill Wood Substation is provided in section 4.4 of **Chapter 4 Description of the Project**.

20.2.2 As part of the Proposed Substation Works there is a requirement to turn in the existing 4ZR 400 kV overhead line into the proposed new Birkhill Wood Substation. This requires the construction of two new pylons (4ZR003B and 4ZR003A) and a section of the existing 4ZR 400 kV overhead line to be reconductored between existing pylon 4ZR002 and existing pylon 4ZR008. To facilitate these works an approximate 1.4 km section of temporary overhead line would be required between existing pylon 4ZR002 and existing pylon 4ZR006, including four temporary structures. Following completion of the works the temporary overhead line would be dismantled.

Proposed Substation Works at High Marham

20.2.3 The proposed High Marnham Substation and associated overhead line works are illustrated in **Figure 4.6 Proposed High Marnham Substation and Associated Works**. The proposed High Marnham Substation is located to the west of the former High Marnham Power Station, approximately 0.1 km to the east of Main Street and approximately 1.4 km to the north of Hollowgate Lane. A description of the proposed High Marnham Substation is provided in section 4.4 of **Chapter 4 Description of the Project**. A new permanent access is proposed from the current access road off Main Street, this would also serve as one of the proposed temporary construction accesses. Three construction compounds/laydown areas are proposed.

20.2.4 As part of the Proposed Substation Works there is a requirement to turn in the existing overhead lines that currently connect into the existing 275 kV substation into the proposed new 400 kV substation. This requires:

- The construction of three new pylons (ZDF004A, ZDF004B, ZDF004C) and a section of the existing ZDF overhead line route reconductored between existing pylons ZDF011 and ZDF005. Dismantling of an approximate 0.8 km section including three pylons on the existing ZDF overhead line. To facilitate these works an approximate 0.6 km section of temporary overhead line would be required between existing pylons ZDF005 and ZDF003 including one temporary pylon. Following completion of the works the temporary overhead line would be dismantled.
- The construction of one new pylon (ZDA251C) and approximately 1.1 km of reconductoring on the existing ZDA overhead line route. Dismantling of approximately 3.4 km including 15 pylons on the existing ZDA overhead line. To facilitate these works an approximate 1.2 km section of temporary overhead line would be required including two temporary pylons. Following completion of the works the temporary overhead lines would be dismantled.
- The construction of one new pylon (XE004A) and approximately 1.4 km of reconductoring on the existing XE overhead line. Dismantling of approximately 0.75 km including three pylons on the existing XE overhead line.
- The construction of three new pylons (4ZV003A, 4ZV003B and 4ZV003C) and modify approximately 3.4 km of the existing circuits on the 4ZV overhead line. Dismantling of approximately 1 km including five pylons on the existing 4ZV overhead line. To facilitate these works an approximate 0.7 km section of temporary overhead line, including one temporary pylon, would be required. Following completion of the works the temporary overhead line would be dismantled.

20.3 Mitigation

20.3.1 As set out in **Chapter 5 Approach to Preparing the PEIR** mitigation measures fall into one of three categories: embedded measures; control and management measures; and additional mitigation measures. With regards to embedded measures, environmental appraisal has been an integral part of the Project design from the outset, this has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable. As set out in **Chapter 4 Description of the Project** National Grid has embedded measures into the design of the Project, this has included sensitive siting of the substations in accordance with the guidance provided in the Horlock Rules (Ref 20.41).

20.3.2 Control and management measures, comprising management activities and techniques, will be implemented during construction to limit effects through adherence to good site practices and achieving legal compliance. A Draft Outline Code of Construction Practice (CoCP) is provided in **Appendix 4.1 Draft Outline Code of Construction Practice** in Volume 3. Relevant measures contained in **Appendix 4.1 Draft Outline Code of Construction Practice** have been taken into account in the preliminary environmental information presented below for the two proposed substations and associated works.

20.3.3 Additional mitigation comprises measures over and above any embedded and standard mitigation measures. The need for additional mitigation will be reviewed as the assessment progresses and the preliminary design develops further, where additional mitigation measures are required these will be set out in the Environmental Statement (ES).

20.4 Preliminary Environmental Information for the Proposed Substation Works at Birkhill Wood

Landscape

20.4.1 This section presents preliminary environmental information in relation to landscape and is supported by the following Figures:

- **Figure 6.1 Landscape Designations and Features** (Sheet 1 of 8);
- **Figure 6.2 Landform and Drainage** (Sheet 1 of 8);
- **Figure 6.3 National Landscape Character Areas** (Sheet 1 of 8); and
- **Figure 6.4 Landscape Character Types** (Sheet 1 of 8).

20.4.2 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the landscape baseline conditions are provided in section 6.4 of **Chapter 6 Landscape**.

20.4.3 The Proposed Substation Works are located in National Character Area (NCA) 40: Holderness as shown on **Figure 6.3 National Landscape Character Areas** and East Riding of Yorkshire Local Character Assessment Landscape Character Type (LCT) 16: Sloping Farmland as shown on **Figure 6.4 Local Landscape Character Areas**. NCA 27: Yorkshire Wolds is located 1.3 km west, as shown on **Figure 6.3 National Landscape Character Areas.** Much of the landscape comprises the undulating and rolling rural agricultural land between Hull and Beverley.

20.4.4 NCA 40: Holderness is a rural, low-lying, undulating plain with the broad, shallow valley of the River Hull flowing southwards through the centre of this NCA towards the settlement of Hull. The river eventually joins the Humber Estuary where it becomes tidal, enclosed by flood banks, and drains into the North Sea (Ref 20.9).

20.4.5 LCT 16: Sloping Farmland is characterised as undulating or gently rolling landform around 80 m AOD which slopes gradually down to the east (Ref 20.9). There are open views across and out from the LCT including Beverley Minster and the Yorkshire Wolds but also pylons and wind turbines. The part of the LCT north of the A164 is scenic and is in the Yorkshire Wolds Important Landscape Area (ILA) identified in the East Riding Local Plan (Ref 20.10). Yorkshire Wolds ILA is located 90 m west of the Proposed Substation Works, as illustrated in **Figure 6.1 Landscape Designations and Figures.** Some small blocks of ancient woodland are scattered across the LCT and there are several ecological interests including Beverley Parks Local Nature Reserve (LNR).

20.4.6 NCA 27: Yorkshire Wolds is located 1.3 km west from the Proposed Substation Works, characterised as an arc of high, gently rolling ground. This NCA comprises a prominent chalk escarpment and foothills rising from the Vale of York to the west and the Vale of Pickering to the north, and falling to the plain of Holderness to the east. A very low proportion of the area is urban and woodland, and the vast majority of the land is agricultural. Woodland planting is restricted to small, scattered woodland blocks on higher land and steeper slopes (Ref 20.9).

20.4.7 Natural England recently consulted on the designation of a new Yorkshire Wolds Area of Outstanding Natural Beauty (AONB)[1]. The consultation closed on 13 January 2025 and was based on a proposed boundary set out in the consultation document published at the start of the consultation in October 2024 (Ref 20.8). The nearest part of the Candidate Area boundary is approximately 14 km from the Proposed Substation Works. In the context of an AONB extension, a 'Candidate Area' refers to an area that has been identified as potentially suitable for inclusion in an AONB but has not yet been officially designated. This status means that the area is under consideration for protection and conservation, but it still needs to undergo further evaluation, including assessments of its natural beauty, ecological value, and local support, before it can be formally added to the AONB network. The 'Candidate Area' status is a step in the process of extending the AONB designation to new regions. The designation process will be kept under review and will be reported in the ES.

20.4.8 At this distance, the special qualities and statutory purposes of the AONB (if designated) are unlikely to be significantly affected by the Proposed Substation Works. However, the boundary will continue to be monitored, and a formal assessment will be carried out in the ES if the boundary extends closer to the Proposed Substation Works.

20.4.9 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.10 The potential effects that could result from the Proposed Substation Works during construction relate to physical and perceptible effects on landscape character and/or the setting of designated landscapes from construction, including vegetation removal and the presence of storage areas, access roads and tracks, plant (including mobile cranes), vehicles and personnel.

20.4.11 The potential effects that could result from the operation include physical and perceptible effects on landscape character from the long-term loss of landscape elements and features, and introduction of new infrastructure.

20.4.12 No potential landscape effects from the maintenance of the Proposed Substation Works are predicted.

20.4.13 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely[2] to be significant.

Visual

20.4.14 This section presents preliminary environmental information in relation to visual amenity and is supported by the following Figures:

- **Figure 7.1 Visual Receptors and Viewpoints** (Sheet 1 of 8); and
- **Figure 7.2 Zone of Theoretical Visibility** (Sheet 1 of 8).

[1] AONBs were recently rebranded as 'National Landscapes'. Legally however, Natural England can only designate an AONB. If the Yorkshire Wolds AONB is subsequently designated, it will become known as a National Landscape.

[2] Real risk or serious possibility

20.4.15 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the visual amenity baseline conditions are provided in section 7.4 of **Chapter 7 Visual**.

20.4.16 The Proposed Substation Works are not located within a designated landscape that would influence the value of the views experienced. As noted above in paragraph 20.4.8, the potential designation of a new Yorkshire Wolds AONB located approximately 14 km from the Proposed Substation Works will continue to be monitored. A formal assessment will be carried out in the ES if the boundary extends closer to the Proposed Substation Works.

20.4.17 There are opportunities for expansive views to the east across open farmland and the River Hull corridor, and to the west towards the Yorkshire Wolds Important Landscape Area (ILA), designated under Policy ENV2 of the East Riding Local Plan (Ref 20.10). This designation reflects the high value placed on the scenic quality of the views in this area. However, these views are often framed or enclosed by woodland, field boundary hedgerows and trees, particularly near the villages.

20.4.18 The character and quality of the views experienced vary depending on the presence and prominence of discordant elements or features. Development and industrial activity, especially around Beverley and the urban areas of Cottingham and Hull to the south, detract from the visual experience. Views are also influenced by the presence of existing overhead lines radiating from the existing Creyke Beck Substation, located east of Beverley. The Proposed Substation Works would extend the visual effects of high-voltage infrastructure across a wider geographical area than the existing Creyke Beck Substation and current overhead lines, thereby reducing the scenic quality experienced in some views.

20.4.1 The following receptors are considered to have a higher susceptibility to changes in their views as a result of the Proposed Substation Works:

- Residents on the edge of Beverley and Hull and in the settlements associated with Tickton, Wawne, Woodmansey, Bishop Burton, Walkington (east), Rowley (to the north of Risby), Skidby (to the east of Skidby Village) and Cottingham, as well as those residing in the smaller villages and dispersed properties.
- People using the public rights of way (PRoW) network, which includes the Beverley 20, High Hunsley Circuit and National Cycle Network Routes 1 and 66.
- Visitors to Cottingham Parks Golf and Leisure Club, which includes the Skidby Lakes Golf Course and Cottingham Park Golf Course.

20.4.2 Overall, the views within 5 km of the Proposed Substation Works contain landscape character-forming features and elements that are established and in good condition. Whilst pockets of more scenic views are apparent away from existing overhead lines, the presence of the 400 kV and 275 kV overhead lines converging on Creyke Beck Substation diminishes the aesthetic and perceptible qualities of views closer to the Proposed Substation Works.

20.4.3 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.4 The potential effects that could result from the construction of the Proposed Substation Works are:

- Potential for effects on the composition and character of views experienced by the people living and moving around communities and engaging in recreational activities, including people using PRoW.
- Potential for effects on the composition and character or views, which may impact the residential visual amenity of the occupants of individual properties.

20.4.5 The potential effects that could result from the operation of the Proposed Substation Works are:

- Potential for effects on the composition and character of views experienced by the people living and moving around communities and engaging in recreational activities, including people using PRoW.
- Potential for effects on the composition and character or views, which may impact the residential visual amenity of the occupants of individual properties.
- Potential for effects on composition and character of views experienced by people at protected viewpoints, panoramas and viewing corridors.

20.4.6 A planting strategy setting out proposals for reinstatement of any vegetation that must be removed will be provided in the ES. This planting will be in accordance with the outline vegetation reinstatement plans included in the Landscape and Environmental Management Plan (LEMP).

20.4.7 No visual effects arising from maintenance of the Proposed Substation Works are predicted.

20.4.8 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Ecology

20.4.9 This section presents preliminary environmental information in relation to ecology and is supported by the following Figures:

- **Figure 8.1 International Sites Designated for Nature Conservation within 10 km and National and Local Statutory Designated Sites within 5 km** (Sheet 1 of 4);
- **Figure 8.2 Non Statutory Sites Designated for Nature Conservation and Priority Habitat within 2 km** (Sheet 1 of 11);
- **Figure 8.3 Phase 1 Habitat Survey** (Sheet 1 of 36);
- **Figure 8.4 Aquatic Survey Locations** (Sheet 1 of 13); and
- **Figure 8.5 Arboricultural Survey Results** (Sheet 1 of 10).

20.4.10 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the ecology baseline conditions are provided in section 8.4 of **Chapter 8 Ecology**.

20.4.11 There are three internationally designated sites within 10 km, one nationally designated site within 5 km and one local statutory designated site within 5 km of the Proposed

Substation Works, as listed in Table 20.1 below. The sites in Table 20.1 are illustrated in **Figure 8.1 International Sites Designated for Nature Conservation within 10 km and National and Local Statutory Designated Sites within 5 km**

Table 20.1 Designated sites for nature conservation from the Proposed Substation Works at Birkhill Wood

Designation	Approximate distance from the Proposed Substation Works
International Designated Sites	
Humber Estuary Ramsar Site	8.68 km
Humber Estuary Special Protection Area (SPA)	8.68 km
Humber Estuary Special Area of Conservation	8.68 km
National Designated Sites	
Burton Bushes Sites of Special Scientific Interest (SSSI)	2.87 km
Local Nature Reserve	
Beverley Parks Local Nature Reserve	0.66 km

20.4.12 There are eight non-statutory designated sites for biodiversity located within 2 km of the Proposed Substation Works, as listed in Table 20.2 below and illustrated in **Figure 8.2 Nature Conservation Non-Statutory Designated Sites and Priority Habitat within 2 km**:

Table 20.2 Local Non-Statutory Sites designated for nature conservation from the Proposed Substation Works at Birkhill Wood

Designation	Approximate distance from the Proposed Substation Works
Jillywood Lane Local Wildlife Site (LWS)	0.36 km
Fishpond Wood, Risby Estate LWS	1.75 km
Birkhill Wood LWS	0.15 km
Drove Road Candidate LWS	1.53 km
Woodhill Path, Cottingham LWS	0.75 km
Bentley Moor Wood LWS	0.34 km
Moor Lane LWS	1.35 km
Mill Beck and Fields LWS	0.92 km

20.4.13 Two areas of ancient semi-natural woodland lie within 1 km of the Proposed Substation Works, comprising Birkhill Wood located immediately to the east, and part of Bentley Moor Wood LWS, located approximately 340 m to the east.

20.4.14 The desk study identified priority habitat Deciduous woodland (55.3 hectares (ha)), Coastal and floodplain grazing marsh (112.6 ha), Traditional orchard (1.3 ha) and No main habitat but additional habitats present (18.4 ha) located within 2 km of the Proposed Substation Works.

20.4.15 There are two ancient or veteran trees recorded within the Proposed Substation Works boundary and one ancient or veteran tree recording within 50 m of the draft Order Limits associated with the Proposed Substation Works, as recorded on the Woodland Trust Ancient Tree Inventory (Ref 20.42).

20.4.16 The findings of a phase 1 habitat survey undertaken for the Proposed Substation Works will be presented in the ES.

20.4.17 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.18 The potential effects that could result from the construction and maintenance of the Proposed Substation Works are:

- Permanent and temporary direct habitat loss and temporary disturbance and fragmentation of protected and notable species.
- Incidental mortality of protected and notable species.
- Disturbance to protected or notable species from noise, vibration, visual and lighting.
- Changes in air quality on designated sites and notable habitats within 200 m of the construction traffic routes.
- Pollution impacts on designated sites and notable habitats.
- Introduction of invasive non-native species (INNS) leading to the degradation of the habitat quality of designated and protected sites and notable habitats and species.
- Loss/reduction in habitat quality of designated/Priority Habitats and habitat quality for protected/notable species from changes in groundwater levels.

20.4.19 During the operation of the Proposed Substation Works, there is potential for effects on protected and notable species due to habitat fragmentation, which could create a barrier to species dispersal.

20.4.20 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Ornithology

20.4.21 This section presents preliminary environmental information in relation to ornithology and is supported by the following Figures:

- **Figure 9.1 Study Areas** (Sheet 1 of 4);
- **Figure 9.2 Vantage Point Location s** Sheet 1 of 6);
- **Figure 9.3 Vantage Point Viewing Arcs** (Sheet 1 of 6);
- **Figure 9.5 Functionally Linked Land Survey Areas** (Sheet 1 of 6);
- **Figure 9.9 CBC Survey Areas** (Sheet 1 of 6);
- **Figure 9.10 International Statutory Designated Sites** (Sheet 1 of 1);
- **Figure 9.11 National and Local Statutory Designated Sites** (Sheet 1 of 1);
- **Figure 9.13 BTO WeBS Core Count Sectors** (Sheet 1 of 3); and
- **Figure 9.14 BTO WeBS Low Tide Count Sectors** (Sheet 1 of 3).

20.4.22 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the ornithology baseline conditions are provided in section 9.4 of **Chapter 9 Ornithology**.

20.4.23 There are two Ramsar sites and two SPAs of international importance located within 30 km of the Proposed Substation Works, listed in Table **20.3** and illustrated in **Figure 9.10 International Statutory Designated Sites**:

Table 20.3 Designated sites for internation importance for ornithology from the Proposed Substation Works at Birkhill Wood

Designation	Approximate distance from the Proposed Substation Works
Lower Derwent Valley Ramsar Site	27.36 km
Lower Derwent Valley SPA	27.36 km
Humber Estuary Ramsar Site	8.68 km
Humber Estuary SPA	8.68 km

20.4.24 There are no statutory designated sites, national and local nature conservation value designed for ornithological interest within 5 km, and no non-statutory designated sites of nature conservation designated for ornithological interest within 2 km of the Proposed Substation Works.

20.4.25 The ornithology surveys undertaken for the Proposed Substation Works will be detailed in the ES.

20.4.26 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.27 The potential effects that could result from the construction of the Proposed Substation Works are:

- Permanent and temporary direct habitat loss and temporary disturbance.
- Incidental mortality of breeding and non-breeding birds.
- Disturbance to protected or notable species from noise/vibration, visual and lighting.
- Changes in air quality on designated sites within 200 m of the construction traffic routes.
- Pollution impacts on designated sites and notable species.
- Loss/reduction in habitat quality used by protected/notable birds from changes in groundwater levels.

20.4.28 The potential effects that could result from the operation of the Proposed Substation Works are:

- Effects on protected and notable species via habitat fragmentation as a result of the Proposed Substation Works creating a barrier to species dispersal.
- Habitat gains for some nesting bird species through the introduction of gantries.

20.4.29 The potential effects that could result from the maintenance the Proposed Substation Works

- Incidental mortality of birds.
- Disturbance to protected or notable bird species from noise/vibration, visual and lighting.

20.4.30 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Cultural Heritage

20.4.31 This section presents preliminary environmental information in relation to cultural heritage and is supported by the following Figures:

- **Figure 10.1 Designated Heritage Assets Within Study Areas** (Sheet 1 of 26); and
- **Figure 10.2 Non-Designated Heritage Assets Within 1 km Study Area** (Sheet 1 of 31).

20.4.32 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the cultural heritage baseline conditions are provided in section 10.4 of **Chapter 10 Cultural Heritage**.

20.4.33 The following scheduled monuments and associated National Heritage List for England Number (NHLE N^{o}) are located within 3 km of the Proposed Substation Works, as listed below and illustrated in **Figure 10.1 Designated Heritage Assets Within Study Areas**:

- Risby Jacobean gardens, hall and medieval settlement remains (NHLE Nº: 1018600);
- Heavy Anti-aircraft gunsite, 350 m west of Butt Farm (NHLE Nº: 1019186);
- 'Cellar Heads' moated site and related ridge and furrow earthworks at Risby Park, 700 m northwest of Risby Park Farm (NHLE Nº: 1015312);
- Romano-British enclosure and two adjoining fields on Westwood Common, 510m southwest of Blackmill (NHLE Nº: 1013999);
- Group of four square barrows on Westwood Common, 200m northwest of Blackmill (NHLE Nº: 1013994);
- Square barrow on Westwood Common, 150m northwest of Blackmill (NHLE Nº: 1013993);
- Square barrow on Westwood Common, 230m northwest of Blackmill (NHLE Nº: 1013997);
- Square barrow on Westwood Common, 230m NNW of Blackmill (NHLE Nº: 1013998);
- Bowl barrow on Westwood Common, 150m north of Blackmill (NHLE Nº: 1013991);
- Bowl barrow on Westwood Common, 50m north of Blackmill (NHLE Nº: 1013992);
- Oval barrow on Westwood Common, 55m northwest of Blackmill (NHLE Nº: 1014000);
- Square barrow on Westwood Common, 50m west of Blackmill (NHLE Nº: 1013996);
- Square barrow on Westwood Common, 120m south of Blackmill (NHLE Nº: 1013995);
- Hall Garth moated site south of Beverley Minister (NHLE Nº: 1008122);
- Blackfrairs (remains of) (NHLE Nº: 1003598);
- Bowl barrow 400 m north of Highfield House (NHLE Nº: 1007731); and
- Baynard Castle (NHLE Nº: 1019823).

20.4.34 There are five conservation areas within the 3 km of the Proposed Substation Works, including Skidby, Cottingham, Walkington, Beverley Grosvenor Place and Beverley.

20.4.35 There are 371 listed buildings within 3 km of the Proposed Substation Works, of which 5 are Grade I, 334 are Grade II and 32 are Grade II*.

20.4.36 In total, 52 non-designated assets recorded on the Historic Environment Record (HER) are within 1 km of the Proposed Substation Works, as illustrated in **Figure 10.2 Non-Designated Heritage Assets Within 1 km Study Area**.

20.4.37 The Proposed Substation Works cross the historic landscape of NCA 40: Holderness, and is located approximated 1.3 km east of the NCA 27: Yorkshire Wolds. Of particular importance located 1.8 km west is the historic landscape of medieval to post-medieval Risby Hall as illustrated in **Figure 10.1 Designated Heritage Assets Within Study Areas**, in NCA 27: Yorkshire Wolds, which evolved from the 16th century onwards. It not only encapsulates two scheduled monuments (NHLE Nº: 1015312, NHLE Nº: 1018600), a Grade II registered park and garden (NHLE Nº: 1001419) and a Grade II listed building (NHLE Nº :1161815), but also extends beyond the designated assets to

encompass the vestigial remains of the former 16th century deer park and later pleasure gardens. Risby Hall is a Grade II Registered Park and Garden (NHLE N°: 1001419).

20.4.38 The Proposed Substation Works are situated on a roughly north to south aligned chalk hill ridge that forms the southernmost section of NCA 27: Yorkshire Wolds, descending gradually to the east towards the plain of Holderness, to the east of the Proposed Substation Works and sharply to the south and west to the flat expanse of the Humberhead Levels. The Great Wolds are capped by thick deposits of Cretaceous chalk devoid of superficial deposits, while the lowlands are covered by sedimentary bedrock of Mercian mudstone of older Triassic date and covered by complex Quaternary glacial, aeolian, alluvial, colluvial and anthropogenic superficial deposits. The western escarpment of the Wolds exposes bedrock strata spanning the intervening periods and includes several layers of chalk, sandstone, limestone, marl, ironstone, and mudstone.

20.4.39 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.40 The potential effects that could result from the construction and maintenance of the Proposed Substation Works are:

- Potential for permanent physical impacts on historic landscapes.
- Potential for temporary impacts on designated heritage assets as a result of changes to their setting.
- Potential for temporary impacts on non-designated heritage assets as a result of changes to their setting.

20.4.41 The potential effects that could result from the operation of the Proposed Substation Works are:

- Potential for permanent impacts to designated heritage assets as a result of changes to their setting.
- Potential for permanent impacts to non-designated heritage assets as a result of changes to their setting.
- Potential for permanent impacts to historic landscapes as a result of changes to their setting.

20.4.42 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Water Environment

20.4.43 This section presents preliminary environmental information in relation to the water environment and is supported by the following Figures:

- **Figure 11.1 Study Area and Water Environment Features** (Sheet 1 of 8);
- **Figure 11.2 Flood Risk Areas** (Sheet 1 of 13); and
- **Figure 11.3 Water Framework Directive Surface Waterbody Status** (Sheet 1 of 8).

20.4.44 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the water environment baseline conditions are provided in section 11.4 of **Chapter 11 Water Environment**.

20.4.45 Wanless Beck is a main river located 500 m from the Proposed Substation Works, as illustrated in **Figure 11.1 Study Area and Water Environment Features**.

20.4.46 There is one ordinary watercourse named Beverly and Barmston Drain located within the Proposed Substation Works, as illustrated in **Figure 11.3 Water Framework Directive Surface Waterbody Status** and **Figure 11.3 Water Framework Directive Surface Waterbody Status**. Beverly and Barmston Drain is a Water Framework Directive (WFD) waterbody (GB10402606721) assigned high sensitivity given its WFD status and flow characteristics. It has a total length of 3.5 km^2 and flows in an easterly direction, away from the Proposed Substation Works, and into the Western Drain.

20.4.47 The WFD classifications for Beverly and Barmston Drain are informed by monitoring a range of parameters that are indicators of water quality at Environment Agency monitoring sites. The waterbody has a moderate ecological status and a failing chemical status (Ref 20.11). Multiple Reasons for Not Achieving Good (RNAG) status are reported for this waterbody, including 'Polybrominated Diphenyl Ethers (PBDE)', 'Phosphate' from flow (land drainage) and diffuse (riparian activities) sources, and 'poor nutrient management'.

20.4.48 In terms of physical form, the Beverly and Barmston Drain waterbody is designated as 'artificial', indicating a waterbody created by human activity. In terms of the hydrological regime, the waterbody is designated with a status of 'supports good'. In terms of its hydromorphological qualities, the waterbody has low sensitivity, being highly modified.

20.4.49 The watercourses within the Proposed Substation Works, which include unnamed ordinary watercourses and land drains, generally flow in an easterly direction and into the Beverly and Barmston Drain. This catchment can be categorised as partially rural in its land use, as well as partially urban with the inclusion of the town Beverly and the villages Woodmansey and Cottingham. The topography slopes in a north-easterly direction.

20.4.50 The Proposed Substation Works would necessitate the installation of 6 permanent culverts at watercourse crossings, as illustrated in **Figure 4.5 Proposed Birkhill Wood Substation and Associated Works Proposed Construction Works** (Sheet 2).

20.4.51 The Proposed Substation Works are not located within a surface water Drinking Water Protected Area but is located within the Springhead (GWSGZ0248) surface water Drinking Water Safeguard Zone. The Proposed Substation Works are located within a Nitrate Vulnerable Zone (NVZ).According to the Environment Agency Flood Map for Planning (Ref 20.12), the Proposed Substation Works are located almost entirely in Flood Zone 1 (low risk), equivalent to an annual chance of flooding from rivers and the sea of less than 1 in 1,000 (0.1%). The access road to the Proposed Substation Works from the A1079 crosses a section Flood Zone 3 (high risk) associated with an unnamed tributary of Beverly and Bramston Drain. Flood Zone 3 is equivalent to an annual chance of flooding from rivers of 1 in 100 (1%) or greater, associated with an unnamed tributary, as illustrated in **Figure 11.2 Flood Risk Areas**.

20.4.52 According to the Environment Agency Asset Information and Maintenance (Ref 20.13) database, there are no flood defences located within the 500 m study area.

20.4.53 The Recorded Flood Outline dataset (Ref 20.14) shows one area of historical flooding associated with fluvial flooding from the Beverly and Barmston Drain. The long-term flood risk map for England (Ref 20.15 shows there is low risk of reservoir flooding within the 500 m study area and notes that groundwater flooding is unlikely. However, it is noted that the groundwater dataset is relatively crude, and this form of flooding will be assessed in further detail in the Flood Risk Assessment.

20.4.54 The land within the Proposed Substation Works is therefore not considered to be particularly at risk of flooding from rivers, the sea, surface water, reservoirs and groundwater.

20.4.55 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.56 The potential effects that could result from the construction of the Proposed Substation Works are:

- Construction activities such as soil stripping, earthworks and excavation and the use and refuelling of plant, giving rise to pollution of water environment receptors from silt, hydrocarbons, and other construction materials. Physical disturbance and change in flow regime at watercourse crossings, associated with the proposed access road crossing of two watercourses and a short diversion of a section of watercourse.
- Increased rates and volumes of rainfall runoff, reduced channel flow capacity due to siltation, and disruption to the land drainage regime.
- Temporary works in the floodplains of watercourses, for example materials storage, reducing floodplain storage and disrupting flow routes, consequently increasing flood risk to people, existing property and infrastructure.
- Increased surface water flood risk due to the construction of areas with impermeable land cover, generating increased rates and volumes of surface water runoff, and disruption to the land drainage regime.

20.4.57 The Proposed Substation Works require the permanent diversion of an unnamed ordinary watercourse and permanent culvert construction as part of the proposed access road. The details of this watercourse realignment and assessment will be detailed in the ES. The other potential effects that could result from the operation of the Proposed Substation Works are limited to increased surface water flood risk due to the introduction of permanent areas of impermeable land cover for the footprint of the Proposed Substation Works. This could generate increased rates and volumes of surface water runoff, disruption to the land drainage regime.

20.4.58 No potential effects on the water environment during maintenance of the Proposed Substation Works are predicted.

20.4.59 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Geology and Hydrogeology

20.4.60 This section presents preliminary environmental information in relation to geology and hydrogeology and is supported by the following Figures:

- **Figure 12.1 Superficial Geology** (Sheet 1 of 13);
- **Figure 12.2 Bedrock Geology** (Sheet 1 of 13);
- **Figure 12.3 Geologically Designated Sites** (Sheet 1 of 3); and
- **Figure 12.4 Source Protection Zones** (Sheet 1 of 7).

20.4.61 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the geology and hydrogeology environment baseline conditions are provided in section 12.4 of **Chapter 12 Geology and Hydrogeology**.

20.4.62 Superficial deposits are present throughout the Proposed Substation Works and 250 m study area, as shown in **Figure 12.1 Superficial Geology**. These deposits predominantly comprise of Tilt (Devensian), described by the British Geological Survey (BGS) as '*diamicton*' often referred to as Boulder Clay (Ref 20.16). A small section in the north and south of the Proposed Substation Works boundary and study area consists of sand and gravel of uncertain age and origin, as indicated to be present in a localised area and described as *'sand and gravel with rare lenses of clay'*.

20.4.63 The area of the Proposed Substation Works is also categorised as a Mineral Safeguarding Area under policy EC6 in East Riding Local Plan (Ref 20.10) and the East Riding of Yorkshire and Kingston Upon Hull Joine Minerals Local Plan (Ref 20.40).

20.4.64 Bedrock geology is illustrated on **Figure 12.2 Bedrock Geology** and the Proposed Substation Works and 250m study area is predominantly comprised of Flamborough Chalk Formation, described as '*White, well-bedded, flint-free chalk with common marl seams'*. The south of the Proposed Substation Works and 250 m study area consists of the Burnham Chalk Formation described as '*white thinly-bedded chalk with common…flint bands; sporadic marl seams'* (Ref 20.16).

20.4.65 The Department for Environment, Food and Rural Affairs (DEFRA) Multi-Agency Geographic Information for the Countryside (MAGIC) map (Ref 20.18) indicates that the Proposed Substation Works is located within a Principal Aquifer, which is described as rock layers that:

'provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands' (Ref 20.20).

20.4.66 A groundwater SPZ is a zone established around a groundwater source, such as a well, borehole or spring, by the Environment Agency to protect a drinking water supply from pollution. SPZ 1 is defined as the inner zone, which represents a 50-day travel time for a pollutant to reach the abstraction point (Ref 20.17). SPZ 2 is defined as the outer zone, which represents an area where it takes groundwater that is used to supply water for domestic or food production purposes up to 400 days to travel to the groundwater abstraction point. The southern half of the Proposed Substation Works and 500 m study area is located within SPZ 1, with the northern half located within SPZ 2.

20.4.67 DEFRA's MAGIC map (Ref 20.18) indicates that the groundwater within the majority of the 500 m study area is classified as Medium vulnerability, with a small section to the south at Creyke Beck Substation classified as High vulnerability. The Environment Agency defines High vulnerability as:

'Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits'

and areas of Low vulnerability as:

'Areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability'.

Medium vulnerability is described as intermediate between Low and High vulnerability (Ref 20.19).

20.4.68 No geo-conservation receptors, potential sources of contamination (PSC), or local geological sites have been identified within a 250 m study area.

20.4.69 In the context of slope stability, soil erosion, and groundwater levels, it is not considered that these factors would have a notable impact on the potential effects given the nature of the Proposed Substation Works and the inherent engineering design.

20.4.70 Much of the Proposed Substation Works and 250 m study area appears to have remained as undeveloped agricultural land and farm buildings since the earliest reviewed historical mapping from the National Library Scotland, dated 1885 (Ref 20.20). In these areas it is considered that there is a very low risk of potential sources of significant existing contamination.

20.4.71 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.72 The potential effects that could result from the construction of the Proposed Substation Works include the increased risk of groundwater pollution within the SPZ1.

20.4.73 No potential effects on the geology and hydrogeology during maintenance of the Propo=sed Substation Works are predicted.

20.4.74 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Agriculture and Soils

20.4.75 This section presents preliminary environmental information in relation to agriculture and soils and is supported by the following Figures:

- **Figure 13.1 Agriculture and Soils Study Area** (Sheet 1 of 13);
- **Figure 13.2 Provisional ALC Mapping** (Sheet 1 of 13);
- **Figure 13.3 Detailed ALC Mapping (Post-1988)** (Sheet 1 of 13);
- **Figure 13.4 Agri-environmental Schemes** (Sheet 1 of 13);
- **Figure 13.5 Forestry and Woodland Grant Schemes** (Sheet 1 of 13); and
- **Figure 13.6 Soilscapes Mapping** (Sheet 1 of 13).

20.4.76 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the agricultural and soils baseline conditions are provided in section 13.4 of **Chapter 13 Agriculture and Soils**.

20.4.77 The solid geology underlying the Proposed Substation Works is described in the Geology and Hydrogeology section above.

20.4.78 The Soil Associations (representing a group of soil series (or soil types) that are typically found occurring together in the landscape) have been identified within the 1 km study area (Ref 20.22) as follows, and as illustrated in **Figure 13.6 Soilscapes**[3]

- Burlingham 2: Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy soils. Some well drained fine and coarse loamy soils. Parent material: chalky till.
- Holderness: Slowly permeable seasonally waterlogged fine loamy soils and similar soils with only slight waterlogging. Some narrow strips of clayey alluvial soils. Parent material: chalky till.
- Landbeach: Permeable calcareous coarse loamy soils affected by groundwater over chalky gravel. Parent material: Glaciofluvial sand and gravel.

20.4.79 Provisional Agricultural Land Classification (ALC) mapping, presented on **Figure 13.2 Provisional Agricultural Land Classification Mapping**, indicates that the Proposed Substation Works is located on Grade 2 land. Within the 1 km study area the land is largely comprised of Grade 2 land with the exception of a small pocket of Grade 3 land located within the northeastern edge of the study area. Based on this coverage, the provisional ALC information indicates that a large portion of the Proposed Substation Works are likely to comprise 'best and most versatile' (BMV) agricultural land – this being land associated with Grades 1, 2 and 3a[4].

20.4.80 A desk-based assessment using detailed aerial photography and Ordnance Survey mapping has shown that the land use across the Proposed Substation Works appears to be arable land.

20.4.81 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.1 The potential effects that could result from the construction of the Proposed Substation Works are:

- Temporary loss of agricultural land resulting in a reduction in the extent of productive agricultural land affecting the associated agricultural business.
- Temporary loss of BMV land.
- Potential effects on soil function resulting in a reduction in the ability of the soil to function and provide ecosystem services as a result of temporary soil disturbance.

[3] Data gaps in relation to soilscapes will be updated for the Environmental Statement

[4] The Provisional ALC mapping does not differentiate Grade 3 land into Subgrades 3a and 3b.

20.4.2 The potential effects that could result from the operation of the Proposed Substation Works include the permanent acquisition of land, including BMV land and a reduction in the extent of the most productive agricultural land.

20.4.3 No potential for effects on agriculture and soils associated with the maintenance of the Proposed Substation Works are predicted.

20.4.4 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Traffic and Transport

20.4.5 This section presents preliminary environmental information in relation to traffic and transport and is supported by the following Figures:

- **Figure 14.1 Primary Access Routes** (Sheet 1 of 14);
- **Figure 14.2 Sensitive Receptors** (Sheet 1 of 14);
- **Figure 14.3 Collision Data** (Sheet 1 of 16); and
- **Figure 14.4 Public Rights of Way Impacted During Construction Phase** (Sheet 1 of 36).

20.4.6 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the traffic and transport baseline conditions are provided in section 14.4 of **Chapter 14 Traffic and Transport**.

20.4.7 It is considered the A164 and A1079 between Hull and Beverley would be utilised for construction traffic vehicles to access the Proposed Substation Works.

20.4.8 Personal injury collision data have been obtained from STATS 19 Department for Transport Road Safety Data for the most recent period where data were available (2020 to 2023) (Ref 20.24), although data from 2023 was given as unvalidated. As such only the period 2020 to 2022 has been used. Collision data for the Primary Access Routes[5] to the Proposed Substation Works are illustrated in **Figure 14.3 Collision Data**.

20.4.9 A collision cluster is determined by the following criteria:

- A: A location where there are six or more injury collisions occurring within a junction or a 100 m stretch; and
- B: A location with three or more fatal and/or serious collisions happening either within a junction or within a 100 m stretch.

20.4.10 Analysis of the A164 and A1079 indicates that these routes both have collision clusters, rated as “A” (defined as a location where there are six or more injury collisions occurring within a junction or a 100 m stretch).

[5] Primary Access Routes (PAR) are comprised of key highway links which provide a route back to the Strategic Road Network or specific A roads, referred to as the Main Road Network.

20.4.11 The Proposed Substation Works would result in the permanent diversion of EY|Rowley|Bridleway No.13, as illustrated in **Figure 14.4 Public Rights of Way Impacted**. The following PRoW are located within the Proposed Substation Works boundary, however it is not considered they would be diverted or altered:

- Beverley Footpath (National Trail) 20;
- EY|Rowley|Bridleway No.13;
- EY|Woodmansey|Bridleway No.6;
- EY|Woodmansey|Bridleway No.30;
- EY|Rowley|Footpath No.12;
- EY|Skidby|Footpath No.11;
- EY|Skidby|Footpath No.16;
- EY|Woodmansey|Footpath No.7; and
- National Cycle Network Route number 1.

20.4.12 Baseline traffic flows will be obtained and reported in the ES. This will include traffic growth factors used to estimate future travel demand and traffic growth.

20.4.13 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.14 The potential effects that could result from the construction of the Proposed Substation Works are:

- Potential for increased severance to pedestrians, cyclists and bridleway users on road lines, road junctions and PRoW EY|Rowley|Bridleway No.13.
- Potential for effects associated with increased driver delay on road links and road junctions.
- Potential for increased pedestrian, cyclist and bridleway user delay on road links and road junctions.
- Potential for a decline in highway safety on road links and road junctions.
- Potential for fear and intimidation and reduction in pedestrian, cyclist, and equestrian amenity on road links, road junctions, PRoW, National trail 20 Beverley Footpath and National Cycle Network Route number 1.
- Traffic and transport effects associated with the operation of the Proposed Substation Works includes the permanent diversion of EY|Rowley|Bridleway No.13, as illustrated in **Figure 14.4 Public Rights of Way Impacted**.

20.4.15 No potential for effects on traffic and transport associated with the maintenance of the Proposed Substation Works are predicted.

20.4.16 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Air Quality

20.4.17 This section presents preliminary environmental information in relation to air quality and is supported by the following Figures.

- **Figure 15.1 Air Quality Baseline** (Sheet 1 of 13); and
- **Figure 15.2 Air Quality Construction Dust Study Area;** (Sheet 1 of 13).

20.4.18 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the air quality baseline conditions are provided in section 15.4 of **Chapter 15 Air Quality**.

20.4.19 A review of the existing baseline has been undertaken to establish an understanding of current air quality and to identify areas that are likely to be sensitive to changes in emissions as a result of the Proposed Substation Works.

20.4.20 Local authority monitoring data for the most recently reported years of 2023 for East Riding of Yorkshire did not show any exceedances of the annual mean nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}) or particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) Air Quality Strategy (AQS) objectives (Ref 20.25).

20.4.21 There are two automatic monitoring sites within 10 km of the Proposed Substation Works. The monitoring sites recorded mean annual concentrations are presented in Table 20.4 below.

Table 20.4 Automatic monitoring within 10 km of the Proposed Substation Works for Birkhill Wood

Monitoring Site	X (OS reference (m))	Y (OS reference (m))	Site Type	Distance from Proposed Substation Works	2022 Annual Mean Concentration (µg/m3)		
					NO_2	PM_{10}	$PM_{2.5}$
Bev ephyr	504859	439769	Roadside	3.7 km	14.2	13.8	12.8
Hess Zephyr	503048	425793	Roadside	10 km	9.1	12.6	11.7

East Riding of Yorkshire Council have not reported 2023 annual mean concentrations in the 2024 ASR.

20.4.22 There are nine non-automatic diffusion tube monitoring sites within 5 km of the Proposed Substation Works, as presented in Table 20.5 below (Ref 20.25).

Table 20.5 Diffusion tube monitoring within 5 km of the Proposed Substation Works for Birkhill Wood

Monitoring Site	X (OS reference (m))	Y (OS reference (m))	Site Type	Distance from Proposed Substation Works	Annual Mean NO_2 Concentration ($\mu g/m^3$)
ERYC S26	504637	440017	Roadside	3.8 km	12.3
ERYC S28	504697	439882	Roadside	3.7 km	22.7
ERYC S33	503754	439572	Roadside	3.0 km	18.8
ERYC S71	504488	439562	Roadside	3.3 km	13.1
ERYC S70	504063	439233	Roadside	2.8 km	16.1
ERYC S9	503086	439020	Roadside	2.28 km	21.4
ERYC S8	503064	439001	Roadside	2.26 km	21.3
ERYC S10	503013	438913	Kerbside	2.17 km	19.6
ERYC S22	504100	433232	Roadside	1.75 km	19

20.4.23 The average DEFRA background pollutant concentrations as set out in **Chapter 15 Air Quality** are considered applicable to the Proposed Substation Works. These are summarised in Table 20.6 below.

Table 20.6 Background pollutant concentrations 2024

Pollutant	Minimum Concentration ($\mu g/m^3$)	Maximum Concentration ($\mu g/m^3$)	Average Concentration ($\mu g/m^3$)	Annual Mean Air Quality Objective ($\mu g/m^3$)
NO_2	5.2	7.0	5.5	40
PM_{10}	11.3	15.9	13.4	40
$PM_{2.5}$	5.6	6.3	5.9	20

20.4.24 Background pollutant concentrations are predicted to decrease in future years, as evidenced by trends observed from local authority monitoring data and future predicted DEFRA background map concentrations (Ref 20.26).

20.4.25 Traffic emissions are likely to contribute to baseline air quality concentrations in the vicinity of the Proposed Substation Works. While vehicle numbers are likely to increase, emissions (per vehicle) are predicted to decrease over time due to new technology, increasingly stringent emission regulations and zero emission vehicles.

20.4.26 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.27 The potential effects that could result from the construction of the Proposed Substation Works are:

- Effects from dust deposition and health impacts from elevated PM_{10} concentrations on:
  - human receptors within 250 m of the Proposed Substation Works and 50 m of the route(s) used by construction vehicles on the public highway within 250 m of the proposed bellmouth; and
  - ecological receptors within 50 m of the Proposed Substation Works and 50 m of the route(s) used by construction vehicles on the public highway within 250 m of the proposed bellmouth.
- Effects on sensitive ecological and human receptors within 200 m of construction traffic routes from increases in local air pollutant concentrations and nitrogen deposition rates from vehicle emissions.
- Effects on sensitive ecological and human receptors within 200 m of Non-Road Mobile Machinery (NRMM).

20.4.28 Air quality effects from the operation and maintenance of the Proposed Substation Works are not expected to occur.

20.4.29 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Noise and Vibration

20.4.30 This section presents preliminary environmental information in relation to noise and vibration and is supported by the following Figures.

- **Figure 16.1 Baseline Conditions** (Sheet 1 of 13);
- **Figure 16.2 Construction Noise and Vibration Buffer Zone** (Sheet 1 of 13); and
- **Figure 16.3 Noise Sensitive Receptors Affected by Overhead Line Noise** (Sheet 1 of 13).

20.4.31 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the noise and vibration baseline conditions are provided in section 16.4 of **Chapter 16 Noise and Vibration**.

20.4.32 The closest settlements comprise Beverley, located 430 m north of the Proposed Substation Works, and Cottingham located approximately 1.2 km south of the Proposed Substation Works.

20.4.33 No Noise Important Areas are located within a 300 m study area of the Proposed Substation Works.

20.4.34 There are a total of 21 Noise Sensitive Receptors (NSR) within a 300 m study area of the Proposed Substation Works. The NSR types are identified in Table 20.7 below.

Table 20.7 Noise sensitive receptors within 300 m of the Proposed Substation Works at Birkhill Wood

NSR Type	Number of NSRs
Residential properties	10
Animal Centre	1
Storage Land	1
Utility	5
Development	4

20.4.35 The main existing sources of noise comprise road traffic from the A164 and A1079 between Hull and Beverley. There are also relatively low levels of traffic on Dunswell Road, which is located to the east of the Proposed Substation Works. DEFRA Road Noise mapping (Ref 20.28) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at NSRs within the study area.

20.4.36 Away from road traffic sources, ambient sound levels are low and comprise general rural noise, distant road traffic, foliage and bird song.

20.4.37 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.38 The potential effects that could result from the construction of the Proposed Substation Works are:

- Noise impact from construction activities on NSRs within 300 m of construction works.
- Vibration impact from construction activities on human NSRs within the 100 m of construction works.
- Noise impact from construction traffic on NSRs within 50 m of routes.

20.4.39 The potential effects that could result from the operation of the Proposed Substation Works include noise impacts associated with the operation of the reconfigured overhead line works.

20.4.40 No potential for effects on noise and vibration associated with the maintenance of the Proposed Substation Works are predicted.

20.4.41 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Socio-Economics, Recreation and Tourism

20.4.42 This section presents preliminary environmental information in relation to socio-economics, recreation and tourism and is supported by the following Figures:

- **Figure 17.1 Study Area** (1 of 13);
- **Figure 17.2 Community Facilities** (1 of 13);
- **Figure 17.3 Business, Recreation and Tourism Receptors** (1 of 13);
- **Figure 17.4 Recreational land and Recreational Routes** (1 of 13); and
- **Figure 17.5 60 Minute Drive Time** (Sheet 1 of 1).

20.4.43 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figures listed above. The data sources and study area for the socio-economic, tourism and recreation baseline conditions are provided in section 17.4 of **Chapter 17 Socio-Economics, Recreation and Tourism**.

20.4.44 The Proposed Substation Works are located in East Riding of Yorkshire. According to Office for National Statistics (ONS) Census data[6] (Ref 20.30 and Ref 20.31), East Riding of Yorkshire has experienced an increase in population of 2.4% in the 10-year period between 2011 and 2021. This percentage growth is lower than the regional and national rates with Yorkshire and the Humber percentage increasing by 3.7% and England by 6.6%.

20.4.45 The working age population (defined by ONS as people aged 16 to 64 proportions) recorded in the Census 2021[6] in East Riding of Yorkshire is at 58%. This is a lower working age population proportion than regionally (62% for Yorkshire and the Humber) and nationally (63%).

20.4.46 East Riding of Yorkshire has the smallest proportion of the population aged 15 years and under (16%), below the national average (19%), and a large proportion aged 65+ (26%), which is above the national average (18%).

20.4.47 Economic activity rates for East Riding of Yorkshire according to the ONS Census data (Ref 20.31) is 55%, this is a lower rate of economic activity than the rates for the Yorkshire and the Humber (56%) and the average for England (59%).

20.4.48 Labour productivity is provided by Gross Value Added (GVA) per filled job[7]. The East Riding of Yorkshire labour productivity is £59,088, this is higher than the labour productivity regionally with Yorkshire and the Humber at £53,549, but less than national levels with England labour productivity at £62,751.

---

6 To note, the Census 2021 statistics should be caveated as the data collection took place during the COVID-19 pandemic, which may affect the results of the dataset (for example, in terms of population, students may have been recorded studying from home rather than living away)

[7] GVA per filled job is a measure of productivity and is calculated by dividing economic output (GVA) by a measure of labour input (the number of filled jobs in a geographical area used to create it).

20.4.49 The latest unemployment data show that East Riding of Yorkshire is at 2.6%. This is a lower unemployment rate than regional (Yorkshire and the Humber at 3.4%) and national levels (England at 3.7%).

20.4.50 Employment by major occupational group, as recorded in Census 2021 data (Ref 20.31), is shown in Table **20**.**8**. In East Riding of Yorkshire, the highest proportion of occupations are in professional occupations. East Riding of Yorkshire has a higher proportion of process, plant and machine operatives (7.3%) than the national average (6.9%).

Table 20.8 People in employment by major occupational group in East Riding of Yorkshire, Yorkshire and the Humber and England

Major occupational group by Standard Occupational Classification (SOC) 2010	**East Riding of Yorkshire**	**Yorkshire and the Humber**	**England**
Total number employed	**156,119**	**2,461,368**	**26,405,214**
	%	**%**	**%**
Managers, directors and senior officials	13.7	11.2	12.9
Professional occupations	18.1	18.1	20.3
Associate professional and technical occupations	12.4	12.3	13.3
Administrative and secretarial occupations	9.1	9	9.3
Skilled trades occupations	12.5	11.1	10.2
Caring, leisure and other service occupations	9.5	9.7	9.3
Sales and customer service occupations	7.1	8.3	7.5
Process, plant and machine operatives	7.3	8.4	6.9
Elementary occupations	10.3	11.8	10.5

20.4.51 Skills and qualifications held by working people aged 16-64 as recorded in the 2021 Census (Ref 20.31) are shown in Table 20.9. In East Riding of Yorkshire, the proportion of the population with NVQ4+ qualifications (30.5%) are lower than the national average (33.9%).

Table 20.9 Skills and qualifications held by worked aged people (16-64) in East Riding of Yorkshire, Yorkshire and the Humber and England

Skills and qualifications	East Riding of Yorkshire	Yorkshire and the Humber	England
	%	%	%
People with NVQ4+	30.5	29.5	33.9
People with NVQ3+	17.2	17.4	16.9
People with NVQ2+	14.1	13.6	13.3
People with NVQ1+	10	10.1	9.7
People with Apprenticeships	7.2	6.1	5.3
People with other qualifications (NVQ)	2.8	2.6	2.8
People with no qualifications (NVQ)	18.2	20.6	18.1

20.4.52 Employment by broad industrial group is shown in Table 20.10, which is based on Standard Industrial Classification (SIC) groups (Ref 20.33) that classify businesses (and their employees) according to the type of their economic activity. In East Riding of Yorkshire, the three industries with the largest proportion of employment are Manufacturing (Sector C), Wholesale and Retail Trade (Sector G) and Human Health and Social Work Activities (Sector Q). This is consistent with the top three employment industries for the Yorkshire and the Humber, showing a regional concentration of employment in these industries.

Table 20.10 Employment by broad industrial group within East Riding of Yorkshire, Yorkshire and the Humber, and England

Broad industrial group SIC 2007	East Riding of Yorkshire	Yorkshire and the Humber	England
Total number employed	**130,350**	**2,473,750**	**27,151,000**
	%	%	%
A: Agriculture, forestry and fishing	3%	1%	1%
B: Mining and quarrying	0%	0%	0%
C: Manufacturing	16%	11%	8%
D: Electricity, gas, steam and air conditioning supply	0%	0%	0%

Broad industrial group SIC 2007	East Riding of Yorkshire	Yorkshire and the Humber	England
Total number employed	**130,350**	**2,473,750**	**27,151,000**
	%	**%**	**%**
E: Water supply; sewerage, waste management and remediation activities	1%	1%	1%
F: Construction	5%	5%	5%
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	15%	15%	14%
H: Transportation and storage	5%	5%	5%
I: Accommodation and food service activities	9%	7%	8%
J: Information and communication	2%	3%	5%
K: Financial and insurance activities	1%	3%	3%
L: Real estate activities	1%	1%	2%
M: Professional, scientific and technical activities	6%	7%	9%
N: Administrative and support service activities	5%	9%	9%
O: Public administration and defence; compulsory social security	6%	5%	4%
P: Education	9%	9%	9%
Q: Human health and social work activities	13%	15%	13%
R: Arts, entertainment and recreation	2%	2%	2%
S: Other service activities	1%	2%	2%
Other employment sectors (Sections T and U)	0%	0%	0%

20.4.53 In summary, the economic activity rate and the proportion of employment by broad industrial group in East Riding of Yorkshire are broadly in line with regional and national averages. This implies that businesses, workers and residents have an average capacity to experience an impact without incurring a change on their economic wellbeing. On this basis, the local economy isn't considered to be particularly sensitive to impacts on employment.

20.4.54 No residential properties are located within the Proposed Substation Works. Within 500 m of the Proposed Substation Works is the settlement of Beverley located 425 m to the north. There are 21 number of isolated residential properties also within 500 m of the Proposed Substation Works.

20.4.55 Socio-economic, recreation and tourism receptors within 500 m of the Proposed Substation Works include Bentley Sanctuary Stone tourist attraction and three local wildlife sites (Bentley Moor Wood LWS, Birkhill Wood LWS and Woodhill Path Cottingham LWS).

20.4.56 The Proposed Substation Works would result in the permanent diversion of EY|Rowley|Bridleway No.13, as illustrated in **Figure 14.4 Public Rights of Way Impacted**. The following PRoW are located within the Proposed Substation Works boundary, however it is not considered they would be diverted or altered:

- Beverley Footpath (National Trail) 20;
- EY|Skidby|Bridleway No.7;
- EY|Rowley|Bridleway No.13;
- EY|Woodmansey|Bridleway No.6;
- EY|Woodmansey|Bridleway No.30;
- EY|Rowley|Footpath No.12;
- EY|Skidby|Footpath No.11;
- EY|Skidby|Footpath No.16;
- EY|Woodmansey|Footpath No.7; and
- National Cycle Network Route number 1.

20.4.57 The Proposed Substation Works would require a Bellmouth and highway widening works on the A1079 Beverley Bypass

20.4.58 One wind turbine would need to be removed to facilitate the Proposed Substation Works.

20.4.59 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.60 The potential effects that could result from the construction of the Proposed Substation Works are:

- Generation of employment, training and apprenticeship opportunities, both directly at work sites and indirectly in the supply chain.
- The effect of the employment, training and apprenticeship opportunities on the local economy (through the generation of Gross Value Added (GVA)).
- Potential temporary amenity impacts on residential properties, local businesses, visitor attractions, community facilities, open space, and/or development land.

20.4.61 The potential effects that could result from the operation of the Proposed Substation Works include:

- Permanent amenity impacts on residential properties, local businesses, visitor attractions, community facilities, open space, and/or development land.
- Permanent diversion of PRoW EY|Rowley|Bridleway No.13.

20.4.62 No potential socio-economic, recreation and tourism effects associated with the maintenance of the Proposed Substation Works are predicted.

20.4.63 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Health and Wellbeing

20.4.64 This section presents preliminary environmental information in relation to health and wellbeing and is supported by the following Figure:

- **Figure 18.1 Health and Wellbeing Baseline Study Area** (Sheet 1 of 13).

20.4.65 The Proposed Substation Works boundary for the proposed Birkhill Wood Substation and the associated overhead line works is shown on the figure listed above. The data sources and study area for the health and wellbeing baseline conditions are provided in section 18.4 of **Chapter 18 Health and Wellbeing**.

20.4.66 The resident population of local authority, regional and national area as recorded in the Census 2021[6] (Ref 20.31) are shown in Table 20.11.

Table 20.11 Population, population change and age cohorts for East Riding of Yorkshire, Yorkshire and the Humber and England.

Local Authority area	Population in 2021	Percentage change since Census 2011	Percentage aged 14 years and under in 2021	Percentage aged 15-64 years in 2021	Percentage aged 65+ years in 2021
East Riding of Yorkshire	342,215	2.4%	15%	59%	26%

Local Authority area	Population in 2021	Percentage change since Census 2011	Percentage aged 14 years and under in 2021	Percentage aged 15-64 years in 2021	Percentage aged 65+ years in 2021
Yorkshire and the Humber	5,480,774	3.7%	17%	64%	19%
England	56,490,048	6.6%	17%	64%	18%

Source: Office for National Statistics (2022, 2011); Census 2021 (Ref 20.31), Census 2011 (Ref 20.30). Note: Table may not sum due to rounding.

20.4.67 The Census 2021 (Ref 20.31) contains data on the ethnicity demographics for all the geographies; these statistics are summarised below in Table 20.12.

Table 20.12 Ethnicity for East Riding of Yorkshire, Yorkshire and the Humber and England.

Local Authority area	Asian, Asian British or Asian Welsh (%)	Black, Black British, Black Welsh, Caribbean or African (%)	Mixed or Multiple ethnic groups (%)	White (%)	Other ethnic group (%)
East Riding of Yorkshire	1.1	0.3	0.9	97.4	0.4
Yorkshire and the Humber	8.9	2.1	2.1	85.4	1.4
England	9.6	4.2	3.0	81.0	2.2

Source: Office for National Statistics, (2022); Census 2021 (Ref 20.31).

20.4.68 Economic activity rates of those 16 years and older (excluding full-time students) for all the geographies, provided by Census 2021 data (Ref 20.31), are shown in Table 20.13 below.

Table 20.13 Economic activity for East Riding of Yorkshire, Yorkshire and the Humber and England.

Local Authority area	Economic activity rate Census 2021 (%)	Unemployment Rate Census 2021 (%)	Office for National Statistics (Claimants as a proportion of residents aged 16-64) July 2024 (%)
East Riding of Yorkshire	55	2.3	2.7
Yorkshire and the Humber	56	3.4	4.8
England	59	3.5	4.4

20.4.69 Skills and qualifications held by working people aged 16-64 as recorded in the 2021 Census (Ref 20.31) are presented in Table 20.14.

Table 20.14 Skills and qualifications held by worked aged people (16-64) East Riding of Yorkshire, Yorkshire and the Humber and England.

Skills and Qualifications	East Riding of Yorkshire (%)	Yorkshire and the Humber (%)	England (%)
People with NVQ4+	30.5	29.5	33.9
People with NVQ3+	17.2	17.4	16.9
People with NVQ2+	14.1	13.6	13.3
People with NVQ1+	10	10.1	9.7
People with Apprenticeships	7.2	6.1	5.3
People with other qualifications (NVQ)	2.8	2.6	2.8
People with no qualifications (NVQ)	18.2	20.6	18.1

20.4.70 The ONS provides data for the Gross Disposable Household Income (GDHI) in International Territorial Level (ITL) regions across the UK in 2021 (Ref 20.35) that was used to determine the GDHI per geographical demographic. East Riding of Yorkshire has a GDHI per person of £20,430, Yorkshire and the Humber has a GDHI per person of £18,363 and England has a GDHI per person of £22,213.

The ONS provides data on deprivation through the Indices of Multiple Deprivation 2019 ([Accessed: January 2025].

20.4.71 Ref 20.36) as shown in Table 20.15. There are 32,844 Lower Layer Super Output Areas (LSOAs) in England, the Index of Multiple Deprivation ranks them from most deprived (1st) to least deprived (32,844th) across multiple domains, as well as assigning them an overall rank.

Table 20.15 2019 Deprivation in the East Riding of Yorkshire

Deprivation	East Riding of Yorkshire
Percentage of LSOAs in the most deprived decile (decile 1) of the Index of Multiple Deprivation	6.2%
Average LSOA Decile in the Index of Multiple Deprivation	7
Average LSOA rank in the Index of Multiple Deprivation	20,624

Deprivation	East Riding of Yorkshire
Percentage of LSOAs in the most deprived decile (decile 1) of the health deprivation and disability domain	3.3%
Average LSOA Decile in the health deprivation and disability domain	7
Average LSOA rank in the health deprivation and disability domain	21,231

20.4.72 According to the Community Life Survey (Ref 20.37), in the regions of Yorkshire and the Humber the most granular level of data, 66% respectively of respondents in 2021/2022 felt like they belonged strongly or fairly strongly to their immediate neighbourhood. This is similar to the average for England (65%).

20.4.73 As part of the 2021 Census, respondents were asked to self-assess the state of their health, both physical and mental (Ref 20.31). This can be seen for the local authority, regional comparator and national comparator below in Table 20.16.

Table 20.16 Self-assessed general health in East Riding of Yorkshire, Yorkshire and the Humber and England.

Self-Assessed General Health	East Riding of Yorkshire	Yorkshire and the Humber	England
Very good health (%)	44.9	46.2	48.5
Good health (%)	35.4	34.3	33.7
Fair health (%)	14.4	13.7	12.7
Bad health (%)	4.1	4.5	4.0
Very bad health (%)	1.3	1.3	1.2

20.4.74 Mental health and well-being profiles produced by Public Health England (PHE) (now the Office for Health Improvement and Disparities) provide a summary of the mental health of people within local authority areas and a comparison of local mental health with average values for all areas of England (Ref 20.38). The most recent data published from 2017 details the proportion of population aged 16 and over with a common mental disorder in East Riding of Yorkshire (14.2%), Yorkshire and the Humber (17.6%), and England (16.9%).

20.4.75 Data on disabilities, physical conditions and mental conditions is available from the 2021 Census (Ref 20.31) and is presented below in Table 20.17.

Table 20.17 Disability prevalence in East Riding of Yorkshire, Yorkshire and the Humber and England

Self-Assessed General Health	East Riding of Yorkshire	Yorkshire and the Humber	England
Disabled under the Equality Act (%)	18.6	18.6	17.3
Day-to-day activities limited a lot (%)	7.7	8.1	7.3
Day-to-day activities limited a little (%)	10.9	10.5	10.0
Not disabled under the Equality Act (%)	81.4	81.4	82.7
Has long term physical or mental health condition but day-to-day activities are not limited (%)	7.7	6.9	6.8
No long term physical or mental health conditions (%)	73.7	74.4	75.9

20.4.76 The Socio-economics, Recreation and Tourism Section of this report, provides details on the PRoW, business and recreational assets within 500 m of the Proposed Substation Works.

20.4.77 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.78 The potential effects that could result from the construction of the Proposed Substation Works are:

- On residents' access to services.
- On local workers from increased employment and income for the construction workforces.
- On education and training levels locally due to upskilling and apprenticeships from the Proposed Substation Works.
- On transport modes, access and connections due to impacts on PRoW, traffic and pedestrians.
- On local communities from a reduction in air quality due to dust and air pollutants associated with the construction of the Proposed Substation Works.
- On local communities from construction noise and vibration.
- On local and national climate change mitigation and adaption from greenhouse gas emissions associated with the Proposed Substation Works.
- On local communities from a reduction in water quality due to water pollution associated with the Proposed Substation Works.

20.4.79 Health and wellbeing effects associated with the operation of the Proposed Substation Works includes the permanent diversion of EY | Rowley | Bridleway No.13.

20.4.80 No potential has been identified for effects on health and wellbeing associated with the maintenance of the Proposed Substation Works are predicted.

20.4.81 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Climate Change

20.4.82 The preliminary assessment has identified that the existing land uses within the Proposed Substation Works consist of arable land. The immediate surrounding landscape includes arable land, Dogger Bank Wind Farm Substation, the existing Creyke Beck Substation and existing overhead lines. Individual trees and woodland are also present in some areas.

20.4.83 The assessment on GHG emissions for the Project, including the Proposed Substation Works are presented in **Chapter 19 Climate Change**.

20.4.84 The current baseline on climate data is based on historical climate data from the nearest weather station, named Hull (Kingston upon Hull) Station, from the Met Office website. The historic climate data at Hull (Kingston upon Hull) Station is presented in Table 20.18.

Table 20.18 Met Office Historic Climate Data at Hull (Kingston Upon Hull) Station

Climate Variable	Baseline (1991-2020)
Mean annual maximum daily temperature (°C)	14.45
Mean Summer maximum daily temperature (°C)	21.13
Mean Winter maximum daily temperature (°C)	8.07
Highest temperature for baseline period (°C)	22.02 (July)
Lowest temperature for baseline period (°C)	7.74 (Jan)
Mean annual rainfall (mm)	693.45
Mean Summer rainfall (mm)	65.19
Mean Winter rainfall (mm)	54.13
Wettest month on average (mm)	68.29 (November)
Driest month on average (mm)	43.30 (March)
Mean monthly wind speed at 10m (knots)	8.92 (England E & NE)

20.4.85 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.4.86 The Proposed Substation Works has the potential to affect, and be affected by, climate change (both adversely or beneficially), during its construction, operation and maintenance in the following ways:

- Resilience of the Proposed Substation Works to projected future climate change impacts, including damage to the Proposed Substation Works resulting from climate change; and
- How the resilience of receptors in the surrounding environment are affected by the combined impact of future climate conditions and the Proposed Substation Works.

20.4.87 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

20.5 Preliminary Environmental Information for the Proposed Substation Works at High Marnham

Landscape

20.5.1 This section presents preliminary environmental information in relation to landscape and is supported by the following Figures:

- **Figure 6.1 Landscape Designations and Features** (Sheet 8 of 8);
- **Figure 6.2 Landform and Drainage** (Sheet 8 of 8);
- **Figure 6.3 National Landscape Character Areas** (Sheet 8 of 8); and
- **Figure 6.4 Landscape Character Types** (Sheet 8 of 8).

20.5.2 The Proposed Substation Works is shown on the figures listed above. The data sources and study area for the landscape baseline conditions are provided in section 6.4 of **Chapter 6 Landscape**.

20.5.3 The Proposed Substation Works are located wholly within NCA 48: Trent and Belvoir Vales, as shown on **Figure 6.3 National Landscape Character Areas**. The landscape comprises the flat, low-lying arable farmland, centred on the River Trent, which gradually merges into a more undulating and enclosed landscape away from the river. Woodland cover is sparse, but hedgerow and riverside trees contribute to a perception of a well-treed landscape (Ref 20.9). The cooling towers of the former Trent Valley power stations and associated overhead lines are widely visible.

20.5.4 In terms of the East Midlands Region Landscape Character Assessment (Ref 20.32), the flat and low-lying arable farmland in the Trent floodplain is classed as Regional Landscape Character Type (RLCT) 3a: Floodplain Valleys while the slightly higher ground to either side is RLCT 4a: Unwooded Vales.

20.5.5 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of

this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.6 The potential effects that could result from the Proposed Substation Works during construction relate to physical and perceptible effects on landscape character and/or the setting of designated landscapes from construction, including vegetation removal and the presence of storage areas, access roads and tracks, plant (including mobile cranes), vehicles and personnel.

20.5.7 The potential effects that could result from the operation include physical and perceptible effects on landscape character from the long-term loss of landscape elements and features, and introduction of new infrastructure. The proposed overhead line configuration works will result in the net removal of 18 pylons and approximately 5 km of overhead line which could result in potential beneficial effects on landscape character.

20.5.8 No potential landscape effects from the maintenance of the Proposed Substation Works are predicted.

20.5.9 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Visual

20.5.10 This section presents preliminary environmental information in relation to visual amenity and is supported by the following Figures:

- **Figure 7.1 Visual Receptors and Viewpoints** (Sheet 8 of 8); and
- **Figure 7.2 Zone of Theoretical Visibility** (Sheet 8 of 8).

20.5.11 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the visual amenity baseline conditions are provided in section 7.4 of **Chapter 7 Visual**.

20.5.12 The Proposed Substation Works would not be located within a designated landscape.

20.5.13 The 5 km study area is characterised by flat, large-scale farmland typical of the Trent Valley. To the east and west, the valley floor is narrower and visually more contained, bordered by rising, undulating farmland and a greater density of trees and woodlands.

20.5.14 Existing views are influenced by the presence of multiple 132 kV, 275 kV and 400 kV overhead lines, which affect the overall quality of the otherwise rural scene. However, the impact of this infrastructure is often locally mitigated by the trees and woodlands around the substation and former power station, along the disused rail line, and around the small villages scattered throughout the farmland.

20.5.15 The following receptors are considered to be susceptible to changes in their views as a result of the Proposed Substation Works:

- Residents in the settlements associated with the parishes Weston, Normanton on Trent, Marnham (east), Fledborough (east), Grassthorpe, Thorney, North Clifton, Wigsley, South Clifton, Spalford, Girton, Sutton-on-Trent, and Meering and residents on the edge of the larger settlements of Ragnall and North Scarle, as well as those in the individual properties and farmsteads dispersed throughout the area.

- Users of the PRoW network which includes the Trent Valley Way and National Cycle Network Route 647.
- Visitors to Marnham Meadows Holiday Park and Girton Sailing Lake, located to the south of the Proposed Substation Works.

20.5.16 Generally, views within 5 km of the Proposed Substation Works tend to be valuable to the local community. While there are pockets of views away from existing overhead lines that contain character-forming features and few discordant elements, the presence of the existing 400 kV and 275 kV overhead lines converging at the existing High Marnham Substation, reducing the aesthetic and perceptible quality of views closer to the Proposed Substation Works.

20.5.17 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.18 The potential effects that could result from the construction of the Proposed Substation Works are:

- Potential for effects on the composition and character of views experienced by the people living and moving around communities and engaging in recreational activities, including people using PRoW.
- Potential for effects on the composition and character or views, which may impact the residential visual amenity of the occupants of individual properties.

20.5.19 The potential effects that could result from the operation of the Proposed Substation Works are:

- Potential for effects on the composition and character of views experienced by the people living and moving around communities and engaging in recreational activities, including people using PRoW.
- Potential for effects on the composition and character or views, which may impact the residential visual amenity of the occupants of individual properties.
- Potential for effects on composition and character of views experienced by people at protected viewpoints, panoramas and viewing corridors.

20.5.20 No visual effects arising from maintenance of the Proposed Substation Works are predicted.

20.5.21 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Ecology

20.5.22 This section presents preliminary environmental information in relation to ecology and is supported by the following Figures:

- **Figure 8.1 International Sites Designated for Nature Conservation within 10 km and National and Local Statutory Designated Sites within 5 km** (Sheet 4 of 4);

- **Figure 8.2 Non Statutory Sites Designated for Nature Conservation and Priority Habitat within 2 km** (Sheet 11 of 11);
- **Figure 8.3 Phase 1 Habitat Survey** (Sheet 35 and 36 of 36);
- **Figure 8.4 Aquatic Survey Locations** (Sheet 13 of 13); and
- **Figure 8.5 Arboricultural Survey Results** (Sheet 10 of 10).

20.5.23 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the ecology baseline conditions are provided in section 8.4 of **Chapter 8 Ecology**.

20.5.24 There are no international designated sites for nature conservation located within 10 km and no local statutory designated sites within 5 km of the Proposed Substation Works.

20.5.25 There is one statutory designated site of national importance within 5 km of the Proposed Substation Works named Spalford Warren SSSI, located 3 km southeast.

20.5.26 There are eleven non-statutory designated sites for biodiversity located within 2 km of the Proposed Substation Works, as listed in **Table 20.19** below and illustrated in **Figure 8.2 Nature Conservation Non-Statutory Designated Sites and Priority Habitat within 2 km**:

Table 20.19 Local Non-Statutory Sites designated for nature conservation

Designation	Approximate distance from the Proposed Substation Works
Dunham Oxbow LWS	1.14 km
Dunham Dubs LWS	1.18 km
Fledborough Home LWS	Partially within Proposed Substation Works boundary
Fledborough to Harby Dismantled Railway LWS	Partially within the Proposed Substation Works boundary
Marnham Railway Yard Candidate LWS	Partially within the Proposed Substation Works boundary
Skegby Road Triangle LWS	Partially within the Proposed Substation Works boundary
Meadow Lane Grasslands, Normanton on Trent LWS	1.81 km
Old Trent, Marnham LWS	0.26 km
North Clifton Church LWS	0.52 km
South Clifton Grassland LWS	0.74 km
Old Trent Oxbow, Spalford LWS	1.02 km

20.5.27 The desk study identified priority habitat Deciduous woodland (32.6 ha), Coastal and floodplain grazing marsh (150 ha), Traditional orchard (2.9 ha), Good quality semi improved grassland (0.5 ha), Lowland fens (0.85) and No main habitat but additional habitats present (1.25 ha) located within 2 km of the Proposed Substation Works.

20.5.28 There are no ancient or veteran trees recorded within 50 m of the draft Order Limits associated with the Proposed Substation Works, as recorded on the Woodland Trust Ancient Tree Inventory (Ref 20.42).

20.5.29 The findings of a phase 1 habitat survey undertaken for the Proposed Substation Works will be presented in the ES.

20.5.30 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.31 The potential effects that could result from the construction and maintenance of the Proposed Substation Works are:

- Permanent and temporary direct habitat loss and temporary disturbance and fragmentation of protected and notable species.
- Incidental mortality of protected and notable species.
- Disturbance to protected or notable species from noise, vibration, visual and lighting.
- Changes in air quality on designated sites and notable habitats within 200 m of the construction traffic routes.
- Pollution impacts on designated sites and notable habitats.
- Introduction of INNS leading to the degradation of the habitat quality of designated and protected sites and notable habitats and species.
- Loss/reduction in habitat quality of designated/Priority Habitats and habitat quality for protected/notable species from changes in groundwater levels.

20.5.32 During the operation of the Proposed Substation Works, there is potential for effects on protected and notable species due to habitat fragmentation, which could create a barrier to species dispersal.

20.5.33 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Ornithology

20.5.34 This section presents preliminary environmental information in relation to ornithology and is supported by the following Figures:

- **Figure 9.1 Study Areas** (Sheet 1 of 4);
- **Figure 9.2 Vantage Point Location s** Sheet 1 of 6);
- **Figure 9.3 Vantage Point Viewing Arcs** (Sheet 1 of 6);
- **Figure 9.9 CBC Survey Areas** (Sheet 6 of 6);

- **Figure 9.10 International Statutory Designated Sites** (Sheet 1 of 1);
- **Figure 9.11 National and Local Statutory Designated Sites** (Sheet 1 of 1); and
- **Figure 9.13 BTO WeBS Core Count Sectors** (Sheet 3 of 3).

20.5.35 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the ornithology baseline conditions are provided in section 9.4 of **Chapter 9 Ornithology**.

20.5.36 There are no statutory designated sites on international importance within 30 km, national and local nature conservation value within 5 km of the Proposed Substation Works. There are no non-statutory designated sites of nature conservation for ornithological interest within 2 km of the Proposed Substation Works.

20.5.37 The ornithology surveys undertaken for the Proposed Substation Works and associated results will be detailed in the ES.

20.5.38 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.39 The potential effects that could result from the construction of the Proposed Substation Works are:

- Permanent and temporary direct habitat loss and temporary disturbance.
- Incidental mortality of breeding and non-breeding birds.
- Disturbance to protected or notable species from noise/vibration, visual and lighting.
- Changes in air quality on designated sites within 200 m of the construction traffic routes.
- Pollution impacts on designated sites and notable species.
- Loss/reduction in habitat quality used by protected/notable birds from changes in groundwater levels.

20.5.40 The potential effects that could result from the operation of the Proposed Substation Works are:

- Effects on protected and notable species via habitat fragmentation as a result of the Proposed Substation Works creating a barrier to species dispersal.
- Habitat gains for some nesting bird species through the introduction of gantries.

20.5.41 The potential effects that could result from the maintenance of the Proposed Substation Works are:

- Incidental mortality of birds.
- Disturbance to protected or notable bird species from noise/vibration, visual and lighting.

20.5.42 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Cultural Heritage

20.5.43 This section presents preliminary environmental information in relation to cultural heritage and is supported by the following Figures:

- **Figure 10.1 Designated Heritage Assets Within Study Areas** (Sheet 25 and 26 of 26); and
- **Figure 10.2 Non-Designated Heritage Assets Within 1 km Study Area** (Sheet 30 and 31 of 31).

20.5.44 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the cultural heritage baseline conditions are provided in section 10.4 of **Chapter 10 Cultural Heritage**.

20.5.45 The following scheduled monuments, and associated NHLE Nº, are located within 3 km of the Proposed Substation Works, as listed below and illustrated in **Figure 10.1 Designated Heritage Assets Within Study Areas**:

- Whimpton Moor medieval village and moated site (NHLE Nº: 1017567);
- Roman Vexillation Fortress, two Roman Marching Camps, and a Royal Observer Corps monitoring post, Newton on Trent (NHLE Nº: 1003608); and
- Moat, three fishponds, enclosures, hollow way and part of a road at Hall Yard (NHLE Nº: 1008247).

20.5.46 There is one conservation area named South Clifton and 78 listed buildings within 3 km of the Proposed Substation Works, of which 4 are Grade I, 68 are Grade II and 6 are Grade II*.

20.5.47 Information on non-designated assets (as recorded in the Historic Environment Record) within 1 km of the Proposed Substation Works will be presented in the ES.

20.5.48 The Proposed Substation Works are located within the historic landscape NCA 48: Trent and Belvoir Vales. Peat deposits are reported in the River Trent and Ouse valley, which the Proposed Substation Works are located within, although it remains unclear whether localised peat deposits relate to the former glacial lake or to the peat accumulated during the Holocene.

20.5.49 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.50 The potential effects that could result from the construction and maintenance of the Proposed Substation Works are:

- Potential for permanent physical impacts on historic landscapes.
- Potential for temporary impacts on designated heritage assets as a result of changes to their setting.
- Potential for temporary impacts on non-designated heritage assets as a result of changes to their setting.

20.5.51 The potential effects that could result from the operation of the Proposed Substation Works are:

- Potential for permanent impacts to designated heritage assets as a result of changes to their setting.
- Potential for permanent impacts to non-designated heritage assets as a result of changes to their setting.
- Potential for permanent impacts to historic landscapes as a result of changes to their setting.

20.5.52 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Water Environment

20.5.53 This section presents preliminary environmental information in relation to water environment and is supported by the following Figures:

- **Figure 11.1 Study Area and Water Environment Features** (Sheet 8 of 8);
- **Figure 11.2 Flood Risk Areas** (Sheet 13 of 13); and
- **Figure 11.3 Water Framework Directive Surface Waterbody Status** (Sheet 8 of 8).

20.5.54 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the water environment baseline conditions are provided in section 11.4 of **Chapter 11 Water Environment**.

20.5.55 River Trent is a main river located 500 m from the Proposed Substation Works, as illustrated in **Figure 11.1 Study Area and Water Environment Features**.

20.5.56 There are two ordinary watercourses which intercept the Proposed Substation Works, both are tributaries of the River Trent, as illustrated in **Figure 11.1 Study Area and Water Environment Features** and **Figure 11.3 Water Framework Directive Surface Waterbody Status**. These are:

- Fledborough Beck, located within the north of the Proposed Substation Works; and
- Trent from Carlton-on-Trent to Laughton Drain, located within the southwest of the Proposed Substation Works.

20.5.57 Fledborough Beck and Trent from Carlton-on-Trent to Laughton Drain have a moderate ecological status and a failing chemical status. Multiple reasons for not achieving good (RNAG) status are reported, both include ‘PBDE’, ‘Mercury and its compounds’, and ‘Phosphate’ from point (sewage discharge) and diffuse (poor agricultural and soil management) sources.

20.5.58 In terms of physical form, Fledborough Beck is ‘not designated artificial or heavily modified’, indicating it is substantially natural in character and therefore sensitive to change. The Trent from Carlton-on-Trent to Laughton Drain is designated as ‘artificial’, indicating a waterbody created by human activity. In terms of its hydromorphological qualities, the waterbody is highly modified and therefore less sensitive to change. In

terms of the hydrological regime, both waterbodies are designated with a status of 'supports good'.

20.5.59 The two ordinary watercourses within the Proposed Substation Works (Fledborough Beck and Trent from Carton-on-Trent to Laughton Drain) and land drains, generally flow in an easterly/north-easterly direction into the River Trent. This catchment can be categorised as mostly rural in its land use, with topography that slopes in an easterly direction.

20.5.60 The Proposed Substation Works would necessitate the installation of 6 permanent culverts, 2 temporary culverts and 1 permanent bridge at watercourse crossings, as illustrated in **Figure 4.6 Proposed High Marnham Substation and Associated Works Proposed Construction Works** (Sheet 2).

20.5.61 The Proposed Substation Works are not located within a surface water Drinking Water Protected Area or surface water Drinking Water Safeguard Zone. The Proposed Substation Works are located within a NVZ.

20.5.62 According to the Environment Agency Flood Map for Planning (Ref 20.12), the Proposed Substation Works are located almost entirely in Flood Zone 1 (low risk), equivalent to an annual chance of flooding from rivers and the sea of less than 1 in 1,000 (0.1%). However, there are several areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk), located in proximity to the watercourses crossed by the Proposed Substation Works, as illustrated in **Figure 11.2 Flood Risk Areas**.

20.5.63 According to the Environment Agency Asset Information and Maintenance (Ref 20.13) database, there are no flood defences located within the 500 m study area.

20.5.64 The Recorded Flood Outline dataset (Ref 20.14) shows that no land in the Proposed Substation Works has previously been flooded; however, there has been previous flooding of land in close proximity.

20.5.65 The Risk of Flooding from Surface Water map shows that whilst a large area of the land within the Proposed Substation Works is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%), there are several large areas of surface water flooding ranging from high (3.3.% annual chance of flooding) to low (0.1% annual chance of flooding) risk.

20.5.66 The long-term flood risk map for England (Ref 20.12) shows there is some reservoir flooding 'where there is also flooding from rivers' along the eastern edge of the proposed substations works, in close proximity to the River Trent. This data source also defines flooding from groundwater is unlikely.

20.5.67 The land within the Proposed Substation Works is therefore not considered to be particularly at risk of flooding from rivers, the sea, surface water, reservoirs and groundwater.

20.5.68 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.69 The potential effects that could result from the construction of the Proposed Substations Works are:

- Construction activities such as soil stripping, earthworks and excavation and the use and refuelling of plant, giving rise to pollution of water environment receptors from silt, hydrocarbons, and other construction materials.
- Physical disturbance and change in flow regime at watercourse crossings.
- Increased rates and volumes of rainfall runoff, reduced channel flow capacity due to siltation, and disruption to the land drainage regime.
- Temporary works in the floodplains of watercourses, for example materials storage, reducing floodplain storage and disrupting flow routes, consequently increasing flood risk to people, existing property and infrastructure.
- Increased surface water flood risk due to the construction of areas with impermeable land cover, generating increased rates and volumes of surface water runoff, and disruption to the land drainage regime.

20.5.70 The potential effects that could result from the operation of the Proposed Substation Works are limited to increased surface water flood risk due to the introduction of permanent areas of impermeable land cover for the footprint of the Proposed Substation Works, generating increased rates and volumes of surface water runoff, and disruption to the land drainage regime.

20.5.71 No potential effects on the water environment are expected during maintenance of the Proposed Substation Works are predicted.

20.5.72 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Geology and Hydrogeology

20.5.73 This section presents preliminary environmental information in relation to geology and hydrogeology and is supported by the following Figures:

- **Figure 12.1 Superficial Geology** (Sheet 13 of 13);
- **Figure 12.2 Bedrock Geology** (Sheet 13 of 13); and
- **Figure 12.4 Source Protection Zones** (Sheet 7 of 7).

20.5.74 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the geology and hydrogeology baseline conditions are provided in section 12.4 of **Chapter 12 Geology and Hydrogeology**.

20.5.75 Superficial deposits within a 250 m study area of the Proposed Substation Works are limited to small sections of Alluvium and Holme Pierrepont sand and gravel (Ref 20.16), as shown on **Figure 12.1 Superficial Geology**.

20.5.76 Alluvium is a general term for clay, silt, sand and gravel, described as (Ref 20.16):

'*Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel*'

20.5.77 Holme Pierrepont sand and gravel is described as (Ref 20.16):

'predominantly cold-phase sands and gravels that underlie the Holme Pierrepont Terrace. Generally pinkish, poorly sorted and compositionally rather immature matrix-supported, sandy, trough-cross bedded (braided river) gravels with syndepositional ice-wedge casts.Gravel dominated by rounded pebbles of "Bunter" quartz/quartzite (typically c. 80%), plus flint, Triassic and Upper Carboniferous sandstone, Lower Carboniferous cherts, etc, and other "exotic" lithogies. Forms a fairly well preserved terrace typically 1 to 2 m above the floodplain in the upper and middle Trent, with the deposits extending beneath those of the younger Hemington Terrace and the floodplain alluvium.'

20.5.78 Bedrock geology is illustrated on **Figure 12.2 Bedrock Geology** and the Proposed Substation Works and 250m study area is entirely comprised of Mercia mudstone group, described as (Ref 20.16):

'Dominantly red…mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread; thin sandstones are also present.'

20.5.79 DEFRA's MAGIC map (Ref 20.18) indicates that the Proposed Substation Works area is located within a Secondary B Aquifers, described by the Environment Agency as:

'*mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers*' (Ref 20.20)

20.5.80 DEFRA's MAGIC map (Ref 20.18) indicates that the groundwater within 500 m of the Proposed Substation Works is primarily classified as High vulnerability with small sections classified as Medium vulnerability. The Environment Agency define High vulnerability as:

'Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits'

and areas of Low vulnerability as:

'Areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability'.

Medium vulnerability is described as intermediate between Low and High vulnerability (Ref 20.19).

20.5.81 No geo-conservation receptors, local geological sites or mineral safeguarding areas have been identified within a 500 m study area, and no source protection zones have been identified within a 500 m study area.

20.5.82 In the context of slope stability, soil erosion and groundwater levels, it is not considered that these factors would have a notable impact on the potential effects given the nature of the Proposed Substation Works and the inherent engineering design.

There are two sites within 500 m of the Proposed Substation Works, where historical potentially contaminative land uses have occurred or where the current land use is potentially contaminative. This includes High Marnham Power Station historical landfill and High Marnham Power Station historical landfill site and Current Substation. Available information relating to these sites and their associated PSC are presented in Table 20.20 and Table 20.21 below.

Table 20.20 Former High Marnham Power Station and Current Substation

Site name/ref	S11-PSC2 – Former High Marnham Power Station and current substation
Site location and description	Sparrow Lane, Marnham, High Marnham, Bassetlaw (480950E, 371103N). The site has mostly been demolished with areas of hardstanding present. The bases of the cooling towers appear to still be in place. The south-west part of the site is in use as the current National Grid substation.
Site history	A general internet search has indicated that the coal fuelled power station was first constructed in 1959 and become fully operational in 1962. The plant operated until 2003 when it was decommissioned, though the cooling towers weren't demolished until 2012. Historical Google aerial imagery shows that the north of the site was utilised to stockpile waste material from the power station. The south-west part of the site is currently in use as an electricity substation.
Geology	The BGS Geoindex indicates that superficial deposits are likely to be absent across the southern part of the site with the Holme Pierrepont sand and gravel present to the north. The bedrock is indicated to comprise the Mercia Mudstone Group.
Hydrogeology	The Mercia Mudstone Group which forms the bedrock at the site, is classified as a Secondary B Aquifer with the superficial Holme Pierrepont gravels classified as a Secondary A Aquifer. The site is not located within a SPZ or a Drinking Water Safeguarded Zone for groundwater.
Environmental setting	None.
Potential for generating contamination	High.
Potential contaminants	Heavy metals, ash, clinker, sulphates, PFA, hydrocarbons, polychlorinated biphenyls (PCBs).
Potential receptors	Human health – construction/maintenance workers. Groundwater.

Potential source	Potential pathway	Potential effects
Contaminated ground	Ingestion Inhalation Direct dermal contact	The potential for effects from this site to affect ingestion, inhalation and direct dermal contact from construction/maintenance workers is considered low
	Leaching Migration Deposition	The potential for effects from this site to affect leaching, migration and deposition from groundwater is considered low Groundwater

Table 20.21 High Marnham Power Station historic landfill

Site name/ref	S11-PSC3 – High Marnham Power Station historical landfill (located directly adjacent to the Proposed Substation Works)
Site location and description	High Marnham Power Station historical landfill (479700E, 371100N), near Newark. The site is located adjacent to the dismantled railway line, approximately 1.2 km northwest of High Marnham. The site is currently identified as scrub land.
Site history	Historical mapping dated 1885-1900 shows the site to the north of a railway line and Fledborough Station. The Google aerial imagery dated 2000 shows the railway still in place. However, the station has been removed and the site appears to be open land. By the 2004 aerial imagery the railway line has started to be dismantled and by 2008 has mostly all been removed.
Other pertinent information	Based on the information from the Environment Agency data the historical landfill was licenced to take inert and industrial waste between 1978 and 1994, however the last input was noted to be in 1979.
Geology	The BGS Geoindex indicates that superficial deposits are likely to be absent across the site, with the bedrock comprising the Mercia Mudstone Group.
Hydrogeology	The Mercia Mudstone Group which forms the bedrock at the site, is classified as a Secondary B Aquifer. The site is not located within a SPZ or a Drinking Water Safeguarded Zone for groundwater.
Environmental setting	None.
Potential for generating contamination	High – as the site accepted both inert and industrial waste.
Potential contaminants	Heavy metals, ash, clinker, pulverised fuel ash (PFA), sulphates, hydrocarbons, ground gas.
Potential receptors	Human health – construction/maintenance workers. Groundwater.

Potential source	Potential pathway	Potential effects
Contaminated ground	Ingestion Inhalation Direct dermal contact	The potential for effects from this site to affect ingestion, inhalation and direct dermal contact from construction/maintenance workers is considered low
	Leaching Migration Deposition	The potential for effects from this site to affect leaching, migration and deposition from groundwater is considered low Groundwater

20.5.83 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.84 No potential for effects on geology and hydrogeology associated with the construction, operation and maintenance of the Proposed Substation Works are predicted.

20.5.85 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Agriculture and Soils

20.5.86 This section presents preliminary environmental information in relation to agriculture and soils and is supported by the following Figures:

- **Figure 13.1 Agriculture and Soils Study Area** (Sheet 13 of 13);
- **Figure 13.2 Provisional ALC Mapping** (Sheet 13 of 13);
- **Figure 13.3 Detailed ALC Mapping (Post-1988)** (Sheet 13 of 13);
- **Figure 13.4 Agri-environmental Schemes** (Sheet 13 of 13);
- **Figure 13.5 Forestry and Woodland Grant Schemes** (Sheet 13 of 13); and
- **Figure 13.6 Soilscapes Mapping** (Sheet 13 of 13).

20.5.87 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the agriculture and soils baseline conditions are provided in section 13.4 of **Chapter 13 Agriculture and Soils**.

20.5.88 The solid geology underlying the Proposed Substation Works is described in the Geology and Hydrogeology section above.

20.5.89 The Soil Associations (representing a group of soil series (or soil types) which are typically found occurring together in the landscape) have been identified within the 1 km study area (Ref 20.22) as follows, and as illustrated in **Figure 13.6 Soilscapes**[8]:

- Blackwood: Deep permeable sandy and coarse loamy soils. Parent material: Glaciofluvial drift.
- Compton: Seasonally wet deep stoneless mostly reddish clayey soils affected by groundwater. Parent material: Reddish river alluvium.
- Fladbury 2: Stoneless clayey soils variably affected by groundwater some with sandy subsoils.
- Whimple 3: Reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar clayey soils on brows. Slowly permeable seasonally waterlogged fine loamy and fine silty over clayey soils on lower slopes. Parent material: Drift over Permo-Triassic and Carboniferous reddish mudstone.

[8] Data gaps in relation to soilscapes will be updated for the Environmental Statement

- Worcester: Slowly permeable non-calcareous and calcareous reddish clayey soils over mudstone, shallow on steeper slopes. Associated with similar noncalcareous fine loamy over clayey soils. Slight risk of water erosion. Parent material: Permo-Triassic reddish mudstone.

20.5.90 Provisional ALC mapping, presented on **Figure 13.2 Provisional Agricultural Land Classification Mapping**, indicates that the Proposed Substation Works is located on Grade 3 ALC land. Within the 1 km study area the land is largely comprised of Grade 3 land, with the exception of a small pocket of Grade 2 land located within the southern edge and urban land located in the northern edge of the study area. Based on this coverage, the provisional ALC information indicates that a large portion of the study area is likely to comprise BMV agricultural land – this being land associated with Grades 1, 2 and 3a[9].

20.5.91 A desk-based assessment using detailed aerial photography and Ordnance Survey mapping indicates that the land use across the Proposed Substation Works is arable land.

20.5.92 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.93 The potential effects that could result from the construction of the Proposed Substation Works are:

- Temporary loss of agricultural land resulting in a reduction in the extent of productive agricultural land, affecting the associated agricultural business.
- Temporary loss of BMV land.
- Potential effects on soil function resulting in a reduction in the ability of the soil to function and provide ecosystem services as a result of temporary soil disturbance.

20.5.94 The potential effects that could result from the operation of the Proposed Substation Works include the permanent acquisition of land, including BMV land and a reduction in the extent of the most productive agricultural land.

20.5.95 No potential for effects on geology and hydrogeology associated with the maintenance of the Proposed Substation Works are predicted.

20.5.96 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

[9] The Provisional ALC mapping does not differentiate Grade 3 land into Subgrades 3a and 3b.

Traffic and Transport

20.5.97 This section presents preliminary environmental information in relation to traffic and transport and is supported by the following Figures:

- **Figure 14.1 Primary Access Routes** (Sheet 1 of 14);
- **Figure 14.2 Sensitive Receptors** (Sheet 1 of 14);
- **Figure 14.3 Collision Data** (Sheet 1 of 16); and
- **Figure 14.4 Public Rights of Way Impacted During Construction Phase** (Sheet 35 and 36 of 36).

20.5.98 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the traffic and transport baseline conditions are provided in section 14.4 of **Chapter 14 Traffic and Transport**.

20.5.99 It is considered the A57 located north of the Proposed Substation Works, and Main Street through Ragnall would be utilised for construction traffic vehicles to access the Proposed Substation Works. Construction traffic could also use the Access Road to Fledborough, Polly Taylors Road, Skegby Road, Marnham Road, Tuxford Road, Normanton Road, Hawbush Road and Fledborough Road. Where construction traffic is required to use these roads this will be presented as part of the traffic assessment within the ES.

20.5.100 Personal injury collision data have been obtained from STATS 19 Department for Transport Road Safety Data for the most recent period where data were available (2020 to 2023) (Ref 20.24), although data from 2023 was given as unvalidated. As such only the period 2020 to 2022 has been used. Collision data for the Primary Access Routes[10] to the Proposed Substation Works are illustrated in **Figure 14.3 Collision Data**.

20.5.101 A collision cluster is determined by the following criteria:

- A: A location where there are six or more injury collisions occurring within a junction or a 100 m stretch; and
- B: A location with three or more fatal and/or serious collisions happening either within a junction or within a 100 m stretch.

20.5.102 Analysis of the A57 indicates that this route collision cluster is rated as “A” (defined as a location where there are six or more injury collisions occurring within a junction or a 100 m stretch). Whereas Main Street does not fall into these categories as the collision data on Main Street is less than Criteria “B”, with less than three fatal and/or serious collisions happening within a junction or within a 100 m stretch.

[10] Primary Access Routes (PAR) are comprised of key highway links which provide a route back to the Strategic Road Network or specific A roads, referred to as the Main Road Network.

20.5.103 No PRoW will be permanently diverted or altered as a result of the Proposed Substation Works. However, the following PRoW are located within the boundary of the Proposed Substation Works:

- NT|Fledborough|Footpath No.8;
- NT|Fledborough|Footpath No.9;
- NT|Fledborough|Footpath No.10;
- NT|Fledborough|Footpath No.12;
- NT|Marnham|Footpath No.4;
- NT|Marnham|Footpath No.5;
- NT|Marnham|Footpath No.7;
- NT|Normanton On Trent|Footpath No.6;
- NT|Normanton On Trent|Footpath No.7;
- NT|Weston|Footpath No.1; and
- National Cycle Network Route number 647.

20.5.104 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.105 Whilst National Grid are not aware of any proposed changes at this time, through discussions with the Local Authorities, the future baseline for walkers, cyclists and horse-riders will be assessed and reported in the ES and will reflect any anticipated changes affecting these users.

20.5.106 The potential effects that could result from the construction of the Proposed Substation Works are:

- Potential for increased severance to pedestrians, cyclists and bridleway users on road lines and road junctions.
- Potential for effects associated with increased driver delay on road links and road junctions.
- Potential for increased pedestrian, cyclist and bridleway user delay on road links and road junctions
- Potential for a decline in highway safety on road links and road junctions. Potential for fear and intimidation and reduction in pedestrian, cyclist, and equestrian amenity on road links, road junctions, PRoW and National cycling route 647.

20.5.107 Traffic and transport effects associated with the operation and maintenance of the Proposed Substation Works are not predicted.

20.5.108 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Air Quality

20.5.109 This section presents preliminary environmental information in relation to air quality and is supported by the following Figures:

- **Figure 15.1 Air Quality Baseline** (Sheet 13 of 13); and
- **Figure 15.2 Air Quality Construction Dust Study Area** (Sheet 13 of 13).

20.5.110 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the air quality baseline conditions are provided in section 15.4 of **Chapter 15 Air Quality**.

20.5.111 A review of the existing baseline has been undertaken to establish an understanding of current air quality and to identify areas that are likely to be sensitive to changes in emissions as a result of the Proposed Substation Works.

20.5.112 Local authority monitoring data for the most recently reported years of 2023 for Bassetlaw District Council did not show any exceedances of the annual mean NO_2, PM_{10} or $PM_{2.5}$ AQS objectives (Ref 20.27)

20.5.113 There are no automatic monitoring sites within 10 km of the Proposed Substation Works (Ref 20.26).

20.5.114 There are four non-automatic diffusion tube monitoring sites within 5 km of the Proposed Substation Works, as presented in Table 20.22 below.

Table 20.22 Diffusion tube monitoring within 5 km of the Proposed Substation Works at High Marnham

Monitoring Site	X (OS reference (m))	Y (OS reference (m))	Site Type	Distance from Proposed Substation Works	Annual Mean NO_2 Concentration ($\mu g/m^3$)
BDC 22	481341	374505	Roadside	2.2 km	18.1
BDC 29	473811	371146	Roadside	3.9 km	25.9
BDC 32	473916	370838	Roadside	3.7 km	18.5
BDC 45	473600	371013	Urban Centre	4.0 km	25.8

20.5.115 The average DEFRA background pollutant concentrations as set out in **Chapter 15 Air Quality** are considered applicable to the Proposed Substation Works. These are summarised in Table 20.23 below.

Table 20.23 Background pollutant concentrations 2024

Pollutant	Minimum Concentration ($\mu g/m^3$)	Maximum Concentration ($\mu g/m^3$)	Average Concentration ($\mu g/m^3$)	Annual Mean Air Quality Objective ($\mu g/m^3$)
NO_2	5.2	7.0	5.5	40
PM_{10}	11.3	15.9	13.4	40
$PM_{2.5}$	5.6	6.3	5.9	20

20.5.116 Background pollutant concentrations are predicted to decrease in future years, as evidenced by trends observed from local authority monitoring data and future predicted DEFRA background map concentrations (Ref 20.26).

20.5.117 Traffic emissions are likely to contribute to baseline air quality concentrations in the vicinity of the Proposed Substation Works. While vehicle numbers are likely to increase, emissions (per vehicle) are predicted to decrease over time due to new technology, increasingly stringent emission regulations and zero emission vehicles.

20.5.118 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.119 The potential effects that could result from the construction of the Proposed Substation Works within 5 km are:

- Effects from dust deposition and health impacts from elevated PM_{10} concentrations on:
  - human receptors within 250 m of the Proposed Substation Works and 50 m of the route(s) used by construction vehicles on the public highway within 250 m of the proposed bellmouth.
  - ecological receptors within 50 m of the Proposed Substation Works and 50 m of the route(s) used by construction vehicles on the public highway within 250 m of the proposed bellmouth.
- Effects on sensitive ecological and human receptors within 200 m of construction traffic routes from increases in local air pollutant concentrations and nitrogen deposition rates from vehicle emissions.
- Effects on sensitive ecological and human receptors within 200 m of NRMM.

20.5.120 Air quality effects from the operation and maintenance of the Proposed Substation Works are not expected to occur.

20.5.121 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Noise and Vibration

20.5.122 This section presents preliminary environmental information in relation to noise and vibration and is supported by the following Figures:

- **Figure 16.1 Baseline Conditions** (Sheet 13 of 13);
- **Figure 16.2 Construction Noise and Vibration Buffer Zone** (Sheet 13 of 13); and
- **Figure 16.3 Noise Sensitive Receptors Affected by Overhead Line Noise** (Sheet 13 of 13).

20.5.123 The Proposed Substation Works boundary is shown on the figures listed above. The data sources and study area for the noise and vibration baseline conditions are provided in section 16.4 of **Chapter 16 Noise and Vibration**.

20.5.124 Two settlements located adjacent to the Proposed Substation Works comprise Fledborough to the north, and Skegby to the west. Remaining settlements within 1 km of the Proposed Substation Works include Ragnall 1 km north, North Clifton 800 m east, South Clifton 825 m southeast, High Marnham 85 m south, Low Marnham 840 m south, Normanton on Trent 525 m south, and Weston 650 m south.

20.5.125 No Noise Important Areas are located within a 300 m study area of the Proposed Substation Works.

20.5.126 Due to data limitations at the time of the preliminary assessment, information on noise sensitive receptors within 300 m of the Proposed Substation Works will be presented in the ES.

20.5.127 The main existing sources of noise comprise the railway line East Coast Main Line located adjacent to the western edge of the Proposed Substation Works. Other existing sources of noise include Main Street, Hollowgate Lane, Fledborough Road, Polly Taylors Road, Marnham Road, Hollow Gate Lane, Skegby Road, Tuxford Road, Hawbush Road, Bell Lane, Crabtree Lane, Mill Lane and Sparrow Lane. Roads that cross the Proposed Substation Works area include Fledborough Road, Hollwgate Lane, Marnham Road, Skegby Road, Hollow Gate Lane and Tuxford Road. No main roads are located within the 300 m study area.

20.5.128 Since the traffic flow on these road are too low to be indicated on the DEFRA Road Noise mapping (Ref 20.28), the existing ambient noise levels in this study area are likely to be below 50 dB $L_{Aeq,T}$.

20.5.129 Away from road traffic sources, ambient sound levels are low and comprise general rural noise, distant road traffic, foliage and bird song.

20.5.130 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.131 The potential effects that could result from the construction of the Proposed Substation Works are:

- Noise impact from construction activities on NSRs within 300 m of construction works.
- Vibration impact from construction activities on human NSRs within the 100 m of construction works.

20.5.132 Noise impact from construction traffic on NSRs within 50 m of routes The potential effects that could result from the operation of the Proposed Substation Works include noise impacts associated with the operation of the substation the reconfigured overhead line works.

20.5.133 No potential noise and vibration effects associated with the maintenance of the Proposed Substation Works are predicted.

20.5.134 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Socio-Economics, Recreation and Tourism

20.5.135 This section presents preliminary environmental information in relation to socio-economic, recreation and tourism and is supported by the following Figures:

- **Figure 17.1 Study Area** (13 of 13);
- **Figure 17.2 Community Facilities** (13 of 13);
- **Figure 17.3 Business, Recreation and Tourism Receptors** (13 of 13);
- **Figure 17.4 Recreational land and Recreational Routes** (13 of 13); and
- **Figure 17.5 60 Minute Drive Time** (Sheet 13 of 1).

20.5.136 The Proposed Substation Works boundary is shown on the figures listed above. The data sources study area for the socio-economic, recreation and tourism baseline conditions are provided in section 17.4 of **Chapter 17 Socio-Economic, Recreation and Tourism**.

20.5.137 A small section of the Proposed Substation Works falls within the Newark and Sherwood District as illustrated on **Figure 1.1 Project Location and Route Sections**. This section solely relates to reconductoring the existing 4ZV overhead line. The need to include Office for National Statistics (ONS) Census 2021 (Ref 20.31) baseline data for this Local Authority Area will be kept under review and presented in ES where appropriate.

20.5.138 The Proposed Substation Works are primarily located in Bassetlaw District Council, with the far southwestern section located within Newark and Sherwood District Council. According to ONS Census data (Ref 20.30 and Ref 20.31), Bassetlaw District Council has experienced an increase in population of 4.4%in the 10-year period between 2011 and 2021. This growth rate is higher than that seen across Yorkshire and the Humber (3.7%) over the same period but lower than that across the East Midlands (7.7%) and England (6.6%).

20.5.139 The working age population (defined by ONS as people aged 16 to 64 proportions) recorded in the Census 2021[6] in Bassetlaw District Council is at 61% . This is a lower working age population proportion than regionally (62% for the East Midlands) and nationally (63%).

20.5.140 East Midlands shows a slightly smaller proportion of the population aged 15 years and under (18%) than nationally (19%), and a slightly larger proportion of the population aged 65+ (20%) compared to the national average (18%).

20.5.141 Economic activity rates for in Bassetlaw District Council is 57%. According to the ONS

Census data (Ref 20.31) this is a slightly lower rate of economic activity than the rates for the East Midlands region (58%) and the average for England (59%).

20.5.142 Labour productivity is provided by GVA per filled job. Bassetlaw District Council labour productivity is £46,461. This is less than the labour productivity regionally with East Midlands at £52,889 and national levels with England labour productivity at £62,751.

20.5.143 The latest unemployment data show that Bassetlaw District Council is at 3%. Both local councils have a lower unemployment rate than regional (Yorkshire and the Humber at 3.4%) and national levels (England at 3.7%).

20.5.144 Employment by major occupational group, as recorded in Census 2021 data (Ref 20.31), is shown in Table 20.24. In Bassetlaw District Council, the highest proportion of occupations are in professional occupations. Bassetlaw District Council has a higher proportion of process, plant and machine operatives than the national average of 6.9%.

Table 20.24 People in employment by major occupational group in Bassetlaw District Council, East Midlands and England

Major occupational group by Standard Occupational Classification (SOC) 2010	Bassetlaw District Council	East Midlands	England
Total number employed	**54,919**	**2,272,324**	**26,405,214**
	%	**%**	**%**
Managers, directors and senior officials	12.4	12	12.9
Professional occupations	14.5	17.5	20.3
Associate professional and technical occupations	10.8	11.9	13.3
Administrative and secretarial occupations	8.3	9.1	9.3
Skilled trades occupations	11.9	10.8	10.2
Caring, leisure and other service occupations	10.5	9.5	9.3
Sales and customer service occupations	7.6	7.7	7.5
Process, plant and machine operatives	11	8.9	6.9
Elementary occupations	13	12.6	10.5

20.5.145 Skills and qualifications held by working people aged 16-64 as recorded in the 2021 Census (Ref 20.31) are shown in Table 20.25. In Bassetlaw District Council the proportion of the population with NVQ4+ qualifications (25.5%) are lower than the national average (33.9%).

Table 20.25 Skills and qualifications held by worked aged people (16-64) in Bassetlaw District Council, East Midlands and England

Skills and qualifications	Bassetlaw District Council	East Midlands	England
	%	%	%
People with NVQ4+	25.5	29.1	33.9
People with NVQ3+	17.4	18.3	16.9
People with NVQ2+	14.8	13.9	13.3
People with NVQ1+	10.9	10.4	9.7
People with Apprenticeships	6.7	6	5.3
People with other qualifications (NVQ)	3.1	2.8	2.8
People with no qualifications (NVQ)	21.6	19.5	18.1

20.5.146 Employment by broad industrial group is shown in Table 20.26, which is based on SIC groups (Ref 20.33), that classify businesses (and their employees) according to the type of their economic activity. Construction (Section F) in Bassetlaw District Council (7%) has a higher proportion of employment than its regional comparator East Midlands (6%) and national comparator England (5%).

Table 20.26 Employment by broad industrial group within Bassetlaw District Council, East Midlands and England

Broad industrial group SIC 2007	Bassetlaw District Council	East Midlands	England
Total number employed	**49,940**	**2,163,000**	**27,151,000**
	%	%	%
A: Agriculture, forestry and fishing	1%	1%	1%
B: Mining and quarrying	0%	0%	0%
C: Manufacturing	16%	11%	8%
D: Electricity, gas, steam and air conditioning supply	1%	1%	0%
E: Water supply; sewerage, waste management and remediation activities	0%	1%	1%

Broad industrial group SIC 2007	Bassetlaw District Council	East Midlands	England
Total number employed	**49,940**	**2,163,000**	**27,151,000**
	%	**%**	**%**
F: Construction	7%	6%	5%
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	16%	16%	14%
H: Transportation and storage	6%	7%	5%
I: Accommodation and food service activities	7%	8%	8%
J: Information and communication	2%	3%	5%
K: Financial and insurance activities	1%	2%	3%
L: Real estate activities	1%	1%	2%
M: Professional, scientific and technical activities	6%	7%	9%
N: Administrative and support service activities	6%	9%	9%
O: Public administration and defence; compulsory social security	4%	4%	4%
P: Education	7%	9%	9%
Q: Human health and social work activities	16%	14%	13%
R: Arts, entertainment and recreation	2%	2%	2%
S: Other service activities	1%	1%	2%
Other employment sectors (Sections T and U)	0%	0%	0%

20.5.147 In summary, the economic activity rate and the proportion of employment by broad industrial group in the study area are broadly in line with regional and national averages. This implies that businesses, workers and residents have an average capacity to experience an impact without incurring a change on their economic wellbeing. On this basis, the local economy isn't considered to be particularly sensitive to impacts on employment.

20.5.148 No residential properties are located within the Proposed Substation Works area. Within 500 m of the Proposed Substation Works are the settlements of Fledborough, High Marnham, Skegby and Normanton on Trent. There are 54 number of isolated residential properties also within 500 m of the Proposed Substation Works.

20.5.149 Socio-economic, recreation and tourism receptors within 500 m of the Proposed Substation Works include a pub (The Brownlow Arms), holiday park (Marnham Meadows Holiday Park) and five LWSs (Marnham Railway Yard LWS, Fledborough to Harby Dismantled Railway LWS, Fledborough Holme LWS, Skedby Road Triangle LWS and Old Trent, Marnham).

- No PRoW will be permanently diverted or altered as a result of the Proposed Substation Works. However, the following PRoW are located within the boundary of the Proposed Substation Works: NT|Fledborough|Footpath No.8;
- NT|Fledborough|Footpath No.9;
- NT|Fledborough|Footpath No.10;
- NT|Fledborough|Footpath No.12;
- NT|Marnham|Footpath No.4;
- NT|Marnham|Footpath No.5;
- NT|Marnham|Footpath No.7;
- NT|Normanton On Trent|Footpath No.6;
- NT|Normanton On Trent|Footpath No.7;
- NT|Normanton On Trent|Footpath No.8;
- NT|Weston|Footpath No.1; and
- National Cycle Network Route number 647.

20.5.150 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.151 The potential effects that could result from the construction of the Proposed Substation Works are:

- Generation of employment, training and apprenticeship opportunities, both directly at work sites and indirectly in the supply chain.
- The effect of the employment, training and apprenticeship opportunities on the local economy (through the generation of Gross Value Added (GVA)).
- Potential temporary amenity impacts on residential properties, local businesses, visitor attractions, community facilities, open space, and/or development land.

20.5.152 The potential effects that could result from the operation of the Proposed Substation Works include the permanent amenity impacts on residential properties, local businesses, visitor attractions, community facilities, open space, and/or development land. No potential socio-economic, recreation and tourism effects associated with the maintenance of the Proposed Substation Works are predicted.

20.5.153 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Health and Wellbeing

20.5.154 This section presents preliminary environmental information in relation to health and wellbeing is supported by the following Figures:

- **Figure 18.1 Health and Wellbeing Baseline Study Area (Sheet 13 of 13)**.

20.5.155 The Proposed Substation Works boundary is shown on the figure listed above. The data sources and study area for the health and wellbeing baseline conditions are provided in section 18.4 of **Chapter 18 Health and Wellbeing**.

20.5.156 A small section of the Proposed Substation Works falls within the Newark and Sherwood District as illustrated on **Figure 1.1 Project Location and Route Sections**. This section solely relates to reconductoring the existing 4ZV overhead line. The need to include Office for National Statistics (ONS) Census 2021 (Ref 20.31) baseline data for this Local Authority Area will be kept under review and presented in ES where appropriate.

20.5.157 The resident population of local authority, national and regional area as recorded in the Census 2021[6] (Ref 20.31) are shown in Table 20.27.

Table 20.27 Population, population change and age cohorts for Bassetlaw District Council, East Midlands and England.

Local Authority area	Population in 2021	Percentage change since Census 2011	Percentage aged 14 years and under in 2021	Percentage aged 15-64 years in 2021	Percentage aged 65+ years in 2021
Bassetlaw District Council	117,804	4.4%	16%	62%	22%
East Midlands	4,880,054	7.7%	17%	64%	19%
England	56,490,048	6.6%	17%	64%	18%

Source: Office for National Statistics (2022, 2011); Census 2021 (Ref 20.31), Census 2011 (Ref 20.30). Note: Table may not sum due to rounding.

20.5.158 The Census 2021 (Ref 20.31) contains data on the ethnicity demographics of all the geographies; these statistics are summarised below in Table 20.28.

Table 20.28 Ethnicity for Bassetlaw District Council, East Midlands and England.

Local Authority area	Asian, Asian British or Asian Welsh (%)	Black, Black British, Black Welsh, Caribbean or African (%)	Mixed or Multiple ethnic groups (%)	White (%)	Other ethnic group (%)
Bassetlaw District Council	1.2	0.6	1.2	96.4	0.5
East Midlands	8.0	2.7	2.4	85.7	1.3
England	9.6	4.2	3.0	81.0	2.2

Source: Office for National Statistics, (2022); Census 2021 (Ref 20.31).

20.5.159 Economic activity rates of those 16 years and older (excluding full-time students) for all the geographies, provided by Census 2021 data (Ref 20.31) are shown in Table 20.29.

Table 20.29 Economic activity for Bassetlaw District Council, East Midlands and England

Local Authority area	Economic activity rate Census 2021 (%)	Unemployment Rate Census 2021 (%)	Claimant Count (Claimants as a proportion of residents aged 16-64) July 2024 (%)
Bassetlaw District Council	57	2.4	3.7
East Midlands	58	3.0	3.9
England	59	3.5	4.4

20.5.160 Skills and qualifications held by working people aged 16-64 as recorded in the 2021 Census (Ref 20.31) are presented in Table 20.30 below.

Table 20.30 Skills and qualifications held by worked aged people (16-64) in Bassetlaw District Council, East Midlands and England

Skills and Qualifications	Bassetlaw District Council (%)	East Midlands (%)	England (%)
People with NVQ4+	25.5	29.1	33.9
People with NVQ3+	17.4	18.3	16.9
People with NVQ2+	14.8	13.9	13.3
People with NVQ1+	10.9	10.4	9.7

Skills and Qualifications	Bassetlaw District Council (%)	East Midlands (%)	England (%)
People with Apprenticeships	6.7	6	5.3
People with other qualifications (NVQ)	3.1	2.8	2.8
People with no qualifications (NVQ)	21.6	19.5	18.1

20.5.161 The ONS provides data for the GDHI in ITL regions across the UK in 2021 (Ref 20.35) was used to determine the GDHI per geographical demographic. Bassetlaw District Council has a GDHI per person of £18,935, East Midlands is £18,956 and England is at £22,213.

The ONS provides data on deprivation through the Indices of Multiple Deprivation 2019 ([Accessed: January 2025].

20.5.162 Ref 20.36) as shown in Table 20.31. There are 32,844 Lower Layer Super Output Areas (LSOAs) in England, the Index of Multiple Deprivation ranks them from most deprived (1st) to least deprived (32,844th) across multiple domains, as well as giving them an overall rank.

Table 20.31 2019 Deprivation in the Bassetlaw District Council

Deprivation	Bassetlaw District Council
Percentage of LSOAs in the most deprived decile (decile 1) of the Index of Multiple Deprivation	7.1%
Average LSOA Decile in the Index of Multiple Deprivation	5
Average LSOA rank in the Index of Multiple Deprivation	14,627
Percentage of LSOAs in the most deprived decile (decile 1) of the health deprivation and disability domain	11.4%
Average LSOA Decile in the health deprivation and disability domain	4
Average LSOA rank in the health deprivation and disability domain	21,231

20.5.163 According to the Community Life Survey (Ref 20.37), in the regions of East Midlands (the most granular level of data), 65% respectively of respondents in 2021/2022 felt like they belonged strongly or fairly strongly to their immediate neighbourhood. This is the same as England (65%).

20.5.164 As part of the 2021 Census, respondents were asked to self-assess the state of their health, both physical and mental (Ref 20.31). This can be seen for the local authority, regional comparator and national comparator below in Table 20.32.

Table 20.32 Self-assessed general health in Bassetlaw District Council, East Midlands and England

Self-Assessed General Health	Bassetlaw District Council	East Midlands	England
Very good health (%)	43.9	46.2	48.5
Good health (%)	34.8	34.8	33.7
Fair health (%)	15.2	13.6	12.7
Bad health (%)	4.8	4.2	4.0
Very bad health (%)	1.4	1.2	1.2

20.5.165 Data on disabilities, physical conditions and mental conditions is available from the 2021 Census (Ref 20.31) and is presented below in Table 20.33. The local authorities have a higher proportion of disabled individuals compared to the national average. This may partly reflect that the population has an older population on average compared to England. This vulnerable sub-population could be more sensitive to changes to their environment and may have a higher reliance on health services.

Table 20.33 Disability prevalence in Bassetlaw District Council, East Midlands and England

Self-Assessed General Health	Bassetlaw District Council	East Midlands	England
Disabled under the Equality Act (%)	20.4	18.3	17.3
Day-to-day activities limited a lot (%)	9.1	7.7	7.3
Day-to-day activities limited a little (%)	11.3	10.7	10.0
Not disabled under the Equality Act (%)	79.6	81.7	82.7

Self-Assessed General Health	Bassetlaw District Council	East Midlands	England
Has long term physical or mental health condition but day-to-day activities are not limited (%)	7.1	7.1	6.8
No long term physical or mental health conditions (%)	72.5	74.6	75.9

20.5.166 The Socio-economics, Recreation and Tourism Section of this report, provides details on the PRoW, business and recreational assets within 500 m of the Proposed Substation Works.

20.5.167 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.168 The potential effects that could result from the construction of the Proposed Substation Works are:

- On residents' access to services.
- On local workers from increased employment and income for the construction workforce.
- On education and training levels locally due to upskilling and apprenticeships from the Proposed Substation Works.
- On transport modes, access and connections due to impacts on PRoW, traffic and pedestrians.
- On local communities from a reduction in air quality due to dust and air pollutants associated with the construction of the Proposed Substation Works.
- On local communities from construction noise and vibration.
- On local and national climate change mitigation and adaption from greenhouse gas emissions associated with the Proposed Substation Works.
- On local communities from a reduction in water quality due to water pollution associated with the Proposed Substation Works.

20.5.169 No potential effects on health and wellbeing associated with the operation and maintenance of the Proposed Substation Works are predicted.

20.5.170 Taking account of the embedded measures set out in **Chapter 4 Description of the** Project and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

Climate Change

20.5.171 Based on the preliminary assessment, the current land use within the Proposed Substation Works consists of arable land. The immediate surrounding landscape includes arable land, the existing High Marnham Power Substation and existing overhead lines. Individual trees and small woodland areas are present.

20.5.172 The assessment on GHG emissions for the Project, including the Proposed Substation Works are presented in **Chapter 19 Climate Change**.

20.5.173 The current baseline on climate data is based on historical climate data from the nearest weather station, named Scampton (Lincolnshire) Station, from the Met Office website. The historic climate data at Scampton (Lincolnshire) Station, is presented in Table 20.34.

Table 20.34 Met Office Historic Climate Data at Scampton (Lincolnshire) Station.

Climate Variable	Baseline (1991-2020)
Mean annual maximum daily temperature (°C)	13.84
Mean Summer maximum daily temperature (°C)	20.71
Mean Winter maximum daily temperature (°C)	7.21
Highest temperature for baseline period (°C)	21.62 (July)
Lowest temperature for baseline period (°C)	6.86 (Jan)
Mean annual rainfall (mm)	619.40
Mean Summer rainfall (mm)	60.38
Mean Winter rainfall (mm)	47.02
Wettest month on average (mm)	58.79 (July)
Driest month on average (mm)	35.87
Mean monthly wind speed at 10m (knots)	9.72 (England E & NE)

20.5.174 With regards to future baseline there is a large amount of energy infrastructure proposed in the surrounding locality of the Proposed Substation Works. The inclusion of this within future baseline and as part of the cumulative assessment will be covered in the ES.

20.5.175 The Proposed Substation Works has the potential to affect, and be affected by, climate change (both adversely or beneficially), during its construction, operation and maintenance in the following ways:

- Impact of GHG emissions arising over the lifetime of the Proposed Substation Works on the climate;
- Resilience of the Proposed Substation Works to projected future climate change impacts, including damage to Proposed Substation Works resulting from climate change; and
- How the resilience of receptors in the surrounding environment are affected by the combined impact of future climate conditions and the Proposed Substation Works.

20.5.176 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice**, the potential effects listed above are not considered likely to be significant.

20.6 References

Ref 20.1 H.M.Government (1990). Town and Country Planning Act 1990. [Online]. Available at: https://www.legislation.gov.uk/ukpga/1990/8/contents [Accessed: January 2025].

Ref 20.2 National Grid (2023). North Humber to High Marnham Environmental Impact Assessment Scoping Report. [Online]. Available at: https://www.national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020034/documents [Accessed: January 2025].

Ref 20.3 H.M.Government (1989). Electricity Act 1989. [Online]. Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents [Accessed: January 2025].

Ref 20.45 National Grid, The Horlock Rules, [Online] Available at: https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf [Accessed: January 2025].

Ref 20.67 The Planning Inspectorate (2024). Scoping Opinion: Proposed North Humber to High Marnham. [Online]. Available at: https://www.national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020034/documents [Accessed: January 2025].

Ref 20.8 Yorkshire Wolds Designation Project. (n.d.). Have Your Say. [Online] Available at: https://www.yorkshire-wolds-designation-project.org/have-your-say [Accessed: January 2025].

Ref 20.9 Natural England (Date unknown). Access to Evidence. [Online]. Available at: https://www.publications.naturalengland.org.uk/ [Accessed: January 2025].

Ref 20.10 East Riding of Yorkshire Council (2016). East Riding Local Plan 2012-2029 Strategy Document. [Online]. Available at: https://www.downloads.eastriding.org.uk/corporate/pages/east-riding-local-plan/Strategy%20Document%20-%20Adopted%20April%202016%20lo.pdf [Accessed: January 2025].

Ref 20.11 Environment Agency (2024). Catchment Data Explorer database of Cycle 2 and 3 WFD information. [Online]. Available at: https://www.environment.data.gov.uk/catchment-planning/ [Accessed: January 2025].

Ref 20.12 Environment Agency (2024). Get flood risk information for planning in England. [Online]. Available at: https://www.flood-map-for-planning.service.gov.uk/ [Accessed: January 2025].

Ref 20.13 Environment Agency (2024). Environment Agency Asset Information and Maintenance. [Online]. Available at: https://www.environment.data.gov.uk/asset-management/index.html [Accessed: January 2025].

Ref 20.14 Environment Agency (2024). The Historic Flood Map and Recorded Flood Outlines dataset. [Online]. Available at: https://www.data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map and https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines [Accessed: January 2025].

Ref 20.15 Environment Agency (2024). Long term flood risk map for England. [Online]. Available at: https://www.gov.uk/check-long-term-flood-risk [Accessed: January 2025].

Ref 20.16 British Geological Survey (2024). British Geological Survey GeoIndex Viewer [Online]. Available at: https://www.mapapps2.bgs.ac.uk/geoindex/home.html [Accessed: January 2025].

Ref 20.17 Environment Agency (2023). Groundwater source protection zones (SPZs) [Online]. Available at: https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs [Accessed: January 2025].

Ref 20.18 Department for Environment, Food and Rural Affairs (2024). Multi-Agency Geographic Information for the Countryside (MAGIC) [Online]. Available at: https://www.magic.defra.gov.uk/ [Accessed: January 2025].

Ref 20.19 Environment Agency (2017) Environment Agency Report SC040016/R, New Groundwater Vulnerability Mapping [Online]. Available at: https://www.assets.publishing.service.gov.uk/media/5a81dd24ed915d74e6234867/Groundwater_vulnerability_report_2017.pdf [Accessed: January 2025].

Ref 20.20 National Library of Scotland (2024) Map Images. [Online]. Available at: https://www.maps.nls.uk/ [Accessed: January 2025].

Ref 20.21 Environment Agency (2024) Protect groundwater and prevent groundwater pollution [Online]. Available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution [Accessed: January 2025].

Ref 20.22 Soil Survey of England and Wales (1983). Soil Association Data

Ref 20.23 Meteorological Office (1989). Climatological Data for Agricultural Land Classification. London: The Meteorological Office. [Online]. Available at: https://www.Climatalogical Data for Agricultural Land Classification - ALC010 (naturalengland.org.uk) [Accessed: January 2025].

Ref 20.24 Department for Transport (2024). Road Safety Data. [Online]. Available at: https://www.data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-accidents-safety-data [Accessed: January 2025].

Ref 20.25 East Riding of Yorkshire Council (2023). 2023 Air Quality Annual Status Report (ASR). [Online]. Available at: https://www.downloads.eastriding.org.uk/corporate/pages/air-quality-monitoring/pdfs/Air%20Quality%20Annual%20Status%20Report%20(ASR)%202023.pdf [Accessed: January 2025].

Ref 20.26 Department for Environment, Food and Rural Affairs, UK Air Information Resource (2024). [Online]. Available at: https://www.uk-air.defra.gov.uk/ [Accessed: January 2025].

Ref 20.27 Bassetlaw District Council, (2022). 2022 Air Quality Annual Status Report (ASR). [Online]. Available at: https://www.data.bassetlaw.gov.uk/media/9076/air-quality-report-bassetlaw-2022.pdf [Accessed: January 2025].

Ref 20.28 Department for Environment, Food & Rural Affairs – Data Services Platform (2019). DEFRA strategic noise map: Road Noise Round 3 (2019). [Online]. Available at: https://www.environment.data.gov.uk/dataset/fd1c6327-ad77-42ae-a761-7c6a0866523d [Accessed: January 2025].

Ref 20.29 Landscape Design Associates (2010). East Midlands Region Landscape Character Assessment [Online]. Available at: https://www.publications.naturalengland.org.uk/publication/5635681403535360 [Accessed: January 2025].

Ref 20.30 Office for National Statistics (2011). Census 2011. [Online]. Available at: https://www.ons.gov.uk/census/2011census [Accessed: January 2025].

Ref 20.31 Office for National Statistics (2021). Census 2021. [Online]. Available at: https://www.ons.gov.uk/census [Accessed: January 2025].

Ref 20.32 Central Lincolnshire (2023). Central Lincolnshire Local Plan - Adopted April 2023. [Online]. Available at: https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf [Accessed: January 2025].

Ref 20.33 Gov.UK (2008). Standard Industrial Classification of Economic Activities (SIC). [Online]. Available at: https://www.gov.uk/government/publications/standard-industrial-classification-of-economic-activities-sic [Accessed: January 2025].

Ref 20.34 Office for National Statistics (2018). Population projections – local authority based by single year of age. [Online]. Available at: https://www.nomisweb.co.uk/datasets/ppsyoala [Accessed: January 2025].

Ref 20.35 Office for National Statistics (2024). Regional gross disposable household income: local authorities by ITL1 region. [Online]. Available at: https://www.ons.gov.uk/economy/regionalaccounts/grossdisposablehouseholdincome/datasets/regionalgrossdisposablehouseholdincomelocalauthoritiesbyitl1region [Accessed: January 2025].

Ref 20.36 Ministry of Housing, Communities and Local Government (2019). English Indices of Deprivation 2019. [Online]. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019 [Accessed: January 2025].

Ref 20.37 Department for Digital, Culture, Media and Sport (2023). Community Life Survey 2021/2022 Reference Tables, Table B4. [Online]. Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fassets.publishing.service.gov.uk%2Fmedia%2F63fcdae28fa8f527fe30db40%2FCommunity_Life_Survey_2021_22_Reference_Tables.ods&wdOrigin=BROWSELINK [Accessed: January 2025].

Ref 20.38 Public Health England, Department of Health and Social Care (2017). Common Mental Health Disorders. [Online]. Available at: https://www.fingertips.phe.org.uk/profile-group/mental-health/profile/common-mental-disorders [Accessed: January 2025].

Ref 20.39 Public Health England, Department of Health and Social Care (2024). Local Authority Health Profiles. [Online]. Available at: https://www.fingertips.phe.org.uk/profile/health-profiles [Accessed: January 2025].

Ref 20.40 East Riding of Yorkshire Council and Kingston Upon Hull (2019). East Riding of Yorkshire and Kingston Upon Hull Joints Minerals Local Plan 2016 – 2033 Policies Map – November 2019. [Online]. Available at: https://www.downloads.eastriding.org.uk/corporate/planning/planning-policy-and-the-local-plan/joint-minerals-plan/jmp/Joint%20Minerals%20Local%20Plan%20-%20Adopted%20Policies%20Map.pdf [Accessed: January 2025].

Ref 20.41 National Grid (2009). Horlock Rules. [Online]. Available at: https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf [Accessed : January 2024].

Ref 20.42 Woodland Trust (2024). Ancient Tree Inventory. [Online]. Available at: https://www.ati.woodlandtrust.org.uk/tree-search/?v=2640233&ml=map&z=11&nwLat=53.59299711986571&nwLng=-2.699247066894539&seLat=53.41084488272741&seLng=-1.825833980957039 [Accessed: January 2024].

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com