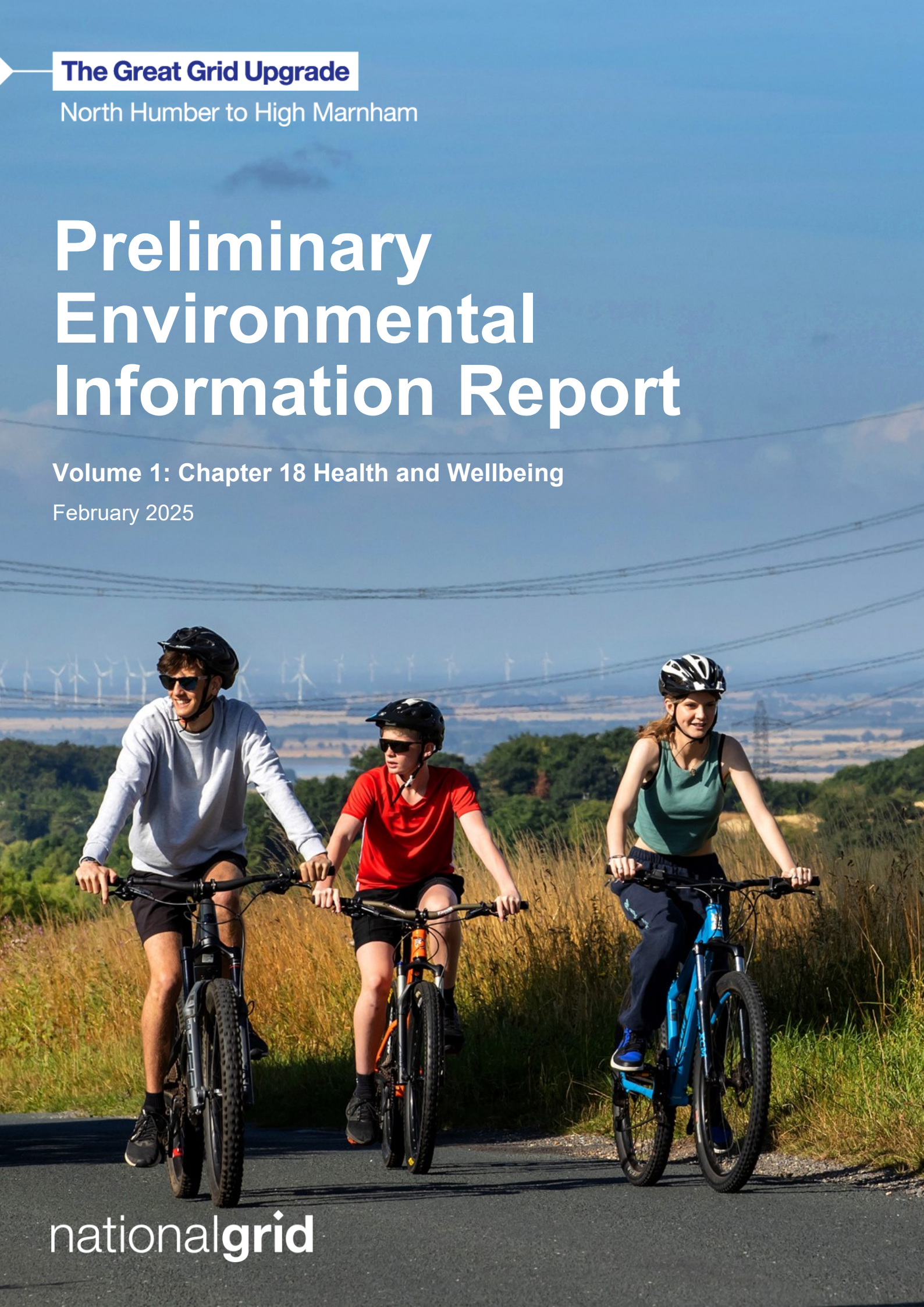
The Great Grid Upgrade

North Humber to High Marnham

Preliminary Environmental Information Report

Volume 1: Chapter 18 Health and Wellbeing

February 2025



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18. Health and Wellbeing

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18. Health and Wellbeing

18.1 Introduction

18.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents information about the preliminary environmental assessment of the likely significant Health and Wellbeing effects identified to date, that could result from the Proposed Overhead Line between the proposed Birkhill Wood Substation and the proposed High Marnham Substation as described in **Chapter 4 Description of the Project**.

18.1.2 **Chapter 1 Introduction** explains that the proposed Birkhill Wood Substation and proposed High Marnham Substation are proposed to be authorised through separate consenting procedures, however, they have also been included as part of the Project. As explained in **Chapter 5 Approach to Preparing the PEIR**, the environmental effects of these two substations including their associated overhead line reconfigurations, hereafter referred to as the Proposed Substation Works, have accordingly been considered within **Chapter 20 Substations and Associated Works**. For the purpose of this chapter the Proposed Overhead Line between the proposed Birkhill Wood Substation and the proposed High Marnham Substation is hereafter referred to as the Proposed Overhead Line.

18.1.3 To ensure that the Project as a whole has been assessed a summary has been included within this preliminary assessment of the likely significant effects on Health and Wellbeing which brings together the assessment of the Proposed Overhead Line and Proposed Substation Works for Health and Wellbeing.

18.1.4 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, mitigation and the preliminary health and wellbeing residual significant effects that could result from the Project.

18.1.5 This chapter covers effects on the following during construction, operation and maintenance noting that decommissioning has been scoped out:

- physical and mental health and wellbeing; and
- the general population, and vulnerable groups/communities (defined by characteristics such as age, ethnic diversity, economic status, disability, sex/gender) who may be disproportionately affected by such changes.

18.1.6 This chapter should be read in conjunction with:

- **Chapter 4 Description of the Project**;
- **Chapter 5 Approach to Preparing the PEIR**;
- **Chapter 20 Substations and Associated Works;** and
- **Chapter 21 Cumulative Effects.**

18.1.7 There are interrelationships related to the potential effects on other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 6 Landscape;**
- **Chapter 7 Visual;**
- **Chapter 11 Water Environment;**
- **Chapter 14 Traffic and Transport;**
- **Chapter 15 Air Quality;**
- **Chapter 16 Noise and Vibration;**
- **Chapter 17 Socio-economics, Recreation and Tourism;** and
- **Chapter 19 Climate Change.**

18.1.8 This chapter is supported by **Figure 18.1 Health and Wellbeing Baseline Study Area** in Volume 2, which shows the draft Order Limits and the local authorities that comprise the baseline study area.

18.2 Regulatory and Planning Context

18.2.1 This section sets out the legislation and planning policy that is relevant to the preliminary health and wellbeing assessment. A full review of compliance with relevant national and local planning policy will be provided within the Planning Statement that will be submitted as part of the application for Development Consent.

18.2.2 **Chapter 2 Regulatory and Planning Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy and planning guidance relevant to the assessment of potential health and wellbeing effects associated with the construction, operation and maintenance of the Project is presented below.

Legislation

18.2.3 The legislation listed below has been considered when identifying potential constraints to the Project, design options and mitigation:

- Health and Social Care Act 2022 (Ref 18.1).

18.2.4 The Health and Social Care Act 2022 sets out health reforms in England. This Act removes existing competition rules and formalises Integrated Care Systems (ICS) as the means of provision of healthcare services. Each ICS has been established with four strategic purposes:

- improve population health and healthcare;
- tackling unequal outcomes and access;
- enhance productivity and value for money; and
- helping the National Health Service (NHS) to support broader social and economic development.

National Policy Statements (NPSs)

18.2.5 **Chapter 2 Regulatory and Planning Context** sets out the overarching policy context relevant to the Project, including the Overarching NPS for Energy (EN-1) (Ref 18.2). This is supported by the NPS for Electricity Networks Infrastructure (EN-5) (Ref 18.3).

18.2.6 Paragraph 4.4.1 of EN-1 states that:

'Energy infrastructure has the potential to impact on the health and well-being ("health") of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the construction of energy infrastructure and…distribution… of energy may have negative impacts on some people's health.'

18.2.7 Paragraph 4.4.3 of EN-1 states that:

'New energy infrastructure may also affect the composition and size of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity'.

18.2.8 Paragraph 4.4.4 of EN-1 states that:

'Where the proposed project has an effect on humans, the ES should assess these effects for each element of the project, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate'.

18.2.9 Paragraph 4.4.5 of EN-1 states:

'The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate'.

18.2.10 Paragraph 2.9.44 of EN-5 states that:

'Power frequency [Electric and Magnetic Fields] EMFs arise from generation, transmission, distribution and use of electricity and will occur around power lines and electric cables and around domestic, office or industrial equipment that uses electricity'. Paragraph 2.9.46 of EN-5 states that *'EMFs can have both direct and indirect effects on human health'.*

18.2.11 Paragraph 2.9.48 of EN-5 states that:

'To prevent these known effects, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 for both public and occupational exposure. These are expressed in terms of the induced current density in affected tissues of the body, 'basic restrictions', and in terms of measurable 'reference levels' of electric field strength (for electric fields), and magnetic flux density (for magnetic fields)'.

18.2.12 Paragraph 2.9.51 of EN-5 states:

'The levels of EMFs produced by power lines in normal Operation are usually considerably lower than the ICNIRP 1998 reference levels'.

Other National Policy

18.2.13 Although the Project will be tested in line with National Policy stated above, the preliminary assessment has also been undertaken in accordance with, and with reference to, the National Planning Policy Framework (NPPF) 2024 (Ref 18.4). The NPPF has a social objective to:

'*support strong, vibrant and healthy communities*' where 'p*lanning policies and decisions should aim to achieve healthy, inclusive and safe places*'.

Regional and Local Policy

18.2.14 **Chapter 2 Regulatory and Planning Context** lists relevant regional and local policy. Key local policy relevant to health and wellbeing, that has informed this PEIR and will inform the assessment within the Environment Statement (ES), comprises:

- East Riding Local Plan 2012-2029, Adopted 2016 (Ref 18.5)
  - Policy C1: Providing infrastructure and facilities;
  - Policy C2: Supporting community services and facilities;
  - Policy C3: Providing public open space for leisure and recreation;
- North Lincolnshire Local Development Framework Core Strategy 2006 – 2026, Adopted 2011 (Ref 18.6).
  - Policy CS24: Health Care Provision;
  - Policy CSC1: Health and Wellbeing;
  - Policy CSC2: Health Care Provision;
- Bassetlaw Local Development Framework – Core Strategy and Development Management Policies DPD, Adopted 2011 (Ref 18.7)
  - Policy DM11: Developer contributions and infrastructure provision;
  - East Riding of Yorkshire Local Plan Update 2020 – 2039 (Ref 18.8)
  - Policy S9: Strengthening blue/green infrastructure;
  - Policy C1: Providing infrastructure and facilities;
  - Policy C2: Supporting community services and facilities;
  - Policy C3: Providing public open space for leisure and recreation;
- Bassetlaw Local Plan 2020 – 2038 Main Modifications (Ref 18.9)
  - Policy ST44: Promoting Healthy, Active Lifestyles;
  - Policy ST45: Protection and Enhancement of Community Facilities;
  - Policy ST46: Delivering Quality, Accessible Open Space;
- Headon, Upton, Grove, and Stokeham Final Neighbourhood Plan, Adopted 2018 (Ref 18.10)
  - Policy 5: Existing Community Facilities;
  - Policy 7: Local Green Space;
  - Policy 8: Enhancing our Public Rights of Way;

- Misterton Neighbourhood Plan, Adopted 2019 (Ref 18.11)
  - Policy 13: Enhancing the provision of community facilities;
  - Policy 14: Improving Green Infrastructure;
- Treswell and Cottam Neighbourhood Plan, Adopted 2019 (Ref 18.12)
  - Policy 3: Protecting Existing Community Facilities;
  - Policy 4: Local Green Space;
- Walkeringham Neighbourhood Plan 2019-2035, Adopted 2021 (Ref 18.13)
  - Neighbourhood Plan Policy 7: Enhancing the provision of community facilities;
- Misterton Neighbourhood Plan Review 2022 – 2028 (Ref 18.14)
  - Policy 3R Improving Green and Blue Infrastructure and Biodiversity;
  - Policy 13R Enhancing the Provision of Community Facilities and Services;
- Treswell with Cottam Neighbourhood Plan Submission Draft, 2024 (Ref 18.15)
  - Policy 7 Community Facilities;

18.2.15 Local authorities and Integrated Care Boards have equal and joint duties to prepare Joint Strategic Needs Assessments (JSNAs) and Health and Wellbeing Strategies for their areas, which set out the current and future health care needs for a local area and strategies for how these needs should be met.

18.2.16 North Lincolnshire Council submitted the New Local Plan for Examination in November 2022. The Examination progressed however the authority took the decision to formally withdraw the New Local Plan from the Examination in September 2024. The Saved Policies in the Local Plan (2003) as updated in October 2024 (Ref 18.17), North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 18.6) from the adopted Development Plan and have been considered in the PEIR where relevant.

18.3 Scoping Opinion and Consultation

Scoping Opinion

18.3.1 The scope of the assessment has been informed by the Scoping Opinion (Ref 18.17) provided by the Planning Inspectorate on behalf of the Secretary of State, following submission of the Environmental Impact Assessment (EIA) Scoping Report (Ref 18.18). The scope has also been informed through consultation and engagement with relevant stakeholders. A summary of the Scoping Opinion (Ref 18.17) together with a response from National Grid against each point of relevance to health and wellbeing is provided in is provided in Table 18.1. The scope of the Health and Wellbeing Assessment is set out in Table 18.2.

Table 18.1 - Scoping Opinion responses

ID	Inspectorate's comments	Response
3.12.1	**Potential impacts of EMFs on local residents and workers – Operation** The Applicant proposes to scope this matter out on the basis that the Applicant will ensure that policies and procedures are in place at the design phase to ensure that all equipment will comply with public EMF exposure limits. The Inspectorate considers that the ES should provide evidence that these polices, and procedures are in place and confirm that receptors will not be impacted by potential sources of EMF. In the absence of such evidence, the Inspectorate considers that the ES should provide an assessment of the impact of EMF on local residents and workers where there is potential for likely significant effects to occur. Although not explicably requested, the Inspectorate agrees to scope out an assessment of EMFs during the construction phase on the basis that they are associated with Operational power distribution.	An Electric and Magnetic Field Compliance Report will be produced and submitted with the application. This will provide an assessment and conclusion of the compliance of electric and magnetic fields (EMF) produced by the Project. The Project will be designed in accordance with the guidelines outlined in National Policy Statement (EN-5), which is based on advice from the UK Health Security Agency (UKHSA), therefore ensuring that receptors are protected from any potential sources of EMF.
3.12.2	**Health determinants for diet and nutrition, housing and relocation – Construction and Operation** The Applicant proposes to scope out these health determinants on the basis that they are unlikely to be affected by the Project. The Inspectorate agrees to scope these matters out, however, should housing and relocation be affected by the Project this should be detailed within the ES and an assessment provided where there is the potential for likely significant effects to occur.	This is noted for the ES.

ID	Inspectorate's comments	Response
3.12.3	**Determination of sensitivity and magnitude for Public Rights of Way (PRoW) and recreational routes** It is unclear how the frequency of use for PRoW and recreational routes will be determined. The Inspectorate considers that the determination of sensitivity and magnitude of impact on for these routes should include reference to its usage. The ES should clearly set out the data sources and any surveys utilised in determining the sensitivity and magnitude of these routes. The Applicant's attention is drawn to the United Kingdom (UK) Health Security Agency's response (Appendix 2 of the Opinion) in this regard.	Where information is available on the number of users, and the purpose of users' trips, this will be used to inform the sensitivity of both the socio-economic and health and wellbeing assessments. The location of the PRoW and the potential for alternative routes will also be a factor in determining the potential sensitivity of a given route. For these factors, the sources and the results of surveys will be clearly stated and referenced.

Table 18.2 - Scope of the Health and Wellbeing Assessment

Determinants Scoped in	Project Phase
Health and social care services	Construction
Employment and income	Construction
Education and training	Construction
Transport modes, access, and connections	Construction
Air quality	Construction
Noise and Vibration	Construction
Open space, leisure, and play	Construction and operation
Climate change mitigation and adaptation	Construction and operation
Water quality or availability	Construction
Community identity, culture, resilience, and influence	Construction and operation

18.3.2 Table 18.3 lists the Institute of Environmental Management and Assessment (IEMA) determinants that have been scoped out of the human health assessment and the justification for this. Some of the determinants have been scoped out at PEIR stage due to their effects being considered in the IEMA determinants above in Table 18.2 and are therefore not repeated. Three IEMA determinants were scoped out in the Scoping Report with further determinants scoped out at PEIR stage; housing; diet and nutrition; and relocation.

Table 18.3 - Determinants scoped out of the Health and Wellbeing Assessment

Determinants	Justification for Scoping out
Physical activity	Physical activity effects relate most directly to open space and transport and so are captured within the assessments of those determinants, as suggested by IEMA guidance.
Housing	As stated in the Scoping Report, the Project is unlikely to affect housing need directly or indirectly to justify its inclusion as a determinant.
Risk-taking behaviour	Chapter 19 Major Accidents and Disasters of the Scoping Report scoped out all hazards from the assessment and therefore the chapter was scoped out from the PEIR Report and ES. Due to the nature of the Project, IEMA considerations such as alcohol use, cigarette use, drug use, gambling and communicable diseases are unlikely to be affected.
Community Safety	Due to the nature of the Project, there are no significant effects expected in relation to community safety through impacts on crime. Chapter 19 Major Accidents and Disasters of the Scoping Report for the Project submitted to the Planning Inspectorate in 2023, scoped out all hazards from the assessment and therefore the chapter was scoped out from the PEIR report and ES.
Social participation, interaction, and support	Effects relating to accessing community centres and other places of social interaction are assessed under the ‘transport, access and modes’ determinant, as well as the ‘community identity, culture, resilience and influence’ determinant.
Diet and nutrition	As stated in the Scoping Report, effects on opportunities to promote good nutrition, to support healthy food options or to increase learning and skills initiatives for this subject are unlikely to be affected by the Project.
Relocation	As stated in the Scoping Report, as housing need is likely to be unaffected by the Project and no population relocation is likely to occur, any impacts on relocation are likely to be negligible.
Wider societal infrastructure and resources	Wider contributions to economic development are assessed under the ‘employment and income’, and ‘education and skills’. Impacts on climate change are considered as part of climate change mitigation and adaptation’. Impacts on water resources are considered under ‘water quality or availability’. Impacts on transport infrastructure are considered under the ‘transport modes, access, and connections’.
Built environment	Impacts on community assets such as educational facilities are assessed under the ‘transport modes, access, and connections’. Impacts on health and social care services is considered under the determinant ‘health and social care services’. Impacts on mental wellbeing from reduced views and landscape quality from the introduction of pylons to the built environment are covered under the community identity, culture, resilience, and influence determinant.

Determinants	Justification for Scoping out
Land Quality	**Chapter 12 Geology and Hydrogeology** states that significant impacts on human health receptors due to construction-related new contamination are unlikely due to mitigation measures for groundwater receptors. No sites with a moderate or above risk rating in relation to existing contamination were identified and therefore significant effects relating to existing contamination are unlikely. Operational and maintenance geology and hydrogeology effects are scoped out.
Radiation	Electric and magnetic fields (EMFs) produced by electricity and transmission systems are termed as non-ionising radiation, which differs fundamentally from ionising radiation. Non-ionising radiation lacks sufficient energy to cause ionisation, unlike ionising radiation which poses strong health risks to humans. As stated in the Scoping Report, impacts of the generation of EMFs have been scoped out during operation as the Applicant will ensure that all policies and procedures are in place at the design phase to ensure all equipment complies with public EMF exposure limits. Furthermore, the Planning Inspectorate noted during the Scoping Opinion that an assessment of EMFs during the construction phase should be scoped out on the basis that they are associated with operational power distribution.

Project Engagement and Consultation

18.3.3 Stakeholder engagement will be undertaken as the Project progresses with relevant statutory bodies. That is the relevant statutory bodies as identified by Government guidance on consultation and pre-decision matters, which includes the Environment Agency and the relevant Local Planning Authorities. Correspondence from these discussions will be detailed in the ES.

18.4 Assessment Approach and Methods

18.4.1 **Chapter 5 Approach to Preparing the PEIR** sets out the overarching approach which has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the baseline conditions, sensitivity of receptors and magnitude of effects and sets out the criteria that have been used for the preliminary health and wellbeing assessment. This section also identifies further assessment needed to be undertaken as part of the ES.

Guidance Specific to the Health and Wellbeing Assessment

18.4.2 Relevant guidance identified in the Scoping Report, specific to health and wellbeing assessment that has informed the approach to the preliminary assessment in this PEIR and will inform the assessment within the ES, comprises:

- Planning Practice Guidance (PPG) – Healthy and safe communities, 2022 (Ref 18.19);
- Design Manual for Roads and Bridges (DMRB) Document LA112 (Ref 18.20);

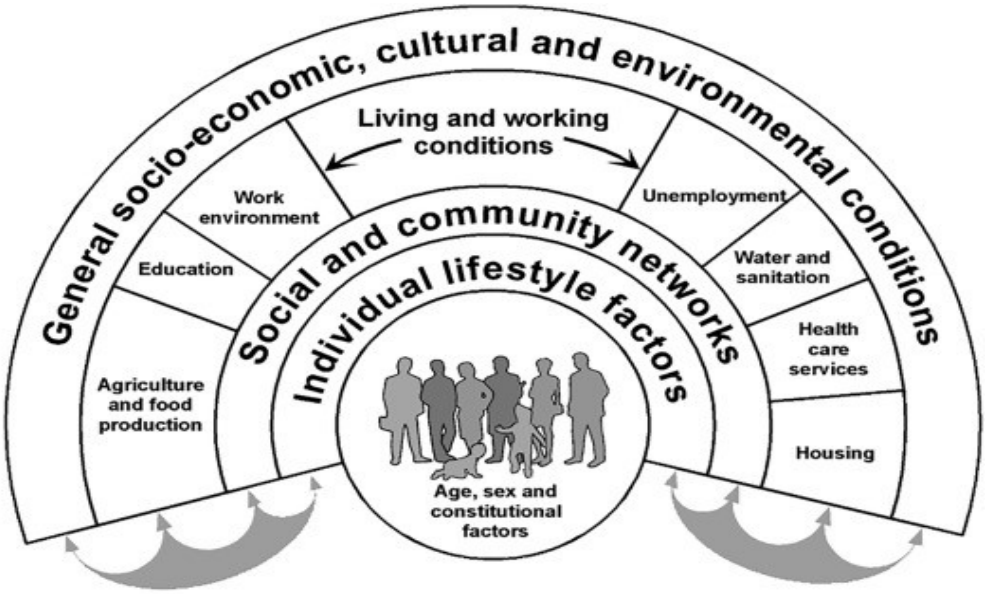
- NHS Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment (HIA) Tool (Ref 18.21);
- Public Health England (PHE) Guidance: Spatial Planning for Health: An evidence resource for designing healthier places (Ref 18.22);
- PHE Strategy 2020 to 2025 (Ref 18.23);
- The Marmot Review: Fair Society Healthy Lives (2010) (Ref 18.24);
- Health Equity in England 10 Years On (2020) (Ref 18.25);
- Build Back Fairer – The Covid-19 Marmot Review (Ref 18.26);
- International Commission on Non-Ionising Radiation Protection (1998) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields. Health Physics, 74 (4), p.494) (Ref 18.27); and
- Control of Electromagnetic Fields at Work Regulations (2016) (Ref 18.28).

18.4.3 Additional guidance identified at PEIR stage comprises:

- A Green Future: Our 25 Year Plan to Improve the Environment, 2018 (Ref 18.29);
- Putting Health into Place, 2018 (Ref 18.52);
- Health Impact Assessment in spatial planning, 2020 (Ref 18.31);
- Advice on the content of Environmental Statements accompanying an application under the NSIP Regime, 2021 (Ref 18.32);
- Health in Environmental Impact Assessment – A Primer for a Proportionate Approach, 2017 (Ref 18.33);
- Mental Wellbeing Impact Assessment Collaborative, National Mental Wellbeing Impact Assessment, 2011 (Ref 18.34);
- Effective Scoping of Human Heath in Environmental Impact Assessment, 2022 (Ref 18.35);
- Determining Significance for Human Health in Environmental Impact Assessment, 2022 (Ref 18.36); and
- NHS Long Term Plan (2019) (Ref 18.37).

18.4.4 Dahlgreen and Whitehead's model of the main determinants of health (Ref 18.38) illustrates the breadth of possible influences on health, as shown in **Image 1 - Determinants of health**. At the centre of the illustration are factors that are largely fixed, including individual age, sex, constitutional and genetic factors. Outside this are factors generally described as the wider or broader determinants of health. The model emphasises interactions between the layers. Moving outwards from the centre, individual lifestyle choices are embedded in social norms and community networks, and in living and working conditions, which in turn are shaped by and related to the wider socio-economic and cultural environment.

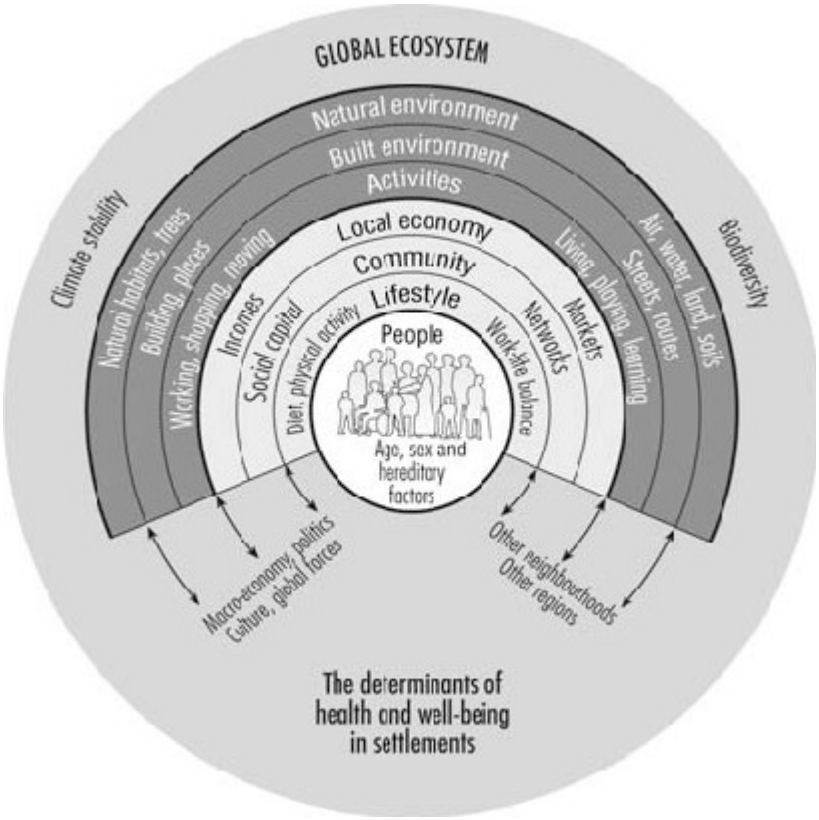
Image 1 - Determinants of health



Source: adapted from Dahlgren and Whitehead, 1991

18.4.5 This model has been developed to show elements of the built environment and communities that are the most significant determinants of health, as shown in **Image 2 - Determinants of health in neighbourhoods**.

Image 2 - Determinants of health in neighbourhoods



Source: Barton and Grant (2006) (Ref 18.39)

18.4.6 Within a population there can also be health inequalities, defined by the World Health Organisation (WHO) as “differences in health status or in the distribution of health determinants between different population groups. For example, differences in mobility between elderly people and younger populations or differences in mortality rates between people from different social classes”

Study Area

18.4.7 The study area for the Health and Wellbeing baseline is presented in **Figure 18.1 Health and Wellbeing Baseline Study Area**. This is presented for the Project inclusive of both the Proposed Overhead Line and Proposed Substation Works

18.4.8 The study area for health and wellbeing has been defined using professional judgement and experience of other similar linear projects.

18.4.9 The study areas for the assessment of potential health and wellbeing effects have been defined to include human populations likely to be at risk from the possible direct and indirect health impacts that might arise from the Project. Therefore, the study areas for the health assessment vary by the type of impact being assessed.

18.4.10 For sensitive receptors, the study area is defined based on the geographic extent of other topics for each environmental aspect of relevance to health and wellbeing, notably **Chapter 6 Landscape, Chapter 7 Visual, Chapter 11 Water Environment, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change**. These study areas are set out in the relevant chapters of this PEIR and are summarised in Table 18.4 below.

18.4.11 In the Scoping Report, paragraph 17.3.1 states that the health baseline study area will consist of wards. Lower Layer Super Output Areas (LSOAs[1]) have been used due to more data being available at LSOA level and because LSOAs are more granular data than wards.

18.4.12 The following geographical areas have been considered for the collation of the information for the baseline, which informs the sensitivity of relevant populations and sub-populations and their ability to respond to change:

- the LSOAs comprising the draft Order Limits, known as the Direct Impact Area[2];
- the local authorities of East Riding of Yorkshire, North Lincolnshire, and Bassetlaw District Council (Nottinghamshire);
- the wider study area combining the local authorities of East Riding of Yorkshire, North Lincolnshire, Bassetlaw District Council (Nottinghamshire) combined;
- their corresponding regions of Yorkshire and the Humber (region for North Lincolnshire and East Riding of Yorkshire) and the East Midlands (region for Bassetlaw District Council); and
- the national comparator of England.

[1] Lower Layer Super Output Areas (LSOAS) are small geographical areas comprising of approximately 1,500 people.

[2] The LSOAs comprising the DIRECT IMPACT AREA are: The East Riding of Yorkshire LSOAs 022E, 024D, 024E, 032A, 026A, 026B, 026C, 026E, 020C, 024F, 032I and 038D; the North Lincolnshire LSOAs 020A, 020B, 020D, 006B, 006C, 023A, 023B and 023D; and the Bassetlaw LSOAs 002A, 003A, 002D, 015C, 002E, 015D and 015F.

18.4.13 Table 18.4 presents the different components of the health and wellbeing effects assessment for this PEIR, the geographical scale at which each component is assessed, and the rationale behind these geographical scales.

Table 18.4 - Health and wellbeing impacts by geographical scale

Impact	Geographical Area of Impact	Rationale for Impact Area
Impacts on health and social care services	1 km from the draft Order Limits	Study area includes communities and road users that could be affected by severance or access impacts, or journey delay, as set out in **Chapter 14 Traffic and Transport** and **Chapter 17 Socio-economics, Recreation and Tourism.**
Impacts on employment and Income	60-minute drive time area	Professional judgement regarding the scope for potential employment impacts, as set out in **Chapter 17 Socio-economics, Recreation and Tourism.**
Impacts on education and training	60-minute drive time area	Impacts will be limited to the principal labour market catchment area which as set out in **Chapter 17 Socio-economics, Recreation and Tourism** is a 60-minute drive time area.
Impacts on transport Modes, access and connections	Within the draft Order Limits	As set out in **Chapter 14 Traffic and Transport and Chapter 17 Socio-economics, Recreation and Tourism**, PRoW and recreational routes are assessed within the boundary, due to professional judgement and experience from other electricity network infrastructure schemes in England. **Chapter 14 Traffic and Transport** uses a study area that takes into account the main settlements and highways that may be impacted by the construction of the Project, as well as the Primary Access Routes.
Impacts on air quality	50 m – 250 m from the draft Order Limits	Study area includes human receptors which could be impacted by construction phase dust or emissions generated by construction vehicle emissions. As set out in **Chapter 15 Air Quality**, the geographical area of

Impact	Geographical Area of Impact	Rationale for Impact Area
		impact ranges from 50 m to 250 m for construction dust, construction vehicle emissions and construction plant and equipment emissions as informed by the relevant guidance.
Impacts on noise and vibration	50 m – 300 m from the draft Order Limits	Study area includes human receptors that could be impacted by increased exposure to noise and vibration. These study areas are in accordance with the relevant guidance, as set out **Chapter 16 Noise and Vibration** for the construction noise, construction vibration and construction traffic noise assessments.
Impacts on open space, leisure and play	500 m from the draft Order Limits	500 m is the distance threshold beyond which it is considered that people are likely to be deterred from making trips to an extent that they would change their habits (based on DMRB LA 112 (Ref 18.20), as set out in **Chapter 17 Socio-economics, Recreation and Tourism**. Beyond this buffer, receptors must have a clear rationale for their inclusion, which is derived from assessments for the dependent chapters of either **Chapter 6 Landscape; Chapter 7 Visual; Chapter 14 Traffic and Transport; Chapter 15 Air Quality;** or **Chapter 16 Noise and Vibration**, or a combination of these chapters, as set out in **Chapter 17 Socio-economics, Recreation and Tourism.**
Impacts on climate change mitigation or adaption	All greenhouse gas (GHG) emissions and how the Project contributes to wider grid decarbonisation.	As stated in **Chapter 19 Climate Change**, the Climate Change Risk Assessment encompasses all GHG emissions during the construction, operation and maintenance of the Project.
Impacts on water quality or availability	500 m from the draft Order Limits	As stated in **Chapter 11 Water Environment**, 500 m is considered an appropriate study area based on the nature of the Project's construction and operation activities

Impact	Geographical Area of Impact	Rationale for Impact Area
		and technical knowledge of similar schemes.
Impacts on community identity, culture, resilience, and influence	500 m – 10 km	As stated in **Chapter 17 Socio-economics, Recreation and Tourism**, community facilities are assessed at a distance of 500 m based on professional judgement and experience from other electricity network infrastructure schemes in England. **Chapter 7 Visual** uses preliminary Zone of Theoretical Visibility (ZTV) maps for a 10 km radius as they show the spatial extent as to which the Project may have visual impacts. **Chapter 6 Landscape** also uses these 10 km radius ZTV maps.

Baseline Data Gathering and Forecasting Methods

Data sources

18.4.14 The baseline information has been informed by a desk study which has drawn on the following information sources.

- Office for National Statistics (ONS), Census 2021, (2022) (Ref 18.40);
- Public Health England, Local Authority Health Profiles, (2024) (Ref 18.41);
- ONS, Regional Gross Disposable Household income (GDHI), (2023) (Ref 18.42);
- ONS, English Indices of Deprivation, (2019) (Ref 18.43);
- Public Health England, Common Mental Health Disorders, (2017) (Ref 18.44);
- ONS, Claimant Count, (2024) (Ref 18.45);
- ONS, Population Projections, (2018) (Ref 18.46);
- Ordnance Survey (OS) 1:10,000, 1:25,000, 1:50,000 and 1:250,000 base mapping;
- OS AddressBase Plus;
- Department for Digital, Culture, Media and Sport, (2023), Community Life Survey 2021/22 (Ref 18.47);
- NHS, (2024), General Practice Workforce (Ref 18.48);
- NHS, London Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment Tool, (2019) (Ref 18.49); and

- Baseline data presented in **Chapter 6 Landscape, Chapter 7 Visual, Chapter 11 Water Environment, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change.**

Site visits and surveys

18.4.15 The following field surveys have been carried out by related technical topics relevant to this assessment:

- **Chapter 6 Landscape** sets out details of field survey work carried out during several visits between Spring 2023 and Summer 2024, and records were made in the form of field notes and photographs. Field survey work was completed to consider likely effects on locally designated landscapes and on landscape character.
- **Chapter 7 Visual** sets out details of field survey work carried out during several visits between Spring 2023 and Summer 2024, Field survey work included visits to a selection of representative public viewpoints where photos were taken.

Further data to be collected to inform the ES

18.4.16 The majority of baseline data has been collected at PEIR stage, however some data from the chapters listed below that this chapter is reliant upon will be collected at the ES stage. Ongoing reviews of data will be undertaken to ensure the assessment in the ES incorporates the latest available information.

18.4.17 In addition, the ES will be informed by assessment results from **Chapter 6 Landscape Chapter 7 Visual, Chapter 11 Water Environment, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change.**

Assessment Methods and Criteria

18.4.18 The preliminary health and wellbeing assessment determines if effects arising because of the Project, following the implementation of mitigation, are likely to be positive, negative, together with predicting if effects are likely to be significant.

18.4.19 The World Health Organisation (WHO) defines health as a:

'state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.

18.4.20 The range of personal, social, economic, and environmental factors that influence health status are known as health determinants and include the physical environment, income levels, employment, education, social support, and housing.

18.4.21 The Project has the potential to give rise to changes in health status by influencing health determinants. Changes can affect the health of receptors, identified as the 'general population' and 'vulnerable groups'. The latter relates to groups who may have a higher sensitivity to these changes in health status, by virtue of factors such as age (for example older people or children), ethnicity, economic factors, disability, sex, or gender.

18.4.22 The assessment in this PEIR is based on published IEMA guidance on Determining Significance for Human Health in EIA (Ref 18.36) and Effective Scoping of Human Health in EIA (Ref 18.35). The assessment identifies and assesses the change on environmental conditions, along with physical and mental health, because of the Project.

18.4.23 The baseline sets out the wider health context required to inform the assessment, covering both physical and mental health. This information has been used as a basis for determining the sensitivity of receptors to changes in health determinants arising from the Project.

18.4.24 The potential for likely significant effects on health and wellbeing resulting from related environmental change, as set out in **Chapter 6 Landscape, Chapter 7 Visual, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change** is summarised in this chapter, for both general population and vulnerable group receptors.

18.4.25 The qualitative assessment presented in this PEIR is informed by the Mental Wellbeing Impact Assessment (Ref 18.34). This guidance considers the potential mental health effects because of the Project, specifically in relation to control, resilience and community assets, and participation and inclusion.

18.4.26 Wherever possible, the impacts identified in the assessment will be appraised against relevant national guidance as shown in paragraph 18.4.2. Where relevant standards do not exist, professional experience and professional judgement will be applied and justified. Best practice principles are also provided in the NHS England's Healthy Urban Development Unit's Rapid Health Impact Assessment (HIA) Toolkit 2019 (Ref 18.49) and this toolkit will assist the approach to assessing the impacts on health arising from the Project. The significance criteria of human health effects will be assessed based on expert judgment and professional experience of the author and relies on the sensitivity and magnitude considerations listed below. When combined, these factors determine the consequent significance of the effect.

Sensitivity

18.4.27 The sensitivity of health and wellbeing effects is driven by a number of factors which are set out in Table 18.5 and are based on guidance set out by IEMA guidance (Ref 18.36, Ref 18.35, Ref 18.33) and professional judgement of this guidance. This good practice approach is based on existing national and international guidance, hence why the sensitivity levels and terminology differs slightly from that set out in **Chapter 5 Approach to Preparing the PEIR.**

18.4.28 Sensitivity of human health receptors including general populations and potentially vulnerable sub-populations: specific values in terms of sensitivity are not attributed to population health due to the diverse range of determinants and indicators that can determine overall health. However, the assessment will take account of the qualitative (rather than quantitative) sensitivity of relevant populations and their likely ability to adapt to change. Sensitivity can be informed by baseline data, including demographic statistics, public health statistics and deprivation mapping. It can also be informed by professional judgements about the characterisation of the relevant population, e.g., in relation to their capacity to adapt and the likely presence of vulnerable groups.

Table 18.5 - Sensitivity classification

Level of Sensitivity	Indicative Criteria
High	High levels of deprivation (including pockets of deprivation); reliance on shared resources (between the population and the Project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependents; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependent); people with good health status; and/or people with a very high capacity to adapt.

Magnitude

18.4.29 Magnitude of impact is driven by a number of factors which are set out in Table 18.6, based on guidance set out by IEMA guidance (Ref 18.36).

18.4.30 Magnitude of impact entails consideration of the scale of the exposure of the population to an impact; whether the impact is one-off or continuous; the likely nature of the human health impact; the permanence of the change; and the proportion of the relevant study area population that would be affected. Magnitude can be informed by a full understanding of the Project and the findings of the other technical chapters, including their zones of influence and expected degrees of change.

Table 18.6 - Human health magnitude of impact criteria

Level of Magnitude	Description
Large	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) or very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or moderate change in quality of life; large minority of population affected; gradual reversal; small service quality implications.
Small	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality of life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or small scale; very short-term duration; one off frequency; severity predominantly relates to minor change in quality of life; very few people affected; immediate reversal once activity complete; no service quality implications.

Significance of effects

18.4.31 The overall effects of the Project are defined as one of the following:

- beneficial – an advantageous or beneficial effect on a receptor;
- negligible – an imperceptible effect on a receptor;
- adverse – a disadvantageous or negative effect on a receptor; or
- no effect – no discernible effects on a receptor.

18.4.32 Duration of effect is also considered, with more weight given to permanent changes than to temporary ones. For the purposes of this assessment, short-term effects are of one year or less, medium-term effects of one to five years and long-term effects for over five years.

18.4.33 Where an effect is assessed as being beneficial or adverse, the effect will be classified as Major, Moderate, Minor or Negligible. The assessment of significance will be informed by considering the sensitivity of the receptor and the magnitude of impact as informed by **Chapter 5 Approach to Preparing the PEIR**. Moderate and major effects are generally considered to be significant, whereas minor and negligible effects are generally considered to be not significant.

Approach to determining significance in the PEIR

18.4.34 **As set out in Chapter 5 Approach to Preparing the PEIR** the general approach taken to determining the significance of effect in this preliminary assessment is only to state whether effects are likely or unlikely to be significant rather than assigning a significance levels.

18.4.35 Following on from the identification of whether an effect is considered likely to be significant or not significant a confidence in the prediction is given a rating of high, moderate or low in line with the confidence level definitions presented in **Chapter 5 Approach to Preparing the PEIR**.

Preliminary Assessment Assumptions and Limitations

18.4.36 The assessment has been undertaken based on preliminary design information for the Proposed Overhead Line as described in **Chapter 4 Description of the Project and** consideration of preliminary conclusions from other related environmental topic assessments. This information is likely to develop further in response to ongoing design, assessment and stakeholder feedback, and will be updated for the ES as the design evolves.

18.4.37 All conclusions and assessments are, by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.

18.4.38 Health effects are considered at a population, rather than an individual, level. Effects may therefore be presented in relation to the general population or in relation to vulnerable groups.

18.4.39 Ascertaining the level of exposure of a population to effects on certain health determinants is based on professional judgement, considering inherent uncertainties in identifying how and where people may spend their time (for example in a location exposed to effects) as opposed to other locations where other factors may be responsible for health changes. The assessment draws from and builds upon the outputs of the supporting technical disciplines and is therefore subject to the same limitations and assumptions affecting those assessments.

18.4.40 The scale and significance of effects cannot always be quantified. It is common for health assessments to address this through descriptive analysis of effects and identification of the potential direction of effects.

18.4.41 A small section of the draft Order Limits 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 as part of the proposed High Marnham Substation works as described in **Chapter 4 Description of the Project**. The need to include Office for National Statistics (ONS) Census 2021 (Ref 18.40) baseline data for this Local Authority Area will be kept under review and presented in ES where appropriate.

18.4.42 Effects on human health draw upon other PEIR chapters, namely **Chapter 6 Landscape, Chapter 7 Visual, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change** is summarised in this chapter. Relevant assumptions and limitations are set out in the respective chapters and as such are not repeated here.

18.4.43 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated, or refined. The ES will present the final key parameters and assumptions used within that assessment, drawing attention to any areas that may have changed from that which is presented in this preliminary assessment.

Further Assessment within the ES

18.4.44 The ES will present a detailed assessment in accordance with IEMA guidance documents (Ref 18.33, Ref 18.35, Ref 18.36) with the significance of the effect on a receptor presented during construction and operation (and maintenance) (where relevant), when considered in relation to the sensitivity or value of the receptor and the magnitude of the potential effect.

18.4.45 The ES will include the results of relevant site surveys undertaken to inform the assessments of other environmental topics. Field surveys undertaken at PEIR stage are noted in paragraph 18.4.15**.**

18.4.46 The ES will include a qualitative assessment determining the magnitude of potential change and sensitivity of receptors to change (both general population and vulnerable groups). The assessment will include:

- How the health determinant might change because of the Project and whether this would be beneficial or adverse;
- Duration of change – temporary or permanent;
- Exposure to change (including identification of vulnerable groups); and
- Intensity (magnitude or severity of the change in the health determinant).

18.4.47 A conclusion on significance and associated reasoning will be provided where possible in relation to identified receptors (general population and vulnerable groups) and effects on physical and mental health arising from environmental change.

18.5 Baseline Conditions

18.5.1 This section describes the baseline with specific reference to human health in the study area where it relates to the Proposed Overhead Line. The baseline with specific reference to human health in the study area in relation to the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works**.

18.5.2 Firstly, a demographic and health profile of the local population is set out, covering both physical and mental health, as well as information that can be used to identify potential vulnerable populations (age, ethnicity, economic status, disability etc). Secondly, existing local infrastructure relevant to the health assessment is summarised; this draws largely on **Chapter 17 Socio-economics, Recreation and Tourism** and includes health provision, community facilities and recreational routes such as Public Rights of Way (PRoW).

Physical and Mental Health Context

Population demographics

18.5.3 The resident population of the Direct Impact Area and the local authority areas comprising the Wider Study Area as recorded in the Census 2021 (Ref 18.40) are shown in Table 18.7. In the Direct Impact Area, the population in 2021 was 47,894. The most populous local authority area was East Riding of Yorkshire (342,215) and the least populous was the Bassetlaw District Council (117,804). The total resident population for the Wider Study Area (defined as East Riding of Yorkshire, North Lincolnshire and the Bassetlaw District Council local authorities) was 629,700.

18.5.4 In terms of the local authorities, population growth since 2011within the wider study area Wider Study Area was greatest in Bassetlaw District Council (4.4%). The average population growth across the three local authorities was 2.5%, a lower growth rate than the regional and national averages. These statistics may be affected by the COVID-19 pandemic, which was underway when the Census 2021 was conducted (for example, by students studying from home rather than living away).

18.5.5 Fourteen percent of the Direct Impact Area's population are aged 14 and under, the smallest proportion of all geographies. The Direct Impact Area had the joint largest proportion of aged 65+ population (26%), equal to that in East Riding of Yorkshire. Of the local authorities, East Riding of Yorkshire has the smallest proportion of the population aged 14 years and under (15%) and the largest proportion aged 65+ (26%). Compared to England and the regional comparators, all of the local authorities have larger proportions of individuals aged 65+. The Wider Study Area also exhibits these trends, with 24% of the population aged 65+, compared to England's 18%.

18.5.6 It is evident that the Wider Study Area has a generally older population on average compared to the regional and national averages. This sub-population is overrepresented in the Wider Study Area and could be more sensitive to changes to their environment and may have a higher reliance on health services. This will be assessed in the assessment of likely impacts.

Table 18.7 - Population, population change and age cohorts

Local Authority area (Route Section)	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
Direct Impact Area	47,894	N/A	14%	61%	26%
East Riding of Yorkshire	342,215	2.4%	15%	59%	26%
North Lincolnshire	169,680	1.3%	17%	62%	22%

Local Authority area (Route Section)	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%
Wider Study Area	629,699	2.5%	16%	61%	24%
East Midlands	4,880,054	7.7%	17%	64%	19%
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 18.40), Census 2011 (Ref 18.50).
Note: Table may not sum due to rounding.

Ethnicity

18.5.7 The Census 2021 (Ref 18.40) contains data on the ethnicity demographics of all of the geographies; these statistics are summarised below in Table 18.8.

18.5.8 The study area has a predominantly white population, with 97.8% of the Direct Impact Area and 96.0% of the Wider Study Area being white. This is substantially higher than the regional and national comparators; 81.0% of England, 85.4% of Yorkshire and the Humber and 85.7% of the East Midlands are white. The second largest ethnic group in the Direct Impact Area is mixed or multiple ethnic groups, comprising 0.9% of the population. The second largest ethnic group in the Wider Study Area is Asian, Asian British or Asian Welsh, comprising 1.9% of the Wider Study Area.

Table 18.8 - Ethnicity

Local Authority area (Route Section)	Asian, Asian British or Asian Welsh (%)	Black, Black British, Black Welsh, Caribbean or African (%)	Mixed or Multiple ethnic groups (%)	White (%)	Other ethnic group (%)
Direct Impact Area	0.8	0.3	0.9	97.8	0.2
East Riding of Yorkshire (Route Sections 1-4)	1.1	0.3	0.9	97.4	0.4

Local Authority area (Route Section)	Asian, Asian British or Asian Welsh (%)	Black, Black British, Black Welsh, Caribbean or African (%)	Mixed or Multiple ethnic groups (%)	White (%)	Other ethnic group (%)
North Lincolnshire (Route Sections 5-7)	3.3	0.5	1.1	94.3	0.8
Bassetlaw District Council (Route Sections 8-11)	1.2	0.6	1.2	96.4	0.5
Wider Study Area	1.9	0.5	1.1	96.0	0.6
East Midlands	8.0	2.7	2.4	85.7	1.3
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 18.40).

Economic activity

18.5.9 Economic activity rates of those 16 years and older (excluding full-time students) provided by Census 2021 data (Ref 18.40**)** is shown in Table 18.9. The Direct Impact Area has an economic activity rate of 57%, 3% lower than the national average (59%). In terms of the local authorities, East Riding of Yorkshire (55%), North Lincolnshire (56%) and Bassetlaw District Council (57%) all have lower rates of economic activity than the national average (59%). This is also true of the economic activity rate for the Wider Study Area (56%) This is slightly less than the rates for the East Midlands region (58%) and less than the average for England (59%). Economic activity rates for both regions, East Midlands (58%) and Yorkshire and the Humber (56%), are less than the national rate of 59%.

18.5.10 The Office for National Statistics provides monthly data on the number of people claiming benefits principally for the reason of being unemployed, also known as the claimant count (Ref 18.45). In July 2024, East Riding of Yorkshire had the lowest claimant count (2.7%) of all of the geographies. The study area had a lower proportion of claimants than the national average; in the Wider Study Area, the claimant count was 3.4%, compared to 4.4% nationally. Claimant count data is not available for the Direct Impact Area; however, it is available for Census 2021 unemployment, in which the Direct Impact Area had the lowest unemployment rate of all geographies (2.1%).

Table 18.9 - Economic Activity

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 (%)
Direct Impact Area	57	2.1	N/A
East Riding of Yorkshire	55	2.3	2.7
North Lincolnshire	56	3.0	3.9
Bassetlaw District Council	57	2.4	3.7
Wider Study Area	56	2.6	3.4
East Midlands	58	3.0	3.9
Yorkshire and the Humber	56	3.4	4.8
England	59	3.5	4.4

Source: Office for National Statistics, (2022); Census 2021 (Ref 18.40).

Qualifications

18.5.11 Skills and qualifications held by working people aged 16-64 as recorded in the 2021 Census (Ref 18.40) are presented in Table 18.10. 31.5% of the Direct Impact Area were qualified to level NVQ4+, a larger proportion than all comparator geographies but England (33.9%). The Direct Impact Area also has the lowest proportion of residents with no qualifications (16.8%).

18.5.12 In the local authorities of East Riding Of Yorkshire (30.5%), North Lincolnshire (23.9%) and Bassetlaw District Council (25.5%), the proportions of the population with NVQ4+ qualifications are all lower than the national average (33.9%). The proportion of the population with NVQ4+ qualifications in the Wider Study Area is 27.8%, which is also lower than the East Midlands (29.1%), Yorkshire and the Humber (29.5%) and England (33.9%) averages.

Table 18.10 - Skills and qualifications held by worked aged people (16-64)

Skills and Qualifications	Direct Impact Area	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council	Wider Study Area	East Midlands	Yorkshire and the Humber	England
	%	%	%	%	%	%	%	%
People with NVQ4+	31.5	30.5	23.9	25.5	27.8	29.1	29.5	33.9
People with NVQ3+	18.3	17.2	17.2	17.4	17.2	18.3	17.4	16.9
People with NVQ2+	14.3	14.1	15.1	14.8	14.5	13.9	13.6	13.3
People with NVQ1+	9.5	10	11.7	10.9	10.6	10.4	10.1	9.7
People with Apprenticeships	6.9	7.2	7.1	6.7	7.1	6	6.1	5.3
People with other qualifications (NVQ)	2.6	2.8	3.1	3.1	2.9	2.8	2.6	2.8
People with no qualifications (NVQ)	16.8	18.2	21.8	21.6	19.8	19.5	20.6	18.1

Source: Office for National Statistics, (2022); Census 2021 (Ref 18.40).

Average Gross Disposable Household Income

18.5.13 The Office for National Statistics provides data for the Gross Disposable Household Income (GDHI) in International Territorial Level (ITL) regions across the UK in 2021 (Ref 18.42), displayed below in Table 18.11. The Wider Study Area has a lower average GDHI per person (£18,913) than the average in England (£22,213). Of the three local authorities comprising the Wider Study Area, East Riding of Yorkshire has the highest average GDHI per person (£20,430), compared to Bassetlaw District Council's £18,935 and North Lincolnshire's (£17,374). Both of the regional GDHI per person averages were lower than the national average, however only Yorkshire and the Humber's GDHI per person (£18,363) was lower than that in the Wider Study Area.

Table 18.11 - Gross disposable household income

	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council	Wider Study Area	East Midlands	Yorkshire and the Humber	England
GDHI per Person in Current Prices	£20,430	£17,374	£18,935	£18,913	£18,956	£18,363	£22,213

Source: Office for National Statistics, (2021); Gross Disposable Household Income (Ref 18.42).

Deprivation

18.5.14 The Office for National Statistics provides data on deprivation through the Indices of Multiple Deprivation 2019 (Ref 18.43) as shown in Table 18.12. 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.

18.5.15 The Direct Impact Area has a higher average rank (20,820) than the three local authorities, indicating a lower level of deprivation. 0.0% of the Direct Impact Area's LSOAs are in the most deprived decile of the overall index and 0.0% are in the most deprived decile of the health deprivation and disability domain. Of the three local authorities comprising the Wider Study Area, North Lincolnshire has the highest percentage of LSOAs in the bottom decile (the 10% most deprived LSOAs in England) of the Index of Multiple Deprivation at 10.9%, compared to Bassetlaw District Council (7.1%) and East Riding of Yorkshire (6.2%). Bassetlaw District Council however has a lower average rank (14,627) than the other two geographies. In both the overall Index of Multiple Deprivation and the health deprivation and disability domain, East Riding of Yorkshire is substantially less deprived than North Lincolnshire and Bassetlaw District Council; the average LSOA in East Riding of Yorkshire is in the 7th decile (least 40% to 30% deprived of all of England's LSOAs). Conversely, the Bassetlaw District Council LSOA average health deprivation and disability domain decile is the fourth, indicating a higher-than-average level of deprivation.

Table 18.12 - 2019 Deprivation

	Direct Impact Area	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council
Percentage of LSOAs in the most deprived decile (decile 1) of the Index of Multiple Deprivation	0.0%	6.2%	10.9%	7.1%
Average LSOA Decile in the Index of Multiple Deprivation	7	7	5	5
Average LSOA rank in the Index of Multiple Deprivation	20,820	20,624	15,797	14,627
Percentage of LSOAs in the most deprived decile (decile 1) of the health deprivation and disability domain	0.0%	3.3%	10.9%	11.4%
Average LSOA Decile in the health deprivation and disability domain	7	7	5	4
Average LSOA rank in the health deprivation and disability domain	20119	21,231	13,641	10,898

Source: Office for National Statistics, (2019); Indices of Multiple Deprivation 2019 (Ref 18.43).

Community cohesion

18.5.16 According to the Community Life Survey (Ref 18.47), in the regions of Yorkshire and the Humber and East Midlands (the most granular level of data), 66% and 65% 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%).

General health

18.5.17 As part of the 2021 Census, respondents are asked to self-assess the state of their health, both physical and mental (Ref 18.40). This can be seen for the Direct Impact Area, local authorities, regional comparators and national comparators below in Table 18.13. The Direct Impact Area has a larger proportion of residents in very good health (45.7%) compared to the Wider Study Area (43.9%), however the proportion is lower than the average regionally (46.2% in both the East Midlands and Yorkshire and the Humber) and nationally (48.5%). The Direct Impact Area did however have a larger proportion of residents in good health (35.5%) and fair health (13.8%) compared to the national average. The Direct Impact Area also had the lowest proportion of residents in very bad health (1.1%) of all the geographies.

The Wider Study Area and the three local authorities comprising the Wider Study Area all have a lower proportion of respondents indicating their health as very good compared to East Midlands (46.2%), Yorkshire and the Humber (46.2%) and England (48.5%). Furthermore, the Wider Study Area has a higher proportion of respondents assessing their health as very bad (1.3%) compared to England (1.2%), as well as a higher proportion of individuals in bad health (4.5%) compared to England (4.0%).

Table 18.13 - Self-assessed general health

Self-Assessed General Health	Direct Impact Area	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council	Wider Study Area	East Midlands	Yorkshire and the Humber	England
Very good health (%)	45.7	44.9	42.9	43.9	43.9	46.2	46.2	48.5
Good health (%)	35.5	35.4	35.9	34.8	35.4	34.8	34.3	33.7
Fair health (%)	13.8	14.4	15.1	15.2	14.9	13.6	13.7	12.7
Bad health (%)	3.8	4.1	4.7	4.8	4.5	4.2	4.5	4.0
Very bad health (%)	1.1	1.3	1.3	1.4	1.3	1.2	1.3	1.2

Source: Office for National Statistics, (2022); Census 2021 (Ref 18.40). Note: Some columns may not sum due to rounding.

Mental health

18.5.18 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 18.44). The most recent data published is from 2017 and can be seen below for the study area geographies and comparator geographies where data is available in Table 18.14. The Wider Study Area has a lower proportion of individuals aged 16+ with a common mental disorder (16.2%) than the average across England (16.9%), Yorkshire and the Humber (17.6%) and the East Midlands (16.3%). However, there is large variation between the local authorities comprising the Wider Study Area. The local authority of East Riding of Yorkshire has the lowest proportion of individuals aged 16+ with a common mental health disorder of all of the geographies (14.2%), whereas Bassetlaw District Council has the highest proportion of all the geographies (17.7%).

Table 18.14 - Common mental health disorders

	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council	Wider Study Area	East Midlands	Yorkshire and the Humber	England
Proportion of population aged 16 and over with a common mental disorder (%)	14.2	16.8	17.7	16.2	16.3	17.6	16.9

Source: Public Health England, (2017); Mental health and wellbeing profiles (Ref 18.44*).*

Disability

18.5.19 Data on disabilities, physical conditions and mental conditions is available from the 2021 Census (Ref 18.40) and is presented below in Table 18.15 for the Direct Impact Area and the comparator geographies. The Direct Impact Area has a lower proportion of individuals disabled under the equality act ((defined as individuals with a physical or mental impairment that has a ‘substantial’ and ‘long-term’ negative effect on their ability to do normal daily activities (Ref 18.51) (18.2%) compared to the local authorities, however the proportion in the Direct Impact Area is larger than the average across England (17.3%).The Wider Study Area has a higher proportion of individuals disabled under the Equality Act with (19.6%) compared to England (17.3%), Yorkshire and the Humber (18.6%) and the East Midlands (18.3%). The local authority of Bassetlaw District Council had the highest proportion of individuals disabled under the Equality Act of all of the geographies (20.4%), with 9.1% of these individuals limited a lot in their day-to-day activities.

18.5.20 It is evident that the Direct Impact Area and 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. This will be assessed in the assessment of likely impacts.

Table 18.15 - Disability prevalence

	Direct Impact Area	East Riding of Yorkshire	North Lincolnshire	Bassetlaw District Council	Wider Study Area	East Midlands	Yorkshire and the Humber	England
Disabled under the Equality Act (%)	18.2	18.6	19.7	20.4	19.6	18.3	18.6	17.3
Day-to-day activities limited a lot (%)	7.4	7.7	8.6	9.1	8.5	7.7	8.1	7.3
Day-to-day activities limited a little (%)	10.8	10.9	11.1	11.3	11.1	10.7	10.5	10.0
Not disabled under the Equality Act (%)	81.8	81.4	80.3	79.6	80.4	81.7	81.4	82.7
Has long term physical or mental health condition but day-to-day activities are not limited (%)	7.9	7.7	6.8	7.1	7.2	7.1	6.9	6.8
No long term physical or mental health conditions (%)	73.8	73.7	73.6	72.5	73.3	74.6	74.4	75.9

Source: Office for National Statistics, (2022); Census 2021 (Ref 18.40).

Wider determinants of health

18.5.21 Public Health England (PHE) (now the Office for Health Improvement and Disparities) publishes local authority health profiles on an annual basis, detailing health outcomes against 32 different indicators (Ref 18.41). The indicators are updated regularly to reflect the latest data, with life expectancy data (in years) most recently updated in February 2024. Data for the local authorities of East Riding of Yorkshire, North Lincolnshire and Bassetlaw District Council are presented below:

Life expectancy

- In 2022, male life expectancy was lower in Bassetlaw District Council (78.6) and North Lincolnshire (77.9) than the average across England (79.3), whereas East Riding of Yorkshire had a higher life expectancy for males than England (80.4).
- In 2022, female life expectancy was lower in Bassetlaw District Council (82.0) and North Lincolnshire (83.1) compared to England (83.2), however in East Riding of Yorkshire female life expectancy was higher than the England average (83.4).
- Between 2018 and 2020, the difference in male life expectancy between the most deprived areas and least deprived in Bassetlaw District Council, North Lincolnshire, East Riding of Yorkshire and England was 6.7, 10.9, 6.8 and 9.7 years respectively.
- Between 2018 and 2020, the difference in female life expectancy between the most deprived areas and least deprived in Bassetlaw District Council, North Lincolnshire, East Riding of Yorkshire and England was 5.8, 8.1, 3.2 and 7.9 years respectively.

Child health

- Between 2022 and 2023, the prevalence of obesity in year 6 students was highest in Bassetlaw District Council (26.1%) and England (26.1%). In North Lincolnshire and East Riding of Yorkshire, year 6 obesity rates were lower with respective proportions of 22.3% and 21.4%.
- Between 2022 and 2023, GCSE attainment (mean attainment 8 score[3]) was highest in East Riding of Yorkshire (46.2) and England (46.2). Bassetlaw District Council and North Lincolnshire performed worse in this indicator, with respective scores of 44.0 and 43.8.
- Between 2022 and 2023, the rate of smoking during pregnancy was substantially worse in North Lincolnshire (15.6%) than the average across England (8.8%). In Bassetlaw District Council and East Riding of Yorkshire, the rates of smoking during pregnancy were also worse than England just to a lesser degree, with respective rates of 9.5% and 10.6%.
- Between 2020/21 and 2022/23, hospital admissions for alcohol-specific conditions in under 18s were higher in England (26 per 100,000) compared to Bassetlaw District Council (14.4 per 100,000), East Riding of Yorkshire (13.5 per 100,000) and North Lincolnshire (19.5 per 100,000).

[3] Attainment 8 is a measure published annually showing the average academic performance of a secondary school.

Adult health

- Between 2022 and 2023, the proportion of the 18+ population in Bassetlaw District Council, East Riding of Yorkshire and North Lincolnshire who were overweight or obese was 64.8%, 71.2% and 71.1% respectively, higher than the average across England (64.0%).
- Between 2022 and 2023, the proportion of the 19+ population that was physically active in England was 67.1%, higher than Bassetlaw District Council (66.0%), East Riding of Yorkshire (66.8%) and North Lincolnshire (65.3%).
- In 2022, 12.7% of England's population were active smokers. The same proportion was observed in Bassetlaw District Council, however in North Lincolnshire the proportion of active smokers was higher (15.4%). East Riding of Yorkshire had the smallest proportion of active smokers (10.2%).
- Between 2022 and 2023, there were 475 alcohol-related hospital admissions per 100,000 people in England. North Lincolnshire and Bassetlaw District Council performed worse than England, with respective rates of 487 per 100,000 people and 481 per 100,000 people. East Riding of Yorkshire performed better in this indicator than the average across England, with 450 admissions per 100,000 people.
- In 2022, the under 75 mortality rates from all circulatory disease was highest in North Lincolnshire (100.5 per 100,000 people), much worse than the England average (77.8 per 100,000 people). Bassetlaw District Council also performed worse than the England average (85.2 per 100,000 people), whereas East Riding of Yorkshire had the lowest mortality rate of all the geographies (68.1 per 100,000 people).
- Between 2022 and 2023, hip fractures in the over 65 population were highest in Bassetlaw District Council (693 per 100,000 people) followed by North Lincolnshire (642 per 100,000 people). The average across England was 558 per 100,000 people; East Riding of Yorkshire had a marginally lower incidence of hip fractures with 549 per 100,000 people.

Infrastructure Baseline

Healthcare facilities

18.5.22 **Chapter 17 Socio-economics, Recreation and Tourism** details the healthcare facilities located within 1 km of the draft Order Limits. Two General Practice (GP) surgeries are identified: South Axholme Practice, Belton Surgery and South Axholme Practice, Pinfold Surgery at Owston Ferry which are within Route Section 7: M180 motorway to Graizelound of the route. Information on the number of GPs and the number of patients is provided by the NHS General Practice Workforce (Ref 18.48). Details on these GP surgeries and the number of GPs and patients as of July 2024 can be found below in Table 18.16.

18.5.23 Across the two GP surgeries there were 13.56 full time equivalent (FTE) working GPs, averaging at 1,104 patients per GP, which is below the Royal College of General Practitioners target of 1,800 patients per GP.

18.5.24 One hospital is identified within the study area in Route Section 10: A620 east of North Wheatley to Fledborough, named Rampton High Security Hospital, approximately 440 m from the draft Order Limits.

Table 18.16 - GP surgeries within 1 km of the draft Order Limits

GP Surgery	Distance from draft Order Limits	Route Section	FTE GPs	Number of Patients	GP: Patient Ratio
South Axholme Practice*	433m-502m**	Route Section 7: M180 motorway to Graizelound	13.56	14,967	1:1,104

Source: NHS, (2024); General Practice Workforce July 2024 (Ref 18.48). *The South Axholme practice includes 5 different surgeries/sites. Only two of the sites are within 1 km of the draft Order Limits: South Axholme Practice- Belton Surgery and South Axholme Practice Pinfold Surgery- Owston Ferry. Data on GPs and the number of patients isn't available separately for each site. Only South Axholme as a whole has been included. ** South Axholme Practice- Belton Surgery is 502m from the draft Order Limits; South Axholme Practice Pinfold Surgery- Owston Ferry is 433m from the draft Order Limits.

Social infrastructure, community and recreational facilities, businesses

18.5.25 **Chapter 17 Socio-economics, Recreation and Tourism** provides detail on the social infrastructure, community and recreational assets and businesses within 500 m of the draft Order Limits. There is a range of community, recreational and social infrastructure facilities located in proximity to the Proposed Overhead Line including educational facilities, churches, town halls, greenspaces and hotels, as well as businesses such as pubs.

Public Rights of Way

18.5.26 A number of Public Rights of Way (PRoW) are located within and in close proximity to the draft Order Limits. These are detailed in **Chapter 17 Socio-economics, Recreation and Tourism**.

Vulnerable groups

18.5.27 The local authorities within the study area present differences in terms of vulnerable groups and associated sensitivities in human health and wellbeing, for example:

- The Direct Impact Area and Wider Study Area has an older population on average compared to England. The over 65 population proportion in the Wider Study Area is projected to increase by a greater proportion than the national trend by the time of the Project's operation, as seen in Table 18.18.
- The population of the local authorities and Wider Study Area have a lower gross disposable household income compared to the national average. This may partially reflect the older population in the Wider Study Area compared to the national average.
- The Direct Impact Area and Wider Study Area population has a greater proportion of individuals considered disabled under the Equality Act compared to national averages. This may partially reflect the older population in the Direct Impact Area and Wider Study Area compared to the national average.

Environmental Context

18.5.28 As previously noted, the health and wellbeing assessment focuses on health-related environmental change. Accordingly, this chapter draws on information from other environmental topic chapters, including **Chapter 6 Landscape, Chapter 7 Visual, Chapter 11 Water Environment, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration**, **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change.**

Future Baseline

18.5.29 Predicting future baseline requires projecting forward any trends in change and considering how they may affect the baseline conditions over time. The nature of future baseline is influenced by a combination of natural and human processes, including climate change. The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project. These are further considered in **Chapter 21 Cumulative Environmental Affects**.

Population and age profile projections

18.5.30 Potential future population change for the Wider Study Area relative to the resident population recorded in the ONS Population Projections dataset (Ref 18.46) are shown in Table 18.17. Future projected changes to age cohorts are shown in Table 18.18. These figures are projections from mid-2014 to mid-2018 data based on assumed levels of future fertility, mortality and migration and published in 2020. The projections did not consider the findings of the Census 2021.

18.5.31 Table 18.17 shows that all comparator areas in the study area are expected to increase in population size. Of these, Bassetlaw District Council is the local authority expected to grow by the greatest proportion from the construction to the operational phase (1.4%). In the Wider Study Area and the local authorities comprising the Wider Study Area between 2028 and 2031, with reinstatement works continuing into 2023, there is a projected reduction in the size of the age 0-15 cohort (-2.3% in Wider Study Area), with a substantial increase in the proportion of the population aged 65+ (+6.1% in Wider Study Area). These trends reflect national projections: The total population is likely to experience a slight net age increase, with decreases in younger populations and increases in the 65 and over category.

Table 18.17 - Projected future population change

Study Area	Years Projected	
	2028 Construction Starts	2031 Fully Operational
East Riding of Yorkshire	351,157	353,292
North Lincolnshire	175,743	176,201
Bassetlaw District Council	124,708	126,473
Wider Study Area	651,608	655,966
East Midlands	5,138,039	5,219,027

Yorkshire and the Humber	5,674,180	5,721,284
England	58,751,641	59,389,107

Source: ONS Subnational population projections for England 2018-based (Ref 18.46). * The population projection published in 2018 representing the Wider Study Area in 2021 was 1,918,918. This is 0.03% higher than the resident population of 1,918,400 recorded by the Census 2021.

Table 18.18 - Projected future age cohorts

Geography	Age Group	2028 Construction Starts	2031 Fully Operational	Percentage Change 2028-2031 (%)
East Riding of Yorkshire	Aged 0-15	53,094	51,780	-2.5
	Aged 16-64	192,706	190,014	-1.4
	Aged 65+	105,357	111,496	5.8
North Lincolnshire	Aged 0-15	29,508	28,565	-3.2
	Aged 16-64	102,837	101,569	-1.2
	Aged 65+	43,396	46,067	6.2
Bassetlaw District Council	Aged 0-15	21,668	21,514	-0.7
	Aged 16-64	71,830	71,628	-0.3
	Aged 65+	31,202	33,332	6.8
Wider Study Area	Aged 0-15	104,270	101,859	-2.3
	Aged 16-64	367,373	363,211	-1.1
	Aged 65+	179,955	190,895	6.1
East Midlands	Aged 0-15	904,777	895,419	-1.0
	Aged 16-64	3,112,672	3,129,040	0.5
	Aged 65+	1,120,592	1,194,555	6.6
Yorkshire and the Humber	Aged 0-15	1,018,740	1,001,435	-1.7
	Aged 16-64	3,456,606	3,453,730	-0.1
	Aged 65+	1,198,839	1,266,110	5.6
England	Aged 0-15	10,573,201	10,387,050	-1.8
	Aged 16-64	36,002,756	36,056,306	0.1
	Aged 65+	12,175,690	12,945,733	6.3

Source: ONS Subnational population projections for England 2018-based (Ref 18.46).

18.6 Mitigation

18.6.1 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. Those measures relevant to the assessment of health and wellbeing effects are set out below.

Embedded Mitigation Measures

18.6.2 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.

18.6.3 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.

18.6.4 Embedded measures are those that are intrinsic to and built into the design of the Project, these are presented in Table 4.2 in **Chapter 4 Description of the Project**. Measures of relevance to Health and Wellbeing chapter include:

- Sensitive Routeing and Siting to develop the draft overhead line alignment, siting of substations and draft Order Limits. Avoids and reduces, as far as practicable, impacts on identified receptors, in line with the National Policy Statements EN-1 (Ref 4.4) and EN-5 (Ref 4.5) as well as the Holford Rules (Ref 4.6) and the Horlock Rules (Ref 4.8). Further information on options appraisal and the alternative options considered is set out in **Chapter 3 Project Need and Alternatives**.
- The Project would be designed in accordance with National Grid design standards and will be compliant with the guidelines and policies relating to EMF stated in NPS EN-5 (Ref 18.3), including the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines. Compliance with these guidelines and policies mean that the Project will already have designed out potential effects from EMF to a level to meet health and safety standards.

Control and Management Measures

18.6.5 Control and management measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.

18.6.6 Mitigation measures relevant to **Chapter 6 Landscape**, **Chapter 7 Visual, Chapter 11 Water Environment, Chapter 14 Traffic and Transport, Chapter 15 Air Quality, Chapter 16 Noise and Vibration, Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 19 Climate Change** which reduce construction and operational impacts will in turn mitigate the effects on receptors from a human health perspective

18.6.7 A Draft Outline Code of Construction Practice (CoCP) is provided in **Appendix 4.1: Draft Outline Code of Construction Practice** in Volume 3.Measures contained in the Draft Outline CoCP that are relevant to the control and management of impacts that could affect the Health and Wellbeing assessment are:

- TT01 - The CTMP will set out measures to reduce route and journey mileage to and from, and around, the site, and to prevent potential nuisance to residents, businesses and the wider community associated with parking, vehicle movements

and access restrictions. It will also provide suitable control for the means of access and egress to the public highway and set out measures for the maintenance and upkeep of the public highway. The CTMP will also identify access for emergency vehicles. It will also set out measures to reduce safety risks through construction vehicle and driver quality standards and measures to manage abnormal loads.

- TT02 - The contractor(s) will implement a monitoring and reporting system to check compliance with the measures set out within the CTMP. The contractor(s) will also be expected to monitor the number of construction vehicles between the site and the strategic road network. Deviations from the authorised routes or changes to traffic levels that are higher than the CTMP assumptions will require discussion of the need for additional mitigation measures with highways authorities.
- TT03 - All Public Rights of Way (PRoWs) will be identified, and any potential temporary closures applied for/detailed in the DCO. All designated PRoWs crossing the working area will be managed with access only closed for short periods while construction activities occur. Any required temporary diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns.
- GG03: The following environmental management plans will be produced prior to construction;
  - Code of Construction Practice (CoCP)
  - Register of Environmental Actions and Commitments (REAC)
  - Construction Traffic Management Plan (CTMP)
  - Soil Management Plan (SMP)
  - Public Rights of Way Management Plan
  - Materials and Waste Management Plan (MWMP)
  - Noise and Vibration Management Plan
  - Landscape and Ecology Management Plan (LEMP) including an Outline Landscape Maintenance and Management Plan
  - Archaeological Written Scheme of Investigation (WSI)
- GG04 - The CoCP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake site inspections to check conformance to the Management Plans.
- GG05 - A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced EnvCoW will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CoCP. The EnvCoW will monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures. The EnvCoW will be supported as necessary by appropriate technical specialist advisors, including archaeologists, ecologists, soil scientists, and arboriculturists.
- GG06 - Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:

  - Working hours;
  - Ecology: working in or adjacent to protected sites and priority habitats, protected species, management, mitigation and controls;
  - Water management: legislation, buffer zones, control mechanisms, flood risks and emergency response procedures;
  - Waste management: legislation, segregation, contamination, best practice;
  - Agreed traffic routes and access points;
  - Nuisance: dust, behaviour, noise, vibration, management and controls;
  - Working around trees: tree and root protection;
  - Contaminated land: recognising and dealing with contaminated material;
  - Pollution prevision and incident response; and
  - Spill and emergency response.
- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG13 - Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric, or other low carbon plant and equipment should be used where available and where practicable.
- GG14 - Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited, where practicable.
- GG15 - Fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. Where practicable, they will be stored >15 m from watercourses, ponds and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15 m distance, additional measures will be identified. All refuelling, soiling and greasing of construction plant and equipment will take place above drip trays and also away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potential hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110 % of the maximum stored volume. Spill kits will be located nearby.
- GG17: Wash down of vehicles and equipment will take place in designated areas, for example within construction compounds and intermittently along construction access roads. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps.
- GG18: Wheel washing facilities will be provided at each main compound, where appropriate. Road sweepers will be deployed on public roads where necessary to prevent excessive dust or mud deposits.

- GG19: Earthworks and stockpiled soil will be protected by covering, seeding or using water suppression where appropriate.
- GG20: Bonfires and the burning of waste material will be prohibited.
- GG21: Construction lighting will be of the lowest luminosity necessary to safely perform each task. It will be designed, positioned and directed to reduce the intrusion into adjacent properties, protected species and habitats.
- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise and limit effects on perceptual aspects of landscape, such as tranquillity, will be set out within the CoCP
- NV02 - Contractor(s) will be required to follow good construction practices (referred to as best practicable means (BPM)) as outlined in BS 5228-1 and BS 5228-2 to control noise and vibration respectively. BS 5228-1 and BS 5228-2 have Approved Code of Practice status (in England) under the powers conferred by Sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974, as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. Compliance with the good practice noise and vibration requirements stated therein are a statutory obligation under the Act.
- S01: Provision of training to construction and maintenance workers, particularly in relation to working hours and the management of emissions (dust, noise, vibration, etc).
- S02: PRoWs crossing the working areas will be managed in discussion with the relevant local authorities and applications for any temporary closures will be discussed with the relevant local authority. Access disruption will be minimised, where practicable and safe, while construction activities occur. Any required temporary diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns.
- LV01: The contractor(s) will retain vegetation where practicable. Where vegetation is lost and trees cannot be replaced in situ due to the restrictions associated with land rights required for operational safety, replacement vegetation will be planted as close by as practicable and will complement landscape character and be sympathetic to the local habitat type in order to provide a high biodiversity value.
- LV02: The contractor(s) will apply the relevant protective principles set out in British Standard (BS) 5837:2012: Trees in relation to design, demolition and construction.
  - All works to trees, including trees under Tree Preservation Orders and veteran trees, will be undertaken or supervised by a suitably qualified arboriculturist.
- LV03: A five-year aftercare period will be established for all reinstatement and mitigation planting.
- B10: Where the works require the removal of sections of hedgerow, the gap will be reduced to a width required for safe working. Where hedge removals are necessary, ‘dead hedging’ should be used, where practicable, in the interim periods to retain connectivity during construction. Dead hedging can comprise vegetation arisings or artificial provision, such as willow screening panels or Heras fencing covered in camouflage netting. New hedgerow planting will contain native, woody species of local provenance.

Additional Mitigation Measures

18.6.8 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

18.6.9 The preliminary assessment reported in this PEIR has not identified any requirements for additional mitigation at this stage, over and above the embedded or control and management measures identified. This will continue to be reviewed as the assessment progresses and the preliminary design develops further.

18.7 Preliminary Assessment

18.7.1 This section first identifies the potential effects that could occur as a result of the construction, operation and maintenance of the Proposed Overhead Line. The preliminary assessment is then presented for the Proposed Overhead Line as described in **Chapter 4 Description of the Project**. The preliminary assessment of the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works**.

18.7.2 The preliminary assessment takes account of the embedded, control and management, and additional mitigation measures (where relevant) as set out in section 18.6.

Potential Effects

18.7.3 The potential for the Proposed Overhead Line to result in likely significant effects on health and wellbeing receptors was determined through the EIA Scoping process. This section lists those potential effects that have been scoped into the assessment within the Scoping Report (Ref 18.18) taking into account the comments received within the Scoping Opinion (Ref 18.17). Where the scope has been amended since the Scoping Report (Ref 18.18), explanatory text has been included to provide justification for this change in Table 18.2 and Table 18.3.

Construction

18.7.4 The potential effects that could result from the construction of the Proposed Overhead Line are:

- on residents' access to healthcare and social services due to increased pressure on GP capacity and impacts on the accessibility of GPs.
- 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 Project.
- 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 Project.
- on local communities from construction noise and vibration.
- on the amenity, access and provision of open space, leisure space and play space due to severance associated with the Proposed Overhead Line.

- on local and national climate change mitigation and adaption from greenhouse gas emissions associated with the Project.
- on local communities from a reduction in water quality due to water pollution associated with the Project.
- on local communities from the deterioration of community identity, culture, resilience and influence.

Operation and maintenance

18.7.5 The potential effects that could result from the operation of the Proposed Overhead Line are:

- from permanent severance of access to open space, leisure space and play space for local residents.
- on local and national climate change mitigation and adaption from greenhouse gas emissions associated with the Project.
- on local communities from the deterioration of community identity, culture, resilience and influence.

Preliminary Assessment of Effects

Health and social care services

18.7.6 Construction activities from the Proposed Overhead Line may restrict, or create severance to, the accessibility of hospitals, GPs, and other social infrastructure for residents in the study area.

18.7.7 Table 18.19 provides the preliminary assessment of access to healthcare services through increased demand for healthcare services during construction. Table 18.20 provides the preliminary assessment of access to healthcare services through increased traffic and severance which reduces access on healthcare facilities.

Table 18.19 - Preliminary assessment of access to health and social care services - increased demand for healthcare services during construction

	Preliminary assessment
Receptor	Human receptors who use local healthcare services
Potential Impact	In a worst-case scenario, it is anticipated that peak construction workforce numbers would be approximately 570 workers. A high level of leakage is expected (70%) (see **Chapter 17 Socio-economics, Recreation and Tourism**) meaning in a very worst case during peak construction, 399 peak workers could be sourced from outside of the 60-minute drive time area. These additional workers may place extra demand on health and social care services if they move to the area, or if emergency treatment is required. Workers already residing locally will be registered at a local practice currently and will therefore not place additional demand for services on local GPs. However,

	Preliminary assessment
	under a worst-case scenario, it is assumed that all of the approximately 399 peak construction workers who are not likely to live locally require places at local GPs. There are 13.56 FTE GPs at the two surgeries within 1 km of the draft Order Limits and the patient to GP ratio is 1:1,104, which is below the recommended ratio of 1:1,800. If the additional 399 patients during peak construction register at the two surgeries, this would increase the ratio for each GP to 1,133 patients per GP, still below (better than) the recommended ratio of 1:1,800.
Project Phase	Construction
Mitigation	N/A
Preliminary Sensitivity	General Population – **Low** As described in section 18.5, GP practices local to the Proposed Overhead Line are, on average, operating below (better than) benchmark patient to GP ratios. Vulnerable Population – **Medium** As described in section 18.5, the Direct Impact Area has an older population compared to the national average with a higher proportion of the population over 65. The Direct Impact Area also has a higher proportion of individuals classified as disabled under the equality act compared to the national average. In contrast, the GP to patient ratio in the local GP practices is better than guidelines, and general health in the Direct Impact Area is relatively similar to that nationally.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Moderate Based on the preliminary assessment in **Chapter 17 Socio-economics, Recreation and Tourism.**

Table 18.20 - Preliminary assessment of access to health and social care services - Increased traffic and severance, reducing access to healthcare facilities during construction

	Preliminary assessment
Receptor	Human receptors who use local healthcare services
Potential Impact	Residents of properties in the villages surrounding the Proposed Overhead Line attempting to access healthcare facilities are likely to use the same strategic roads as construction traffic associated with the and workers attempting to access the Site. Increased traffic flows and severance effects may inhibit local residents' ability to access healthcare facilities. **Chapter 14**

	Preliminary assessment
	Traffic and Transport finds that in Route Section 7: M180 motorway to Graizelound of the route in which the two GP facilities within 1 km of the draft Order Limits have been identified, there are potential significant impacts on pedestrians, impacting their journey times and distances. Significant impacts on bus passengers in Route Section 7 are also noted, increasing journey times for users.
Project Phase	Construction
Mitigation	TT01, TT02, GG03
Preliminary Sensitivity	General Population – **Low** As described in section 18.5, GP practices local to the Proposed Overhead Line are, on average, operating below (better than) benchmark patient to GP ratios. Vulnerable Population – **Medium** As described in section 18.5, the Direct Impact Area has an older population compared to the national average with a higher proportion of the population over 65. The Direct Impact Area also has a higher proportion of individuals classified as disabled under the equality act compared to the national average. In contrast, the GP to patient ratio in the local GP practices is better than guidelines, and general health in the Direct Impact Area is relatively similar to that nationally.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Low Based on the preliminary assessment in **Chapter 14 Traffic and Transport**

Employment and income

18.7.8 Table 18.21 presents the preliminary assessment of employment and income during construction.

Table 18.21 - Preliminary assessment of employment and income during construction

	Preliminary assessment
Receptor	Human receptors who could potentially benefit from employment opportunities, directly related to the Proposed Overhead Line
Potential Impact	There is evidence that employment matters to health, not only from an economic standpoint, but also in terms of quality of life (Ref 18.52). Good quality work protects against social exclusion

	Preliminary assessment
	through the provision of income, social interaction, a core role, identity, and purpose. Therefore, the generation of jobs is assessed to be a beneficial outcome. As set out in **Chapter 17 Socio-economics, Recreation and Tourism**, the Applicant estimates that the Proposed Overhead Line will require an average of 418 gross direct FTE jobs on-site per day over the construction period. **Chapter 17 Socio-economics, Recreation and Tourism** estimates that, after accounting for displacement, leakage and multiplier effects, the Proposed Overhead Line will support, on average, 314 net additional jobs during the construction period. Of these, 94 jobs per annum will be expected to be taken-up by residents within the study area.
Project Phase	Construction
Mitigation	N/A
Preliminary Sensitivity	**Medium** Baseline data with respect to employment and income shows that the Direct Impact Area is relatively less deprived compared to the national average and has a low unemployment rate. The local authorities however have a lower average gross household income than that nationally.
Likely Effect	**Positive**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	High Based on the preliminary assessment set out in **Chapter 17 Socio-economics, Recreation and Tourism.**

Education and training

18.7.9 Table 18.22 - Preliminary assessment of education and training during construction presents the preliminary assessment of education and training during construction.

Table 18.22 - Preliminary assessment of education and training during construction

	Preliminary assessment
Receptor	Human receptors who could potentially benefit from training and apprenticeship opportunities, directly related to the construction of the Proposed Overhead Line.
Potential Impact	At this PEIR stage, the Applicant cannot commit to any specific education and training schemes. However, a social value strategy is being developed, which will include engagement with schools and education providers to support STEM subjects and educate students on opportunities in the

	Preliminary assessment
	energy sector. The social value strategy will also explore opportunities with contractors to generate apprenticeships and training opportunities.
Project Phase	Construction
Mitigation	N/A
Preliminary Sensitivity	**Low** Baseline data with respect to education and training shows that the Direct Impact Area has a relatively educated population compared to the national average, with a higher proportion of individuals qualified to NVQ level 4+ and a lower proportion of individuals with no qualifications.
Likely Effect	**Positive**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Low

Transport modes, access and connections

18.7.10 Table 18.23 presents the preliminary assessment of transport modes, access and connections during construction.

Table 18.23 - Preliminary assessment of transport modes, access and connections

	Preliminary assessment
Receptor	Users of PRoW, recreational routes, pedestrian walkways, bridle paths and roads within proximity to the Proposed Overhead Line.
Potential Impact	As noted in **Chapter 14 Traffic and Transport**, there are a number of PRoW with the study area that could be impacted by the construction of the Proposed Overhead Line. The majority of any planned diversions will be relatively small and centred around construction areas and would not change journey lengths substantially. **Chapter 14 Traffic and Transport** identifies only one PRoW that requires a substantial diversion (C1-23/C1-24). Various temporary closures proposed for PRoW around work areas or access points will occur throughout construction, as well as one permanent closure for the Birkhill Wood Access, where a diversion is located very close to the PRoW route. The remaining PRoW will be managed and temporarily closed where a PRoW passes under the overhead line. In these cases, any closure would only be temporary for a period of up to one month

	Preliminary assessment
	and diversions onto alternative PRoWs will be provided wherever possible. **Chapter 14 Traffic and Transport** states that no significant impacts on delay, severance and journey length to pedestrians, cyclists and road users will occur around the primary access Route Sections 1: Creyke Beck to Skidby, 2: Skidby to A63 dual carriageway, 3: A63 dual carriageway to River Ouse, 4: River Ouse crossing, 9: Chesterfield Canal to A620 east of North Wheatley and 11: Fledborough to High Marnham. There are potential significant effects in the remaining sections. None of the significant effects noted are in relation to car drivers and passengers; the majority are in relation to pedestrians and bus users.
Project Phase	Construction
Mitigation	TT01, TT02, TT03, GG03, S02
Preliminary Sensitivity	General Population – **Low** Baseline data in section 18.5 shows that general heath in the study area is relatively similar to the national average. As described in **Chapter 14 Traffic and Transport**, there is a large network of PRoWs and roads that can be used as substitutes in the event of closures and diversions. Vulnerable Population – **Medium** As noted in section 18.5, the Direct Impact Area has a generally older population than the average across England, and this sub-population may be more reliant on transport to access services and more sensitive to change.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Low Based on the preliminary assessments presented in **Chapter 17 Socio-economics, Recreation and Tourism and Chapter 14 Traffic and Transport.**

Air quality

18.7.11 Table 18.24 presents the preliminary assessment of air quality during construction.

Table 18.24 - Preliminary assessment of air quality during construction

	Preliminary assessment
Receptor	Human receptors likely to be at risk of possible direct and indirect air quality impacts from the Proposed Overhead Line.
Potential Impact	The activities associated with the construction of the Proposed Overhead Line have the potential to reduce air quality, due to construction dust/elevated PM_{10} concentrations and construction vehicle emissions which could lead to adverse health effects on residents. **Chapter 15 Air Quality** assesses the preliminary impact of construction dust to be Not Significant, assuming necessary mitigation is implemented. **Chapter 15 Air Quality** states that construction vehicle emissions will be assessed at ES stage.
Project Phase	Construction
Mitigation	Mitigation set out in Table 15.13 of **Appendix 15.1 Construction Dust Assessment and Methodology,** as well as GG04, GG11, GG13, GG14, GG17, GG18, GG19, GG20, S01.
Preliminary Sensitivity	General population – **Low** As stated in **Chapter 15 Air Quality**, concentrations of NO_2 and particulate matter in the vicinity of the Proposed Overhead Line are below annual mean air quality objective values. Furthermore, as stated in section 18.5 of this chapter, general health in the Direct Impact Area is relatively in line with the national average. Vulnerable population – **Medium** section 18.5 identifies that the Direct Impact Area has on average an older population than England; this sub-population are more likely to experience negative health effects from worsened air quality.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Low Based on the preliminary assessment presented in **Chapter 15 Air Quality.**

Noise and vibration

18.7.12 Table 18.25 presents the preliminary assessment of noise and vibration during construction.

Table 18.25 - Preliminary assessment of noise and vibration during construction

	Preliminary assessment
Receptor	Human receptors likely to be at risk of possible direct and indirect noise and vibration impacts from the Proposed Overhead Line.
Potential Impact	Construction activities related to the Proposed Overhead Line have the potential to lead to increases in noise and vibration, which could lead to adverse health and wellbeing effects in terms of annoyance and/or disruption to local amenities. **Chapter 16 Noise and Vibration** assesses noise and vibration potential impacts during construction to be **Not Significant** if appropriate mitigation methods are implemented such as plant silencers and screening.
Project Phase	Construction
Mitigation	GG03, GG04, GG06, GG11, GG13, GG14, NV01, NV02, S01
Preliminary Sensitivity	**Medium** Section 11.5 of **Chapter 16 Noise and Vibration** notes that noise levels across the Proposed Overhead Line vary widely by Route Section, with sections such as Route Section 10: A620 east of North Wheatley to Fledborough in proximity to built up areas such as Sturton le Steeple. In contrast, sections such as Route Section 11: Fledborough to High Marnham are a large distance from built up areas and only pass by a small number of residential properties.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Moderate Based on the preliminary assessment presented in **Chapter 16 Noise and Vibration.**

Open space, leisure and play

18.7.13 Table 18.26 presents the preliminary assessment of open space, leisure and play during the construction and operation phases.

Table 18.26 - Preliminary assessment of open space, leisure and play.

	Preliminary assessment
Receptor	Users of open space, leisure and play space in the study area.
Potential Impact	Construction activities associated with the Proposed Overhead Line and the operation of the Proposed Overhead Line may intersect, or otherwise impact upon, the accessibility of open space, leisure space, recreational routes and Public Rights of Way (PRoW) in the study area, which could impact the health and wellbeing of local residents. As noted in **Chapter 14 Traffic and Transport**, there are a number of PRoW with the study area that could be impacted by the construction of the Proposed Overhead Line. The majority of any planned diversions will be relatively small and centred around construction areas and would not change journey lengths substantially. Therefore, access to open space, leisure and play space via PRoW would not change substantially. **Chapter 14 Traffic and Transport** identifies only one PRoW that requires a substantial diversion (C1-23/C1-24). Various temporary closures proposed for PRoW around work areas or access points will occur throughout construction, as well as one permanent closure for the Birkhill Wood Access. The remaining PRoW will be managed and temporarily closed where a PRoW passes under the overhead line. In these cases, any closure would only be temporary for a period of up to one month and diversions onto alternative PRoWs will be provided wherever possible. **Chapter 14 Traffic and Transport** states that no significant impacts on journey length for car users, cyclists and pedestrians will occur around the primary access routes in Route Sections 1: Creyke Beck to Skidby, 2: Skidby to A63 dual carriageway, 3: A63 dual carriageway to River Ouse, 4: River Ouse crossing, 9: Chesterfield Canal to A620 east of North Wheatley and 11: Fledborough to High Marnham and therefore impacts on access to open spaces and on direct access to physical exercise opportunities are not significant**.** **Chapter 14 Traffic and Transport** identifies potential significant effects in the remaining Route Sections. **Chapter 17 Socio-economics, Recreation and Tourism** notes that two recreational land receptors will have potential Significant adverse impacts from the Proposed Overhead

	Preliminary assessment
	Line. These receptors are Risby Park LWS and the Chesterfield Canal. During construction, the Risby Park LWS will be impacted by potential road disruption along Dunflat Road, as well as by PRoW disruption. During operation, views and the overall scenic quality of the park will be diminished by the new overhead line. During construction, the Chesterfield Canal will be impacted by views of construction works. During Operation, views will also be diminished due to the Proposed Overhead Line.
Project Phase	Construction, operation and maintenance
Mitigation	S02
Preliminary Sensitivity	**Medium** Baseline data in section 18.5 shows that in the study area local authorities, physical activity rates are lower than the national average. General health in the Direct Impact Area however is relatively in line with national averages. The Direct Impact Area is also relatively less deprived compared to the national average.
Likely Effect	**Negative (construction)** **Negative (operation and maintenance)**
Likely Significance of Effect	**Not Significant (operation and maintenance)** **Not Significant (operation and maintenance)**
Confidence in Prediction	Moderate Based on the preliminary assessments presented in **Chapter 17 Socio-economics, Recreation and Tourism** and **Chapter 14 Traffic and Transport.**

Climate change mitigation or adaption

18.7.14 Table 18.27 - Preliminary assessment of climate change, mitigation or adaption presents the preliminary assessment of climate change, mitigation or adaption during construction and operation.

Table 18.27 - Preliminary assessment of climate change, mitigation or adaption

	Preliminary assessment
Receptor	Human receptors at risk of experiencing worsened respiratory conditions as a result of greenhouse gas (GHG) emissions.
Potential Impact	As outlined in **Chapter 19 Climate Change**, the overall significance of GHG emissions is taken in the context of the

	Preliminary assessment
	UK carbon budgets and the national policy environment is assessed below. The overall estimated GHG emissions of the Project contribute to less than 0.2% of each respective UK carbon budget. Consideration is also given to the Project's role in wider UK policy to decarbonise the electricity grid. Over its lifetime, the Project will provide a key contribution to the UK, fulfilling its net zero policy and transition away from fossil fuels. By reinforcing the electricity transmission network, the Project will facilitate the connection of new renewable and low-carbon energy generation and transmission. The effect of GHG emissions associated with the Project is therefore deemed to be minor adverse and not significant. The assessment in **Chapter 19 Climate Change** is based on a benchmark and therefore only a high-level estimate subject to uncertainty. However, the conclusion of the significance level for GHG effects associated with the Project (i.e., not significant) is deemed high.
Project Phase	Construction, operation and maintenance
Mitigation	TT01, GG13, GG06, GG05, GG03
Preliminary Sensitivity	General Population – **Low** Baseline data in section 18.5 shows that general health in the Direct Impact Area is relatively in line with national averages. Vulnerable Population – **Medium** Baseline data in section 18.5 shows that the Direct Impact Area has a generally older population than nationally; this sub-population is more susceptible to the impacts arising from GHG, as their respiratory systems are at higher risk of health conditions.
Likely Effect	**Negative (construction)** **Negative (operation and maintenance)**
Likely Significance of Effect	**Not Significant (construction)** **Not Significant (operation and maintenance)**
Confidence in Prediction	Moderate Based on the preliminary assessment presented in **Chapter 19 Climate Change.**

Water quality or availability

18.7.15 Table 18.28 presents the preliminary assessment of water quality or availability during construction.

Table 18.28 - Preliminary assessment of water quality or availability during construction

	Preliminary assessment
Receptor	Human users of water resources.
Potential Impact	Where construction works are undertaken within or in proximity to surface watercourses and groundwater there is potential for adverse impacts on water quality due to deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals. There may also be indirect water quality impacts to downstream receptors, as contaminated water can propagate down to receiving water courses. **Chapter 11 Water Environment** assesses that effects on water quality during construction are not Significant.
Project Phase	Construction
Mitigation	GG04, GG06, GG15, GG17, GG18, GG23, W01, W02
Preliminary Sensitivity	**Low** Baseline data in section 18.5 shows that the general health of the Direct Impact Area's population is in line with the national average.
Likely Effect	**Negative**
Likely Significance of Effect	**Not Significant**
Confidence in Prediction	Moderate Based on the preliminary assessment presented in **Chapter 11 Water Environment.**

Community identity, culture, resilience, and influence

18.7.16 Table 18.29 presents the preliminary assessment of community identity, culture, resilience and influence during the construction and operation phases.

Table 18.29 - Preliminary assessment of community identity, culture, resilience and influence

	Preliminary assessment
Receptor	Human receptors in communities near to the Proposed Overhead Line
Potential Impact	Impacts on landscape and visual amenity arising from the Proposed Overhead Line, during construction and operation, could have an impact on resident's mental health. This could be linked to pride around their local area and uncertainty surrounding the Proposed Overhead Line and the impacts it will have visually. **Chapter 6 Landscape** and **Chapter 7 Visual** state that there is potential for significant construction and operational effects on the landscapes and visual amenity due to direct impacts on landscape elements and features, as well as indirect effects on their overall composition and character. Potential effects that could result from the construction of the Proposed Overhead Line relate to effects on landscape character, due to vegetation removal, the presence of construction compounds, storage areas, access roads and tracks, plant vehicles and personnel. Pylons associated with the Proposed Overhead Line in some Route Sections will be the most prominent vertical element in the landscape, leading to a noticeable loss of scenic quality and a diminished sense of tranquillity and rurality. However, when the detailed assessment is undertaken it is possible that the identified effects, particularly those arising from construction, will not be considered significant. As part of the Applicant's social value strategy, the Applicant will be identifying opportunities to support local registered non-profit community organisations and charities that make a positive impact on residents' physical and mental wellbeing, in addition to funding a Community Grant Programme. Currently during the development phase of the Proposed Overhead Line, the Applicant's Community Relations Team takes phone calls and emails from residents. They also periodically send out newsletters with updates and have a Proposed Overhead Line website. **Chapter 17 Socio-economics, Recreation and Tourism** notes that there will be potential Significant adverse impacts on three community facilities during construction. These three facilities are: Ealand Victory Hall (Jehovah's Witness Kingdom Hall); All Saints Parish Church, Misterton; and St Martin's Church, Saundby. All three impacts are due to traffic disruption and severance, with the exception of Ealand Victory Hall (Jehovah's Witness Kingdom Hall which will also be affected by disruption on nearby footpaths.
Project Phase	Construction, operation and maintenance
Mitigation	B07, LV01, LV02, LV03

	Preliminary assessment
Preliminary Sensitivity	**Low** Baseline Community Life Survey data found in section 18.5 shows that the proportion of residents in the regions of Yorkshire and the Humber and the East Midland that felt like they belonged strongly or fairly strongly to their immediate neighbourhood in 2021/22 was in line with the national average.
Likely Effect	**Negative (construction)** **Negative (operation and maintenance)**
Likely Significance of Effect	**Not Significant (construction)** **Not Significant (operation and maintenance)**
Confidence in Prediction	Moderate Based on the preliminary assessments presented in **Chapter 17 Socio-economics, Recreation and Tourism, Chapter 6 Landscape and Chapter 7 Visual.**

Summary of the Preliminary Assessments of the Proposed Overhead Line with the Proposed Substation Works

18.7.17 The preliminary assessment of the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works**.

18.7.18 Shared receptors associated with the Proposed Substation Works at Birkhill Wood and at High Marnham include;

- Local community
- Transport modes, access and connections
- Local employment, skills and training

18.7.19 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** any potential effects from the Proposed Substation Works are not likely to be significant, and, when considered together are unlikely to change the preliminary significance that is presented in this Chapter.

18.8 References

Ref 18.1 H.M.Government (2022). Health and Care Act 2022. [Online]. Available at: https://www.legislation.gov.uk/ukpga/2022/31/contents [Accessed: October 2024].

Ref 18.2 Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). [Online]. Available at: https://www.assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf [Accessed: November 2024]

Ref 18.3 Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). [Online]. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5 [Accessed: November 2024].

Ref 18.4 Department for Levelling Up, Housing and Communities (2024). National Planning Policy Framework. [Online]. Available at: https://www.gov.uk/guidance/national-planning-policy-framework [Accessed: December 2024].

Ref 18.5 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: November 2024].

Ref 18.6 North Lincolnshire Council (2011). North Lincolnshire Local Development Framework Core Strategy. [Online]. Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-policy-local-development-framework/#1591178700859-b856fc83-069c [Accessed: November 2024]

Ref 18.7 Bassetlaw District Council (2011). Bassetlaw District Local Development Framework, Core Strategy and Development Management Policies DPD. [Online]. Available at: https://www.bassetlaw.gov.uk/media/1543/cs1adoptedcorestrategy.pdf [Accessed: November 2024].

Ref 18.8 East Riding of Yorkshire Council (2021). Local Plan Update 2020-2039. [Online]. Available at: https://www.downloads.eastriding.org.uk/corporate/planning/proposed-submission-local-plan-update/PS-LP01%20Strategy%20Document%20Update.pdf [Accessed: November 2024].

Ref 18.9 Bassetlaw District Council, North Nottinghamshire (2023). Bassetlaw Local Plan 2020-2038 Main Modifications. [Online]. Available at: https://www.bassetlaw.gov.uk/media/8099/local-plan-mm.pdf [Accessed: November 2024].

Ref 18.10 Headon, Upton, Grove, and Stokeham Parish Council (2018). Headon, Upton, Grove, and Stokeham Final Neighbourhood Plan. [Online]. Available at: https://www.btckstorage.blob.core.windows.net/site15293/HUGS%20Final%20Plan%20Submission%20Version.pdf [Accessed: November 2024].

Ref 18.11 Misterton Parish Council (2019). Misterton Neighbourhood Plan [Online] Available at: https://www.bassetlaw.gov.uk/media/4731/misterton-03-neighbourhood-plan-external-document.pdf [Accessed: November 2024].

Ref 18.12 Treswell with Cottam Parish Council (2019). Treswell and Cottam Neighbourhood Plan. [Online]. Available at: https://www.bassetlaw.gov.uk/media/3723/treswell-and-cottam-neighbourhood-plan-referendum-version.pdf [Accessed: November 2024].

Ref 18.13 Walkeringham Parish Council (2020). Walkeringham Neighbourhood Plan 2019-2035. [Online]. Available at: https://www.bassetlaw.gov.uk/media/5650/walkeringham-np-final-version-june-2020.pdf [Accessed: November 2024].

Ref 18.14 Misterton Parish Council. (2023). Misterton Neighbourhood Plan Review 2022-2038 Submission Draft. [Online]. Available at: https://www.bassetlaw.gov.uk/media/8170/misterton-neighbourhood-plan-review-submission-draft-compressed.pdf [Accessed: November 2024].

Ref 18.15 Treswell with Cottam Parish Council (2024). Treswell and Cottam Neighbourhood Plan Review Version 2023. [Online]. Available at: https://www.bassetlaw.gov.uk/media/8575/treswell-with-cottam-neighbourhood-plan-review-submission-version.pdf [Accessed: November 2024].

Ref 18.16 National Grid (2024). Scoping Opinion: Proposed North Humber to High Marnham Scoping Opinion Responses [Online]. Available at: https://www.national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020034/documents [Accessed: October 2024].

Ref 18.17 North Lincolnshire Council (2004). Saved 2003 Local Plan Policies. [Online]. Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-policy-the-north-lincolnshire-local-plan/#1593095254001-ec189f5a-67c8 [Accessed: December 2024].

Ref 18.18 National Grid. (2023). North Humber to High Marnham Volume 1 Environmental Impact Assessment Scoping Report. [Online]. Available at: https://www.national-infrastructureconsenting.planninginspectorate.gov.uk/projects/EN020034/documents [Accessed: October 2024].

Ref 18.19 Ministry of Housing, Communities and Local Government (2018). Planning Practice Guidance: Healthy and safe communities. [Online]. Available at: https://www.gov.uk/guidance/health-and-wellbeing [Accessed: November 2024].

Ref 18.20 Standards for Highways (2020) Design Manual for Roads and Bridges Sustainability and Environment Appraisal - LA 112 Population and human health, v.11. Design Manual for Roads and Bridges, Volume 11, Section 3, Part 6. Population and human health. LA112. [Online]. Available at: https://www.standardsforhighways.co.uk/search/1e13d6ac-755e-4d60-9735-f976bf64580a [Accessed: October 2024]

Ref 18.21 National Health Service London Healthy Urban Development Unit (2019). Rapid Health Impact Assessment Tool. [Online]. Available at: https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf [Accessed: November 2024].

Ref 18.22 Public Health England (2017). Spatial Planning for Health: An evidence resource for designing healthier places. [Online]. Available at: https://www.assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729727/spatial_planning_for_health.pdf [Accessed: November 2024].

Ref 18.23 Public Health England (2019). PHE Strategy 2020 to 2025. [Online]. Available at: https://www.assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/831562/PHE_Strategy_2020-25.pdf [Accessed: November 2024].

Ref 18.24 Marmot, M. (2010). Fair Society, Healthy Lives: The Marmot Review. Strategic `Review of Health Inequalities in England Post 2010. [Online]. Available at: https://www.parliament.uk/globalassets/documents/fair-society-healthy-lives-full report.pdf [Accessed: November 2024].

Ref 18.25 Marmot, M., Allen, J., Boyce, T., Goldblatt, P., and Morrison, J. (2020). Health Equity in England: The Marmot Review 10 Years On. [Online]. Available at: https://www.instituteofhealthequity.org/resources-reports/marmot-review-10-years-on [Accessed: November 2024].

Ref 18.26 Institute of Health Equity (2020). Build back fairer: The Covid – 19 Marmot Review. [Online]. Available at: https://www.health.org.uk/publications/build-back-fairer-the-covid-19-marmot-review [Accessed: November 2024].

Ref 18.27 International Commission on Non-Ionising Radiation Protection (1998). Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). *Health Physics*, *74* (4), pp.494-522.

Ref 18.28 Legislation.gov (2016). The Control of Electromagnetic Fields at Work Regulations [Online]. Available at: https://www.legislation.gov.uk/uksi/2016/588/contents/made [Accessed: November 2024].

Ref 18.29 H.M.Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. [Online]. Available at: https://www.assets.publishing.service.gov.uk/media/5ab3a67840f0b65bb584297e/25-year-environment-plan.pdf [Accessed: November 2024].

Ref 18.30 Public Health England (2018). Putting Health into Place. [Online]. Available at: https://www.england.nhs.uk/ourwork/innovation/healthy-new-towns/ [Accessed: November 2024].

Ref 18.31 Public Health England (2020). Health Impact Assessment in spatial planning. [Online]. Available at: https://www.assets.publishing.service.gov.uk/media/5f93024ad3bf7f35f184eb24/HIA_in_Planning_Guide_Sept2020.pdf#:~:text=HIA%20is%20a%20tool%20used%20to%20identify%20the,fore%2C%20HIAs%20add%20value%20to%20the%20planning%20process. [Accessed: November 2024].

Ref 18.32 Public Health England (2021). Advice on the content of Environmental Statements accompanying an application under the NSIP Regime. [Online]. Available at: https://www.khub.net/documents/135939561/390856715/Advice+on+the+content+of+environmental+statements+accompanying+an+application+under+the+Nationally+Significant+Infrastructure+Planning+Regime.pdf/a86b5521-46cc-98e4-4cad-f81a6c58f2e2?version=1.0&t=1615998516658&download=true [Accessed: October 2024].

Ref 18.33 Institute of Environmental Management and Assessment (2017). Health in Environmental Impact Assessment – A Primer for a Proportionate Approach. [Online]. Available at: https://www.iema.net/media/3uvf3s2n/health-in-eia-a-primer-for-proportinate-approach.pdf [Accessed: October 2024].

Ref 18.34 National Mental Well-being Impact Assessment Collaborative (2011). Mental Wellbeing Impact Assessment – a toolkit for wellbeing. [Online]. Available at: https://www.phwwhocc.co.uk/whiasu/wp-content/uploads/sites/3/2021/05/Mental_Wellbeing_Impact_Assessment_Toolkit_-_full_version.pdf [Accessed: November 2024].

Ref 18.35 Institute of Environmental Management and Assessment (2022). Effective Scoping of Human Heath in Environmental Impact Assessment. [Online]. Available at: https://www.files.clickdimensions.com/iemanet-ay0iq/files/iemaeiaguidetoeffectivescopingofhumanhealth.pdf?1668617996077 [Accessed: October 2024].

Ref 18.36 Institute of Environmental Management and Assessment (2022). Determining Significance for Human Health in Environmental Impact Assessment. [Online]. Available at: https://www.files.clickdimensions.com/iemanet-ay0iq/files/iemaeiaguidetodeterminingsignificanceforhumanhealth.pdf?1668618011303 [Accessed: October 2024].

Ref 18.37 National health Service (2019). NHS Long Term Plan. [Online]. Available at: https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/ [Accessed: November 2024].

Ref 18.38 Dahlgren, G and Whitehead, M. (2021). The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. *Public Health*. *199*, pp.20-24.

Ref 18.39 Barton, H. and Grant, M. 2006. A health map for the local human habitat. *The journal of the Royal Society for the Promotion of Health*. *126*(6), pp.252-253.

Ref 18.40 Office for National Statistics (2021). UK Business Register and Employment Survey. [Online]. Available at: https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey [Accessed: September 2024].

Ref 18.41 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: September 2024].

Ref 18.42 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: September 2024].

Ref 18.43 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: September 2024].

Ref 18.44 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: September 2024].

Ref 18.45 Office for National Statistics (2024). Claimant Count. [Online]. Available at: https://www.nomisweb.co.uk/ [Accessed: September 2024].

Ref 18.46 Office for National Statistics (2018). Population Projections. [Online]. Available at: https://www.nomisweb.co.uk/ [Accessed: September 2024].

Ref 18.47 Department for Digital, Culture, Media and Sport (2023). Community Life Survey 2021/2022 Reference Tables, Table B4. [Online]. Available at: https://www.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: September 2024].

Ref 18.48 National Health Service (2024). General Practice Workforce July 2024, Practice Level CSVs. [Online]. Available at: https://www.digital.nhs.uk/data-and-information/publications/statistical/general-and-personal-medical-services/31-july-2024 [Accessed September 2024].

Ref 18.49 National Health Service (2019). London Healthy Urban Development Unit Rapid Health Impact Assessment Tool. [Online]. Available at: https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf [Accessed: October 2024].

Ref 18.50 Office for National Statistics (2011). 2011 Census. [Online]. Available at: https://www.ons.gov.uk/census/2011census [Accessed: November 2024].

Ref 18.51 H.M.Government (2010). Definition of disability under the Equality Act 2010. [Online]. Available at: https://www.gov.uk/definition-of-disability-under-equality-act-2010#:~:text=You%E2%80%99re%20disabled%20under%20the%20Equality%20Act%202010%20if%20you%20have [Accessed: September 2024].

Ref 18.52 Public Health England. (2019). Health matters: health and work. [Online]. Available at: https://www.gov.uk/government/publications/health-matters-health-and-work/health-matters-health-and-work [Accessed: September 2024].

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