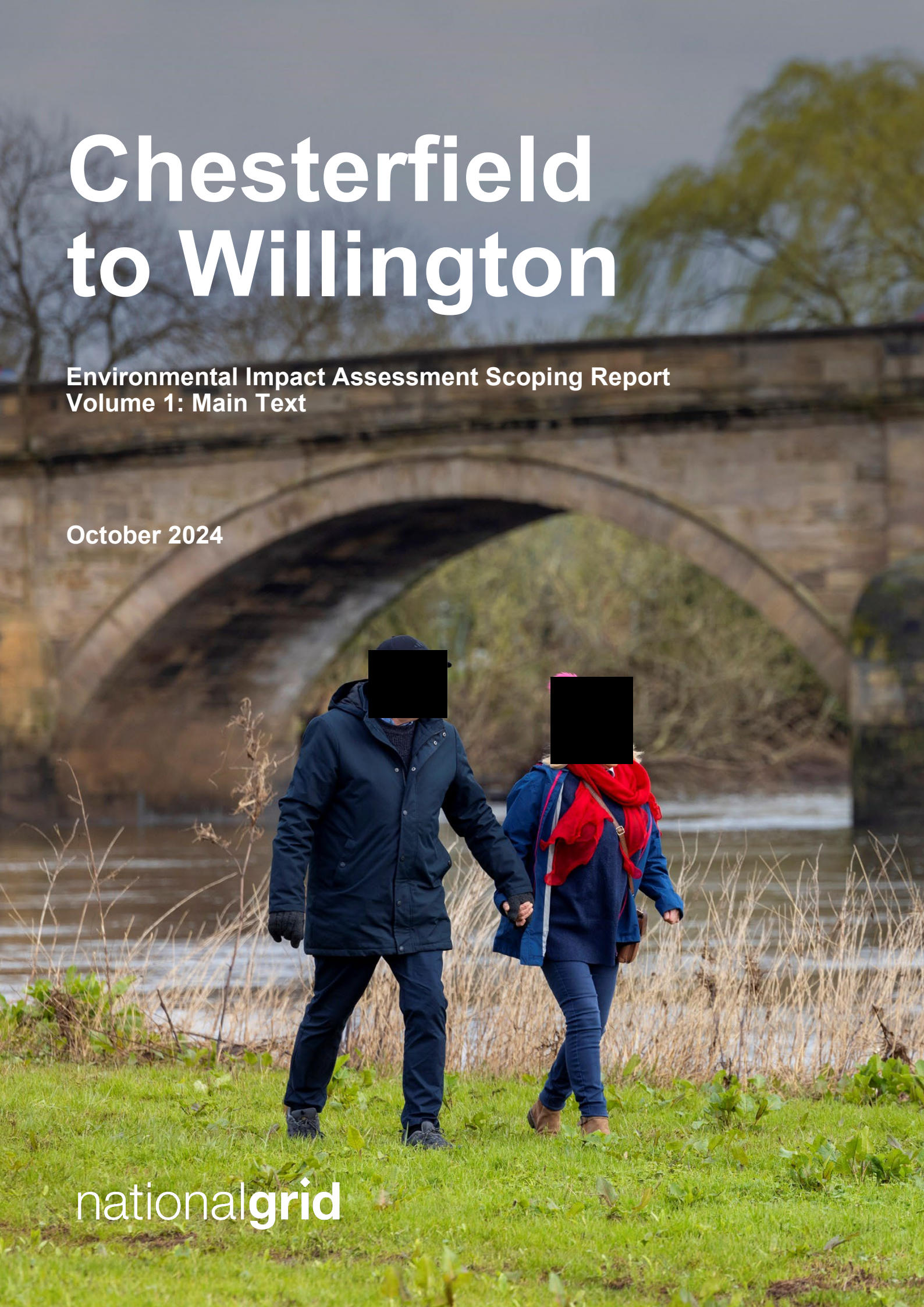
Chesterfield to Willington

Environmental Impact Assessment Scoping Report
Volume 1: Main Text

October 2024



nationalgrid

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Abbreviations and Glossary

nationalgrid

Abbreviations

Abbreviation / term	Definition
AADT	Annual Average Daily Traffic
AC	Alternating Current
AD	Anno Domini
ADMS	Atmospheric Dispersion Modelling Software
AILs	Abnormal Indivisible Loads
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
ASR	Annual Status Report
AVBC	Amber Valley Borough Council
BAP	Biodiversity Action Plan
BDC	Bolsover District Council
BGS	British Geological Survey
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BS	British Standard
BNL	Basic Noise Level
BTEC	Business and Technology Education Council
BTO	British Trust for Ornithology
CBRN	Chemical, Biological, Radiological or Nuclear
CBS	Cement Bound Sand
CEMP	Construction Environmental Management Plan

Abbreviation / term	Definition
CIEEM	Chartered Institute of Ecology and Environmental Management
CNP	Critical National Priority
CoCP	Code of Construction Practice
COMAH	Control of Major Accident Hazards
CPRSS	Corridor Preliminary Routeing and Siting Study
CRoW	Countryside Rights of Way
CRTN	Calculation of Road Traffic Noise
CSE	Certificate of Secondary Educations
CTMP	Construction Transport Management Plan
CWS	County Wildlife Site
CWTP	Construction Worker Travel Plan
dB	Decibels
dB(A)	A-weighed Decibels
DBRC	Derbyshire Biological Records Centre
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DLL	District Level Licencing
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operator
DWT	Derbyshire Wildlife Trust
EAP	Emergency Action Plan
EBC	Erewash Borough Council
ECoW	Ecological Clerk of Works
EEC	European Economic Community
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Fields
EPR	Environmental Permitting Regulations
ES	Environmental Statement
ESO	Electricity System Operator

Abbreviation / term	Definition
ETYS	Electricity Ten Year Statement
EU	European Union
FCDs	Field Capacity Days
FES	Future Energy Scenarios
FLL	Functionally Linked Land
FRA	Flood Risk Assessment
FRAP	Flood Risk Activity Permit
GCN	Great Crested Newt
GHG	Greenhouse Gas
GI	Geotechnical Investigation
GIS	Geographical Information System
GLTA	Ground Level Tree Assessment
GNVQ	General National Vocational Qualification
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectare
HCA	Homes and Communities Agency
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGBI	Herpetofauna Groups of Britain and Ireland
HGV	Heavy Goods Vehicle
HMSO	His Majesty's Stationary Office
HMWB	Heavily Modified Water Body
HND	Holistic Network Design
HPI	Habitat of Principal Importance
HRA	Habitats Regulation Assessment
HSE	Health and Safety Executive
HSI	Habitat Suitability Index (for GCN)
Hz	Hertz

Abbreviation / term	Definition
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
INNS	Invasive Non Native Species
IPCC	Intergovernmental Panel on Climate Change
IRZ	Impact Risk Zone
JNCC	Joint Nature Conservation Committee
km	Kilometres
kV	Kilovolt
kV/m	Kilovolt per metre
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LDV	Light Duty Vehicle
LGS	Local Geological Site
LHA	Local Highway Authority
LLFA	Lead Local Flood Authority
LLAU	Limit of Land to be Acquired or Used
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LoD	Limits of Deviation
LPA	Local Planning Authority
LV	Limit Value
LVIA	Landscape & Visual Impact Assessment
LWS	Local Wildlife Site
MAGIC	Multi Agency Geographic Information for the Countryside
MAHP	Major Accident Hazard Pipelines
MCC	Manual Classified Counts
MML	Midland Main Line
MRN	Major Road Network
MSA	Mineral Safeguarding Area

Abbreviation / term	Definition
NBN	National Biodiversity Network
NCA	National Character Area
NCN	National Cycle Network
NEDDC	North-East Derbyshire District Council
NERC Act	Natural Environment and Rural Communities Act 2006 (as amended)
NETS	National Electricity Transmission System
NFU	National Farmers Union
NGET	National Grid Electricity Transmission Plc
NIA	Noise Important Area
NO_2	Nitrogen Dioxide
NOA	Network Options Assessment
NO_X	Nitrogen Oxides
NP	National Park
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NPS	National Policy Statement
NPS EN-1	Overarching National Policy Statement for Energy
NPS EN-5	National Policy Statement for Electricity Networks Infrastructure
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptor
NSRI	National Soils Resources Institute
NTS	Non-Technical Summary
NVC	National Vegetation Classification
Ofgem	Office of Gas and Electricity Markets
OHL	Overhead Line
ONC	Ordinary National Certificate
OND	Ordinary National Diploma
ONS	Office for National Statistics
OS	Ordnance Survey

Abbreviation / term	Definition
PCM	Pollution Climate Model
PEIR	Preliminary Environmental Information Report
PGCE	Postgraduate Certificate in Education
PHE	Public Health England
PINS	Planning Inspectorate
pLWS	Potential Local Wildlife Site
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in diameter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter
PRoW	Public Right of Way
PS(T)	National Grid's Policy Statement PS(T)134 Operational Audible Noise Policy of Overhead Lines (New Build, Reconductoring, Diversion and Uprating)
RBD	River Basin District
RBMP	River Basin Management Plan
RCP	Representative Concentration Pathways
RIGS	Regionally Important Geological Site
RSPB	The Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SM	Scheduled Monument
SDDC	South Derbyshire District Council
SEC	Sealing End Compound
SFRA	Strategic Flood Risk Assessment
SGT	Super Grid Transformer
SLA	Special Landscape Area
SNCI	Sites of Nature Conservation Importance
SOAEL	Significant Observed Adverse Effect Level
SOR	Strategic Options Report
SoS	Secretary of State
SPA	Special Protection Area
SPI	Species of Principal Importance

Abbreviation / term	Definition
SPZ	Source Protection Zone
SQSS	Security and Quality of Supply Standards
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage System
SWMP	Site Waste Management Plan
TA	Transport Assessment
TEMPro	Trip End Model Presentation Program
TGN(E)	National Grid Technical Guidance Note TGN(E)322 'Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating)'
TR(E)	National Grid Technical Report TR(E)564 'Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating)'
UK NSN	UK National Site Network
UKBAP	UK Biodiversity Action Plan
UKCP18	UK Climate Projections 2018
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
VSR	Vibration Sensitive Receptor
WC	Wetness Class
WeBS	Wetland Birds Survey
WFD	Water Framework Directive
WSI	Written Scheme of Investigation
ZOI	Zone Of Influence
ZTV	Zone of Theoretical Visibility
µT	Microteslas
CA	Competent Authority
CBC	Chesterfield Borough Council
ECP	Environmental Control Plan
CERC	Cambridge Environmental Research Consultant

Glossary

Term	Definition
Abnormal Indivisible Loads (AIL)	Large loads to be delivered to the construction site which, by their nature, cannot be broken into smaller multiple deliveries
Additional Mitigation Measures	Additional mitigation measures comprise measures over and above any embedded and good practice mitigation measures, for which the EIA has identified a requirement to further reduce significant environmental effects, such as landscape planting.
Advice Note	The Planning Inspectorate has published a series of advice notes that are intended to inform applicants, consultees, the public and others about a range of process matters in relation to the Planning Act 2008.
Agricultural Land Classification (ALC)	A standardised method for classifying agricultural land according to its versatility, productivity, and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using the Ministry of Agriculture, Food and Fisheries Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land,1988.
Air Quality Assessment Level	An Air Quality Assessment Level, may be an air quality objective, EU limit or target value, or an Environment Agency 'Environment Assessment Level' which the percentage change in concentration with the proposed development is compared against.
Air Quality Management Area (AQMA)	A Local Authority must designate an Air Quality Management Area if any of the Air Quality Objectives set out in the regulations are not likely to be met over a relevant time period.
Air Quality Objectives (AQO)	The AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.
Air Quality Strategy	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland describes the plans drawn up by the Government and the Developed Administrations to improve and protect ambient air quality in the UK in the medium-term. The Strategy sets objectives for the main air pollutants to protect health. Performance against these objectives is

Term	Definition
	monitored where people regularly spend time and might be exposed to air pollution.
Alternating Current (AC)	A type of electrical current in which the direction of the flow electrons switches back and forth at regular intervals or cycles. Current flowing in transmission lines and normal household electricity that comes from a wall outlet is alternating current.
Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far and expressed in the LAeq statistical parameter.
Annual Status Report	As part of the Environment Act 1995 (amended 2021) all local authorities are required to produce an Annual Status Report each year on the local management of air quality in their area of jurisdiction.
Aquifer	An underground layer of rock with water storage capability.
Area of Outstanding National Beauty (AONB)	An AONB is land protected by the Countryside and Rights of Way Act 2000 (CRoW Act). It protects the land to conserve and enhance its natural beauty.
Atmospheric Dispersion Modelling Software	Software that uses mathematical formulations to simulate atmospheric processes and predicts the dispersion and concentrations of pollutants at discrete receptor locations.
A-weighted dB(A) decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not perceived to be as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" weighting filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise for the assessment and consideration of impacts upon humans is measured using the “A” weighted filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Background Noise	Background noise is defined by the L90 statistical parameter, as “the noise for 90% of a given time interval”, representative of the quieter portions of the noise climate; and usually in the A-weighted noise weighting descriptor.
Baseline	Describes the existing nature of the environment within the study area at a fixed point in time, as well as any changes likely to occur independently of the Project, including the legislative and planning context and any relevant published guidance.

Term	Definition
Bellmouth	An access point from the public highway for construction purposes.
Best and Most Versatile (BMV) agricultural land	Defined as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality. BMV agricultural land is afforded a degree of protection against development within planning policy.
Biodiversity Net Gain (BNG)	BNG is an approach to development which aims to leave nature in a better state than it was before the project was completed. National Grid has made a commitment to delivering a BNG target of 10% above baseline on its development projects (as agreed with Ofgem).
Blue-collar Employment	Employment in non-office settings and involves manual labour
Brinsworth to High Marnham Uprating	A proposed uprating of the existing 275kV overhead lines to facilitate a transmission load of 400kV and the development of three new substations to help carry more green power from the North of England to homes and businesses in the Midlands.
Bronze Age	2,600 to 700 BC
Chesterfield to Willington (the Project)	Located in the East Midlands region of England, the Project comprises major reinforcement of the electricity transmission system. This would transport clean energy from the North of England to homes and businesses in the Midlands and play an important role in building a more secure and resilient future energy system. These proposals form part of The Great Grid Upgrade, which is the largest overhaul of the grid in generations. The Project will support the UK's Net Zero target by adding capacity to accommodate increasing power flows from offshore wind and interconnections from Scotland and North East England, which is expected to double within the next ten years, to areas of demand south to the Midlands and beyond.
Circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow.
Code of Construction Practice (CoCP)	A written code of standards and procedures that developers and contractors must adhere to.
Conductors	The 'live' part of the overhead line, which hang from pylons on insulators. Conductors come in several different designs depending on the amount of power that is transmitted on the circuit.
Conservation Area	A conservation area is an area of special architectural or historic interest, the character, appearance or setting of which it is desirable to preserve or enhance, designated by the Local Planning Authority.

Term	Definition
Construction Environmental Management Plan (CEMP)	A Construction Environmental Management Plan sets out the intended methods of the effective management of potential environmental impacts arising during the construction of a project.
Construction Phase	Activity on and/or offsite required to implement the Project. The construction phase is considered to commence with the first activity on site (e.g. creation of site access) and ends with demobilisation.
Corridor Preliminary Routeing and Siting Study (CPRSS)	The CPRSS reports the process undertaken as part of the Options Identification and Selection Stage (Stage 2) to identify an emerging preferred corridor, siting zones and siting areas (where relevant) within which the required infrastructure for the Project may be located.
Culvert	A tunnel (pipe or box-shaped) carrying a stream, open drain or utility equipment under a feature such as a road or railway.
Cumulative Effects	Incremental effects that result from the accumulation of a number of individual effects, either caused by different types of effect from the same project (intra-project effects), or by the interactions between the likely effects of other reasonably foreseeable developments with the likely effects of the proposed project (inter-project effects).
Decibel (dB)	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed such that it can be set to mimic the operation of the human ear (“A” Weighted filter band). The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sounds are heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Four engine jet aircraft at 100m 120 dB Riveting of steel plate at 10m 105 dB Pneumatic drill at 10m 90 dB Circular wood saw at 10m 80 dB Heavy road traffic at 10m 75 dB Telephone bell at 10m 65 dB Male speech, average at 10m 50 dB Whisper at 10m 25 dB Threshold of hearing, 1000 Hz 0 dB
Development Consent Order (DCO)	Where the Secretary of State (SoS) proposed to grant consent for a Nationally Significant Infrastructure Project (NSIP), this

Term	Definition
	will be through a DCO which is normally made as a statutory instrument – a form of secondary legislation.
Direct Current (DC)	Electrical current which flows consistently in one direction. The current that flows in a torch or another appliance running on batteries is direct current.
Distribution Network Operator (DNO)	A Distribution Network Operator is the company that owns and operates the overhead power lines and infrastructure that connects the National Grid electricity transmission system to properties and businesses. The DNO in proximity to the Project is National Grid Electricity Distribution Plc (NGED).
Driver Delay	Traffic delays to non-development traffic.
Earthwire	Wire strung between the tops of towers used for lightning and system protection. May also be used to carry telecommunication signals.
Electricity System Operator (ESO)	The Electricity System Operator plans and operates the transmission system in Great Britain but does not own the transmission assets such as the overhead lines and substations. These are developed, owned and maintained by National Grid Electricity Transmission and other 'Transmission Owner' companies. Generation and interconnector customers apply to National Grid ESO when they wish to connect to the network. The ESO is a wholly independent company within the wider National Grid Group.
Electricity Transmission System	In England and Wales, the electricity transmission system is made up largely of 400kV and 275kV assets connecting separately owned generators, interconnectors, large demands fed directly from the transmission system, and distribution systems. The electricity transmission system is designed to make sure there is sufficient transmission capacity so that the system can be operated in an economic and efficient way by the ESO, ensuring that power can be moved from where it is generated to demand centres across Britain. The planning and development of the electricity transmission system is governed by the Security and Quality of Supply Standard (SQSS) which ensures that the network is developed and operated securely and is resilient to any foreseeable network faults and disruption.
Electromagnetic fields (EMF)	Electric fields are created by differences in voltage: the higher the voltage, the stronger will be the resultant field. Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field. An electric field will exist even when there is no current flowing. If current does flow, the strength of the magnetic field will vary with power consumption, but the electric field strength will be constant.

Term	Definition
Embedded Mitigation Measures	Measures that form part of the engineering design of the Project, developed through an iterative design process.
Emerging Preferred Corridor	An area within which the transmission infrastructure for the Project may be located, based on the findings of the Options Identification and Selection Stage (Stage 2).
Environmental Impact Assessment (EIA)	An EIA is a tool for systematically examining and assessing the impacts and effects of a development on the environment. The objective of the EIA is to identify any likely significant effects which may arise from the Project and identify measures to prevent, reduce or offset any adverse effects.
Environmental Statement (ES)	The outcome of the EIA process is reported within a document called an ES
Exception Test	When a development cannot be located in areas with a lower risk of flooding, the Exception Test is used to ensure the benefits of the site outweigh the risk.
Fear and Intimidation	In the context of traffic and transport, these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths.
Flood plain	The flood plain is located adjacent to a watercourse that is susceptible to flooding during out of bank peak river flow events.
Flood Risk Assessment	The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk will be managed over the Project's lifetime.
Flood Zone	These denote areas designated as a certain level of risk of fluvial or tidal flooding.
Free-Field	A situation in which the radiation from a sound source is completely unaffected by the presence of any reflecting surfaces.
Future Energy Scenarios (FES)	Published annually by the ESO to indicate possible future power requirements and where future connections may occur across the network.
Good Practice Mitigation Measures	In the context of the Project, standard approaches and actions commonly used to avoid or reduce environmental impacts of infrastructure development. These are typically applicable across the whole Project.
Greenhouse gas (GHG)	Gases able to absorb infrared radiation emitted from Earth's surface and reradiate it back to Earth's surface, thus contributing to the greenhouse effect. Carbon dioxide, methane, and water vapour are the most important greenhouse gases.

Term	Definition
Habitat of Principal Importance (HPI)	HPI are covered under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The term is interchangeable with 'UK Priority BAP Habitat', 'Section 41 habitat' and 'NERCs41 habitat'.
Habitats Regulations Assessment	A HRA refers to the several distinct stages of Assessment which must be undertaken in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) to determine if a plan or project may affect the protected features of a habitats site before deciding whether to undertake, permit or authorise it.
Heavy Duty Vehicle	Vehicles greater than 3.5 tonnes unladen weight.
Heavy Goods Vehicle (HGV)	Goods vehicles >3.5 t gross vehicle weight.
Holford Rules	A series of guidelines/rules for the routeing and design of new overhead lines or overhead line extensions. The guidelines were initially developed in 1959 and have been reviewed on a number of occasions by National Grid and by the other UK transmission licence holders. The guidelines provide a set of design criteria that have stood the test of time and became accepted industry best practice in overhead line routeing. The guidelines now form an important part of national planning policy relating to the development of electricity networks, as set out in National Policy Statement EN-5 1.
Horizontal Directional Drilling	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Horlock Rules	A series of guidelines/rules for the siting and design of new substations, or substation extensions, including consideration of line entries and SECs. The guidelines were initially developed in 2003 and have been reviewed on a number of occasions by National Grid, with a revised version issued in 2009. The Horlock Rules provide a set of principles which avoid, or reduce the environmental impacts associated with the development of new substation infrastructure.
Infrastructure Planning (Environmental Impact Assessment) Regulations 2017	The EIA Regulations transpose amendments to Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment which were made by Directive 2014/52/EU. They implement the requirements for environmental impact assessment (EIA) procedures in the context of the nationally significant infrastructure regime in England and Wales.
Institute of Air Quality Management	The Institute of Air Quality Management is the professional body for air quality professionals. It occasionally produces guidance that is widely used and accepted by consultants and councils (dependent on the nature of the project).

Term	Definition
Insulator	Insulators are part of an insulator set which in turn supports the conductors, which carry the electrical power and are at a high voltage, from the pylon steelwork which is taken to be at zero earth potential (i.e. 0V). Insulators can be made of porcelain or toughened glass.
Inter-project effects	The combined action of a number of different projects, in combination with the project being assessed, on a resource/ receptor.
Intra-project effects	The combined action of a number of different environmental topic specific effects upon on a resource/ receptor.
Joint bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Kilometre (km)	A metric unit of length, equal to 1,000 metres.
Kilovolts (kV)	A unit of electromotive force, equal to 1,000 volts
Light Duty Vehicle	Vehicles less than 3.5 tonnes unladen weight.
Limits of Deviation (LoD)	Identify a maximum distance or measurement of variation within which the permanent works must be constructed. These comprise lateral (i.e., on the ground) and vertical limits (in relation to height).
Listed Building	A building or structure of special historical or architectural/artistic interest. Designated by the Department for Culture, Media and Sport. All buildings built before 1700 which survive in anything like their original condition are likely to be listed, as are most buildings built between 1700 and 1850.
Ln noise Descriptors	Because noise varies with time, a single noise value cannot adequately define the noise climate. For this reason, the acoustic environment is described using a number of noise level descriptors, statistical parameters, as follows; L10: The sound pressure level that is exceeded for 10% of the time for which the given sound is measured. L90: The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A). Leq: The Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.

Term	Definition
	LAmax: The maximum RMS A-weighted sound pressure level occurring within a specified time period. LAmin: The minimum RMS A-weighted sound pressure level occurring within a specified time period.
Local Air Quality Management	The Local Air Quality Management (LAQM) process requires Local Authorities to periodically review and assess the current and future quality of air in their areas.
Local Geological Sites	A non-statutory designation for regionally important geological and geomorphological sites that have been identified as being of importance locally.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level above which adverse effects on health and quality of life can be detected.
Magnitude of Impact	The scale of the change caused to the baseline conditions.
Main River	Main Rivers are a statutory watercourse designated by the Environment Agency due to the significant importance for flood management.
Major Event	Events that threaten immediate or delayed serious environmental effects on human health, welfare and/or the environment, and require the use of resources beyond those of the client or its appointed representatives to manage. While malicious intent is not accidental, the outcome (e.g. train derailment) may be the same. Therefore, many mitigation measures will apply to both deliberate and accidental events.
Medieval	1066 AD to 1540 AD
Microphone	An electro acoustic transducer which receives an acoustic signal and delivers a corresponding electric signal.
Mineral Safeguarding Areas	An area designated by the Minerals Planning Authorities which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development.
Modern	1901 AD to present
National Cycle Network (NCN)	The NCN is a UK-wide network of signed paths and routes for walking, cycling, wheeling and exploring outdoors.
National Electricity Transmission System	In England and Wales, the electricity transmission system is made up largely of 400 kV and 275 kV assets connecting separately owned generators, interconnectors, large demands fed directly from the transmission system, and distribution systems. The electricity transmission system is designed to make sure there is sufficient transmission capacity so that the system can be operated in an economic and efficient way by the ESO, ensuring that power can be moved from where it is

Term	Definition
	generated to demand centres across Britain. The planning and development of the electricity transmission system is governed by the Security and Quality of Supply Standard (SQSS) which ensures that the network is developed and operated securely and is resilient to any foreseeable network faults and disruption.
National Grid	Throughout this Report, the term National Grid is used to refer to National Grid Electricity Transmission Plc (see below). The wider National Grid Group comprises several businesses, including National Grid Ventures and National Grid Electricity Distribution. These businesses are not licensed Transmission Owners and do not develop the national transmission system.
National Grid Electricity Distribution Plc (NGED)	In June 2021, Western Power Distribution was acquired by National Grid Group. It remains a separate company from NGET, operating within the wider National Grid Group and recently rebranded as National Grid Electricity Distribution (NGED). NGED is a DNO operating in proximity to the Project.
National Grid Electricity Transmission Plc (NGET)	National Grid operates the national electricity transmission network across Great Britain and owns and maintains the network in England and Wales, providing electricity supplies from generating stations to local distribution companies. National Grid does not distribute electricity to individual premises, but its role in the wholesale market is vital to ensuring a reliable, secure and quality supply to all.
National Planning Policy Framework (NPPF)	The National Planning Policy Framework was published in March 2012 by the UK's Department of Communities and Local Government, consolidating over two dozen previously issued documents called Planning Policy Statements (PPS) and Planning Practice Guidance Notes (PPG) for use in England. The NPPF was updated in December 2023 by the Ministry of Housing, Communities and Local Government.
National Policy Statement (NPS)	Government planning policy relating to the development of Nationally Significant Infrastructure Projects (NSIPs) is set out in the relevant National Policy Statement (NPS). NSIPs should be developed in accordance with the relevant NPS. In the case of new transmission routes, the relevant energy-related NPS are EN-1 2; Overarching NPS for Energy and EN-5; Electricity Networks Infrastructure.

Term	Definition
National Site Network (NSN)	Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the UK no longer form part of the EU's Natura 2000 ecological network. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes: l Existing SACs and SPAs; and l New SACs and SPAs designated under these Regulations. Designated Wetlands of International Importance (known as Ramsar sites) do not form part of the national site network. Many Ramsar sites overlap with SACs and SPAs and may be designated for the same or different species and habitats. All Ramsar sites remain protected in the same way as SACs and SPAs.
Nationally Significant Infrastructure Project (NSIP)	NSIPs are developments (relating to energy, transport, water, or waste) which are identified in the Planning Act 2008 and require a type of consent known as "development consent".
Net Zero	The balance between the amount of greenhouse gas (GHG) that's produced and the amount that's removed from the atmosphere. It can be achieved through a combination of emission reduction and emission removal.
Noise	Sound which a listener does not wish to hear.
Non-Road Mobile Machinery	Any mobile machine, item of transportable industrial equipment, or vehicle (with or without bodywork) that is: not intended for carrying passenger or goods on the road and is installed with a combustion engine, either an internal spark ignition petrol engine or a compression ignition diesel engine.
Non-statutory Consultation	An engagement process which will be undertaken to capture public, stakeholder and landowner feedback on the emerging preferred corridor, siting zones, siting areas (where relevant) and the graduated swathe. The feedback received will inform the onward development of the Project. Non-statutory consultations are consultations that are not held pursuant to Section 42 and 47 of the Planning Act 2008.
Non-Technical Summary (NTS)	A summary, usually of technical reports, which presents the content of the main report in a simplified form, limiting the use of technical terms, to make the content accessible to a wide audience.
Operational Phase	Describes the operational phase of a completed development and is considered to commence at the end of the construction phase, after demobilisation.
Options Appraisal	A robust and transparent process used to compare options and to assess the potential impacts they may have across a wide

Term	Definition
	range of criteria including environmental, socio-economic, technical and cost factors.
Options Identification and Selection	Work undertaken to determine the emerging preferred corridor and preliminary routeing options for the Chesterfield to Willington Project. It is intended to demonstrate how National Grid's statutory duties, licence obligations, policy considerations, environmental, socio-economic, technical, cost and programme issues have been considered and to provide information on the approach to the identification and appraisal of corridors.
Order Limits	The Order Limits are the outermost extent of the Project indicated on the Plans supporting the application for Development Consent. This is the Limit of Land to be Acquired or Used (LLAU) by the Project and represents the area in which the DCO would apply.
Overhead Line	An above-ground electricity line that safely and securely transmits electricity through a series of conductors (wires). An overhead line comprises a series of components including: supporting structures, such as pylons; line fittings, such as electrical insulators and conductor spacers; an earth wire (to protect the line from electrical faults and carry control data); and the conductors themselves.
Particulate Matter (PM_{10} and $PM_{2.5}$)	PM is the term used to describe condensed phase (solid or liquid) particles suspended in the atmosphere. Their potential for causing health problems is directly linked to the size of the particles. PM10 is particulate matter with a diameter of 10 microns or less (also referred to as micrometres or 1/1000th of a meter). PM2.5 is particulate matter 2.5 microns or less in diameter.
Pedestrian Delay	The ability of people to crossroads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions.
Planning Act 2008	The primary legislation that establishes the legal framework for applying for, examining and determining Development Consent Order applications for Nationally Significant Infrastructure Projects.
Planning Practice Guidance (PPG)	PPG supports the NPPF and sets out government policies for England.
Pollution Climate Model	A collection of models produced by Defra designed to fulfil part of the UK's EU Directive (2008/50/EC) requirements to report on the concentrations of particular pollutants in the atmosphere.
Post Medieval	1540 AD to 1901 AD

Term	Definition
Prehistoric	1,000,000 BC to AD 43
Preliminary Environmental Information Report (PEIR)	An early output of the EIA process, and part of the DCO application process. The PEIR is presented as part of the Section 42 Statutory Consultation under the Planning Act 2008.
Principle Aquifer	Aquifer designation defined by the Environment Agency (2017) as rock layers that “provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands”.
Protected Wreck	The remains of ships and boats which meet the criteria set out in the Protection of Wrecks Act 1973.
Pylon	Overhead line structure used to carry overhead electrical conductors, insulators and fittings.
Q95	Q95 refers to the flow in a river which is equalled to or exceeded to 95% of the time.
Ramsar Site	An area of land designated under the Ramsar Convention to conserve wetlands, especially those providing waterfowl habitat
Receptor	A component of the natural or built environment (such as a human being, water, air, a building or a plant) affected by an impact of the construction and/or operation of a development.
Registered Battlefield	Register of nationally significant military engagements maintained and designated by Historic England.
Registered Park or Garden	Register of historic parks, gardens, grounds, and planned open spaces maintained and designated by Historic England.
Residual Effects	Those effects that remain following the implementation of the mitigation measures proposed.
River Basin Management Plan	A regional plan that sets out how organisations, stakeholders and communities would work together to improve the water environment and fulfil the requirements of the Water Framework Directive
Rochdale Envelope	An approach established by UK planning case law which involves broadly defining the project (or elements of it) but limiting it by a number of clearly defined fixed parameters. Rochdale Envelopes are typically defined by a series of maximum extents of a project (or ‘worst case scenarios’) by which effects can be assessed.
Scheduled Monument	Nationally important archaeological sites. Designated by the Department for Digital, Culture, Media and Sport. These can be above or below-ground and do not need to be ancient.

Term	Definition
Scoping	The process of identifying the issues to be addressed by the Environmental Impact Assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered unlikely to be significant.
Scoping Boundary	The Scoping Boundary is defined at an early stage of a project at scoping, to represent the likely maximum extent of development at that time. Following the receipt of a Scoping Opinion and further design development, the Scoping Boundary will be refined and replaced by the Order Limits.
Scoping Opinion	A Scoping Opinion is requested from the Planning Inspectorate on behalf of the SoS, to inform the requirements of EIA process and ultimately the ES which will be submitted as part of the application for development consent. Through the scoping process the views of the statutory consultees and other relevant organisations on the proposed scope of the EIA are sought.
Scoping Report	A report produced before the Environmental Statement to outline the key issues associated with a project and assist the relevant regulator in providing a Scoping Opinion.
Sealing End Compound (SEC)	A secure compound within which the transition between underground cables and overhead lines is made. Buried cables are brought to the surface and directed vertically through insulated post structures before connecting onto overhead line conductors (wires) secured (via insulators) to anchor blocks or gantry structures.
Secondary A Aquifer	Aquifer designation defined by the Environment Agency (2017) as “permeable layers that can support local water supplies, and may form an important source of base flow to rivers”.
Secondary B Aquifer	Aquifer designation defined by the Environment Agency (2017) as “mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers”.
Secondary Undifferentiated Aquifer	Aquifer designation defined by the Environment Agency (2017) as “where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value”.
Sensitivity and Value of Receptor	Term applied to specific receptors, combining judgements of the susceptibility of the receptor to specific type of change proposed and the value related to that receptor.
Sequential Test	The aim of the Sequential Test is to steer new developments to areas with the lowest risk of flooding from any source.

Term	Definition
Setting	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate an asset, or may be neutral.
Significance of Effects	The level or importance of effects, generally determined by considering together the sensitivity of the receptor with the magnitude of impact.
Significant Observed Adverse Effect Level (SOAEL)	This is the level above which significant adverse effects on health and quality of life occur.
Site of Special Scientific Interest (SSSI)	An area of land designated by Natural England as of special interest by reason of its flora, fauna or geological or physiographical features.
Site Waste Management Plan	A document which sets out how resources will be managed, and waste controlled during the Project. Plans usually involve recording the amount of waste that will be produced and details the proposed methods of waste disposal.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The fluctuations in air pressure, from the steady atmospheric pressure, created by sound, when measured on the decibel scale.
Spatial Scope	The geographical area over which environmental effects are predicted to occur as a consequence of the Project, and therefore will be assessed within the environmental impact assessment (EIA).
Special Area of Conservation (SAC)	An area of land designated under the under Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora to protect one or more special habitats and/or species.
Special Protection Area (SPA)	An area of land designated under the Directive 79/409 on the Conservation of Wild Birds to protect the habitats of migratory birds and certain particularly threatened birds.
Species of Principal Importance (SPI)	Covered under Section 41 of the NERC Act 2006. The term is interchangeable with ‘UK Priority BAP Species’, ‘Section 41 species’ and ‘NERCs41 species’.
Strategic Flood Risk Assessment (SFRA)	SFRA are strategic level studies conducted by the LPA to evaluate flood risk from all sources within the district boundary.

Term	Definition
Strategic Road Network (SRN)	The SRN is made up of motorways and trunk roads (the most significant 'A' roads).
Study Area	The spatial area within which environmental effects are assessed (i.e., extending a distance from the development footprint). This area varies between different environmental topic areas.
Substation	A secure node on the electricity system where: switching may be undertaken to direct power flows; operating voltages may be altered through the use of electricity transformers; and sources of electricity import, generation and/or demand can be connected, substations may be located either outdoors or within a building but will always be enclosed by a secure perimeter fence.
SuDS Manual	The SuDS Manual provides guidance on planning, design, construction and maintenance of SuDS measures to manage flood risk and improve water quality.
Super grid transformer	Used at substations along the electricity transmission system to increase or reduce voltage.
Superficial Deposits	Geologically recent deposits that consist of various sediments (clay, sand, gravel etc.) and sit on top of the bedrock.
Surface Water Flooding	Surface water flooding is the result of heavy rainfall unable to infiltrate into the ground or overwhelming drainage systems, travelling across overland flow paths.
Surface Water Management Plan (SWMP)	SWMP are developed by local authorities which outline the strategy for managing surface water in a given location, in order to reduce flood risk.
Sustainable drainage systems / SuDS	Measures designed to control surface runoff close to its source, including management practices and control measures such as storage tanks, basins, swales, ponds and lakes. Sustainable drainage systems allow a gradual release of water and thereby reduce the potential for downstream flooding.
Temporal Scope	The environmental impact assessment (EIA) will predict the changes (effects) to the current and future baseline during the construction and operation phases of the Project.
Tensioning site	A site where the new conductor is fed out from during construction. This also includes a tensioning winch to keep the conductor off the ground.
Underground cable	An insulated conductor carrying electric current designed for underground installation.

Term	Definition
Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. The Directive establishes a framework for the protection of inland surface waters, estuaries, coastal waters and groundwater. The framework for delivering the WFD is through river basin management planning. The UK has been split into several river basin districts. Each river basin district has been characterised into smaller management units known as water bodies. The surface water bodies may be rivers, lakes, estuary or coastal.
White-collar Employment	Employment in office settings.
Wirescape	Caused by multiple overhead lines running in different angles or the proximity of multiple overhead lines.
World Heritage Site	A natural or man-made site, area, or structure recognised as being of outstanding international importance and therefore as deserving special protection. Sites are nominated to and designated by the World Heritage Convention.
Zone of Influence (ZOI)	The area within which features could potentially be affected by the construction and/or operational phases of the Project.

1. Introduction

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Contents

1. Introduction

1.1 Overview of the Project

1.1.1 This Environmental Impact Assessment (EIA) Scoping Report supports a request by National Grid Electricity Transmission plc (NGET), under Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 1.1) (hereafter referred to as 'the EIA Regulations'), for a written Scoping Opinion from the Secretary of State (SoS) for Energy Security and Net Zero, administered by the Planning Inspectorate on behalf of the SoS, to inform the EIA for the Project.

1.1.2 The Chesterfield to Willington Project (the 'Project') is a proposal by NGET to reinforce the transmission network in the East Midlands region. The Project will establish a new 400 kilovolts (kV) transmission connection between a new 400 kV Chesterfield Substation and the existing Willington Substation. The connection is expected to wholly or largely comprise of a new overhead line.

1.1.3 NGET owns, builds and maintains the electricity transmission network in England and Wales, and operates the high voltage electricity network throughout Great Britain, transporting electricity from generators (such as wind farms, solar farms and power stations) to local distribution network operators. Under the Electricity Act 1989 (Ref 1.2), NGET holds a transmission licence, under which it is required to develop and maintain an efficient, coordinated and economical electricity system.

1.1.4 NGET is also required, under Section 38 of the Electricity Act 1989, to comply with the provisions of Schedule 9 of the Act. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to:

- Schedule 9(1)(a) "…have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest;".
- Schedule 9(1)(b) "…do what [it] reasonably to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects".

1.1.5 The Project is at an early stage of development and therefore the detailed design is not fully understood yet, however the Project is likely to comprise of the following components, as described in further detail below and shown in **Figure 1.1: Location / Context** in **Volume 3**:

- A new 400 kV overhead line route, approximately 60 kilometres (km) in length between a proposed new Chesterfield Substation and the existing Willington Substation. It is anticipated that this would comprise steel lattice pylons in accordance with National Grid's guidance and national planning policy.

- Replacement of short sections of existing transmission line (overhead line) and local changes to the lower voltage distribution networks to facilitate the construction of the Project.
- Works to facilitate the connection of a new overhead line into a new proposed 400 kV Chesterfield Substation and at the existing 400 kV Willington Substation.
- Potential cable sealing end compounds (SEC) and installation of underground cable sections for the Project using open cut and trenchless techniques such as horizontal directional drilling.
- Potential permanent accesses to facilitate maintenance.
- Temporary works associated with the construction of the Project such as site compounds, haul roads and accesses.
- Potential utility diversions and / or modifications may also be required to facilitate the construction of the Project.

1.1.6 The Project would connect into the existing Willington Substation and a proposed new substation at Chesterfield. The intention is for the new substation to be consented and delivered under a separate NGET project (Brinsworth to High Marnham). However, notwithstanding the default position being that such works would not be incorporated as part of this Project, there remains the possibility that they would be incorporated on a 'fall-back' basis to guard against any risk of delay to the delivery of this Project. In view of this potential inclusion, the new substation and its potential environmental effects have been considered in this Scoping Report (where applicable) for completeness. If the works are ultimately determined to be necessary to include as part of the Project, they will be considered as part of the Preliminary Environmental Information Report (PEIR) produced at statutory consultation and then ultimately as part of the Project's Environmental Statement (ES).

1.1.7 Further details regarding the Project features would be included within the ES and would be incorporated within the Order Limits supporting the application for Development Consent.

1.1.8 **Chapter 4: Description of the Project** of this Scoping Report provides a more detailed description of the Project.

1.1.9 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under Part 3 Section 14 and Section 16 of the Planning Act 2008 (as amended) (Ref 1.3) as it meets the following criteria:

- ‘Section (14)(1) In this Act “nationally significant infrastructure project” means a project which consists of any of the following—…
  - (b) the installation of an electric line above ground…’
- ‘Section (16)(1) The installation of an electric line above ground is within section 14(1)(b) only if (when installed) the electric line will be— (a) wholly in England…’
- The Act also lists out specific exemption criteria if a new electric line does not constitute an NSIP, including:

- ‘(a) if the nominal voltage of the line is expected to be less than 132 kilovolts, (aa) if the length of the line (when installed) will be less than two kilometres, (ab) if— (i) the line will replace an existing line….
- (b) to the extent that (when installed) the line will be within premises in the occupation or control of the person responsible for its installation…
- (c) if section 37(1) of the Electricity Act 1989 (consent required for overhead lines) does not apply to it by virtue of the Overhead Lines (Exemption) (England and Wales) Regulations 2009 (S.I. 2009/640), as amended by the Overhead Lines (Exempt Installations) (Consequential Provisions) Order 2010.]’

1.1.10 The Project does not meet any of the exemption criteria and is therefore categorised as a NSIP.

1.1.11 An Inception Meeting was held with Planning Inspectorate on 17 April 2024, where a high-level timeframe was discussed in terms of submission of the Scoping Report and submission of the Development Consent Order (DCO) application. It was confirmed that the Project would be delivered as a NSIP.

1.1.12 The Project also constitutes EIA development as defined in the EIA Regulations. The Project falls within Schedule 1 paragraph 20 of the EIA Regulations, ‘*Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km’*. Consequently, an assessment of the impacts of the Project on the environment is required.

1.2 The Need for the Project

1.2.1 The UK Government has set targets of 50 gigawatts (GW) of offshore wind generation by 2030 (UK Government, 2022) and up to 140 GW by 2050 (Ref 1.4). There is particular growth forecast in offshore wind capacity in Scotland and the north-east of England, as well as interconnectors to and from European power grids. This will put pressure on the existing network such that reinforcement of the network in the East Midlands region has been identified as necessary to secure the operation of the transmission system and ensure reliable, economic long-term supply.

1.2.2 The need for this Project was first identified by the National Grid Electricity System Operator (ESO[1]) in 2019. NGET then undertook a Strategic Options Appraisal (Ref 1.5) at the Strategic Proposal Stage which identified the preferred strategic option to bring forward to address the identified need. This considered a wide range of options for providing the necessary north-south power flows and concluded that the establishment of a new electricity transmission route between Chesterfield and Willington Substations represented the most appropriate solution. The Strategic Options Appraisal identified the following needs for the Project:

- Ensure Security and Quality of Supply Standards (SQSS) compliance.

[1] The UK’s 2023 Energy Act set the legislative framework for an independent system planner and operator to help accelerate Great Britain’s energy transition. Therefore, the ESO has transitioned to the National Energy System Operator, taking a whole system view, beyond electricity, inclusive of all energy sources and uses.

- Provide a cost-beneficial level of boundary uplift across network transmission boundary B8, as presented in **Plate 1.1** below, in order to improve transfer capability facilitating north to south power flows and reduce generation constraints on renewable energy sources resulting from insufficient capacity of the National Electricity Transmission System (NETS).

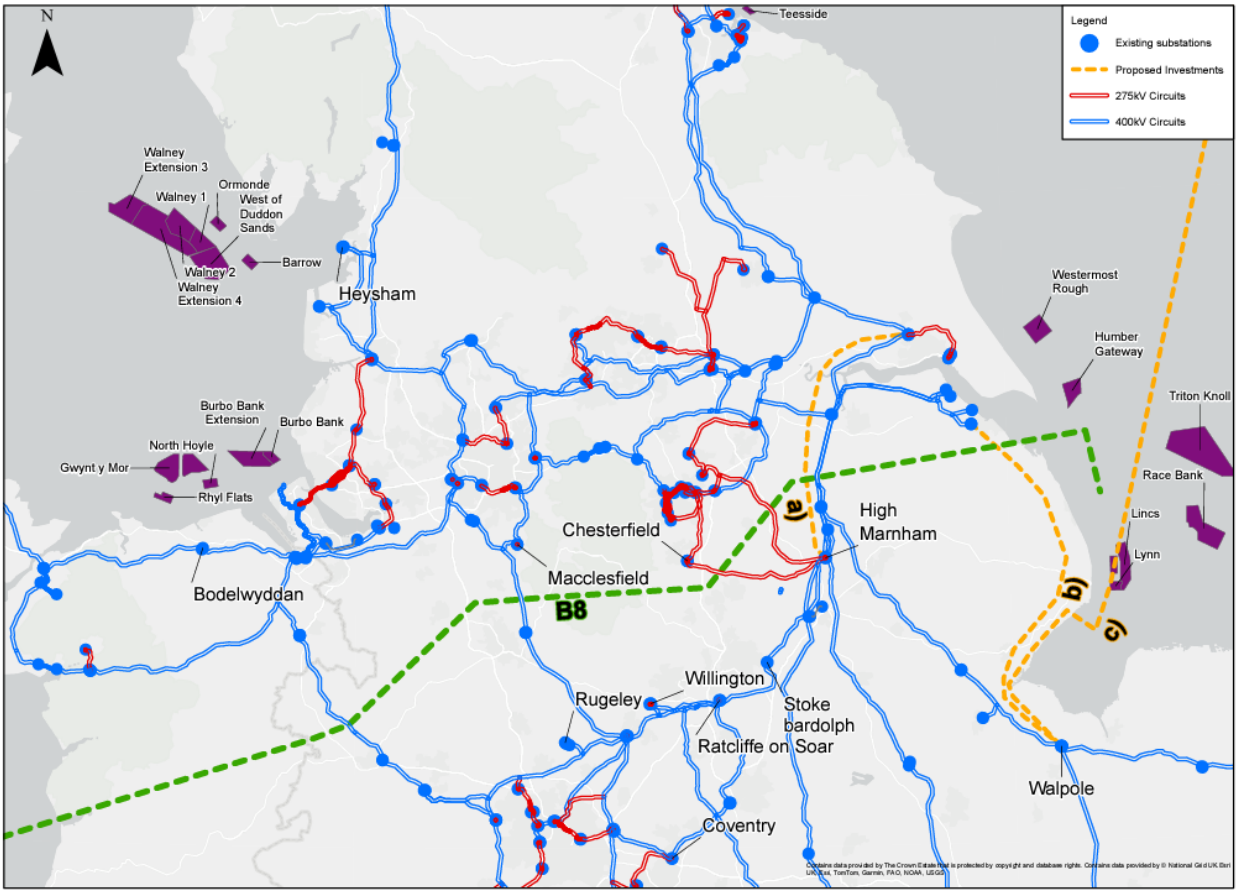

Plate 1.1 – The NETS in the North and Midlands

1.2.3 Located in the East Midlands region, the Project is required to reinforce the electricity transmission system to help deliver the UK Government's Net Zero targets. This would transport clean energy from the North of England to homes and businesses in the Midlands and play an important role in building a more secure and resilient future energy system. These proposals form part of The Great Grid Upgrade (Ref 1.6), which is the largest overhaul of the grid in generations. The Project will support the UK's Net Zero target by adding capacity to accommodate increasing power flows from offshore wind and interconnections in Scotland and North-East England, which is expected to double within the next ten years, to areas of demand south to the Midlands and beyond.

1.2.4 In considering the need for the Project, NGET had due regard to the policy, projects and investment decisions for the transmission system set out within 2020 Future Energy Scenarios (FES 2020) (Ref 1.7), the Electricity Ten Year Statement 2020 (ETYS 2020) (Ref 1.8) and Network Options Assessment 2020 / 2021 (NOA 2020 / 2021) (Ref 1.9). NGET also had regard to government

targets for offshore wind and any emerging outcomes from the Offshore Transmission Network review to ensure the options identified and selected are future proofed and able to facilitate net zero targets.

1.2.5 Other proposed projects that would reinforce the transmission system between the north of England, Midlands, and southern England were also taken into account. These include proposals to increase the operating voltage of the existing transmission line between Brinsworth (on the east side of Sheffield) and High Marnham (southeast of Retford in Nottinghamshire), referred to in the ESO's Network Options Assessment 2021/2022 (Ref 1.10) with the project code EDEU.

1.2.6 An optioneering process has been completed for the Project which identified a preferred Strategic Proposal to deliver a 400 kV electricity transmission connection between a proposed new 400 kV Chesterfield Substation (adjacent to the existing 275 kV Chesterfield Substation) and the existing Willington Substation.

1.2.7 Following the selection of the Strategic Proposal, the routeing and siting stage was undertaken, this resulted in an emerging preferred corridor as reported in the Corridor Preliminary Routeing and Siting Study (CPRSS) (Ref 1.11) being identified. The emerging preferred corridor in the CPRSS, was consulted on at non-statutory consultation and in this Scoping Report is referred to as the 'Scoping Boundary'. The Scoping Boundary has been referenced within this Scoping Report to determine the scope of the EIA to be reported in the ES. Further details of this are included within **Chapter 3: Main Alternatives Considered** and **Chapter 4: Description of the Project** of this Scoping Report.

1.3 Geographical Context

1.3.1 The Scoping Boundary represents the emerging preferred corridor selected as part of the options appraisal process, as documented in the CPRSS. A description of the options appraisal process used to define the Scoping Boundary is provided in **Chapter 3: Main Alternatives Considered** of this Scoping Report.

1.3.2 The Scoping Boundary lies entirely within the county of Derbyshire. **Figure 1.1: Location / Context** in **Volume 3** presents the location of the Scoping Boundary.

1.3.3 Typically, the Scoping Boundary is characterised by a rural setting with agricultural fields running in a southerly direction from the proposed new Chesterfield Substation between the urban areas of Derby and Nottingham, crossing the Amber and Derwent Valley. The Scoping Boundary follows a westerly alignment to the south of Derby towards the existing Willington Substation.

1.3.4 The Scoping Boundary has been selected to fully reflect the potential geographical extents of the Project and its environmental impacts and avoid, where possible, potential impacts to areas with the highest amenity value in alignment with the guidelines on overhead line routeing set out through Holford

Rules 1 and 2, as well as finding a direct path in alignment with Holford Rule 3 (Ref 1.12). A summary of the Holford Rules is provided in **Chapter 2: Legislation, Regulatory and Planning Policy Context** of this Scoping Report.

1.3.5 A description of the Project including a sectional breakdown of the Scoping Boundary is outlined in **Chapter 4: Description of the Project** of this Scoping Report.

1.4 Purpose of the Scoping Report

1.4.1 Scoping forms a key stage of the EIA process; providing a framework for identifying potential significant effects arising from the Project and distinguishing the environmental topics to be addressed within the ES. This Scoping Report sets out the proposed content, methodologies to be adopted, and the potential likely significant environmental effects that are proposed to be considered in the EIA.

1.4.2 This Scoping Report has been prepared to accompany a request for a Scoping Opinion from the Planning Inspectorate (prepared on behalf of the SoS). The Scoping Opinion would then inform the scope of the EIA for the Project. The results of the EIA would be presented in an ES to be submitted to the Planning Inspectorate as part of the DCO application.

1.4.3 The opinion of the SoS is being sought specifically on:

- The environmental topics that should be included in the EIA.
- The relevant components of the Project and the resultant likely significant effects.
- Those effects not likely to be significant that do not need to be considered further.
- The approach to setting the study areas for each topic.
- The data that has been gathered (and will be gathered).
- The assessment methods that will be used to determine likely significant effects.
- The approach to determining the environmental measures that could be incorporated into the Project to avoid, prevent, reduce or, if necessary, offset likely significant effects.

1.4.4 This Scoping Report has been prepared in accordance with the EIA Regulations, Regulation 10 also taking account of the guidance in the Advice Note Seven (Ref 1.13).

1.4.5 Regulation 10(3) of the EIA Regulations defines the information that must be provided when requesting a scoping opinion, namely:

> "(a) a plan to sufficiently identify the land.
>
> (b) a description of the proposed development including its location and technical capacity;
>
> (c) an explanation of the likely significant effects of the development on the environment.

(d) such other information or representations as the person making the request may wish to provide or make".

1.4.6 **Table 1.1** identifies where the information set out in Regulation 10(3) and the Planning Inspectorate's Advice Note Seven can be found within this Scoping Report.

Table 1.1 – Compliance with Regulation 10(3) and Planning Inspectorate's Advice Note Seven

Suggested Information to be Included within the Scoping Report	Location within the Scoping Report
The Project	
Referenced plans presented at an appropriate scale to cover clearly all known features associated with the Project.	The Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**
A description of the Project including its location and its technical capacity.	**Chapter 4: Description of the Project**
EIA Approach and Topic Areas	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option.	**Chapter 3: Main Alternatives Considered**
An explanation of the approach to addressing uncertainty which remains in relation to the elements of the Project.	**Chapter 5: EIA Approach and Methodology**
A summary table describing each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues.	Each of the technical chapters (**Chapter 6** to **Chapter 16**) include a summary table identifying the aspects and matters that are proposed to be scoped in and scoped out of the ES.
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided.	This is presented within each of the technical chapters (**Chapter 6** to **Chapter 16**).
Results of desktop and baseline studies where available and where	Information on the baseline characteristics is included in each of the technical chapters (**Chapter 6** to **Chapter 16**).

Suggested Information to be Included within the Scoping Report	Location within the Scoping Report
relevant to the decision to scope in or out aspects or matters.	
Aspects and matters to be scoped in, the report should include details or the methods to be used to assess the impacts and to the determine the significance of effect e.g., the criteria for determining sensitivity and magnitude.	Sources, impacts and receptors proposed to be 'scoped in' for the purpose of the ES are identified within each of the technical chapters (**Chapter 6** to **Chapter 16**). The proposed EIA approach and methods are described in **Chapter 5: EIA Approach and Methodology** and in each of the technical chapters (**Chapter 6** to **Chapter 16**) which describe how they will apply that methodology to their assessments or where it differs due to specific topic guidance, set out their proposed methodologies.
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects.	These are set out within each of the technical chapters (**Chapter 6** to **Chapter 16**) and **Appendix B: Initial Outline Code of Construction Practice** in **Volume 2**.
Information Sources	
Reference to any practice and best guidance to be relied upon.	This is presented within each of the technical chapters (**Chapter 6** to **Chapter 16**).
Evidence or agreements reached with consultation bodies.	Each technical chapter (**Chapter 6** to **Chapter 16**) will include a table showing the summary of engagement undertaken with stakeholders to date.

1.5 Structure of this Scoping Report

1.5.1 Scoping has been undertaken to identify issues which are likely to give rise to significant effects and therefore should be included within the scope of the ES. **Table 1.2** outlines the chapters and supporting appendices along with a summary of the content of this Scoping Report.

Table 1.2 – Structure of the EIA Scoping Report

Volume / Chapter	Content
Volume 1: Main Text	
Chapter 1: Introduction	An introduction to the Project and the purpose and structure of this Scoping Report.
Chapter 2: Legislation Regulatory and Planning Policy context	A review of the legislation and policy relevant to the Project.
Chapter 3: Main Alternatives Considered	Identifies the main alternatives considered through the optioneering process.
Chapter 4: Description of the Project	Describing the key features of the Project including permanent and associated temporary works. It describes the general characteristics of the Project, outlines areas of flexibility in relation to design parameters and how these would be addressed in the environmental assessments through the application of Limits of Deviation and the Rochdale Envelope.
Chapter 5: EIA Approach and Methodology	A description of the overall EIA method that is proposed for the Project including temporal durations and approach to mitigation. Chapter 5 also sets out any topics that are proposed to be fully scoped out of the EIA and the justification for this proposal.
Chapter 6: Landscape and Visual Chapter 7: Ecology and Biodiversity Chapter 8: Historic Environment Chapter 9: Hydrology and Land Drainage Chapter 10: Geology and Hydrogeology Chapter 11: Agriculture and Soils Chapter 12: Traffic and Transport Chapter 13: Air Quality Chapter 14: Noise and Vibration Chapter 15: Socio-economics, Recreation and Tourism Chapter 16: Health and Wellbeing	Each environmental topic scoped into the ES is presented in a separate chapter (**Chapters 6-16**). These topic chapters are structured as follows: 1. Approach to scoping 2. Regulatory and planning policy context 3. Study area 4. Baseline conditions 5. Mitigation and monitoring measures adopted as part of the Project 6. Likely significant effects 7. Proposed assessment method 8. Proposed scope of the ES

Volume / Chapter	Content
Chapter 17: Summary and proposed scope of the ES	This chapter includes a summary table depicting each of the aspects and matters that are proposed to be scoped in and out of the EIA. It also provides the outline structure of the proposed ES.
Volume 2: Appendices	Provides the technical appendices supporting Volume 1: Main Text
Volume 3: Figures	Provides the figures supporting Volume 1: Main Text

1.5.2 The Scoping Report has been prepared by competent experts as required under the EIA Regulations. Further information about the authors is presented in **Appendix 1A: Competent Experts Evidence** in **Volume 2**.

1.6 Other Assessments

1.6.1 In addition to the EIA, the preparation of the DCO application for the Project requires other standalone assessments to be carried out to meet the requirements of other policy and legislation, such as The Conservation of Habitat and Species Regulations 2017. Whilst the outcomes of these assessments may be drawn upon when carrying out the EIA (and vice versa), the scope of these other assessments will be discussed and agreed with appropriate regulatory authorities in line with their own regulatory requirements and relevant policy and legislation, rather than within this Scoping Report.

1.6.2 Where appropriate, however, the individual topic chapters in this Scoping Report outline where the findings of one of the additional assessments are to be drawn upon when carrying out the EIA, and any proposed scope of the relevant additional assessment is set out to facilitate consultation with relevant consultees in relation to this Scoping Report.

1.7 Net Gain Commitments

1.7.1 Under the Environment Act 2021 (Ref 1.14) it will be mandatory for all (terrestrial) NSIPs submitted from November 2025 to deliver biodiversity net gain (BNG). The requirement is to achieve at least 10% measurable net gain, which is to be secured for at least 30 years. The detail of BNG requirements for NSIPs will be set out within a biodiversity gain statement. The Department for Environment, Food and Rural Affairs (Defra) is developing a draft biodiversity gain statement and will publish a public consultation on its content in due course.

1.7.2 National Grid's Environmental Action Plan 2021-2026 (Ref 1.15) makes a commitment to achieving at least 10% gain in environmental value (including biodiversity) on all construction projects by 2026.

1.7.3 This commitment requires delivery of quantifiable enhancement for biodiversity from the pre-development baseline, measured using the Defra statutory biodiversity metric (Ref 1.16) with actions formalised and secured by long term management arrangements with external organisations and partners.

1.8 Stakeholder Engagement

1.8.1 This section sets out National Grid's approach to stakeholder engagement and consultation. It provides an overview of the general approach, the engagement and consultation that has taken place to date, and that is proposed in the future by NGET to support the Project.

1.8.2 Engagement and consultation with technical stakeholders and the local community is a key element of the EIA process and will inform the design and assessment of the Project.

General Approach

1.8.3 The Applicant will continue to ensure stakeholders are engaged and consulted in a useful and inclusive manner. The general approach to engagement and consultation includes:

- Engagement and consultation activities scheduled at key points of the design and assessment process.
- Proactive and effective engagement with statutory and non-statutory stakeholders, including local residents who are most likely to be impacted by the Project.
- A focus on the matters of greatest importance and relevance to stakeholders to ensure efficient use of their time.
- Use of varied and accessible engagement techniques – including a mix of online and in person channels. One-way and two-way communications will be utilised.
- Opportunities for stakeholders to share their experience and knowledge to help identify potential effects, mitigations and enhancements at an early stage of the design process.
- Addressing stakeholder queries and concerns in an efficient and effective manner.
- Feedback which will be recorded, analysed and used to inform the EIA, optioneering and design of the Project.

Summary of Engagement and Consultation Undertaken

1.8.4 A summary of engagement undertaken with respect to the Project since April 2024 is provided in **Table 1.3**.

Table 1.3 – Summary of Engagement Undertaken

Date	Engagement and Consultation Activity	Stakeholders Engaged/ Consulted
April 2024 – 14 May 2024	Initial Project briefings	Initial project briefings with various local planning authorities and a number of Statutory Environmental bodies.
14 May 2024 – 17 September 2024	Non-Statutory Consultation	Public consultation with communities and stakeholders. Feedback received from Statutory Environmental Bodies, non-statutory environmental groups, community members, parish councils and Members of Parliament.
14 May 2024 - ongoing	Statutory Environmental Bodies / Technical Stakeholders	Engagement with Statutory Environmental Bodies / Technical Stakeholders to discuss the Project including, but not limited to: • Environment Agency. • Natural England. • Historic England. • Canal and River Trust. • Coal Authority. • National Highways. • Network Rail. • National Trust. • Wildlife Trust.
14 May 2024 - ongoing	Local Authority Engagement	Engagement with Officers at Derbyshire County Council to introduce and discuss the Project.

1.8.5 The Applicant has commenced engagement with landowners regarding the surveys that have begun or are due to be undertaken to support the assessment of the Project and design optioneering. These discussions will continue through the ongoing programme of surveys.

1.8.6 The Applicant will continue to engage with other developers in the area to consider opportunities for coordination, including with the Brinsworth to High Marnham Project, which is also being developed by NGET.

Future Engagement and Consultation

1.8.7 In line with the requirements of the Planning Act 2008 (as amended), the Applicant will undertake further consultation and engagement with communities and stakeholders as the proposed Project continues to develop.

1.8.8 The programme of ongoing stakeholder engagement and consultation will be structured around key milestones in the design development and assessment process. This will provide the opportunity to update and consult stakeholders on the evolving design and decision-making process.

1.8.9 Engagement and consultation will continue throughout the stages of the Project, with the following stakeholders:

- Statutory bodies.
- Non-statutory bodies.
- Local authorities.
- Directly affected individuals and asset owners.
- Local communities.

1.8.10 It is anticipated that Statutory Consultation will be held in 2025, and the PEIR will be issued as part of this. The PEIR will enable consultees to understand the likely environmental effects of the proposed Project and help to inform their responses to the Statutory Consultation.

1.8.11 The Applicant will set up Technical Working Groups which will be themed to allow collaborative engagement across core environmental issues. The aim is to encourage attendees representing different environmental organisations to assist in reaching resolution with all parties, to inform the EIA.

1.8.12 Through the process of engagement and consultation the aim is to reach agreement, as far as possible, with stakeholders prior to the submission of the DCO. Statements of Common Ground will be developed between the Applicant and relevant stakeholders to document any remaining areas of disagreement which will be shared with the Planning Inspectorate at the point of submitting the DCO application.

1.8.13 A summary of the engagement and consultation activities undertaken, and how feedback has been taken into account will be documented in the Consultation Report which will accompany the DCO application.

1.9 References

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2. Legislation, Regulatory and Planning Policy Context

nationalgrid

Contents

2. Legislation, Regulatory and Planning Policy Context

2.1 Introduction

2.1.1 This chapter of the Scoping Report provides an overview of the relevant strategic regulatory and planning policy context that applies to the Project. This includes national, regional and local planning policy which has been considered across all environmental topic chapters in the preparation of this Environmental Impact Assessment (EIA) Scoping Report. Additional legislation and policy are applicable to some topics. Any such topic specific legislation is set out in the relevant technical chapters (**Chapter 6** to **Chapter 16**). A Planning Statement which will accompany the Development Consent Order (DCO) Application will identify and consider relevant legislation and policies and provide analysis on planning policy compliance.

2.1.2 The Applicant will consider and have regard to all relevant national, regional and local planning policy and relevant legislation in the evolution of the design of the Project, and in the assessment of the impacts of the Project in accordance with Section 104 of the Planning Act 2008 (Ref 2.1).

2.2 Key Legislation

The Planning Act 2008

2.2.1 The Planning Act 2008 provides the legislative basis for applications for a DCO. It also defines the application process under which a DCO is sought. The Planning Act 2008 sets out that the projects meeting certain defined criteria, are classified as Nationally Significant Infrastructure Projects (NSIPs). It requires that developers wishing to construct, operate and maintain NSIPs must obtain a DCO from the relevant Secretary of State (SoS) to authorise the project.

2.2.2 As the Project consists of *the "installation of an electric line above ground*" of more than 132 kilovolts (kV) and more than two kilometres (km) in length, it is classified as an NSIP under Section 14(1)(b) of the Planning Act 2008.

Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

2.2.3 The Infrastructure Planning (EIA) Regulations 2017 ('the EIA Regulations') (Ref 2.2) govern the EIA process relevant to NSIPs. Schedule 1 of the EIA Regulations lists those projects for which an EIA is required and includes, under paragraph 20, the construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km. Similarly relevant to the Project is Regulation 3, which confirms that EIA development means Schedule 2 development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location. A Schedule 2 development is described at Schedule 2 paragraph 3(b) to include projects for the transmission of electrical energy by overhead cables.

2.2.4 The Project includes installation of a 400 kV electricity transmission line over a distance of approximately 60 km, of which the majority of which is expected to wholly

or largely comprise of a new overhead line. It therefore falls under Schedule 1 and requires a statutory EIA.

2.2.5 This EIA Scoping Report provides formal notification to the SoS, under the EIA Regulations, that the Applicant proposes to provide an Environmental Statement (ES) in respect of the Project and requests a Scoping Opinion from the SoS.

2.2.6 The EIA Regulation 5 sets out the EIA process. This includes Regulation 5(2) to identify, describe and assess the direct and indirect significant effects of the Project during construction and operation on the environment. Schedule 4 of the EIA Regulations set out the information to be included in an ES.

Electricity Act 1989

2.2.7 National Grid Electricity Transmission (NGET) has duties placed upon it by the Electricity Act 1989 (Ref 2.3) ('the Electricity Act') and operates under the terms of its transmission licence. Those duties and terms of particular relevance to the Project are set out below. Where NGET develops new infrastructure, such as this Project, it is required to have regard to these following statutory duties under the Electricity Act.

2.2.8 Section 9(2) of the Electricity Act 1989 places general duties on National Grid as a licence holder:

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

2.2.9 In addition, Section 38 and Schedule 9 of the Electricity Act 1989 require National Grid, when formulating proposals for new lines and other works, to:

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

2.2.10 National Grid's Stakeholder, Community and Amenity Policy (Ref 2.4) sets out how the company would meet the Schedule 9 duty placed upon it by the aforementioned legislation.

Environment Act 2021

2.2.11 The Environment Act 2021 (Ref 2.5) provides a framework for improving environmental management across a wide spectrum of environmental issues including waste and resources, water quality, biodiversity and air quality. It aims to deliver long-term targets to improve environmental conditions and reduce pollution, which would need to be considered by the Project. The Environment Act in Section 99 and Schedule 15 includes a requirement for NSIPs to deliver biodiversity gain as part of the application and for the areas of biodiversity gain to be maintained for a specified period. DCOs must meet a biodiversity gain objective defined in a biodiversity gain statement. This requirement for NSIPs begins in November 2025. National Grid is currently working with other organisations to identify how this can best be implemented and also the securing mechanisms for maintaining habitats for the specified period.

Related Assessments

2.2.12 In addition to the EIA, the Project will also be assessed in accordance with other regulatory regimes, where they apply.

2.2.13 Information on these is included in the relevant topic chapter of this Scoping Report. The applicable regulatory regimes are set out below.

The Conservation of Habitats and Species Regulations 2017

2.2.14 The Conservation of Habitats and Species Regulations 2017 ('the Habitat Regulations') (Ref 2.6) transposed the requirements of European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ('the Habitats Directive') (Ref 2.7) into English law.

2.2.15 The Habitat Regulations apply to plans and projects that may have significant effects on the Natura 2000 ecological network (sites designated under the Habitats Directive and the Wild Birds Directive (European Council Directive 2009/147/EC (Ref 2.8)), which codified 79/409/EEC (Ref 2.9). Sites designated in England under the Habitat Regulations include Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).

2.2.16 Following changes made to the Habitat Regulations (as amended) by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 2.10), SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and now form part of the UK National Site Network (UK NSN). It is also government policy that Ramsar sites, potential SPAs, possible SACs, and sites used to compensate for adverse effects on UK NSN sites are considered in the Habitats Regulation Assessment process. This is described in paragraph 187 of the National Planning Policy Framework (NPPF) (Ref 2.11).

2.2.17 The Habitats Regulations require an Appropriate Assessment if a project is likely to have a significant effect on a European site. If that Appropriate Assessment concludes that a project will have an adverse effect on a UK NSN site, then a derogation case must be considered.

Flood Risk Assessment

2.2.18 The Flood Risk Regulations 2009 (Ref 2.12) transposes the European Council Directive 2007/60/EC on the assessment and management of flood risks (Ref 2.13) into law in England and Wales and implements its provisions. The key objective is to coordinate the assessment and management of flood risks within Europe.

2.2.19 The Flood and Water Management Act (2010) (Ref 2.14) places a series of responsibilities on flood risk management authorities with the primary aim of improving flood risk management. Development and land use planning has a key role in achieving the aims of the Flood Risk Regulations. Accordingly, paragraph 5.9.13 of the Overarching National Policy Statement for Energy (NPS EN-1) (Ref 2.15) requires a site-specific flood risk assessment (FRA) for all energy projects in Flood Zones 2 and 3 in England.

2.2.20 An FRA will therefore be submitted in support of the DCO application. The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk will be managed over the Project's lifetime. The FRA will give due regard to climate change.

Water Environment (Water Framework Directive) Regulations 2017

2.2.21 The Water Environment (Water Framework Directive) Regulations 2017 (Ref 2.16) impose duties on the SoS and the Environment Agency to carry out certain, in particular when deciding whether to grant, vary or revoke certain permits and licences which affect water quality.

2.2.22 Part 2 of the Water Environment (Water Framework Directive) Regulations 2017 requires the identification of River Basin Districts (RBD), and a number of other assessments to be carried out by the Environment Agency to characterise and classify the status of water bodies in those districts and assess the economic aspects of water use. River basin management plans must be established for each river basin district.

2.2.23 The regulations require a number of types of areas which are protected by other European Union legislation (for example, protected habitats and bird sites) to be included on registers of protected areas.

2.3 National Planning Policy

2.3.1 The Project is an NSIP which requires development consent under the Planning Act 2008. Section 104 of the Planning Act 2008 outlines the importance of National Policy Statements (NPS) to the decision-making process which applications for development consent are considered. Section 104(2) states, inter alia:

> "In deciding the application, the SoS must have regard to –
>
> a) any additional policy statement which has effect in relation to development of the description to which the application relates (a 'relevant NPS')…
>
> d) any other matters which the SoS thinks are both important and relevant to the SoS decision"

2.3.2 The Overarching National Policy Statement for Energy (NPS EN-1) and National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref 2.17) set the regulatory context within which the routeing and siting for electricity infrastructure networks is undertaken. Taken together these Statements provide the primary national policy context for decisions on applications for electricity transmission projects classified as NSIPs.

2.3.3 The 2023 revised NPSs (NPS EN-1 to NPS EN-5) were published on 22 November 2023 and came into force on 17 January 2024.

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

2.3.4 NPS EN-1 sets out the need for new nationally significant infrastructure which includes meeting energy security and carbon reduction strategies, the need for more electricity capacity to support increased supply from renewables and the need to meet future increases in electricity demand.

2.3.5 NPS EN-1 Section 4.2 sets out the Government's commitments to prioritise low carbon infrastructure. Paragraph 4.2.1 of the NPS states that "*Government has committed to fully decarbonise the power systems by 2035, subject to security of supply, to underpin its 2050 net zero ambitions*".

2.3.6 Paragraph 4.2.4 states that “the Government has therefore concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure”.

2.3.7 Paragraph 4.2.5 lists the types of infrastructure which meet the definition of nationally significant infrastructure, which includes electricity grid infrastructure in the scope of EN-5, including network reinforcement, upgrade works and associated infrastructure such as substations.

2.3.8 NPS EN-1 sets out the impacts and means of mitigation that are anticipated to arise most frequently from energy projects.

2.3.9 Each topic chapter of this Scoping Report has identified the relevant requirements of the NPS EN-1 and demonstrated how these requirements have been considered in the assessment scope.

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

2.3.10 NPS EN-5 covers electricity networks and focuses on policies and considerations that are specific to this type of energy infrastructure. It sets out how the SoS should consider NPS EN-5 and NPS EN-1 in tandem when evaluating applications relating to electricity networks infrastructure.

2.3.11 Part 2 of NPS EN-5 provides general assessment principles and technology-specific policies relating to matters including climate change adaptation, consideration of good design, biodiversity and geological conservation, landscape and visual and noise and vibration.

2.3.12 EN-5 also makes clear that the Holford Rules should be followed by developers when designing their proposals. Paragraphs 2.9.20 and 2.9.21 state that:

> *“Although it is the government’s position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty).*
>
> *In these areas, and where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, the strong starting presumption will be that the applicant should underground the relevant section of the line.”*

National Planning Policy Framework

2.3.13 The revised NPPF was most recently updated in December 2023. Paragraph 5 of the NPPF sets out that it does not contain specific policies for NSIPs and states that:

> *“Framework does not contain specific policies for NSIPs. These are determined in accordance with the decision making framework in the Planning Act 2008 (as amended) and relevant NPS for major infrastructure, as well as any other matters that are relevant (which may include the NPPF). NPSs form part of the overall framework of national planning policy and may be a material consideration in preparing plans and making decisions on planning applications”.*

2.3.14 While NPS EN-1 and NPS EN-5 remain the prime decision-making documents, where they do not provide guidance, each technical chapter of this Scoping Report will consider whether there is important and relevant policy in the NPPF that may require consideration by the decision-making authority. At this stage, it is not possible to confirm if such secondary guidance will be considered important or relevant by the SoS, and it is therefore included for completeness to allow the SoS to make such a determination.

2.4 Regional and Local Planning Policy

2.4.1 Regional and local planning policy has been considered in the development of the Scoping Report. The currently adopted regional and local planning policy documents relevant to the Project include:

- North East Derbyshire Local Plan (2014-2034), adopted 2021 (Ref 2.18).
- Bolsover District Council Local Plan, adopted in March 2020 (Ref 2.19).
- Amber Valley Borough Local Plan, adopted in April 2006 (Ref 2.20).
- Erewash Core Strategy, adopted March 2014 (Ref 2.21)
- City of Derby Local Plan – Core Strategy, adopted January 2017 (Ref 2.22).
- City of Derby Local Plan Review, 2006 (Ref 2.23).
- South Derbyshire Local Plan Part 1, adopted June 2016 (Ref 2.24) and Part 2, adopted November 2017 (Ref 2.25).
- Derbyshire and Derby Minerals Local Plan (amended 2002), adopted in 2000 (Ref 2.26).
- Derbyshire and Derby Waste Local Plan, adopted in 2005 (Ref 2.27).

2.4.2 It is noted that the following regional and local policy documents are in development and expected to be adopted within the timeframe of the Project. Although not formally adopted at this stage, the emerging policy documents would be considered by the Project.

- Amber Valley Local Plan (2022-2040), currently at Local Plan Examination (Ref 2.28).
- Derbyshire and Derby draft Local Minerals Plan (2022-2038), currently in development prior to being examined (Ref 2.29).
- Derbyshire and Derby draft Local Waste Plan (2022-2038) (Ref 2.30).

2.4.3 In addition to the local plans identified above, the developing designs would have appropriate regard to relevant neighbourhood plans.

2.5 National Grid Policy and Guidance

2.5.1 National Grid has its own policies and processes that are followed when developing projects. The policies and guidance that are applicable to this Project are as follows:

- National Grid's approach to options appraisal is set out in **Chapter 3: Main Alternatives Considered** of this Scoping Report and describes the options appraisal process that is followed when developing new gas and electricity infrastructure projects. It follows a staged approach to the assessment and sets out the considerations when making decisions as to which option should be taken forward

- National Grid's Stakeholder, Community and Amenity Policy: This document describes the ten commitments that National Grid has made to the way that electricity and gas works are carried out in the UK. This includes setting out how National Grid would meet its amenity responsibilities and how stakeholders and communities are involved on projects
- National Grid's Approach to Consenting (Ref 2.31): This document outlines National Grids approach to developing and delivering new infrastructure and applies to projects across their whole regulated electricity transmission business

2.5.2 National Grid also has an extensive range of process and guidance documents that govern how projects are designed and implemented to ensure operational safety.

Holford Rules

2.5.3 Guidelines on overhead line routeing were first formulated in 1959 by Sir William, later Lord, Holford, as advisor to the Central Electricity Generating Board. Holford developed a series of planning guidelines in relation to amenity issues, that have subsequently become known as the Holford Rules (Ref 2.32) and remain a valuable tool in selecting and assessing potential overhead line route options as part of the options appraisal process.

2.5.4 Paragraph 2.9.16 of NPS EN-5 makes clear that the Holford Rules are a "common-sense approach to overhead line route design" and "should be embodied in the applicants' proposals for new overhead lines".

2.5.5 A summary of the Holford Rules can be found in **Table 2.1**. These have been an important consideration during the development of the Scoping Boundary and whether certain sections should be considered for undergrounding. The principles of the Holford Rules are being considered during the development of the Project, which would be incorporated within the DCO application.

Table 2.1 - Summary of the Holford Rules

Rule	Description
Rule 1	Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence.
Rule 2	Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle towers, i.e., the more massive structures which are used when lines change direction.
Rule 3	Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers.
Rule 4	Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.
Rule 5	Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.

Rule	Description
Rule 6	In country, which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration or ‘wirescape’.
Rule 7	Approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.

Horlock Rules

2.5.6 National Grid devised the Horlock Rules in 2003 (Ref 2.33), and these were subsequently updated in 2006. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. In summary, like the Holford Rules, they facilitate consideration of environmental and amenity considerations within the design and siting of new substation infrastructure.

2.5.7 Horlock contains the following guidelines in relation to siting:

- The Horlock Rules predominately apply to the siting of substations and line approaches. The general principles underlying the Horlock Rules - the avoidance of areas of high amenity - apply equally to the siting of Sealing End Compounds, although the balance of impacts and constraints will often be different.
- In the development of system options consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements against the consequential environmental impacts, in order to avoid as far as possible adverse impacts.
- Siting should seek to avoid areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.
- Areas of local amenity value, important existing habitats and landscape features should be protected as far as reasonably practicable.
- Siting should take advantage of the screening provided by landform and existing features and the potential use of site layout and levels.
- Proposals should keep visual, noise and other environmental impacts to a minimum.
- Land use impacts of the proposal should be considered when planning siting.
- Early consideration should be given to the options available for pylons and ancillary equipment appropriate to individual locations.
- Space should be used effectively to limit the area required for the Project consistent with appropriate mitigation measures and to minimise the adverse impacts on existing land use and rights of way, whilst also having regard to the potential for any future extension.
- For the design of access roads, perimeter fencing, earth shaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings.

- In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.
- The inter-relationship between pylons, ancillary structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal pylons on prominent ridges should be minimised by siting pylons against a background of trees rather than open skylines.

2.5.8 Paragraph 2.9.18 of NPS EN-5 makes clear that the Horlock Rules “should be embodied in the applicant’s proposals for the infrastructure associated with new overhead lines”.

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3. Main Alternatives Considered

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Contents

3. Main Alternatives Considered

3.1 Introduction

3.1.1 Regulation 14(d) in conjunction with Schedule 4, paragraph 2 of the Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (Ref 3.1) states that an Environmental Statement (ES) should include a description of reasonable alternatives studied by the applicant and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. While there is no statutory requirement to include an assessment of alternatives in support of a request for a Scoping Opinion, the Planning Inspectorate's Advice Note Seven Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Ref 3.2) recommends that a Scoping Report includes "an outline of the reasonable alternatives considered and the reasons for selecting the preferred option".

3.1.2 The current stage of the Project design is the result of an iterative process that commenced at Project inception when the initial need to reinforce the transmission network was identified in Network Options Assessment (NOA) 2020/2021 (Ref 3.3). National Grid has been through an options appraisal process to determine the preferred option for the Project which comprises the Scoping Boundary as presented on **Figure 1.1: Location / Context** in **Volume 3**.

3.2 National Grid Approach to Options Appraisal

3.2.1 National Grid undertakes an options appraisal for their projects. There are often a number of different ways that a project can be developed, involving different locations, technologies or designs. Each project requires judgements and decisions about the most appropriate way to achieve the required outcome. The options appraisal process provides information to help inform those judgements.

3.2.2 Options appraisal is a robust and transparent process that is used to compare options and to assess the positive and negative effects they may have, across a wide range of criteria including environmental, socio-economic, technical, and cost factors. The aim is to find the most appropriate design solution that accords with relevant National Planning Policy, taking into account National Grid's statutory duties and having regard to established policy and principles (e.g. Holford Rules (Ref 3.4) and Horlock Rules (Ref 3.5). Further details can be found in National Grid's Approach to Consenting (Ref 3.6).

3.2.3 At each stage in the options appraisal process for the Project, transparent methods are used to inform the iterative decision-making and design development processes, including inputs from engineers and environmental consultants. Interim decision making takes into account feedback from prescribed bodies, as defined in the Planning Act 2008 (Ref 3.7), other stakeholders, and the local community through an extensive programme of engagement and consultation. In addition, projects are subject to continuous challenge and review to ensure the robustness of the decisions made in the light of changing environments (including technical, environmental, socio-economic and cost).

3.2.4 National Grid's Approach to Consenting outlines the development process for major infrastructure projects, from initial inception to consent and construction. The approach is divided into the following six stages, as detailed in **Plate 3.1**:

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

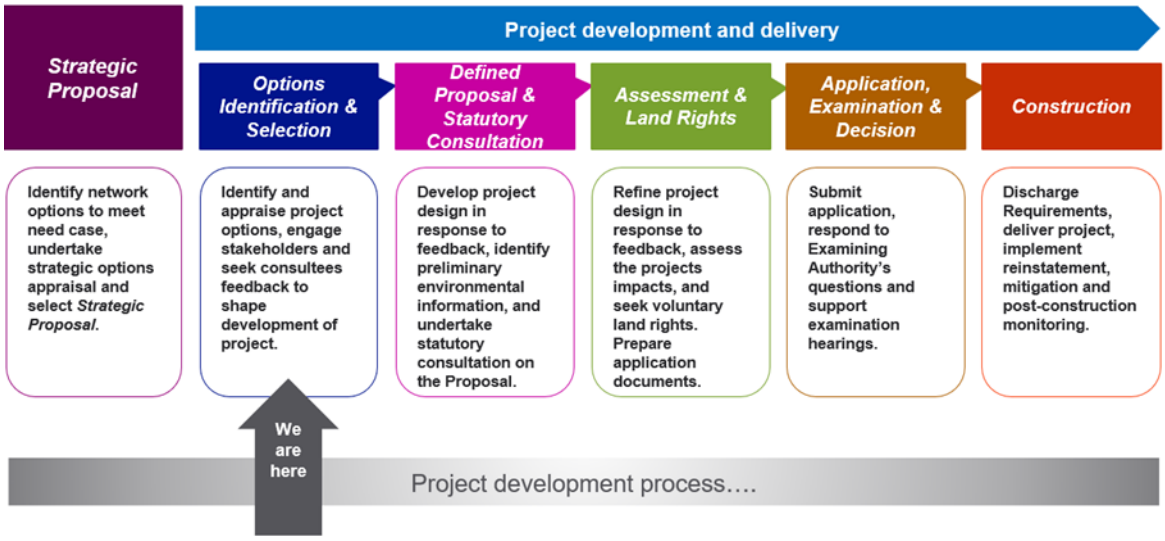

Plate 3.1 - National Grid's Consenting Process

3.2.5 Project decisions have considered National Grid's statutory obligations set out in Sections 9 and 38 of the Electricity Act 1989 (Ref 3.8), its licence requirements, and policy and principles outlined.

3.2.6 The following sections provide a summary of the alternatives that have been considered at each stage of the Project to date.

3.3 Background to the Project

3.3.1 The strategic options considered for the Project were defined and appraised having regard to the needs case that requires the provision of increased network capacity whilst ensuring compliance with National Grid's statutory duties.

3.3.2 The need to reinforce the transmission system is reviewed on an annual basis by the Electricity System Operator (ESO) in response to predicted changes, such as new renewable and low-carbon energy generation forecasted to connect to the network. This review, which sets out the parts of the network that require reinforcing, is reported within the Electricity Ten Year Statement (Ref 3.9). Proposals that provide those reinforcements are then assessed through the NOA (Ref 3.10) which is published annually.

3.3.3 More detail on the background to the Project can be found in **Chapter 1: Introduction**.

3.4 Strategic Options Considered for the Project

3.4.1 National Grid Electricity Transmission plc (NGET) undertook a Strategic Options Appraisal at the Strategic Proposal Stage (Stage 1) which identified the most appropriate strategic solution to bring forward, considering a wide range of options for providing the necessary north-south power flows. The Strategic Options Appraisal is reported in the Strategic Options Report (SOR) (Ref 3.11), which describes the future network requirements and the options appraised to meet these requirements. The consideration of strategic options was part of an iterative process in response to interaction of a range of emerging energy projects and customer requirements. This report also considered how the strategic options interacts with other proposals.

3.4.2 The Strategic Options Appraisal initially identified the need case for the works and identified a list of strategic options which could be further refined through evaluation processes. A chronological history of the projects that were evaluated is included in the Strategic Options Report. The process identified a range of different options, a combination of which satisfied the need as it was defined in the Holistic Network Design (HND). A high-level technical, environmental and socio-economic assessment was undertaken of each option, considering a 20km study area around the strategic options identified. Options were also evaluated for interactivity with other investments identified by the ESO to enable the connection of 50GW of offshore wind by 2030.

3.4.3 Subsequently, this initial long-list of strategic options was reduced by removing those that would not deliver the required outcomes, with four options taken forward for further appraisal in accordance with National Grid's Approach to Consenting. The environmental and socio-economic constraints, technology alternatives, and capital and lifetime circuit costs of the options is detailed in full within the Strategic Options Report.

3.4.4 For each strategic option, a study area was established within which the strategic option could reasonably be expected to be developed. This options appraisal had particular regard for internationally or nationally important sites and other features that are of a scale and importance to inform decision-making at a regional level. A technical appraisal was also undertaken to ensure the option would satisfy the National Electricity Transmission System (NETS) Security and Quality of Supply Standards (SQSS) and resolve the requirements set out in the need case, along with a cost evaluation of the option transmission works.

3.4.5 The Strategic Options Report concluded that the establishment of a new transmission connection (comprising primarily of overhead line) between a new Chesterfield Substation and the existing Willington Substation was the preferred option.

3.4.6 The preferred strategic option between Chesterfield and Willington represents the most advantageous of the options considered when balancing cost, technical performance, environmental and socio-economic effects and physical constraints. The progression of this preferred option is also enabled through the interaction with the Brinsworth to High Marnham project due to the improved capacity across the B8 energy boundary from the additional circuit.

3.4.7 More details on the appraisal of the strategic options can be found in the Strategic Options Report.

3.5 Options Identification and Selection

3.5.1 Having identified the preferred strategic option, National Grid undertook a Corridor and Preliminary Routeing and Siting Study (CPRSS) (Ref 3.12) to establish an emerging preferred corridor for the Project.

Approach to Routeing and Siting

3.5.2 The routeing and siting approach is a phased process which enables National Grid to make informed and proportionate decisions on the selection of corridors and possible route alignments to be further refined. This process allows for options to be appraised on a comparable basis, so that an emerging preferred corridor/option can be identified and progressed.

3.5.3 A brief summary of the steps taken to identify an emerging preferred corridor for the Project are summarised in **Plate 3.2**.

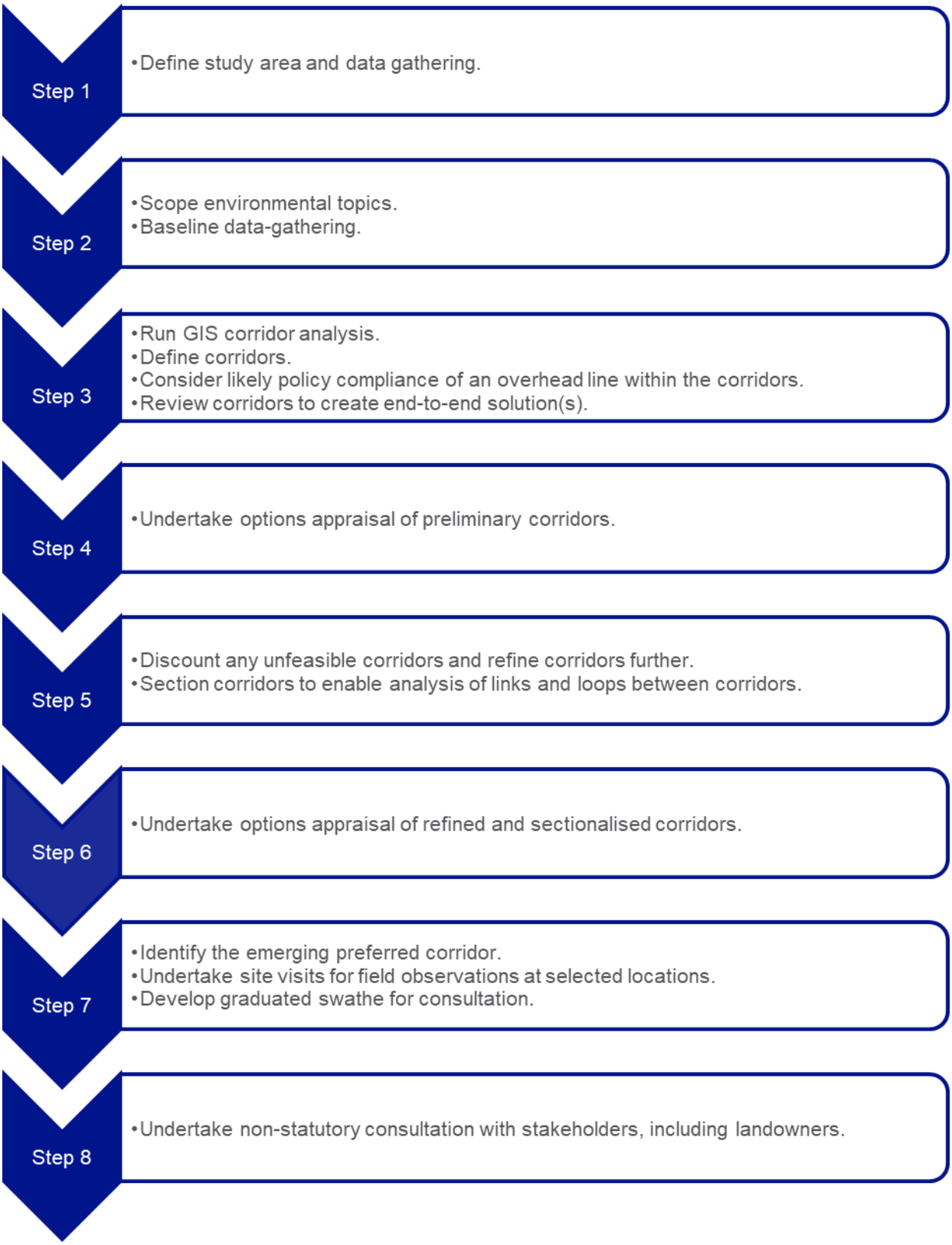

Plate 3.2 - Chesterfield to Willington CPRSS Methodology

3.6 Study Area

3.6.1 The routeing and siting study area was defined through a five-phase process which is detailed in the CPRSS and illustrated on **Figure 3.1: Routeing and Siting Study Area** in **Volume 3.**

3.6.2 The approach to developing the routeing and siting study area balanced National Grid's duty to develop an economical system of transmission (Section 9 of the Electricity Act 1989), with Holford Rule 1 which is to *"avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence"*, and Holford Rule 3; *"other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers"*, whilst also considering possible opportunities to follow existing transmission line corridors.

3.6.3 The routeing and siting study area is broadly located between Chesterfield Substation in the north, Willington Substation in the south, the Peak District National Park in the west, and the edges of Mansfield and Nottingham and smaller populated areas to the east.

3.6.4 Several National Character Areas (NCAs) are present within the Study Area, including the Potteries and Churnet Valley, White Peak, Needwood and South Derbyshire Claylands, Derbyshire Peak Fringe and Lower Derwent, Trent Valley Washlands, Melbourne Parklands, Nottinghamshire, Derbyshire and Yorkshire Coalfield, Southern Magnesian Limestone, Dark Peak and Sherwood NCAs (Ref 3.13 to Ref 3.22).

3.6.5 The Derwent Valley Mills World Heritage Site is a large linear feature approximately 24km in length that broadly extends from the northwest of the routeing and siting study area at Matlock to the central south of the routeing and siting study area at Derby. The Peak District Dales Special Area of Conservation (SAC), Gang Mine SAC and Bees Nest and Clay Pits SAC are present within the northwest of the routeing and siting study area. There are also several Sites of Special Scientific Interest (SSSIs) present within the routeing and siting study area. Some of the larger SSSIs include: Clough Woods on the north western boundary; Via Gellia Woodlands located to the south west of Matlock and bounding the Derwent Valley Mills World Heritage Site; Shining Cliff Woods and Crich Chase located on opposite sides of the Derwent Valley adjacent to the Derwent Valley Mills World Heritage Site; Kirkby Grives and Annesley Woodhouse Quarries to the south of Kirkby-in-Ashfield; Kedleston Park to the north west of Derby; Hilton Gravel Pits to the west of Willington Substation; and Donington Park to the east of Willington Substation.

3.6.6 Several large rivers run through the routeing and siting study area, including: the River Rother which extends from the north at Chesterfield to Moreton; the River Amber which extends from Ogston in the north to Castle Hill; the River Trent which intersects the southern extent of the routeing and siting study area from west to east; the River Derwent which runs from the north west boundary and through Derby to its confluence with the River Trent in the south east; and the River Erewash which runs from the north east of the routeing and siting study area at Mansfield to the south east at Nottingham.

3.6.7 The road network comprises major routes including the M1, A6, A38, A50, A52, A61, A610 and A617 which connect the large settlements of Chesterfield, Mansfield, Derby, Nottingham and Ashbourne, as well as the Peak District National Park.

Route Corridor Options

3.6.8 Eight preliminary route corridor options were identified in the CPRSS between the start and end points for the Project (Chesterfield and Willington Substations respectively) as illustrated on **Figure 3.2 Preliminary Route Corridor Options** in **Volume 3**. These eight preliminary corridors underwent an options appraisal process, taking into consideration all known environmental and socio-economic factors to minimise the risk of significant adverse impacts on the environment and communities whilst considering engineering and economic considerations. Four of the eight preliminary corridors (Preliminary Corridors 3a, 5a, 5b and 5c) were found to have a significant level of technical complexity associated with facilitating engineering solutions to overcome environmental and socio-economic constraints, and would likely have resulted in high socio-economic, cost and programme impacts. As a result, four preliminary corridors were taken forward for further refinement. An additional two corridors were identified to provide alternative routeing options within the eastern extent of the Study Area.

3.6.9 In total, six corridors were refined and then divided into sections, with links between sections for appraisal, as illustrated on **Figure 3.3 Refined Route Corridor Options** in **Volume 3**. The corridors were divided into sections so that an emerging preferred corridor could potentially be identified using a series of sections of one refined corridor via a link to a series of sections of another refined corridor. This provided the opportunity to bypass an area of greater constraint in an otherwise suitable corridor to provide the best end-to-end solution. Not all corridors form an end-to-end corridor, instead requiring linkages with other corridors.

3.6.10 The six refined corridors are described as follows:

Corridor 1

3.6.11 Corridor 1 begins in the vicinity of the existing Chesterfield Substation, immediately to the east of Chesterfield. It continues in a southerly direction broadly following the existing overhead lines out of Chesterfield Substation, before heading in a south-westerly direction towards Grassmoor, where the corridor provides optionality to either side of the settlement. From here, the refined corridor heads west around the north of Tupton, where it then continues between Darley Dale and Upper Hackney, crossing the foothills of the Peak District National Park and valleys that feed the River Amber and the River Derwent.

3.6.12 The refined corridor then continues in a southerly direction, crossing into the Peak District National Park to the west of Matlock in the vicinity of Oaker and Darley Bridge. The refined corridor emerges from the Peak District National Park in the vicinity of Aldwark and continues south through a predominantly agricultural landscape, before crossing several watercourses around the northwest of Derby and providing optionality to either side of the settlement of Lees.

3.6.13 South of Lees, the refined corridor splits into two possible sections to avoid the settlement of Etwall and nearby Toyota manufacturing park, and to provide alternative routeing options to the north or south of these features respectively into Willington Substation. The corridor also splits to provide optionality to either side of the settlements of Burnaston and Findern.

3.6.14 Corridor 1 is located furthest west within the Study Area. Key constraints for this refined corridor include: the Peak District National Park; the setting of the Derwent Valley Mills World Heritage Site; the number and proximity of residential settlements between Chesterfield and Clay Cross, and between Darley Dale and Matlock; major

road and river crossings, notably the River Derwent valley and other key tributaries of the River Trent; a number of listed buildings and scheduled monuments; five Conservation Areas (Wensley, Aldwark, Etwall, Hulland, Trent and Mersey Canal); three SSSIs (Masson Hill, Wall Lands, Hulland Moss), a Country Park (Grassmoor); and several areas of ancient woodland.

3.6.15 This refined corridor was progressed to avoid the higher density urbanised areas in the eastern extent of the Study Area. This refined corridor also provides an option that avoids direct incursion into the Derwent Valley Mills World Heritage Site, routeing to the northwest of the designation west of Matlock.

Corridor 2

3.6.16 Corridor 2 begins to the south of Tupton, using Corridor 1 to connect to Chesterfield Substation. The corridor encompasses the open land between Clay Cross and the villages of Tupton, Old Tupton, North Wingfield and Henmoor, and crosses the River Rother and two railway lines. From this point, the corridor continues south to the west of Clay Cross, crossing the River Amber to the west of the Ogston Reservoir and rising up towards the Peak District National Park foothills around Milltown and Butterley. To the east of Holloway, the corridor splits into two sections, which provide alternative routes to cross the Derwent Valley Mills World Heritage Site, while avoiding the presence of larger SSSIs. The western section of the corridor intersects the Derwent Valley Mills World Heritage Site in the vicinity of Holloway (also providing optionality to either side of the settlement) between the Lea Wood and the settlement of Whatsandwell, before continuing south. The eastern section continues southeast, crossing the River Amber again before heading west and crossing the Derwent Valley Mills World Heritage Site between Ambergate and Belper. Both Sections merge again to the northwest of Belper, which includes optionality to either side of the settlements of Belper Lane End and Cowers Lane.

3.6.17 The refined corridor then heads south, crossing the River Ecclesbourne. The corridor provides optionality to either side of the constrained area including Kedleston Hall, the Kedleston Conservation Area, Kedleston SSSI, and Kirk Langley Conservation Area. The northern side of the corridor crosses Cutler Brook, and the southern side of the corridor crosses Markeaton Brook and Mackworth Brook, as well as providing optionality around Langley Common, before both sides of the corridor join with Corridor 1 west of Derby.

3.6.18 The key constraints for this corridor include: the Derwent Valley Mills World Heritage Site and biodiversity designated sites located along the River Derwent valley near Holloway and Whatsandwell, including several areas of ancient woodland and the Cromford Canal SSSI; the number and proximity of residential settlements around Clay Cross and in the River Derwent Valley; major road and river crossings including the River Derwent, River Amber, River Rother and other smaller watercourses; a number of listed buildings; and two Conservation Areas (Wheatcroft, and Dethick, Lea and Holloway).

Corridor 3

3.6.19 Corridor 3 begins at Clay Cross, using either Corridor 2 or Corridor 5 to route north towards Chesterfield Substation. The corridor extends around the east and south of Clay Cross before providing optionality to either traverse the northern or southern edge of Stretton. The corridor then continues south, along the River Amber valley, providing optionality to route either to the west or east of Oakerthorpe, Pentrich and Lower Hartshay, crossing several brooks before reaching Ripley. To the southwest of Ripley, the corridor splits into two, providing alternative routes around the settlements

of Denby Bottles, Denby Village, Rawson Green, Kilburn, and Horsley Woodhouse, either to the west or the east of the settlements. The eastern section of the corridor through splits again to provide optionality to the west or east of Smalley.

3.6.20 The corridor then merges again in the vicinity of Horsley to the west, or Morley to the east (also providing optionality around the edges of Morley). Two sections provide alternative routes to the west to cross the Derwent Valley Mills World Heritage Site. The northern section of the corridor intersects the Derwent Valley Mills World Heritage Site to the south of Milford in the vicinity of Makeney. The southern section crosses the Derwent Valley Mills World Heritage Site south of Little Eaton. The two sections of the corridor then link to Corridor 2, west of Duffield.

3.6.21 Key constraints for this corridor include: the Derwent Valley Mills World Heritage Site; the number and proximity of settlements in the southern half of the corridor; major infrastructure and river crossings including the A38, railways, River Derwent, River Amber and Bottle Brook; historic mine entries and adits which are extensive across the width of the corridor south west of Ripley; several Listed Buildings; five Conservation Areas (Amber Mill and Toad Hole, South Wingfield, Horsley, Coxbench, Belper and Milford); and one SSSI (Morley Brick Pits).

Corridor 4

3.6.22 Corridor 4 is intended to provide a potential corridor to the east of Derby, therefore avoiding the presence of the Peak District National Park and Derwent Valley Mills World Heritage Site, which are significant constraints highlighted in Corridors 1, 2 and 3. It begins to the south of Morley, linking in this location to Corridor 3, between the settlements of Morley Smithy and Stanley Common. The corridor continues south east, crossing the Stanley Brook and Ock Brook through a predominantly agricultural landscape of gently rolling and occasionally incised landform, with frequent tree lined hedges and occasional tree belts and small woodlands, before heading south west at Borrowash. The corridor then crosses the River Derwent between Elvaston and Draycott, and an extensive area of Flood Zones 2 and 3 associated with the river.

3.6.23 To the north of Aston-on-Trent and then Swarkestone, the corridor heads west, broadly following to the south of the A50, through areas of low-lying floodplain containing large fields, with occasional shelterbelts between them. It intersects the River Trent and several of its tributaries, as well as the Trent and Mersey Canal, also providing optionality to the north or south of the settlements of Barrow upon Trent and Stenson, before approaching Willington Substation from the east.

3.6.24 The key constraints in Corridor 4 include crossing the River Derwent and River Trent and the extensive areas of Flood Zones 2 and 3 associated with these rivers, major road and railway crossings, and the recreational and heritage sensitivity of the Trent and Mersey Canal Conservation Area. There are also several listed buildings, two larger scheduled monuments between Swarkestone and Willington Substation, and an additional Conservation Area at Twyford.

Corridor 5

3.6.25 Corridor 5 is intended to provide a potential route out of Chesterfield Substation to the southeast, avoiding some of the constraints present within Corridor 1 immediately south of Chesterfield Substation. It begins to the south of Sutton Scarsdale, using a link with Corridor 1. The corridor continues south east through gently rolling agricultural land, before heading south in the vicinity of Heath onto the upper land between the valley of the River Rother and River Doe Lea, and parallel with the M1 motorway.

3.6.26 The corridor splits to provide optionality around the settlements of Lower Pilsley, Pilsley, Astwith and Hardstoft, including a potential link to Corridor 3 in the vicinity of Clay Cross, before continuing south. The land through the corridor steadily falls as it crosses the valleys formed by the Westwood Brook and Morton Brook. South of Stonebroom, the corridor splits again, providing optionality to the west and east of the settlement of Westhouses. The western section of corridor crosses Moreton Brook, and the eastern section of the corridor crosses Normanton Brook before both sections of the corridor merge again. The corridor crosses Alfreton Brook, before joining Corridor 3 to the north of Alfreton.

3.6.27 Key constraints in Corridor 5 include Alfreton Brook, Morton Brook and Westwood Brook crossings, the number and proximity of residential settlements through the middle section of the corridor, major road crossings, the presence of a Conservation Area (Heath Village), and the presence of mine adits and entries present in the northern extent of the corridor near Sutton Scarsdale.

Corridor 6

3.6.28 Corridor 6 begins to the north of Ripley, using a link with Corridor 3. The corridor continues south east through areas of mixed land-use and relatively undulating topography running parallel with and to the north of the A610 and the settlements of Codnor and Langley Mill. It crosses railway lines, the River Erewash and Beauvale Brook before reaching the M1 motorway to the east of Eastwood. The corridor then runs adjacent to the west side of the M1 motorway to Nuthall, before heading south west in the vicinity of Junction 26. The corridor continues south west, including the M1 motorway, through more open and gently undulating land, crossing the River Erewash again until it reaches the more built-up area between Stapleford and Trowell. The corridor breaks from the M1 motorway to the north of Junction 25 and splits to provide optionality around the north and south of the settlement of Stanton-by-Dale. As the corridor moves south west from Stanton-by-Dale it crosses a more incised landscape before joining Corridor 4 to the east of Ockbrook.

3.6.29 Key constraints in Corridor 6 include: historic mine entries and adits which cover extensive sections of the corridor; the number and proximity of residential settlements on both sides of the corridor; crossings of the River Erewash and Beauvale Brook, including areas of Flood Zones 2 and 3 associated with these watercourses; major road crossings including the M1 motorway; multiple railway crossings, several listed buildings; and three Conservation Areas (Codnor Park, Strelley and Sandiacre Cloud Side).

Option Selection

3.6.30 Following the options appraisal, the environmental, socio-economic and technical constraints and opportunities identified were discussed and considered alongside the likely cost performance, and the performance of the different corridor options (including links between the corridors) were carefully compared and assessed. Further details on the options appraisal can be found in the CPRSS.

3.6.31 The preferred corridors were not considered as whole end-to-end corridors for the purposes of the comparative evaluation of options. Some of the corridors have constraints which are unavoidable, such as the Peak District National Park present in Corridor 1, and the Derwent Valley Mills World Heritage Site present in Corridors 2 and 3, whilst some of the refined corridors have localised constraints which may be avoided through alternative routeing opportunities (i.e., linking sections of different refined corridors). The presence of certain localised constraints within specific

sections of some of the refined corridors also resulted in a need to perform a comparative analysis of areas within those sections, in order to determine which onward sections remained feasible options after avoiding key constraints. Therefore, a combination of sections of the different corridors, rather than a single corridor, was used to identify the emerging preferred corridor to route between the new Chesterfield Substation and Willington Substation. The sections and their key constraints were broadly appraised from north to south within the study area and considered in a logical stepwise manner at key decision points, as described below:

- Step 1: Determining the viability of western options and corridor routeing out of Chesterfield Substation.
- Step 2: Determining the corridor routeing south to Oakerthorpe.
- Step 3: Determining the corridor routeing around Ripley and other settlements.
- Step 4: Determining the corridor routeing around Denby Bottles and other settlements.
- Step 5: Determining the corridor routeing around Derby to Willington Substation.
- Step 6: Consider all evaluation components as end-to-end solutions to ensure that there were no circumstances where an accumulation of smaller constraints in a 'discarded' option might justify reconsidering decisions in identification of the components.

3.6.32 A preferred option was identified having regard to relevant National Planning Policy, National Grid's statutory duties and all relevant policies and principles. On balance, the preferred option was considered to provide the most appropriate overall solution.

- The emerging preferred corridor identified in the CPRSS ultimately consisted primarily of a new overhead line corridor that:
- Routes east from Chesterfield Substation towards Heath, around the eastern edges of Holmewood and North Wingfield, heading south to Lower Pilsley.
- Continues to Lower Pilsley, providing optionality to the north or south of Lower Pilsley, before continuing around the southern extent of Clay Cross towards Stretton.
- Turns south from Stretton, along the eastern extents of Alfreton and Ripley, to Denby Bottles.
- Provides optionality either to the west or east of a cluster of settlements including Denby Bottles, Denby Village, Kilburn, Lower Kilburn and Horsley Woodhouse, heading south towards Morley.
- Heads south east from Morley towards Ockbrook, around the northeast of Derby, heading west along the southern extent of Derby parallel to the River Trent and connects to Willington Substation from the east.

3.7 Preferred Corridor and Scoping Boundary

3.7.1 Although an emerging preferred corridor has been identified, a preferred alignment for the Project has not yet been established. To retain flexibility at this stage of the Project, a Scoping Boundary (as shown on **Figure 1.1: Location / Context** in **Volume 3**) has been defined to represent the emerging preferred corridor identified by the CPRSS. The study areas identified in the technical chapters within this Scoping Report are based on the Scoping Boundary plus relevant buffers. Feedback from the non-statutory consultation is still being considered and may result in changes to the Project.

3.7.2 The Environmental Statement (ES) will include a chapter on alternative options considered that will record any subsequent option refinements on alignment and scheme components.

3.8 New Chesterfield Substation

3.8.1 NGET's existing 275 kV Chesterfield Substation is located south-east of Chesterfield in Derbyshire. NGET is proposing to develop a new 400 kV Chesterfield Substation in the vicinity of the existing Chesterfield Substation site.

3.8.2 It is currently proposed that the new Chesterfield Substation would not form part of this Project, instead being provided by the Brinsworth to High Marnham project. However, notwithstanding the default position being that such works would not be incorporated as part of this Project, there remains the possibility that they would be incorporated on a 'fall-back' basis to guard against any risk of delay to the delivery of this Project. In view of their potential inclusion, a description of the anticipated works has been provided in **Chapter 4: Description of the Project** of this Scoping Report.

3.8.3 In the scenario where the works to deliver the new Chesterfield Substation are included as part of the Project then the ES will incorporate the necessary assessment, including an outline of the reasonable alternatives considered and the main reason for selecting the preferred substation location, in line with the EIA Regulations.

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Ref 3.13: Natural England (2024a). National Character Area 64: Potteries and Churnet Valley. Available at: Potteries and Churnet Valley - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.14: Natural England, (2024b). National Character Area 52: White Peak. Available at: White Peak - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.15: Natural England (2024c). National Character Area 68: Needwood and South Derbyshire Claylands. Available at: Needwood and South Derbyshire Claylands - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.16: Natural England (2024d). National Character Area 50: Derbyshire Peak Fringe and Lower. Available at: Derbyshire Peak Fringe and Lower - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.17: Natural England (2024e). National Character Area 69: Trent Valley Washlands. Available at: Trent Valley Washlands - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.18: Natural England (2024f). National Character Area 70: Melbourne Parklands. Available at: Melbourne Parklands - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.19: Natural England (2024g). National Character Area 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield. Available at: Nottinghamshire, Derbyshire and Yorkshire Coalfield - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.20: Natural England (2024h). National Character Area 30: Southern Magnesian Limestone. Available at: Southern Magnesian Limestone - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.21: Natural England (2024i). National Character Area 51: Dark Peak. Available at: Dark Peak - National Character Area Profiles (nationalcharacterareas.co.uk)

Ref 3.22: Natural England (2024j). National Character Area 49: Sherwood. Available at: Sherwood - National Character Area Profiles (nationalcharacterareas.co.uk)

4. Description of the Project

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Contents

4. Description of the Project

4.1 Introduction

4.1.1 The Project is a proposal by National Grid Electricity Transmission (NGET) to reinforce the transmission network in the East Midlands region. The Project will establish a new 400 kilovolt (kV) transmission connection between a proposed new 400 kV Chesterfield Substation and the existing 400 kV Willington Substation.

4.1.2 This chapter sets out the current description of the Project that is proposed to be constructed and operated subject to an order granting development consent.

Scoping Boundary

4.1.3 The precise alignment of the Project and location of specific components including temporary working areas are not known at this stage. This will be refined through the development of the Project and will take account of:

- Ongoing technical studies and design development.
- Environmental surveys and assessment.
- Feedback received through stakeholder engagement and non-statutory and statutory consultation.

4.1.4 At the time of writing this Scoping Report, the feedback from the non-statutory consultation, which ran between 14 May 2024 to 17 September 2024, was being analysed. Therefore, the Scoping Boundary, presented on **Figure 1.1: Location/ Context** in **Volume 3** which aligns with the preferred corridor presented at non-statutory consultation, has been used to determine the scope of the Environmental Statement (ES) in this Scoping Report as it represents the potential area within which the Project would be located.

4.1.5 For the purpose of Scoping, the Scoping Boundary has been split into six sections, running from north to south. A summary of the geographical sections of the Scoping Boundary is described as follows:

- Section 1 Chesterfield to Stretton: The Scoping Boundary extends in a south easterly direction from the proposed new Chesterfield Substation to avoid the more constrained and built-up areas to the south between Chesterfield and Clay Cross. The Scoping Boundary turns in a south west direction in the vicinity of Heath between the M1 motorway and the edges of several settlements including Holmewood, North Wingfield and Clay Cross, allowing for potential options to route the Project to the north or south of Lower Pilsley. The Scoping Boundary runs to the south of Clay Cross allowing for potential options to route the Project to the north or south of Stretton.
- Section 2 Stretton to Ripley: The Scoping Boundary broadly follows the Amber River Valley in a southerly direction to Ripley between South Wingfield and Alfreton. The Scoping Boundary traverses west and east of Oakerthorpe, Pentrich and Lower Hartshay to allow potential options for routeing the Project.
- Section 3 Ripley to Morley: The Scoping Boundary continues to extend south between the settlements of Belper and Ripley, allowing for potential route options for the Project around the west or east of a cluster of settlements including Denby Bottles, Denby Village, Rawson Green, Kilburn, Lower Kilburn and Horsley

Woodhouse. The western option traverses between Holbrook and Lower Kilburn, while the eastern option traverses between Horsley Woodhouse and Smalley.

- Section 4 Morley to Ockbrook: Within Section 4, the Scoping Boundary allows for potential options for the Project alignment to be sited to the west or the east of Morley before extending south between Morley Smithy and Stanley Common.
- Section 5 Ockbrook to Aston-on-Trent: The Scoping Boundary continues in a southerly direction on the eastern edge of Derby, running between Borrowash and Draycott and crossing the River Derwent. At this point, the Scoping Boundary begins to turn in a westerly direction towards the intersection between the A6 and A50 road corridors.
- Section 6 Aston-on-Trent to Willington Substation: At this point, the Scoping Boundary broadly follows the corridor containing the A50 and River Trent valley from north of Aston-on-Trent through to the existing Willington Substation, allowing for potential options for routeing the Project around the north and south of Barrow-upon-Trent and Stenson.

4.1.6 The Project is at an early stage of development and therefore the detailed design is not fully understood yet; however, the Project is likely to comprise of the following components:

- A new 400 kV overhead line route, approximately 60 km in length between a proposed new Chesterfield Substation and the existing Willington Substation. It is anticipated that this would comprise steel lattice pylons in accordance with National Grid's guidance and national planning policy.
- Replacement of short sections of existing transmission line (overhead line) and local changes to the lower voltage distribution networks to facilitate the construction of the Project.
- Works to facilitate the connection of a new overhead line into the proposed new 400 kV Chesterfield Substation and at the existing 400 kV Willington Substation.
- Potential cable sealing end compounds and installation of underground cable sections for the Project using open cut and trenchless techniques such as horizontal directional drilling.
- Potential permanent accesses to facilitate maintenance.
- Temporary works associated with the construction of the Project such as site compounds, haul roads and accesses.
- Potential utility diversions and / or modifications may also be required to facilitate the construction of the Project.

4.1.7 Further details regarding the Project features would be included within the ES and would be incorporated within the Order Limits supporting the Development Consent Order (DCO) application.

4.1.8 **Chapter 3: Main Alternatives Considered** of this Scoping Report describes the staged process that has been adopted in the development of the emerging preferred corridor and therefore Scoping Boundary.

New Chesterfield Substation

4.1.9 NGET is proposing to develop a new 400 kV Chesterfield Substation in the vicinity of the existing Chesterfield Substation site. Temporary diversions of the routes may also be required to maintain electricity supplies whilst the permanent works are undertaken. It is currently proposed that the new Chesterfield Substation would not

form part of this Project, instead being provided by the Brinsworth to High Marnham project (Ref 4.1).

4.1.10 However, notwithstanding the default position being that such works would not be incorporated as part of this Project, there remains the possibility that they would be incorporated on a 'fall-back' basis to guard against any risk of delay to the delivery of this Project. In view of their potential inclusion, a description of the anticipated works has been provided below and their potential environmental effects have been considered in this Scoping Report (where applicable) for completeness. If the works are ultimately determined to be necessary to include as part of the Project, they will be considered as part of the PEIR produced at statutory consultation and then ultimately as part of the Project's ES.

Design Principles

4.1.11 The Project will be designed, constructed, maintained, and operated in accordance with applicable health and safety legislation. The Project will comply with relevant design safety standards including the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) (Ref 4.2) which sets out the criteria and methodology for planning and operating the NETS. National Grid policies and processes, which contain details on design standards and technical specifications required to be met when designing, constructing, maintaining, and operating assets such as those proposed on the Project, will be adhered to.

4.1.12 **Chapter 2: Legislation, Regulatory and Planning Policy Context** of this Scoping Report sets out the overarching policy relevant to the Project including the Overarching National Policy Statement for Energy (NPS EN-1) (Ref 4.3) and National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref 4.4).

4.1.13 National Grid's options appraisal encourages good design to be considered as part of the design process. This includes locating project features away from sensitive receptors, where practicable, and considering measures that can be embedded into the design regarding the final features.

4.1.14 **Table 4.1** outlines the principle embedded measures that have been included to date. As the Project moves forward more embedded measures will be identified and included within the Project design. The Project will also be designed to comply with existing National Grid standards and relevant external guidance and processes, such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (Ref 4.5) for reducing effects in relation to electromagnetic fields (EMFs). These measures will mean that the designs will meet the functions required.

Table 4.1 - Embedded Measures incorporated into the Project Design

Embedded Measure	Benefits
Sensitive routeing and siting	Avoids and reduces, as far as practicable, impacts on identified receptors, in line with NPS EN-1, NPS EN-5 and Holford Rules.
Low Height or T-Pylon designs would be considered where appropriate and justified by the technical assessments	Possible benefits of using low height pylons and alternative pylon design would, in the appropriate circumstances,

Embedded Measure	Benefits
	have the ability to better integrate the transmission lines into the immediate and wider landscape setting over traditional lattice pylons.
The Project would be designed in accordance with National Grid design standards and would be compliant with the guidelines and policies relating to EMF stated in NPS EN-5, including the ICNIRP guidelines	Compliance with these guidelines and policies mean that the Project would already have designed out potential effects from EMF to a level to meet health and safety standards.
The Project would be designed to comply with design safety standards including NETS SQSS and the suite of National Grid policies and processes which contains details on design standards required to be met when designing, constructing, and operating its projects.	Existing National Grid processes are designed to identify potential safety risks during construction and operation and to design these out at each stage of Project development. A holistic network design approach based on the application of NETS SQSS as well as NETS procedures and specification will help to deliver a coordinated and reliable electricity transmission system.
Biodiversity Net Gain (BNG) would be embedded as part of the Project design evolution	Embedding BNG from early design stages will ensure improved environmental outcomes and ensure National Grid comply with statutory requirements for Nationally Significant Infrastructure Projects.

The Rochdale Envelope

4.1.15 The Planning Inspectorate's Advice Note Nine: The Rochdale Envelope (Ref 4.6) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be parameters of a project's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst-case variations to ensure that the likely significant environmental effects of the Project have been assessed. As recognised by the Planning Inspectorate's Advice Note Nine, a necessary and proportionate degree of flexibility needs to be incorporated into the design of a development so that unforeseen issues encountered after a development has been consented can be addressed.

4.1.16 Within this Scoping Report, the description of the Project reflects what is currently known owing to the limited Front End Engineering Design undertaken to date. However, as the Project evolves sufficient flexibility within the design would be allowed to provide the future design and build Main Works Contractor with sufficient scope for value engineering through innovative design and / or construction techniques. As such, the Project design presented in the ES and the accompanying

assessment, would both reflect the need for this flexibility and the requirements of Advice Note Nine to ensure that the likely significant effects of the Project are assessed. Furthermore, the design would be informed by the Environmental Impact Assessment (EIA) with the design reflecting iterative working between the designers and the environmental specialists.

Limits of Deviation

4.1.17 The proposed Order Limits, which would be presented in the ES, would include Limits of Deviation (LoD). The LoD would represent the vertical and horizontal maximum parameters for the Project's permanent features, such as the overhead lines and pylons. The LoD would allow for adjustment of the design to account for unforeseen localised issues such as previously unidentified poor ground conditions, or the identification of significant unrecorded archaeological remains.

4.1.18 The LoD would be defined within the DCO and assessed to represent a worst-case within the ES.

Approach to Energy Consumption

4.1.19 The Project aims to support the UK's transition to Net Zero emissions by 2050. As outlined in **Chapter 3: Main Alternatives Considered** of this Scoping Report, National Grid has a statutory duty to develop and maintain an efficient, coordinated, and economical electricity transmission system. Therefore, the Project would contribute to supporting the UK's Net Zero transition.

4.1.20 The Project would consume energy during manufacture and construction. The Project will consider a range of measures to reduce energy consumption during construction, such as the use of energy efficient plant and tools. The Project will aim to use a local grid connection for temporary site power, where viable. Where not viable an alternative sustainable option would be used, such as appropriately sized alternatively fuelled or hybrid generators, where practicable.

4.1.21 A Construction Traffic Management Plan (CTMP), to be developed in accordance with the Outline CTMP submitted in support of the DCO Application, will set out measures to reduce journeys, such as car sharing and using public transport where practicable.

4.1.22 Energy consumption during maintenance and operation would be limited to the energy required to operate and maintain the Project. There may also be small volumes of material assets to replace components. National Grid also has existing processes in place to monitor its energy consumption across the network. If consented, the operational energy requirements would be managed as part of the wider network operation.

4.1.23 The measures outlined above would reduce the energy consumption of the Project during both construction and operation in line with the good design principles.

4.2 Overhead Lines

Pylons and Conductors

4.2.1 Pylons are overhead line structures which carry overhead electrical conductors, insulators and fittings. The main components of an overhead line are shown in **Plate 4.1** which shows a typical steel lattice pylon.

4.2.2 Like most overhead lines owned and maintained by NGET, the Project will carry a voltage of 400 kV. The overhead line for the Project will carry two discrete electrical circuits that can be operated independently of one another, increasing the resilience of the transmission system.

4.2.3 Electrical power will be transmitted through conductors (often referred to as wires). The conductors are attached to the end of a set of insulators that hang from the pylon cross arms and electrically isolate the conductors from the pylon cross arms and the main structure. On a typical double circuit pylon, as shown in **Plate 4.1**, six pylon cross arms are stacked above each other, three on each side. Each cross arm supports a bundle of conductors, with three bundles together forming a single electrical circuit. Two circuits are therefore carried, with one on either side of the pylon (indicated by ‘Circuit 1’ and ‘Circuit 2’ in **Plate 4.1**). The top of the pylons supports a single smaller earthwire that carries data between substations and also provides shielding from lightning strikes for the conductors below. The overhead line on this Project is likely to comprise a maximum of three conductors per bundle, a total of 18 conductors per pylon together with the earthwire.

4.2.4 The conductors will be a minimum height above the ground. The height will be maintained by pylons spaced intermittently along the route.

4.2.5 National Grid Technical Guidance Note 287 (Ref 4.7) sets out minimum heights between the conductors, the ground and various other features, to ensure safe operation. The minimum clearance required between the conductors and the ground is typically between 7-8 m at the maximum sag, as shown in **Plate 4.1**. In order to maintain these sags, pylons need to be a minimum height at the point that the lowest conductor is attached to the pylon arms. This height is dependent upon a range of factors including the distance between pylons, planned operating temperature and conductor wire composition, the intervening topography and the use of the land being crossed. For example, navigable rivers, crossings of railways, road surfaces and motorways, such as the M1, may require far greater clearances (and hence greater pylon heights) to allow vehicles to pass beneath while maintaining safe separation.

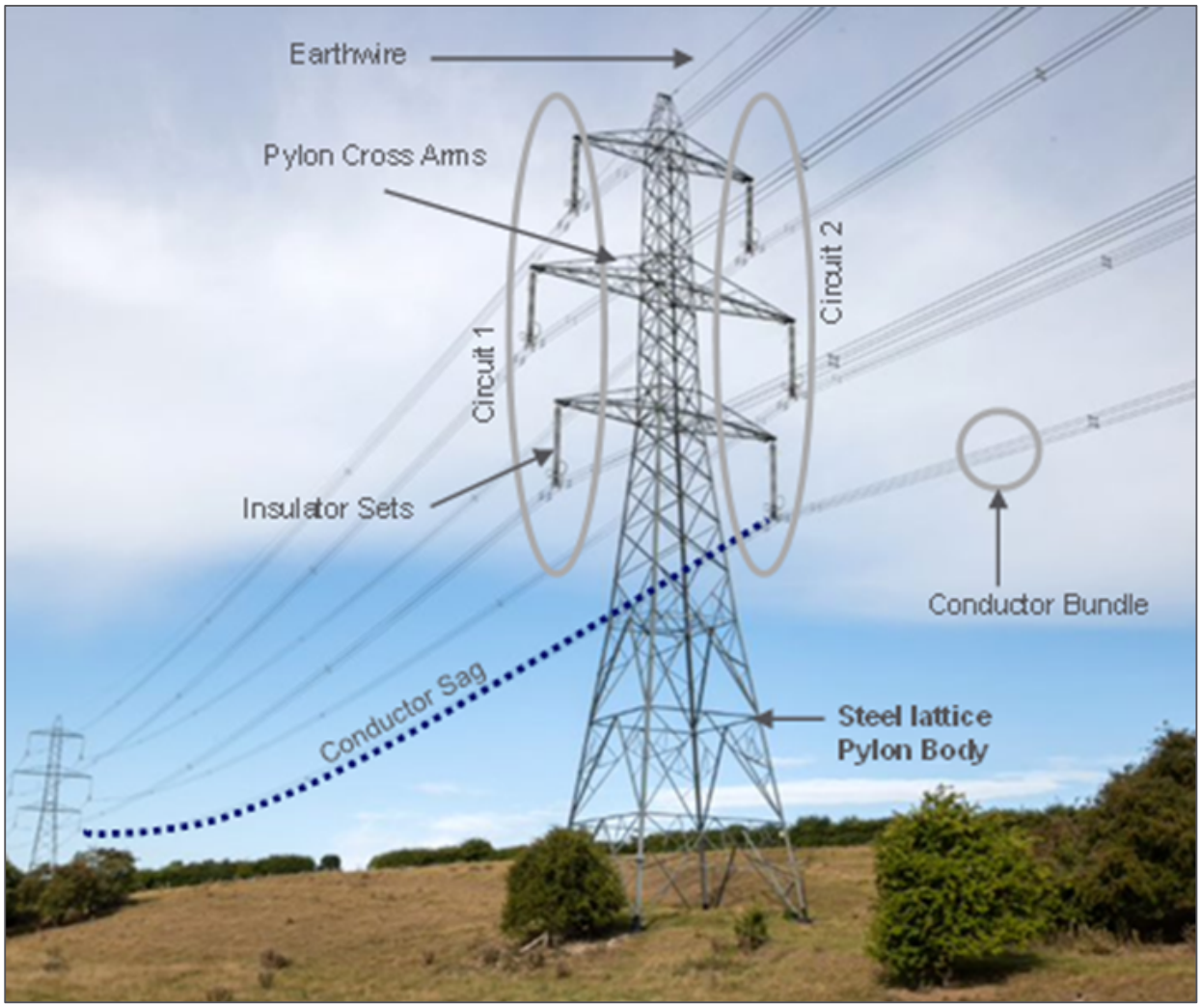

Plate 4.1 - Components of a Typical Double Circuit Transmission Connection

4.2.6 To a lesser extent, the overall pylon height will also be influenced by pylon types. The pylon illustrated in **Plate 4.1** is a suspension pylon, with the conductors hanging on insulator sets beneath the pylon arms. Where the route of the overhead line changes direction the use of such a pylon would see the conductors deviate in vertical arrangement. Where this occurs, angle (tension) pylons are required to accommodate the additional sideways strains with the insulators tensioning the conductors horizontally to keep conductors aligned. At the end of overhead lines where they connect with substations or underground cables, it is necessary to use terminal pylons, they are of greater bulk in order to ensure stability.

4.2.7 **Plate 4.2** illustrates the difference between these three main pylon types.

Plate 4.2 - Suspension Pylon (Left), Angle Pylon (middle), and Terminal Pylon (Right)

4.2.8 Typical heights for steel lattice pylons are around 50 m, however the proposed height of each pylon would depend on the specifics of each location such as topography, land use and crossings. Indicative pylon heights will be provided within the ES which will be limited by a vertical LoD to be defined through the development of the Project and the need to cross other electricity networks, watercourses and other obstacles.

4.2.9 Alternative pylon designs may also be considered, where mitigation (for example for landscape and visual effects) is required. The alternative designs which may be considered are:

- Low height steel lattice.
- T pylon.

4.2.10 Alternative pylon designs are illustrated in **Plate 4.3**.

Plate 4.3 - Alternative Pylon Types

4.2.11 A typical span distance between pylons is approximately 350 m. In broad terms there are typically three pylons for every kilometre of overhead line. Double circuit overhead lines of this voltage typically require a minimum corridor width of 70-100 m to establish a route.

4.2.12 Major construction activities tend to be focused on the base of each pylon and to either side of tension pylons from where the conductors are winched into position. The major impacts of overhead lines are generally considered to be visual, due to the height of the pylons in relation to most buildings and trees.

Pylon Type and Design

4.2.13 The vast majority of transmission lines in Britain use lattice steel pylons with three sets of cross arms (as shown in the first image of **Plate 4.2**). Alternative pylon types, such as steel monopole (similar to a modern wind turbine), have been approved for use which may achieve the technical performance required for the Project (with the potential exception of localised requirements, such as major river crossings), however at this stage of the Project the starting assumption is that steel lattice overhead lines will be used (in accordance with National Grid's guidance and national planning policy).

4.2.14 In previous projects, the visual benefits of utilising standard lattice steel pylons have been recognised, especially when siting a new overhead line close to existing lines that use the pylon type. In proximity to the Project this is the case where 132 kV or 275 kV overhead lines are present at both substations, around Lower Pilsley, and between Locko Park and Dale Abbey.

4.2.15 The current assumption is to use lattice steel pylons. The type of pylons proposed for the Project will be determined through feedback from non-statutory consultation, information from surveys and ongoing design studies and assessments.

Other Modifications

4.2.16 Associated minor temporary and permanent works will need to be carried out to facilitate the construction of the Project. Such modifications will be to the transmission system and electricity distribution networks operated by NGET and National Grid Electricity Distribution Plc (NGED).

4.2.17 The main elements of these works are described below.

Impact on Other Existing Transmission Overhead Lines

4.2.18 The 4ZV Route runs from Chesterfield to High Marnham and is currently operated at 275 kV with plans to be uprated to 400 kV.

4.2.19 A proposed new Chesterfield Substation would be constructed adjacent to the existing Chesterfield Substation; further details are provided in Section 4.3. Depending on the design of the proposed new Chesterfield Substation and the locations of the overhead line terminations, a line swap-over with 4ZV might be possible, which would result in a rationalisation of the network in the area compared to a crossing. However, if a line swap-over is not possible or not recommended, the Project might need to cross the 4ZV Route. A line swap over is illustrated schematically on **Plate 4.4**.

4.2.20 For crossing overhead lines, two main methodologies are typically implemented. The first one would be to accommodate an overhead line "duck-under", which consists of splitting up the two circuits of one of the lines by using single-circuit low-height structures with the conductors arranged in flat configuration to minimise their elevation and maintain statutory clearances to the oversailing double-circuit overhead line. Another option typically used for this type of crossing is to construct a short section of underground cables on one of the lines; this results in a more expensive solution but with operational and safety concerns substantially reduced.

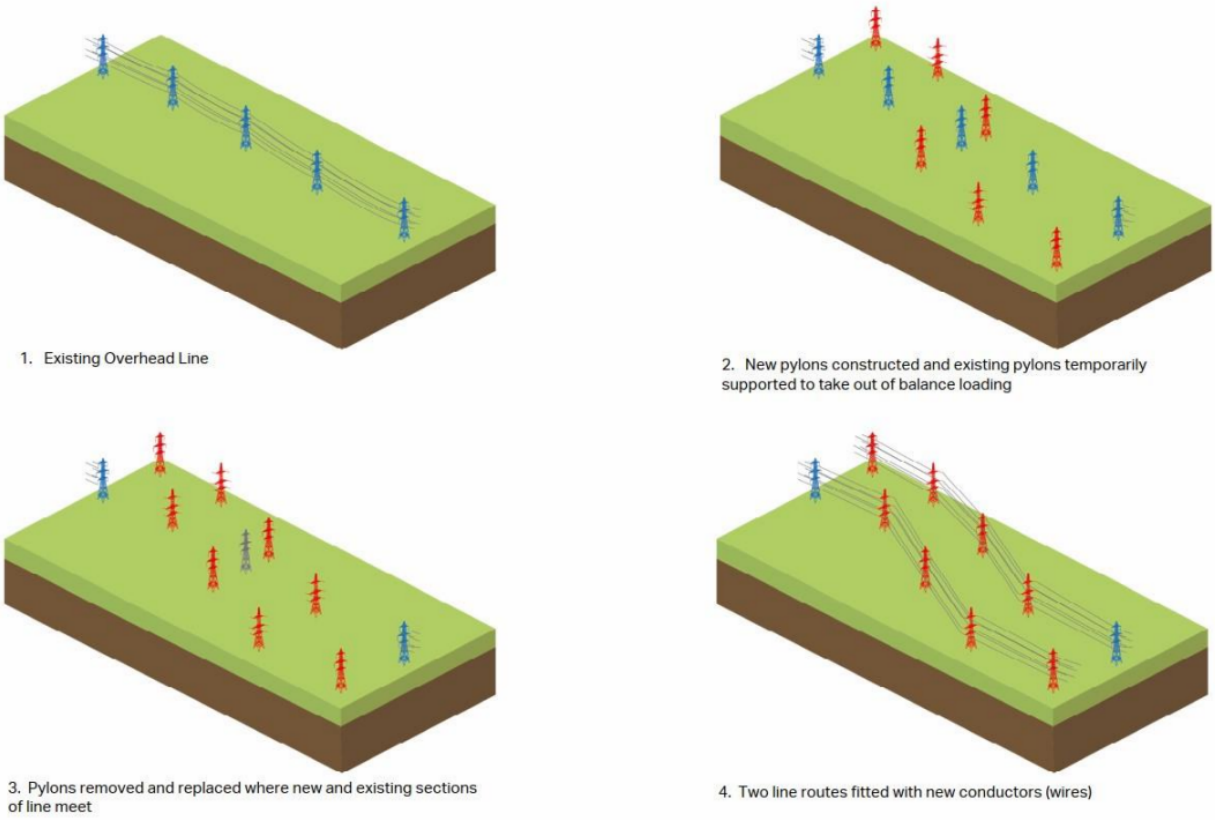

Plate 4.4 - Schematic of a Line Swap Over

Local Modifications to Other Utility Companies' Overhead Lines

4.2.21 In addition to NGET transmission lines, it will be necessary for the new overhead line to cross overhead lines of lower voltage owned and operated by the local electricity distribution network operators. The electricity distribution networks in the vicinity of the Project are operated by NGED.

4.2.22 When crossing lower voltage overhead lines, it may be cost effective, and have reduced environmental impacts, to permanently replace a length of the lower voltage line with underground cables. The Project will need to cross the routes of existing low voltage, 11 kV, 33 kV and 132 kV overhead lines in multiple locations dependent upon the route. As the Project design evolves, the mitigation measures will be developed and assessed on a case-by-case basis.

4.2.23 NGET will work with NGED to design and undertake the replacement of any affected lower voltage overhead lines with underground cables wherever this would be technically practicable and not prohibitively expensive.

4.2.24 The local modifications to existing NGED overhead lines will form part of this Project.

4.3 Substation Connections

4.3.1 Substations are an essential component in the energy network, connecting sources of generation, such as wind farms and power stations. They connect overhead and underground circuits and can connect nearby utility systems. Substations manage electricity flows within the network, which can include connection and disconnection

of circuits to direct the flow, transform voltages to higher or lower ratings (step-up or stepdown – for example 132 kV stepping up to 400 kV), manage the frequency of the electricity and increase the efficiency and reliability of the power supply.

4.3.2 Substations are critical in maintaining an efficient and healthy energy network, as they monitor and report back to operators on statistics and events to provide live information on the network. This allows for the following functions:

- Fault monitoring and identification, which allows for isolation to protect the network and allow repairs.
- Allow for redirection and disconnection of energy to allow for demand/maintenance.
- Provide data such as voltage, current and power flow to allow for efficient running and future predictions.

4.3.3 The Project would connect into a proposed new 400 kV Chesterfield Substation and the existing 400 kV Willington Substation. The intention is for the proposed new substation at Chesterfield to be consented and delivered by the Brinsworth to High Marnham project. This project would be subject to a separate consent application. However, it is considered prudent to include the proposed new Chesterfield Substation proposals within this report in the event of it later being added were it deemed necessary to do so and allow the delivery of both Projects independently.

Existing Chesterfield Substation

4.3.4 The existing Chesterfield Substation forms a connection between existing overhead lines running from Brinsworth and High Marnham. These lines currently operate at a voltage of 275 kV, however this line, built in the mid-1960s, is capable of operating at a higher voltage of 400 kV and has necessary consents to do so. Uprating the operating voltage would allow more power to flow along this route to achieve greater power transfers between the North and the Midlands using the existing overhead line. This should allow these benefits to be achieved earlier than can be achieved with the development of new overhead lines, such as this Project.

4.3.5 The ESO has considered the potential consumer benefits that uprating the existing overhead line would have here. The ESO has consequently recommended that the uprating should proceed.

4.3.6 Studies completed by the ESO and published in their Beyond 2030 Report (Ref 4.8) has identified further reinforcement (upgrading) of the Brinsworth to Chesterfield and Chesterfield to Willington overhead line circuits (cited as EDN3) in addition to the current EDEU and EDN2 projects and herein will be considered as part of further development of the respective scheme designs.

4.3.7 The Brinsworth to High Marnham project has a current delivery date of 2029. This is explained in more detail in the ESO's 'Network Options Appraisal Refresh' published in 2022 (Ref 4.9), where the separate Brinsworth to High Marnham Uprating project is referenced by the code 'EDEU'.

4.3.8 Whilst the uprating of the existing line to 400 kV operation will involve only minor works to the overhead line, it will require the four-circuits supported by the line to be disconnected from the existing 275 kV Chesterfield Substation. These circuits will instead need to be connected into a 400 kV substation.

4.3.9 As such, NGET is proposing to build and operate a new 400 kV substation which will extend to the south of the existing site off Calow Lane in Cock Alley, near Chesterfield

in Derbyshire. As described in paragraph 4.1.9 and 4.1.10, the intention is for the proposed new Chesterfield Substation to be consented and delivered by the Brinsworth to High Marnham project pursuant to a separate planning application. However, it is considered prudent to include the proposals within this Scoping Report in the event of it later being incorporated within the scope of the Project were it deemed necessary to do so and allow the delivery of both projects independently. Therefore, works to construct the new Chesterfield Substation are described below.

Existing Willington Substation

4.3.10 NGET operates an existing 400 kV substation east of Willington adjacent to the former Power Station site. An existing 132 kV substation is also operated in this location by NGED.

4.3.11 Likely bay locations for connection to the new overhead line associated with this Project are anticipated to be on the north side of the substation; however, further investigations are required to confirm this together with the scope of interactions with existing overhead lines as part of ongoing design studies. It is not envisaged that there would be any extension to the existing substation land boundary.

4.4 Undergrounding

Underground Cables

4.4.1 Whilst it is currently assumed that the majority of the Project will be developed as an overhead line, electricity can be transmitted through buried cables as well as through overhead conductors. However, at the alternating current (AC) transmission voltage of 400 kV, the use of buried cables represents a significant technical complexity. As set out in the National Grid publication '*Undergrounding high voltage electricity transmission lines: The Technical Issues*' (Ref 4.10), the size, number and complexity of the underground cables required is far greater than those that operate at lower voltages or direct current (DC) cables. As a result, direct buried transmission cables at the capacity required for the Project are materially more expensive compared to an equivalent overhead line, and this has been assessed in the Strategic Options Report (Ref 4.11). Moreover, and as noted within NPS EN-5 underground cables typically bear a significantly higher lifetime cost of repair and later uprating.

4.4.2 For these reasons, the NPS EN-5 supports, in most instances, the starting presumption for the development of overhead lines rather than underground cables.

Sealing End Compounds

4.4.3 A Sealing End Compound (SEC) is needed where a section of underground cable resurfaces to connect to an overhead line. Within these secure compounds the buried cables are brought to the surface through vertical sealing end structures. These are connected horizontally at a height of approximately 10 m with a set of solid bars (referred to as 'busbars').

4.4.4 The conductor wires from the overhead line drop down to connect onto the solid bars within the secure compound. This connection is achieved structurally via either anchor blocks or standard gantries. The pylon nearest to the SEC, where the overhead line terminates on to the underground cable, is often of a heavier-duty construction than those along the rest of the line (terminal pylon). This is because the terminal pylon is designed to support the unbalanced forces caused by only having wires on one side of the structure.

4.4.5 An alternative configuration would be to use full line tension gantries. As opposed to standard gantries, these structures located within the SEC facilitate a tensioned connection to the pylon, balancing the unbalanced forces. Full line tension gantries may result in a reduction in the size of the pylon nearest the SEC but would increase the size of infrastructure required within the compound.

4.4.6 SECs typically extend to around 50 m by 80 m for a double-circuit 400 kV transmission, but this will vary dependent upon local considerations.

4.4.7 **Plate 4.5** presents an example of a SEC.

Plate 4.5 - Example of a 400 kV Sealing End Compound

4.5 Construction

4.5.1 This section describes how the Project would be constructed including the temporary work features, such as, site compounds and haul routes. It is split into practices common to the whole Project (overhead lines and underground cables). The elements of temporary works have been provided to assist in defining the scope of the assessments and would evolve as the design of the Project progresses and further consultation including with landowners and persons with an interest in the land is undertaken.

Construction Programme

4.5.2 It is anticipated that construction would commence in 2028 and the Project would be operational in 2032.

Construction Compounds

4.5.3 Early construction activities include the preparation and installation of construction compounds. The location of the construction compounds will be determined through the development of the Project and will be presented within the ES. Typically, compounds would comprise the following elements:

- Security gate house and Closed-Circuit Television.
- Plant storage and construction vehicle parking.
- Site office parking area.
- Site offices and welfare facilities.
- Fencing.

- Lighting.
- Laydown area.
- Storage area.
- Wheel wash.
- Collection, storage and disposal of surface water, in addition to water from within the compound including grey and foul water.
- Soil bund(s).
- Waste management such as skips for storage and removal of wastes.
- Utility connections including power supplies, water and telecoms (where feasible to do so alternatively a local grid connection and/or fuelled generators will be used).
- Fuel storage.

4.5.4 Smaller satellite compounds may be required at specific working areas along the route to ensure provision of welfare, storage, and mess room facilities for site operatives.

Overhead Line Construction

4.5.5 The construction of the 400 kV overhead line would generally follow the sequence outlined below as work progresses along the Project's alignment:

- Surveys.
- Ground investigation.
- Installation of bellmouth easements and creation of visibility splays for construction access.
- Installation of stock proof fencing and gates or equivalent.
- Earthworks including, temporary drainage installation where required.
- Installation of access tracks (including culverts and bridges) and demarcated pylon working platforms.
- Installation of pylon foundations (pad and column, mini pile, driven pile or bespoke).
- Working area and layout of steelwork in preparation for erection.
- Assembly of steelwork (painting if required) and erection of pylon structures.
- Installation of temporary works (including scaffolding, traffic management) where the overhead line route intersects existing infrastructure (e.g. highway or railways) for protection to allow the continued safe operation of those assets during stringing of conductors.
- Installation of insulator assemblies and ancillary equipment for conductor stringing on suspension pylons.
- Establishment of machine sites for conductor stringing.
- Temporary earthing.
- Conductor stringing.
- Installation of insulator assemblies on tension and terminal pylons.
- Installation of tower furniture including safety notice plate and anti-climbing devices.
- Removal of construction equipment and temporary works.

- Removal of access tracks and bellmouth easements
- Removal of construction compounds.
- Reinstatement of ground and restoration of soils.

4.5.6 Activities such as surveys, ecological mitigation, archaeological investigation, ground investigation, construction of bellmouth easements and access tracks could commence without the full construction compounds in place. Nominal serviced office and welfare facilities would suffice for an initial period until the full construction compounds are established.

4.5.7 Vegetation clearance may be undertaken prior to or during any of the activities identified above, this would be in accordance with any ecological requirements identified through the EIA and secured through a DCO requirement.

4.5.8 Dependant on local conditions, access roads may be required to be established from suitable access points from the existing road network in the area.

Installation of Bellmouth Easements and Creation of Visibility Splays

4.5.9 Where new accesses or widening of existing accesses from the public highway are required, bellmouth easements would be installed. The installation of bellmouth easements may require realignment of existing underground services, surface water drainage and the creation of visibility splays to create a line of sight for the safe use of the bellmouth. Within the visibility splay, vegetation would need to be cut to a specified height or visual obstacles removed depending on local conditions, the speed rating of the road and whether traffic management was in place.

Earthworks

4.5.10 The topsoil, and subject to ground conditions, subsoil, may be required to be stripped from the access tracks, site compounds and pylon working areas.

4.5.11 The stripped soils would be stored carefully to one side; typically, topsoil would be stored in bunds. Temporary drainage would be installed as required, with necessary environmental protection measures (such as silt fences) installed where required.

Drainage

4.5.12 Temporary drainage would be required during construction, to deal with rainfall and water encountered during excavation where appropriate. The drainage design will include a variety of potential measures to address silt runoff. Construction sustainable drainage systems (SuDS) would be used if necessary and where appropriate to do so.

Installation of Access Tracks (including Culverts and Bridges) and Pylon Working Areas

4.5.13 Single way access tracks/haul roads would typically be approximately 4.5 m wide for overhead line working areas and approximately 7 m wide for underground cabling working areas. Passing places would typically extend the width to approximately 9 m, which, coupled with the area for soil storage and drainage between the track and the fence line, would give a typical swathe of around 12 m. A two-way stone access track/haul road would typically be approximately 9 m, which, coupled with the area for soil storage and drainage between the track and the fence line, would, give a typical swathe of around 20 m. Typical installation would involve stone laid on geotextile

membrane. Another methodology that may also be used comprises of interlocking trackway panels, depending on ground conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions in an effort to optimise construction techniques to reduce aggregate quantities.

4.5.14 The stone access tracks would be constructed using secondary or primary aggregates. The total amount of aggregate material that would be needed for the construction of the stone access tracks (including bellmouth easements) and pylon working areas will be determined through the development of the Project and reported in the ES. On completion of construction, the access tracks would be removed, and aggregates taken to an appropriate facility which could include recycling, or onward use, for example as secondary aggregate in the construction industry.

4.5.15 Culvert installations would be required for temporary access tracks to cross ditches and watercourses. The size and depth of a culvert is dependent upon the dimensions of the crossing, sensitivity, and importance of the watercourse. To maintain the flow of a watercourse during installation of the culvert a pump would be used on site.

4.5.16 Should culverts not be suitable for a particular crossing, due to either the sensitivity of the watercourse or engineering requirements, a temporary bridge would be installed.

4.5.17 Temporary bridges may need to accommodate a mobile crane (capacity would be subject to detailed design) and the temporary bridge abutment requirements would be assessed on a site-by-site basis. Most bridge crossings would be of a short span and flat deck construction; however, Bailey style bridges may also be used. All bridges would be clear span and the foundations would be placed clear of the main channel of the watercourse, where feasible.

4.5.18 Once the foundations are in place the temporary bridge would be fitted. Although the installation method is dependent on the type of bridge being installed, a typical bridge would be delivered in sections. Each bridge component would be assembled on site and lifted into position by crane. With the bridge in position, decking panels would be lifted and fixed into position.

4.5.19 Pylon working areas would typically be approximately 75 m x 75 m. They would either be stone laid on a geotextile, or formed of interlocking trackway panels, depending on ground conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions.

Installation of Pylon Foundation (Pad and Column, Mini or Tube Pile)

4.5.20 The foundations for the pylons would either be pad and column, piled or bespoke if required. The design and selection of foundation type would depend upon the conditions encountered during ground investigation. Foundation works typically involve breaking ground / excavation activities with temporary works including proprietary equipment for temporary access, formwork and falsework (shoring) to enable construction of the steel reinforced concrete foundations. Piling works are undertaken using specialist plant (rigs) to bore (drill) or drive (via a percussive hammer) piles into the ground to the desired embedment depth.

Assembly and Erection of Pylon Structures

4.5.21 The steelwork components would be prefabricated and delivered to each pylon working area. The steelwork components would then be bolted together on the

ground and pylon part assembled in sections beginning from ground upwards, using a mobile crane or telehandler.

4.5.22 To lift the topmost sections of the pylons, a mobile crane with a typical capacity of up to 250 tonnes may be required for the reach and weight of the sections to be landed into position. A smaller capacity crane or telehandler may be used in tandem to move and rotate pylon sections into the correct orientation for lifting by the main crane.

4.5.23 Tower furniture including safety notice plate and anti-climbing devices will be installed to ensure safety from system compliance as part of quality assurance checking of the structures once erection works are completed.

Crossing Protection

4.5.24 Temporary scaffolding (mechanical/netted) would be installed during construction where required as a safety measure to protect assets such as roads, railways, navigable watercourses and distribution network overhead lines (where not already diverted or undergrounded) which would be crossed by the proposed 400 kV overhead lines. Additionally, crossing protection may be required to protect hedgerows. This is required to protect these features during conductor stringing from the accidental dropping of conductors and any of the associated equipment. Temporary closures or traffic management of some affected assets, such as roads, may be required during these works to install the protective netting, or indeed may be used as an alternative mitigation instead of installing scaffolding. Hedgerows or vegetation in proximity of existing infrastructure such as highways or railway may require management through clearance or pruning to facilitate the installation of netting or temporary scaffold structures for stringing works.

4.5.25 The scaffolding would be transported to site using HGVs or tractor and trailer and assembled either side of the feature being protected. Alternative methods may be utilised dependant on local site conditions/restrictions, such as aerial catenary support systems, where feasible.

Installation of Insulators

4.5.26 The insulators would be fastened to the cross arms of the pylons, with running wheels hung from the end of the insulators to carry the pilot wires in preparation for installing the conductors.

Establishment of Machine Sites for Conductor Stringing

4.5.27 The conductors are usually installed from tension pylon to tension pylon, often termed a ‘section’, with machine sites required at either end of the section.

4.5.28 The machine sites for conductor stringing would normally be located within the pylon conductor pulling positions, usually sited on interlocking trackway panels laid directly onto the ground surface reducing disturbance to the underlying soils.

4.5.29 A conductor pulling position would be established at each end of the section with a winching machine (‘winch’) and empty steel reels to accept pilot wires. At the other end of the section the full conductor drums would be arranged in close proximity to the tensioning machine (‘tensioner’). These will be moved and re-sited along the route as the stringing works progresses.

Conductor Stringing

4.5.30 The conductors would be delivered to pulling positions on large cable drums and, depending on the conductor type, each completed drum could weigh up to 8 tonnes, although larger and heavier drums are possible depending on the supplier and the length of conductor. The drums containing the conductors would typically be delivered to the construction compound, or satellite compound, first, and would be distributed from there as required.

4.5.31 Light pilot wires would be laid at ground level (and across temporary scaffolding protecting assets such as roads and railway lines) along the length of the section between the pulling positions. Some vegetation management could be required. The pilot wires would be raised and fed through running wheels on the cross arms of all the pylons in the section, and then fed around the winch at the pulling position. The light pilot wires are used to pull through heavier, stronger pilot wires which are in turn used to pull conductors through from their drums. The tensioning machine would keep the wires off the ground and prevent the conductors running freely when the winch pulls the pilot wire. When the conductor is fully 'run out', it would be fastened at its finished tension and height above ground by linesmen working from elevated platforms on the pylons which are suspended beneath the cross-arms. Additional fittings, such as spacers, vibration dampers and arcing horns would also be fitted.

4.5.32 To counteract the out of balance loading on the tension pylons at the end of a conductor stringing section, it is normal to install temporary backstays. These usually consist of concrete blocks on sledges or ground anchors attached to the pylon body or cross-arms via steel wire ropes in order to restrain the structure once a section is strung with new conductors and only removed once stringing of the following section is completed. Temporary backstays might also be required at other locations such as connecting new conductor to existing conductor, temporary diversions, and temporary spans on overhead line circuits.

4.5.33 A drone/helicopter may be utilised in the construction of the overhead line, and/or transportation of equipment to the Project site.

Removal of Overhead Lines

4.5.34 There may be a need to remove, replace or divert lower voltage overhead lines. Construction activities for the removal or diversion of the overhead lines would begin with the preparation and installation of temporary access tracks to each existing pylon site. The working areas around each pylon would be cleared and, where appropriate, fenced to keep the public and any livestock away from the construction work.

4.5.35 The removal of redundant overhead lines typically involves lowering, cutting and clearing of conductors, tower removal via felling (pulling over by winch tractor) or by crane and foundation removal typically to 1 m below ground level.

4.5.36 Fittings, such as dampers and spacers, would be removed and the conductors would be winched onto drums in a reverse of the process described for the construction of pylons. The fittings would be removed from the pylons and lowered to the ground.

4.5.37 Construction methods for diversions would be similar to those described for overhead lines above.

Removal of Construction Equipment, Reinstatement of Ground and Restoration of Soils

4.5.38 Once the 400 kV overhead line is constructed, the compounds, equipment/plant, access tracks and working areas at the pylon site would be removed and the ground reinstated. Other surfaces would be reinstated, and accesses, including bellmouth easements would be restored to the condition they were in at the commencement of the works, unless agreed otherwise.

Sealing End Compounds

4.5.39 Construction would begin with the preparation and installation of the permanent access road to the SECs, which would also be used as the construction access to the rest of the site where practicable. Following this, the working areas would be stripped of soil and a stone pad would be installed for the mobile crane. The terminal pylon would be constructed in a similar way to the overhead line pylon construction noted previously, with a concrete foundation and the pylon being assembled before being lifted into position by a crane. The cable troughs would also be excavated, and the underground cables and/or ducts would be channelled through the troughs onto the SEC structures.

4.5.40 The SECs require a clean and controlled environment whilst being installed. Therefore, a weatherproof covered scaffold structure would be erected over the SECs during installation. Once constructed, the cables would be tested using a high voltage cable testing lorry.

4.5.41 Percussive piling may be required at the SEC. This would be confirmed through a programme of ground investigations which would in turn inform the foundation designs. The Scoping Report assumes that piling is required at all SEC. Further details on the need for piling and specific locations would be set out within the ES.

Underground Cables

4.5.42 Installation of underground 400 kV cables will typically be undertaken within a 120 m wide working width. The exception to this is where environmental or engineering constraints mean additional land is required such as where the cable would cross features such as roads or watercourses using a non-open cut technique. In these locations, the working width may be required to be larger to accommodate the larger construction equipment required to undertake installation works.

4.5.43 There are two standard techniques that could be adopted to install underground cables, standard open cut and trenchless. Methods adopted would be determined based on ground conditions, technical and environmental features present.

4.5.44 Jointing is required where two adjacent sections of cable meet. This requires clean and dry conditions, so enclosures would be temporarily erected at joint bay locations. Due to the precise nature of engineering works undertaken, joint bays could remain open for several weeks to allow for trench and joint bay excavation, ducting, cable pulling, jointing and reinstatement.

4.5.45 To install sections of underground cable there would be a requirement to establish temporary construction facilities, including suitable locations for cable drum storage and areas for dewatering, temporary and permanent land drainage and temporary access roads which are described above under overhead line construction. The following section provides a typical description of the works required to construct and install underground cables.

4.5.46 Where ducting is proposed as an alternative to direct lay, the ducts would need bedding in with Cement Bound Sand (CBS) and the trench backfilled. Joint bays would be excavated along the route (typically 800 m – 1000 m, dependant on detailed design) which would act as pulling locations for the cables and then the cables would be installed in the ducts by pulling from the cable drum between joint bays.

4.5.47 Underground cable installation would typically be undertaken in the following sequence:

- Survey and ground investigations.
- Site clearance.
- Installation of bellmouths and creation of visibility splays.
- Installation of stock proof fencing and gates or equivalent.
- Earthworks including temporary drainage installation where required.
- Installation of access tracks (including culverts and bridges).
- Cable trenches dug utilising excavators (or by hand in areas of known buried utilities). Excavated sub-soil will be stockpiled separately from the top soil.
- Installation of a base layer of CBS, or suitable alternative material, into the cable trench.
- Cables directly laid in trench by 'pulling' from cable drum, with the aid of rollers placed within the trench.
- Cables are bedded in with CBS.
- Protective tiles are placed along the width of the trench.
- Warning tapes will be placed above the protective tiles.
- Trench is back filled with excavated sub-soil or thermally suitable material where required (to avoid the alteration of local environmental temperatures around the cables).
- Topsoil will be reinstated to original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

4.5.48 Alternatively, cable ducting may be installed with cable pull through taking place following the backfill of the trench. This method would follow similar steps to direct laid cable installation and would include the installation of protective tiles and warning tape.

Open Cut Installation

4.5.49 Standard open cut installation typically involves the following processes:

- Vegetation would be removed where necessary and topsoil would be stripped and stored for reuse.
- A temporary haul route would be installed along the length of each cable section to provide access for construction vehicles to the working areas.
- A number of open trenches (typically six trenches each accommodating three cables) would be excavated for cabling to be installed and covered.

Trenchless Installation

4.5.50 Trenchless crossings may be necessary for example crossing rivers, roads and rail.

4.5.51 The underground cable would be installed using a drilling or boring method to pass beneath features. There are different trenchless methods that could be used, and

each method would have a different construction footprint required for the drill launching/ receiving sites or drill pits. Depending on the technique, the drill may need to undertake a number of passes to make the hole wide enough to allow the ducts (pipes) to be pulled through. The cables would be pulled through the ducts using a cable pulling rig.

Proposed New Chesterfield Substation

4.5.52 As explained in paragraph 4.1.9 and paragraph 4.1.10, whilst it is not anticipated that the works to construct the new Chesterfield Substation will be included as part of the Project (and will instead be consented as part of the separate Brinsworth to High Marnham project), information has been included below to describe the anticipated works involved and which has been considered in the subsequent technical chapters to this Scoping Report (where applicable) for completeness in the instance that it is subsequently deemed necessary to include the works in the Project.

4.5.53 For the proposed new 400 kV Chesterfield Substation, construction activity would begin with site preparation including setting up the temporary accommodation, parking and laydown area. The permanent perimeter fencing would be completed early in the construction programme to secure the construction area. The permanent access road would be installed to connect the proposed new Chesterfield Substation to the nearest main road.

4.5.54 The initial preparatory works would comprise the temporary removal of the top layer of ground and laying a temporary stone capping to provide a clean and stable working platform. Typically, the topsoil and a layer of subsoil would be excavated within the footprint and this would be replaced with clean imported granular fill to form the surface of the compound. A series of copper earth tapes would be installed below the ground to create an earth mat to distribute any electrical charge transferred to the ground by earthed equipment and infrastructure in the proposed new Chesterfield Substation.

4.5.55 The permanent foul, oily water, including below ground oil separator, and surface water drainage systems would be installed once the preparatory works are complete. In addition, shallow concrete pad foundations and steel supports would be installed for the electrical equipment. The majority of electrical equipment would be mounted on steel posts fixed to concrete foundations.

4.5.56 Reinforced concrete bunds would be installed for each super grid transformer (SGT) and would comprise a perimeter concrete wall, a base slab continuous with the wall and a central plinth for supporting the SGT. The bunds act as a secondary oil containment measure. SGTs would be transported to site as an abnormal indivisible load and installed within the bunds. Generally, concrete for the foundations and bunds would be ready-mixed, brought to site in lorries and placed using small plant such as cranes and excavators. There is potential for pre-fabrication off-site however further investigation is required.

4.5.57 Once the equipment is installed, commissioning tests would be undertaken to check that the individual items of plant and the system as a whole works as required. Following successful testing, the proposed new Chesterfield Substation would be connected to the electricity transmission system ready for operation.

4.5.58 The substation would be typically unmanned during operation, however operational requirements may require sites to be manned permanently or temporarily. Routine site visits would be required to visually inspect condition of equipment, structures, and

buildings for signs of damage or wear. The routine maintenance would be carried out in line with maintenance policies and procedures.

4.6 Operation

4.6.1 During operation the Project would transmit electricity between the proposed new Chesterfield Substation and the existing Willington Substation and onto the remainder of the national transmission system.

4.6.2 The Project would be operated remotely in the same way as National Grid operates the rest of the network.

4.7 Maintenance

Overhead Line

4.7.1 The overhead line would be subject to annual inspection from the ground by foot patrol, small van, or by air using drone/helicopter to check for visible faults or signs of wear. The inspections would also indicate if plant/tree growth or third-party developments were at risk of affecting safety clearances. Inspections would provide input as to when refurbishment was required.

4.7.2 The overhead line could support telecommunication equipment such as small mobile telephone antennae and would contain optical fibres within the earthwire. If this were to be the case, independent companies would require access for maintenance purposes using pickup trucks and vans. Access for the optical fibres will usually be at the joint box positions located just above the anticlimbing devices on certain pylons. Position and frequency of joint boxes is subject to design by the successful contractor.

4.7.3 Access for vegetation management, telecommunications and fibre optic maintenance would be along routes agreed with the landowners and may require interlocking trackway panels.

4.7.4 The overhead line would be made up of a variety of materials, including concrete and steel for the foundations, steelwork for the pylon and composite conductors such as aluminium alloy. All these materials have an expected lifespan, which would vary depending on how the overhead line was used and where it is located. Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 40 to 60 years and the insulators and fittings have a life expectancy of approximately 25 to 40 years. The lifespan of the overhead line may be longer than the anticipated 80 years, depending on its condition, the environment to which it is exposed, refurbishments and transmission network requirements.

4.7.5 Minor repairs or modifications may be required from time to time for local earthwire damage, addition of jumper weights, local conductor damage, broken insulator units, damaged or broken spacers, broken or damaged vibration dampers, damaged or broken anti climbing guards. Minor repairs would be programmed locally by a maintenance team using pickup trucks and vans to access site along routes agreed with landowners. Access may require interlocking trackway panels.

4.7.6 Refurbishment work could involve:

- The replacement of conductors and earth wires.

- The replacement of insulators and steelwork that holds the conductors and insulators in place, insulator fittings, conductor fittings, tower signage.
- Painting or replacement of the pylon steelwork.
- Replacement of telecommunication equipment (by separate companies).
- Foundation repairs/upgrades.

4.7.7 Refurbishment would usually be carried out in two stages because the overhead line has two circuits, one on each side of the pylon. This means that work can be undertaken on one side only, so that the other side can be kept 'live'. Once all the work has been completed on the first side, the circuit would be re-energised, and the opposite side switched off, so that the work could be carried out on the other side.

4.7.8 The refurbishment works would require temporary access tracks, a small compound and potentially scaffolding to protect roads and other features during the work.

4.7.9 Vans are used to carry workers in and out of site and HGVs are used to bring new materials and equipment to site and remove old equipment. Temporary works including installation of access routes and installation of scaffolding to protect roads, railways and footpaths would be required as necessary for the overhead line refurbishment (similar to the initial construction requirements).

Sealing End Compounds

4.7.10 Maintenance activities would include infrequent visits to the SECs to monitor the outdoor sealing end terminations and carry out periodic maintenance and checks on electrical equipment within the compound.

4.7.11 When the SEC require refurbishment and/or replacement works, vans would be used to carry workers in and out of the site and larger vehicles (possibly HGVs and small mobile cranes) would be used to bring new materials and equipment to site and remove old equipment. Temporary scaffolding may be required to protect any infrastructure around the compound.

Underground Cables

4.7.12 Maintenance activity along sections of cable would generally be limited to non-intrusive inspections and cable repairs. The latter would only be required in the unlikely event of a cable fault. Where a fault does occur the location of the fault would be identified, and the faulty section of cable replaced. The activities involved in cable repair would be similar to those outlined above for construction albeit over a much smaller area and scale.

4.8 Decommissioning

4.8.1 NPS EN-1 paragraph 4.3.5 states that the ES should cover the decommissioning of a project, however decommissioning of electricity networks is not specifically covered in NPS EN-5 which recognises that generally, nationally significant electricity networks are likely to have an ongoing function, but will be subject to maintenance, reinforcement works and for assets to be replaced when they come to the end of their lifespan. There are currently no specific plans to decommission the Project. It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. To date, relatively few transmission projects have been decommissioned since the main expansion of such infrastructure in the 1950s and 1960s.

4.8.2 As set out in NPS EN-5 paragraph 2.1.4, it is states that nationally significant electricity networks are likely to have an ongoing function, that will be subject to maintenance and reinforcement works. The design life of the Project is at least 80 years but with regular maintenance it is possible to extend further. At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. At the point where the Project requires decommissioning, National Grid would consider and implement an appropriate decommissioning strategy taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements. As such, decommissioning is excluded from the environmental assessment. Instead, the ES would include a high-level description of likely methods for decommissioning and summarise potential effects from decommissioning for each environmental topic within an appendix to the description of the Project chapter within the ES.

4.9 References

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5. EIA Approach and Methodology

nationalgrid

Contents

5 Environmental Impact Assessment Approach and Methodology

5.1 Introduction

5.1.1 Environmental Impact Assessment (EIA) is a process of compiling, evaluating and presenting information about the likely significant environmental effects, both adverse and beneficial, that could occur as a result of a project. EIA is designed to help protect the environment by providing decision makers and statutory consultees with the environmental information they require during their determination of an application for consent. The early detection of likely significant adverse environmental effects enables appropriate mitigation (i.e. measures to avoid, reduce or offset those effects) to be identified and incorporated into the design of a project, or commitments to be made, for example to environmentally sensitive construction methods and practices. The approach is iterative and involves close working between the applicant, the EIA team and the designers.

5.1.2 Three main EIA documents are produced as part the Development Consent Order (DCO) pre-application process:

- **EIA Scoping Report**: The Scoping Report sets out a framework for identifying potential significant effects arising from the Project to distinguish the environmental topics to be addressed within the ES and environmental topics that can be scoped out where significant effects are not likely. This Scoping Report sets out the proposed content, methodologies to be adopted and the potential likely significant environmental effects that are proposed to be considered in the EIA. The Scoping Report is issued by the Planning Inspectorate to consultees for comment on the scope and methodology proposed and for informing the scoping opinion.
- **Preliminary Environmental Information Report (PEIR)**: The PEIR sets out the information that 'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development' (Ref 5.1). The PEIR is used by consultees to inform their consultation responses during the Statutory Consultation, and it is typically issued at the same time the Statutory Consultation launches.
- **Environmental Statement (ES)**: The ES presents the results of the EIA undertaken for the project. It identifies the likely significant effects that would result if the project was implemented, and any proposed mitigation to reduce those significant effects. The ES is submitted as part of the application for development consent and is taken into account during the decision-making process.

5.2 General Approach

5.2.1 This chapter describes the methodology which will be used to assess the potential effects on the natural, human and built environment as a result of the Project. In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) (Ref 5.2), the assessments undertaken will evaluate and identify the likely significant environmental effects arising from the

proposed construction and operational phases of the Project. This information will be presented in an ES.

5.2.2 Each topic chapter within this Scoping Report includes a description of the methodology that is proposed for determining significant effects relevant to that topic. The Scoping Report is, and ultimately the ES would also be, supported by industry guidance, professional judgement and discussion from the technical specialist authors to justify the final judgements on significance.

5.2.3 In general, the assessment within the ES would follow a receptor-based assessment approach. Receptors are those aspects of the environment which are sensitive to temporary or permanent change as a result of sources such as dust, noise, and construction activities. When deciding on which receptors to include within the Scoping Report, consideration has been given to Regulation 5(2) and Schedule 4, paragraph 4 of the EIA Regulations (Ref 5.2), and the Planning Inspectorate Advice Note Seven: EIA: Process, Preliminary Environmental Information and Environmental Statements (Ref 5.1). The EIA will identify environmental effects and, if any, propose project specific mitigation measures to avoid, reduce or offset adverse environmental effects or maximise environmental benefits. The EIA will also identify any monitoring requirements resulting from the assessment outcomes.

5.2.4 The EIA process involves the main steps on **Plate 5.1.**

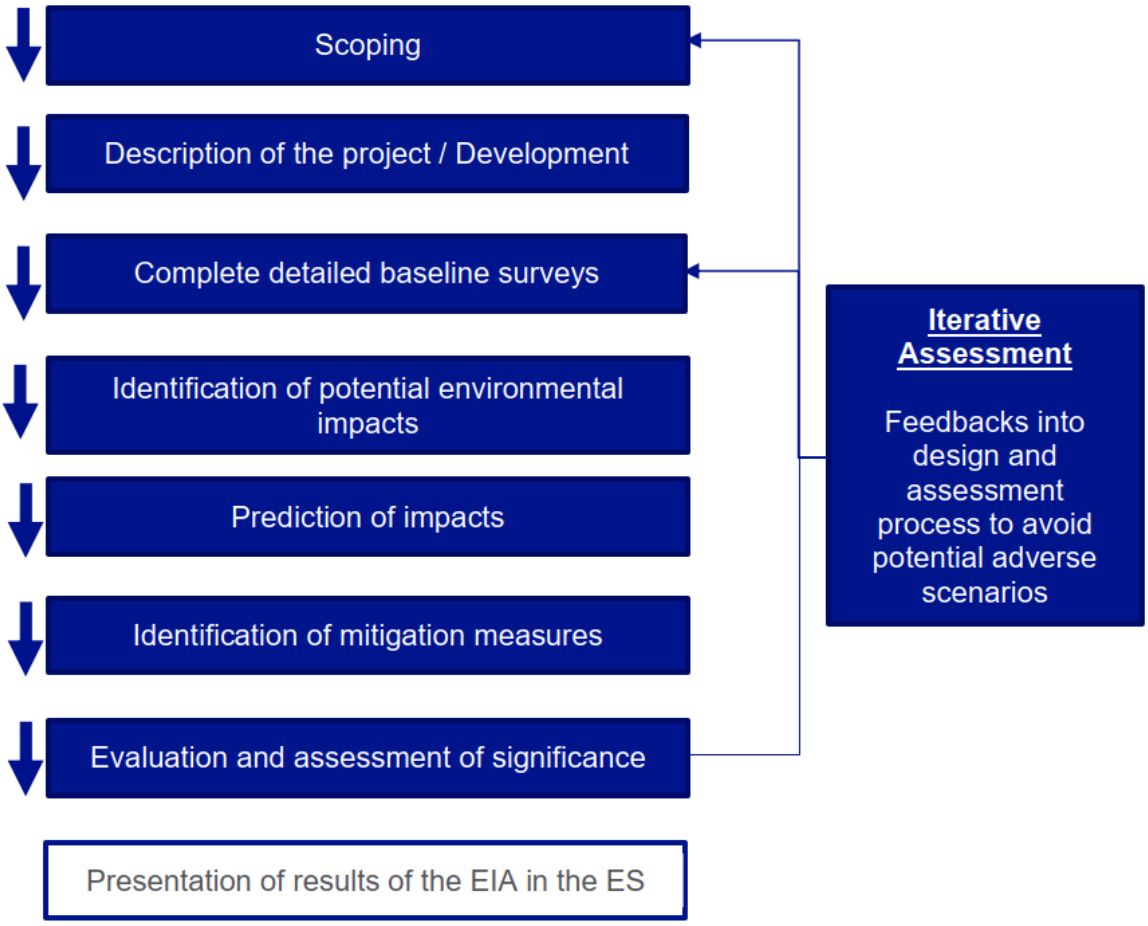

Plate 5.1 – The EIA Process

5.3 The ‘Rochdale Envelope’ Approach

5.3.1 Major infrastructure projects such as linear infrastructure projects for overhead lines, above ground installations and underground cables, typically need some flexibility to be maintained for detailed design and construction, if conditions are found that would otherwise prevent or delay construction. Examples can include previously unknown archaeological assets at the location of proposed pylons. To mitigate such issues a flexible approach to design parameters is used within the EIA process. This is typically referred to as the ‘Rochdale Envelope’ and it allows for a realistic worst-case scenario assessment to be undertaken.

5.3.2 By developing a realistic worst-case scenario in response to critical technical and engineering parameters, as well as the emerging findings of the EIA and feedback from stakeholders, it is possible to strike a balance between the level of design information needed for the purpose of EIA and the application for consent, while still retaining the level of design flexibility needed as the Project moves into detailed design and construction.

5.3.3 The EIA process will aid and inform the design process and support the identification of a design freeze that is flexible enough to accommodate change in future stages but not so flexible that it could over-state or unnecessarily amplify the potential environmental impacts of the Project. The ES will describe the minimum and maximum parameters informing the environmental assessment.

5.4 Approach to Scoping

5.4.1 Scoping sets the proposed scope for the EIA process and, when followed appropriately, it provides a clear framework for reporting the outcomes of the EIA in the ES. A robust scope, focussed on the potential for likely significant environmental effects, is required in order to ensure the EIA is proportionate. The process of scoping helps to ensure that the relevant topics are captured, and that the proposed methods for gathering baseline information and the methods of assessment are appropriate and have considered the views of decision makers and consultees.

5.4.2 The EIA scoping process establishes which aspects of the environment are potentially likely to be significantly impacted by a project and involves identifying:

- The people and environmental resources (collectively known as “receptors”) that could be significantly impacted by the Project.
- The work required to take forward the assessment of these potential likely significant effects.

5.4.3 The approach taken in preparation of this Scoping Report has also been informed by the Planning Inspectorate’s Advice Note Seven (Ref 5.1) and reflects that the EIA Regulations (Ref 5.2) require an ES to focus on aspects of the environment likely to be subject to significant effects. In line with guidance and legislation, this Scoping Report seeks to, where appropriate, scope out aspects/matters from further assessment with suitable justification provided. This will streamline the assessment to focus on key likely significant effects and ensure the EIA for the Project is proportionate in accordance with the Institute of Environmental Management and Assessment (IEMA) Delivering Proportionate EIA guidance document (Ref 5.3).

5.4.4 The approach taken to identifying the proposed scope of the EIA has used a staged approach that considers the likelihood of significant effects using a source, pathway, receptor-based approach. This is to ensure transparency and provide a clear justification as to why particular receptors and aspect/matters are either proposed to be

scoped in or scoped out of the EIA, with the aim of ensuring that the ES is proportionate. The approach taken to the identification of the proposed scope is presented in **Plate 5.2.**

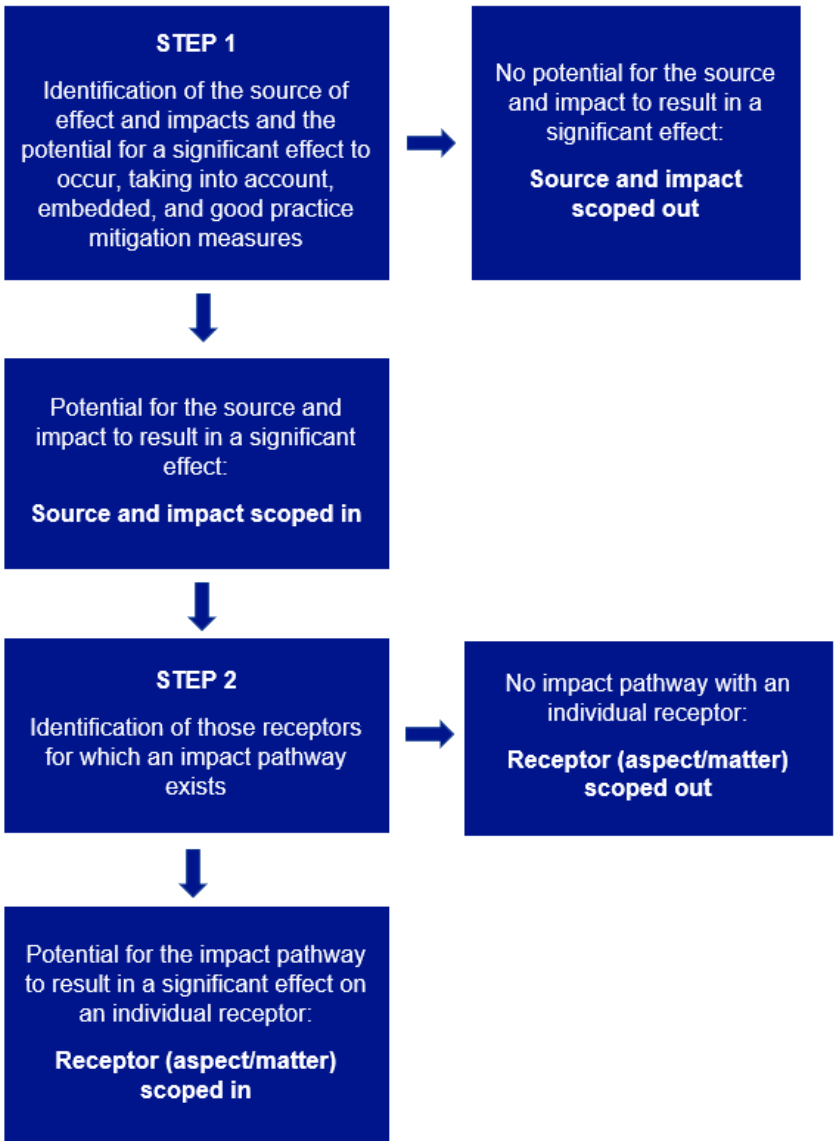

Plate 5.2 – Approach to the Identification of the Proposed Scope of Assessment

5.5 Technical Scope

5.5.1 The technical scope of assessment for each environmental topic is detailed in Technical Chapters 6-16 and this includes proposals for scoping matters in or out of the EIA. The technical scope also details the approach to baseline data collection and assessment methodologies.

5.6 Spatial Scope

5.6.1 The spatial scope for each environmental topic, the area over which environmental effects are predicted to occur as a consequence of the Project, will depend on the nature of the potential effects and the location of receptors that could be impacted. It takes account of:

- The physical area of the Project.
- The nature of the baseline environment.

- The manner and extent to which environmental effects may occur.

5.6.2 The proposed Order Limits would encompass the land required permanently and temporarily to build and operate the Project.

5.6.3 The proposed Order Limits would include Limits of Deviation (LoD), covering the maximum parameters within which the proposed infrastructure for the Project would be installed. LoD are a common feature of linear infrastructure projects. They provide the necessary flexibility when constructing the authorised development, reducing the risk that the project as approved cannot later be implemented for unforeseen engineering or environmental reasons. For example, previously unidentified poor ground conditions may require a pylon to be moved for geotechnical reasons, such as ground stability. The limits of deviation set specific parameters to moving infrastructure on the ground, as well as controlling changes to the vertical height of the infrastructure.

5.6.4 The study areas to be presented in the ES are based on the distance over which an environmental effect is likely to occur. Study areas are defined in each of the topic chapters and vary between topics. These are based on topic specific industry guidance and professional judgement. Each technical chapter describes the study area to be considered, providing a clear explanation as to why the study area has been adopted. The spatial scope of each assessment may be refined for both the PEIR and the ES in response to comments from consultees or further assessment work.

5.7 Temporal Scope

5.7.1 Subject to gaining development consent, construction works would be expected to start in 2028 and be completed by 2032.

5.7.2 The EIA will predict the changes (effects) to the current and future baseline during the construction and operation phases of the Project. The general approach is summarised below and any variations from this are discussed in the relevant technical chapters:

- Baseline year: the baseline is the reference level of the environmental conditions without implementation of the Project, against which the potential effects of the project are assessed. The baseline year is 2025, when the majority of baseline surveys are to take place. For certain topics the baseline environment is expected to change over time, and for these topics this change has been predicted to enable robust identification of the effects of the project against a future baseline.
- Construction Phase: these are effects that are likely to occur during the construction phase of the Project. This will include effects resulting from the activities associated with installation of the overhead line, any underground cables, cable sealing end compounds, construction of the proposed new Chesterfield Substation (where such works are brought into the Project scope as described in paragraph 4.1.9 and paragraph 4.1.10 in **Chapter 4: Description of the Project**) and works to facilitate the connection of the overhead line into the substations at Chesterfield and Willington. It also includes effects associated with the temporary works such as construction access, haul roads, construction compound areas and work activities.
- Operation Phase: these are effects that will potentially occur as a result of the presence, operation and maintenance of the Project.

5.7.3 As set out in Electricity Networks National Policy Statement (NPS EN-5) paragraph 2.1.4, it is states that nationally significant electricity networks are likely to have an ongoing function, that will be subject to maintenance and reinforcement works. The

design life of the Project is at least 80 years, but with regular maintenance is likely to extend further. At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. At the point where the Project requires decommissioning, National Grid would consider and implement an appropriate decommissioning strategy taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements at that point in time. The environmental effects associated with decommissioning are likely to be similar to those associated with construction, subject to any changes to the baseline environment in the intervening period.

5.7.4 Given the above, it is not possible to assess the probable future effects at the present time. National Grid therefore proposes to scope decommissioning out of the environmental assessment. Instead, the ES would include a high-level summary of potential effects from decommissioning for each environmental topic within an appendix to the description of the Project chapter within the ES.

5.7.5 The environmental assessment uses defined temporal scales to characterise the duration of potential effects. For the purposes of assessment, the following definitions are applied unless otherwise defined in the specific topic chapter:

- Short term: This is assumed to be up to 2033 which covers construction plus one-year reinstatement.
- Medium term: This is assumed to be 2034 to 2049 which is based on year 2-15 years post construction.
- Long term: This is assumed to be 2050 onwards and is used to describe effects with a duration that extends longer than 15 years post construction.

5.7.6 The temporal nature of effects could be different to the phase in which the effects occur. For example, effects as a result of vegetation clearance during construction may be felt for a number of years after construction has been completed, before any replanted habitats have matured. For the purposes of the EIA, the effects are described under the phase within which the impact arises (i.e. in the above example, vegetation loss assessed for the construction phase).

5.7.7 The future baseline is the theoretical situation that would exist in the absence of the Project. This is based upon extrapolating the current baseline using technical knowledge of likely changes to predict this (e.g. predictable changes such as climate change, changes that can be predicted based on reasonable assumptions and modelling calculations, information about other relevant developments etc.).

5.7.8 Each technical chapter of the ES will define the baseline (current or future or both) against which the environmental effects of the Project will be assessed. The baseline conditions to be assessed for each environmental topic are outlined in technical chapters of this Scoping Report. Where relevant, topic chapters provide further information on the time elements within the Project programme that will be considered for their assessment.

5.8 Mitigation Measures Adopted as part of the Project

5.8.1 A number of measures would be adopted through the Project to avoid and reduce the likely significant effects that would be experienced during the construction and operational (including maintenance) phases of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures, and that may be required to avoid or reduce the potential for significant adverse effects of the Project.

5.8.2 **Embedded mitigation measures** are those that are intrinsic to and built into the design. Embedded measures may include, for example, working within the existing topography to reduce pylon intrusion, and reducing habitat loss by minimising land take. They can also include the avoidance of designated sites through sensitive routeing, siting and design. Initial embedded measures are described within **Chapter 3: Main Alternatives Considered** and **Chapter 4: Description of the Project**. The embedded mitigation measures which form an intrinsic part of the Project design would be described within the ES.

5.8.3 **Good practice mitigation measures** comprise management activities, control measures and techniques, that would be implemented during construction of the Project to limit impacts. They include adherence to good site practices and achieving legal compliance. These measures may include, for example, applying construction site dust suppression techniques within working areas, which the Main Works Contractor would be required to implement as part of their working practices under the terms of their contract. Control and management measures to address construction-related impacts are described in each of the technical chapters and are detailed in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**. As the Project evolves these will be added to as appropriate and will be supplemented by other control and management documents such as the Construction Traffic Management Plan (CTMP). Outline versions of these documents will form part of the DCO application.

5.8.4 In addition, licenses applied for through separate consenting regimes may also be required. For example, ecological licences and assents granted by Natural England and various permits relating to water and waste granted by the Environment Agency. On the presumption that the regulatory authorities would not permit the works unless the potential impacts have been appropriately managed, it is assumed that these licensable activities are considered measures adopted as part of the Project.

5.8.5 **Additional mitigation measures** comprise measures over and above any embedded and good practice mitigation measures, for which the EIA has identified a requirement to further reduce significant environmental effects, such as landscape planting.

5.8.6 All mitigation measures will be described within the ES and secured through the DCO or through other statutory agreements.

5.8.7 Environmental compensation is considered where mitigation at an impacted location is not possible to avoid or reduce a significant effect. Where identified, compensation measures forming part of the Project would be described within the ES.

5.8.8 Embedded, good practice and additional mitigation measures are assumed to be in place or at least achievable prior to undertaking the scoping of likely significant effects, in accordance with guidance from the IEMA Guide to Shaping Quality Development[1].

5.9 Assessment of Effects and Determination of Significance

5.9.1 Regulation 5(2) of the EIA Regulations states that “the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors: (a) population and human health, (b) biodiversity…, (c) land, soil, water, air and climate, (d) material

[1] Institute of Environmental Management and Assessment (2015). Environmental Impact Assessment Guide to Shaping Quality Development. [Online]. Available at:

https://www.iaia.org/pdf/wab/IEMA%20Guidance%20Documents%20EIA%20Guide%20to%20Shaping%20Quality%20Development%20V6.pdf [Accessed: 30.04.24].

assets, cultural heritage and the landscape; e) the interaction between the factors referred to in sub-paragraphs (a) to (d)".

5.9.2 Schedule 4, paragraph 5 of the EIA Regulations requires a description of the likely significant effects of the development on the environment. The assessment of the significance of effects for the majority of topics will be based on the steps set out in the following paragraphs.

5.10 Identification of Potential Effects

5.10.1 The likely significant effects (beneficial and adverse) of the Project will be predicted and evaluated using appropriate evaluative techniques, many of which follow specific best practice guidelines for a particular topic. Potential effects will be identified first, usually in summary, as an indication of what effects could theoretically occur in the absence of mitigation (other than mitigation inherent in the design of the Project).

5.11 Assessing Effects and Determining Residual Significance

5.11.1 Schedule 4 paragraph 5 of the EIA Regulations requires a description of the likely significant effects of the development on the environment.

5.11.2 Residual effects are those that are predicted to remain after the proposed mitigation measures have been implemented. These will be described at the end of each topic chapter within the ES. The significance of the residual effects will be determined by reference to criteria for each assessment topic. Specific significance criteria for each technical discipline will give due regard to the following:

- Scale of the impact.
- Impact duration, and whether effects are temporary, revisable, or permanent.
- Nature of effect (whether direct or indirect, reversible or irreversible, beneficial or adverse).
- Where the effect occurs in isolation, is cumulative, or will interact with other effects.
- Performance against any relevant environmental quality standards.
- Sensitivity of the receptor.
- Compatibility with environmental policies.

5.11.3 Each technical chapter of this Scoping Report includes a description of the proposed approach to determining the significance of effects, including how professional judgement may be applied. The technical chapters use the terminology for magnitude, sensitivity and significance described in the following sections unless there is a need to deviate due to specific topic guidance. Where there is a requirement to deviate this justification is provided within the technical topic chapter.

Magnitude of Impact

5.11.4 The Magnitude of impact is the scale of the change caused to the baseline conditions considering both the degree of change from the baseline conditions and the duration and/or reversibility of the effect. The assessment of magnitude takes into consideration all mitigation whether embedded, good practice or additional mitigation measures.

5.11.5 General criteria for defining the magnitude of an impact, or change, are set out in **Table 5.1**. Key factors for assessing the magnitude of impact include:

- Scale of change – the scale of change refers to the degree of change to or from the baseline environment caused by the impact being described.
- Spatial extent – the extent of an impact is the full area over which the impact occurs.
- Duration and frequency – the duration is a measure of how long the impact is expected to last. Frequency refers to how often the impact would occur; it may be continuous or periodic.

Table 5.1 - Impact Magnitude Criteria

Magnitude	General criteria
Large	Adverse: Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features, or elements. Beneficial: Large scale or major improvement of resource = quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse: Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. Beneficial: benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Small	Adverse: Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Beneficial: Minor benefit to, or in addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk or negative impact occurring.
Negligible	Adverse: Very minor loss of detrimental alteration to one or more characteristics, features or elements. Beneficial: Very minor benefit to or positive addition of one or more characteristics, features or elements.

5.11.6 The criteria for defining the magnitude of an impact varies between each environmental topic. The criteria for defining the magnitude of an impact, or change, is outlined within each topic chapter within this Scoping Report.

Sensitivity and Value of the Receptor

5.11.7 The sensitivity of a receptor or feature is characterised by its vulnerability to change and its ability to recover. The value of a receptor or feature reflects its overall importance, and the value placed on it by society; this may be reflected by its level of statutory or policy protection or else a value may be attributed through consultation and the application of professional judgement. Criteria for defining the sensitivity and/or value of a receptor are set out in **Table 5.2**. Characterisation of the receptor is achieved by balancing out these considerations to determine the receptors sensitivity:

- Vulnerability – the vulnerability of the receptor relates to its capacity to accommodate change i.e. the tolerance/intolerance of the receptor to change.
- Recoverability – the ability of the receptor to return to the baseline state.

- Importance – the importance of the receptor or feature is a measure of the value assigned to that receptor based on biodiversity and ecosystem services, social value and economic value. Importance of the receptor is also defined within a geographical context, whether it is important internationally, nationally or locally.

Table 5.2 – Sensitivity Criteria

Value	General criteria
Very High	Very high importance and rarity, value at an international level and limited potential for recovery or substitution.
High	High importance and rarity, value at a national level and limited potential for recovery or substitution.
Medium	Medium importance and rarity, value at a regional level and limited potential for recovery or substitution.
Small	Low or medium importance and rarity, value at a local level and limited potential for recovery or substitution.
Negligible	Very low importance and rarity, valued at a local level, easy to replace.

5.11.8 The criteria for defining the sensitivity / value of a receptor varies between each environmental topic. The sensitivity criteria is outlined within each technical chapter of this Scoping Report.

5.12 Evaluating the Significance of Effects

5.12.1 Having established the magnitude of change and sensitivity of the receptor, the significance of an effect can be assessed. To aid transparency in the assessment process, the matrix shown on **Table 5.3** will be used as the basis for assigning significance to an effect; however, the identification of significance typically requires the application of professional judgement. As an illustration, a high sensitivity receptor subject to a large magnitude of change would experience a major or moderate significance of effect, and a low sensitivity receptor subject to a small magnitude of change would experience a minor or negligible significance of effect.

Table 5.3 – Significance Matrix

		Sensitivity of Receptor				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude of Impact	**Large**	Major	Major	Major	Moderate	Minor / Negligible
	Medium	Major	Major	Moderate	Minor	Negligible
	Small	Major / Moderate	Moderate	Minor	Minor / Negligible	Negligible
	Negligible	Minor	Minor	Negligible	Negligible	Neutral
	No Change	Neutral	Neutral	Neutral	Neutral	Neutral

5.12.2 Each of the specialist disciplines will apply professional judgement when assigning magnitude and sensitivity criteria for each topic area, and for some topics these may be defined in industry guidelines.

5.12.3 The influence of impact duration on the overall significance of effect would also be considered as part of the determination of magnitude and sensitivity.

5.12.4 Following the classification of an effect using the methodology, a clear statement will then be made in the ES as to whether that effect is significant or not significant. Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are considered to be not significant. However, professional judgement will also be applied in reaching conclusions as to the significance of effects. Typical definitions for the classification of effects are shown in **Table 5.4**.

Table 5.4 – Significance Criteria

Significance	General criteria	Significant effect
Major	A large and detrimental change to a valuable/sensitive receptor; likely exceeding an accepted (often legal) threshold. A large and beneficial change, resulting in improvements to the baseline result in previously poor compliance or a major contribution being made to national targets. These effects may represent key factors in the decision-making process. Potentially associated with sites and features of international or national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features that are unique and which, if lost, cannot be replaced, or relocated.	Yes

Significance	General criteria	Significant effect
Moderate	A medium scale change that, although not beyond an accepted threshold, is still considered to be generally unacceptable, unless balanced out by other significant positive benefits of a project. Likely to be in breach of planning policy, rather than legal statute. These effects, if adverse, are likely to be important at a regional or local scale and on their own could have a material influence on decision making. A positive moderate effect is a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets are contributed to.	Yes
Minor	A small change that, whilst adverse, does not exceed legal or planning policy thresholds. A small positive change, but not one that is likely to be a key factor in the overall balance of issues. These effects may be raised as local issues and may be of relevance in the detailed design of a project but are unlikely to be critical in the decision-making process.	No
Negligible	A very small change that is so small and unimportant that it is considered acceptable to disregard. Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.	No

5.13 Cumulative Effects

Introduction

5.13.2 When undertaking an assessment of the environmental effects of a project, it is necessary to consider how various effects may interact, and also how the effects of the project could accumulate with the effects of other developments proposed within the same zone of influence (ZOI). The cumulative effects assessment for the Project will include the following effects:

- Inter-project effects: effects resulting from the Project combined with the same aspect-related effects generated by other developments2 to impact a common receptor.
- Intra-project effects: individual environmental aspect effects resulting from the Project, which are not significant in their own right, but could combine with other

[2] Including the assessment of cumulative effects factoring in those associated with the New Chesterfield Substation were it to remain outside the scope of the Chesterfield to Willington Project.

environmental aspect effects from the Project to create effects that are significant.

5.13.3 Both inter-project effects and intra-project effects will be assessed within a Cumulative Effects chapter within the ES.

Legislation, Planning Policy and Technical Guidance

5.13.4 Schedule 4 of the EIA Regulations (Ref 5.2) states that an ES is to include a description of the likely significant effects of a development on the environment, which should cover, amongst others, cumulative effects. Paragraph 5(e) describes cumulative as: *"the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources"*. In addition, Regulation 5(2)(e) of the EIA Regulations requires that the EIA considers the interaction of environmental effects associated with the Project. The intra-related effects assessment considers likely significant effects from multiple impacts and activities from the construction and operation of the Project on the same receptor, or group of receptors.

5.13.5 Overarching National Policy Statement for Energy (NPS EN-1) (Ref 5.4) states in paragraph 4.3.3 that "The Regulations require an assessment of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, transboundary, short, medium, and long-term, permanent and temporary, positive and negative effects at all stages of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects."

5.13.6 NPS EN-5 (Ref 5.5) provides topic-specific guidance for electrical infrastructure including overhead lines and underground cables but makes only limited reference to cumulative considerations: paragraph 2.9.10 refers to overhead lines and the potential for landscape and visual cumulative impacts to arise in relation to substations, wind farms and other sources of power generation. NPS EN-5 also refers briefly to NPS EN-1 and to landscape and visual considerations.

5.13.7 Paragraph 115 of the National Planning Policy Framework (NPPF) (Ref 5.6) states that "Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe". Paragraph 191 states that "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development". Paragraph 192 states that "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas".

5.13.8 Planning Inspectorate Advice Note 17, Cumulative Effects Assessment (Ref 5.7), sets out a staged approach to cumulative effects assessment for Nationally Significant Infrastructure Projects and provides template formats for documenting the assessment within an applicant's ES.

Intra-Project Effects

5.13.9 Intra-project cumulative effects (sometimes referred to as combined or interactive effects) occurs where a single receptor is impacted by more than one source of effect or aspect of the Project. An example of an intra-project effect would be where a local

community is impacted by dust, noise, and traffic disruption during the construction of the Project, with the result being a greater level of nuisance than each individual effect alone.

5.13.10 A useful summary of the principle of cumulative intra-project effects is provided by the Planning Inspectorate in Advice Note Nine: Rochdale Envelope (Ref 5.8). *"The ES should not be a series of separate unrelated topic reports. The interrelationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how interrelationships have been assessed in order to address the environmental impacts of the proposal as a whole. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant but could become significant when their interrelationship is assessed. It will be for the developer to demonstrate that the likely significant impacts of the project have been properly assessed".*

5.13.11 In line with this requirement, a description of the likely significant intra-project cumulative effects will be provided within the ES.

5.13.12 There is no standard approach to the assessment of intra-project effects, although it should be carried out with reference to guidance and to professional judgement. Some environmental topics consider receptors that are not considered by any other topics and so intra-project cumulative assessment is unlikely to be necessary. Other receptors may be considered by multiple topics, and as such intra-project cumulative effects are more likely to occur. Receptors considered in multiple chapters are likely to include local residents, communities, and businesses. It should be noted that some elements of the assessment inherently consider intra-related effects. For example, the terrestrial ecology and nature conservation assessment of effects considers the potential for multiple impacts impacting particular features such as disturbance effects on faunal receptors resulting from noise and vibration, visual disturbance and lighting. Where this is the case, this is described within the individual topic chapter.

5.13.13 It is proposed to undertake the assessment of intra-project cumulative effects using a three-stage approach (**Plate 5.3**). The first stage consists of a pre-screening exercise to determine whether a receptor is exposed to more than one type of effect.

5.13.14 Those receptors identified as experiencing more than one type of effect will be taken through to the second stage. The second stage will consist of a screening exercise to identify the significance each type of effect has on each receptor. Those receptors exposed to two or more types of effect, with a significance of effect greater than negligible, will be taken forward to the third stage. The third stage is the main intra-project assessment, which will consider if the combination of effects is likely to lead to overall effects of greater significance.

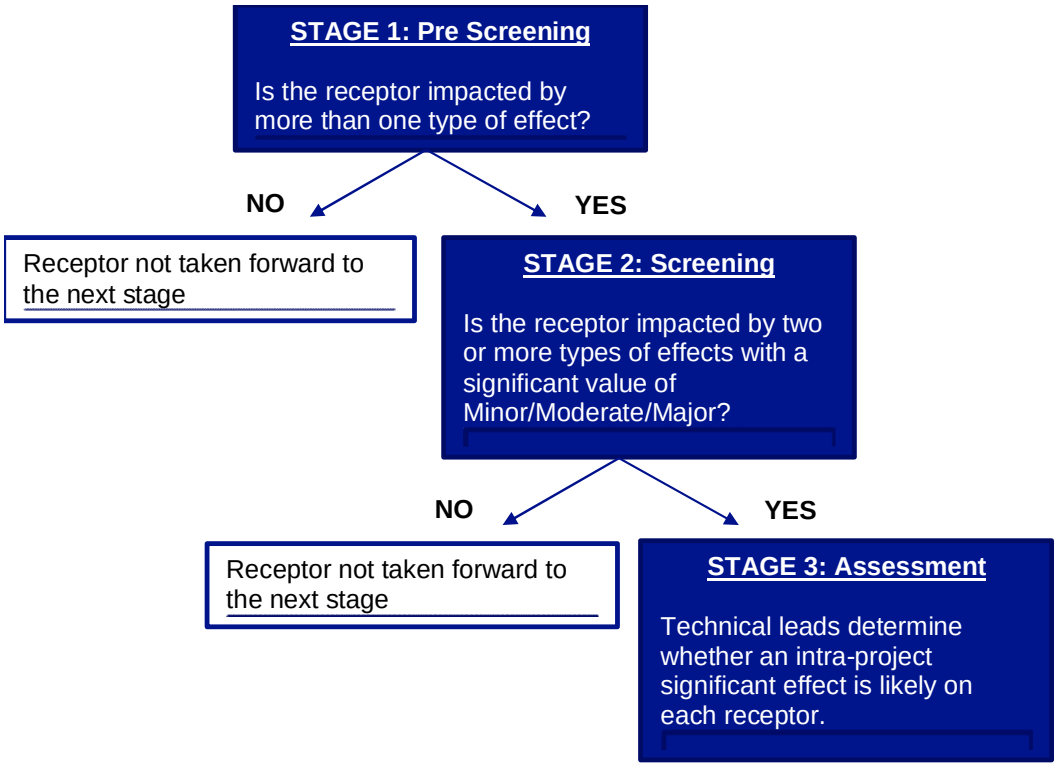

Plate 5.3 – Methodological Approach to Identifying Intra-Project Cumulative Effects

5.13.15 An initial pre-screening assessment is presented in **Table 5.5** showing how the receptor groups are likely to interact between chapters. This will be revisited as part of the ES to ensure all receptors considered within the ES are taken through this pre-screening assessment.

Table 5.5 – Likely Interaction between Receptor Groups and Topic Chapters

Receptor	Topic Chapter										
	Landscape and Visual	Ecology and Biodiversity	Historic Environment	Hydrology and Land Drainage	Geology and Hydrogeology	Agriculture and Soils	Traffic and Transport	Air Quality	Noise and Vibration	Socio-Economic, Recreation and Tourism	Health and Wellbeing
Landscape character and designations	✓	✓	✓								
Visual receptors	✓		✓					✓	✓	✓	
Commercial receptors									✓	✓	
Ecological receptors	✓	✓		✓				✓	✓		
Notable habitats (terrestrial and aquatic)	✓	✓		✓				✓	✓		
Designated heritage assets	✓		✓								
Non-designated heritage assets			✓								
Water resources (existing abstractions and discharges)				✓	✓						
Watercourses and waterbodies				✓	✓						
Flood risk receptors				✓							
Best and Most Versatile agricultural land						✓					
Agricultural holdings						✓					
Soil						✓				✓	

Receptor	Topic Chapter										
	Landscape and Visual	Ecology and Biodiversity	Historic Environment	Hydrology and Land Drainage	Geology and Hydrogeology	Agriculture and Soils	Traffic and Transport	Air Quality	Noise and Vibration	Socio-Economic, Recreation and Tourism	Health and Wellbeing
Public Rights of Way (PRoW)	✓						✓			✓	
Cycle routes	✓						✓				
Roads							✓				
Communities	✓				✓				✓	✓	
Geology					✓						
Mineral reserves					✓					✓	
Groundwater					✓						
Human health	✓			✓	✓		✓	✓	✓	✓	
Climate		✓		✓							

Inter-Project Effects

5.13.16 Inter-project cumulative effects occur where a receptor is impacted by two or more projects at the same time, potentially amplifying the overall effect. Individually the effects may not be significant, but when considered together could create a significant cumulative effect.

5.13.17 The Planning Inspectorate Advice Note 17 (Ref 5.7) provides a methodology for assessing inter-project cumulative effects. It provides guidance about the type and scale of other developments that should be considered in the assessment of cumulative effects with other projects. It is acknowledged that the availability of information necessary to conduct the inter-project effects assessment will depend on the current status of the other existing development and/or approved development. Any assumptions or limitations in relation to the 'other existing development and/or approved development' data collected will be stated. A level of certainty, reflecting the availability of detail and information necessary for the assessment, will be assigned to each development and recorded.

5.13.18 The approach outlined in Advice Note 17 is split into four stages:

- **Stage 1** – the two main tasks in this stage are to establish what the ZOI is for each topic and to then identify a 'long list' of other developments within the ZOI, by reviewing planning applications, development plans.
- **Stage 2** – criteria are set for the inclusion or exclusion of developments on the long list to create a shortlist. These will be based on overlaps in construction programmes, shared receptors, or shared effect pathways.
- **Stage 3** – information is gathered about the shortlisted projects, including design, location, programme, operation, and decommissioning information, and reported environmental effects.
- **Stage 4** – Cumulative Effects Assessment is undertaken in relation to the shortlisted developments and the findings are reported in the matrix format. The focus is on Tier 1 and 2 projects, with Tier 3 included if possible. These three tiers are described below in **Table 5.7**.

5.13.19 As set out in paragraph 4.1.9 and paragraph 4.1.10 in **Chapter 4: Description of the Project,** National Grid Electricity Transmission **(**NGET) is proposing to develop a new 400 kV Chesterfield Substation in the vicinity of the existing substation site. It is currently proposed that the new Chesterfield Substation would not form part of this Project, instead being provided by the Brinsworth to High Marnham project. In this instance, the proposed new Chesterfield Substation would be addressed in the EIA as part of the inter-project cumulative effects assessment.

Stage 1: Establishing the Long List

5.13.20 The first step of Stage 1 is to identify a ZOI within which the long list of projects can be identified. The ZOI is the geographic area within which a development is likely to affect environmental receptors. As such, the ZOI would vary for different receptors. The ZOI used for this Scoping Report is based on a distance extending from either side of the Scoping Report Corridor boundary. As the Project develops, the ZOI would be based on the relevant distances (according to the individual environmental topic) around the proposed Order Limits.

5.13.21 The largest study areas proposed for technical chapters 6-16 form the ZOIs for the environmental topics. These are summarised in **Table 5.6**. The rationale for these study areas is explained in Section 3 of the relevant Technical Chapters 6-16.

Table 5.6 – Largest Study Areas and ZOIs for Environmental Topics

Environmental topic	ZOI
Landscape and Visual	7.5 km
Ecology and Biodiversity	20 km 30km for SACs where bats are the qualifying interest
Historic Environment	2 km
Agriculture and Soils	1km (soils) and Local Authority Boundaries*
Socio-Economics	1km (recreation and tourism) and Local Authority Boundaries*
Health and Wellbeing	0.2km (EMF) and Local Authority Boundaries*
Water Environment, Geology and Hydrogeology, Traffic and Transport, Air Quality, Noise and Vibration	≤0.5 km

* The study area comprises local authority boundaries that the preferred corridor passes through for assessment of inter-project effects on BMV land (Agriculture and Soils), economy and employment (Socio-Economics), and Health and Wellbeing.

5.13.22 The long list of other projects identified within the ZOI will be categorised into three tiers (**Table 5.7**). Minor planning applications will be excluded from the assessment, as these relate to projects of small scale and local significance. These projects are highly unlikely to give rise to significant cumulative environmental effects over and above the Project in isolation. All reasons for excluding any development from further consideration will be clearly recorded and presented in the ES to present a clear audit trail.

Table 5.7 – 'Other Development' for Inclusion in the Inter-Project Cumulative Effects Assessment

Tier	Development
Tier 1	Under construction where the project is 'major development'*
	Permitted application(s), where the project is classified as 'major development,' whether under the Planning Act 2008 or other consent regimes, but not yet implemented.
	Submitted application(s), where the project is classified as 'major development,' whether under the Planning Act 2008 or other consent regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects, and/or the relevant local planning authorities planning portal where the project is classified as 'major development' and a scoping or screening report has been submitted.

Tier	Development
Tier 3	Projects on the Planning Inspectorate's Programme of Projects, and/or the subject of pre-application discussion with a relevant local planning authority, where a scoping or screening report has not been submitted. Projects registered on the local planning authority's portal classed as major development but do not require EIA.
	Identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

* 'Major development' as described in the Town and Country Planning (Development Management Procedure) (England) Order 2015 (Ref 5.9): 'development involving any one or more of the following – (a) the winning and working of minerals or the use of land for mineral-working deposits; (b) waste development; (c) the provision of dwellinghouses where – (i) the number of dwellinghouses to be provided is 10 or more; or (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i); (d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or (e) development carried out on a site having an area of 1 hectare or more.

Stage 2: Establishing the Short List

5.13.23 Following Stage 1, the projects included on the long list will be screened as to the temporal scope, scale and nature of the development to identify whether they would be likely to result in a potential for a significant cumulative effect with the Project. Professional judgement would be used during the application of threshold criteria to determine whether developments should be scoped in or out of the assessment. This would include developments that were below the threshold criteria but with characteristics that were likely to give rise to a significant effect or could give rise to cumulative effects by virtue of its proximity to the proposed Project.

5.13.24 The following inclusion/exclusion criteria will be used for the assessment:

- **Temporal Scope:** other projects with an overlapping construction phase (currently expected to be 2028-2032) and in some cases operational effects would be scoped into the assessment. Planning applications submitted up to five years prior to the planned commencement year of construction (2028) would be included in the assessment. Five years is selected as planning permissions typically expire after a period of three to five years (unless an application for extension is permitted). Applications submitted outside this temporal scope would be excluded.
- **Scale and nature of development:** development identified as Schedule 1 and 2 developments in the EIA Regulations would be considered further. Development not identified as Schedule 1 or 2 developments would be scoped out of the assessment, except where professional judgement identifies specific scenarios where there is a high likelihood of significant environmental effects arising in combination with the Project.
- **Sensitivity of the receiving environment:** where there are potential source-pathway-receptor linkages between the Project and other development, cumulative effects would be considered further. Other development with no clear source-pathway-receptor linkage would be scoped out of the assessment.

5.13.25 The long and short lists of other development would be discussed with the relevant planning authorities to seek their opinion on the developments to be included in the cumulative assessment.

Stage 3: Information Gathering

5.13.26 Further information on the short-listed developments will be gathered to inform the final cumulative effects assessment, where this is available. This will include:

- Proposed design and location information.
- Construction and operational timescales.
- Results of any environmental assessments completed for the other developments.

5.13.27 Project data will be gathered from a variety of sources including the website of the relevant local planning authorities, the Planning Inspectorate's website and potentially through direct liaison with stakeholders including local authorities, statutory bodies and relevant applicants/developers.

Stage 4: Assessment

5.13.28 The cumulative effects assessment will describe and evaluate the likely significant inter-project cumulative effects arising from the Project and other existing or approved developments. The results of the assessment would be documented and presented in an accessible format similar to Matrix 2 provided at Appendix 2 of the Planning Inspectorate's Advice Note 17 (Ref 5.7) and tabulated within the ES.

5.13.29 The value of a resource and magnitude of impact will be determined according to the criteria set within the environmental topic sections in this Scoping Report. The effects of the Project will be taken from the environmental topic chapters to inform the significance of cumulative effects with other developments. Effects would be identified as direct, indirect, permanent or temporary.

5.13.30 The cumulative effects assessment will be commensurate with information available at the time of assessment. Information on some proposals may be limited and such gaps will be acknowledged within the assessment. The assessment for Tier 3 development may be high level in comparison to Tier 1 and 2, reflective of the level of information available. Any measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant cumulative effects and, where appropriate, any proposed monitoring arrangements will be identified.

5.14 Monitoring

5.14.1 Schedule 4, Paragraph 7 of the EIA Regulations (Ref 5.2) states that, where appropriate, the ES should include a description of any proposed monitoring arrangements where likely significant residual effects have been identified. The monitoring requirements will be detailed within the ES topic chapters to include clear and proportionate objectives for monitoring, the parameters to be monitored, the methodology for the monitoring, a timescale for implementation, identification of the party who will be responsible for the monitoring, and an outline of the remedial actions to be undertaken should results be adverse.

5.15 Approach to the Environmental Statement

5.15.1 The Planning Inspectorate Advice Note Seven (Ref 5.1) requires that applicants provide an outline structure of what the ES will contain. The structure of the ES for the Project will broadly follow the same order of chapters that are presented in this Scoping

Report, acknowledging that changes may need to be made within the ES to address the advice from the Scoping Opinion, both in terms of presentation of the Project to aid understanding and address the design requirements as they evolve.

5.15.2 Subject to outcome of the Scoping Opinion, an indicative outline structure of the ES is set out in **Table 5.8**. It is proposed that relevant regulatory and planning policy context would be set out and addressed in the Planning Statement accompanying the DCO application.

Table 5.8 – Indicative Structure of the ES

ES Volume	Title	Likely content
Volume 1	Non-Technical Summary	A concise and standalone document which will provide a description of the Project, EIA process and its findings in a manner that is easily understood by the general public
Volume 1 Main Document	Chapter 1 Introduction	Setting out an overview of the Project including the Project need. The purpose and structure of the ES and a brief summary of the other relevant assessments and documents.
	Chapter 2 Main Alternatives Considered	This chapter will set out the main alternatives considered and the reasons for the selection of the preferred options.
	Chapter 3 Project Description	This chapter will provide a description of the Proposed Development and how the Proposed Development would be constructed, operated and maintained.
	Chapter 4 EIA Approach and Methodology	This chapter will provide a description of the overall EIA methodology that is proposed on the Project including temporal durations and approach to mitigation.
	Chapter 5 Landscape and Visual Chapter 6 Ecology and Biodiversity Chapter 7 Historic Environment Chapter 8 Hydrology and Land Drainage Chapter 9 Geology and Hydrogeology	There will be a chapter for each environmental topic scoped into the EIA. The topic chapters will be structured in accordance with best practice to broadly cover the following information: • Introduction. • Scope of assessment. • Stakeholder engagement. • Assessment methodology including topic study area and data sources used for the assessment. • Baseline environment. • Embedded, additional and good practice mitigation measures.

ES Volume	Title	Likely content
	Chapter 10 Agriculture and Soils Chapter 11 Traffic and Transport Chapter 12 Air Quality Chapter 13 Noise and Vibration Chapter 14 Socio-economics Chapter 15 Health and Wellbeing	• Assessment of likely significant effects. • Summary.
	Chapter 16 Cumulative Effects	Assessment of inter-project effects and intra-project effects
	Chapter 17 Summary	Summary of the findings of the ES.
	Chapter 18 References	Reference list.
Volume 2	Appendices	Provides the appendices which support Volume 1.
Volume 3	Figures	Provides the Figures which support Volume 1.

5.16 Whole Topics Proposed to be Scoped Out of the EIA

Introduction

5.16.2 This section outlines the environment topics that are proposed to be **Scoped Out** of the ES.

5.16.3 The environmental topics discussed include:

- Major Accidents and Disasters.
- Climate Resilience.
- Greenhouse Gas Emissions.
- Material Assets and Waste.

5.16.4 Each topic proposed to be **Scoped Out** includes justification and proposed mitigation for the construction and operation (including maintenance) of the Project.

5.16.5 As discussed above, the decommissioning of the Project will not form part of the environmental assessment.

5.17 Major Accidents and Disasters

Introduction

5.17.2 The requirement to consider major accidents and disasters as part of the EIA process is set out in the EIA Regulations 2017 (Ref 5.2) which state:

5.17.3 “A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned… Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.

5.17.4 This Scoping Report considers extreme incidents during construction and operation, relevant to the project, that would only very rarely occur (or mitigation, management or regulatory controls will be in place to prevent the occurrence). Major accidents and disasters are collectively referred to as ‘Major Events’ within this Scoping Report.

5.17.5 The assessment of Major Events shall consider:

- The vulnerability of the Project to Major Events.
- The Project’s potential to cause Major Events.

5.17.6 For the purposes of this Scoping Report, the following definitions have been adapted using the IEMA primer on Major Accidents and Disasters (Ref 5.10) and Design Manual for Roads and Bridges (DMRB) LA104 (Ref 5.11):

- Major Event – events that threaten immediate or delayed serious environmental effects on human health, welfare and/or the environment, and require the use of resources beyond those of the client or its appointed representatives to manage. While malicious intent is not accidental, the outcome (e.g. train derailment) may be the same. Therefore, many mitigation measures will apply to both deliberate and accidental events. Major Events have been split into the following groups:
  - Natural disasters: Geological, hydrological, meteorological, space and biological disasters.
  - Man-made or technological disasters: Industrial and urban accidents, transport accidents, engineering accidents/failures, terrorism, crime and civil unrest.
- Potential Receptor – the specific environmental factors that could be adversely affected if the source reaches it. An environmental factor is defined as: features of the environment that are subject to assessment under Article 3 of the EIA Directive. These receptors described in the following chapters of this Scoping Report:
  - Chapter 6: Landscape and visual.
  - Chapter 7: Ecology and Biodiversity.
  - Chapter 8: Historic Environment.
  - Chapter 9: Hydrology and Land Drainage.
  - Chapter 10: Geology and Hydrogeology.
  - Chapter 11: Agriculture and Soils.
  - Chapter 12: Traffic and Transport.

- Chapter 13: Air Quality.
- Chapter 14: Noise and Vibration.
- Chapter 15: Socio-economics, Recreation and Tourism.
- Chapter 16: Health and Wellbeing.

5.17.7 It is not anticipated that the Project would use significant amounts of hazardous material that could be released in the event of a major accident or disaster.

Methodology

5.17.8 In line with the IEMA primer on Major Accidents and Disasters (Ref 5.10), the following three stages have been undertaken to establish reasoned conclusions presented:

- Stage 1 – collation of long list of possible Major Events within the study area and establish if the development has a vulnerability to Major Events and the potential impact pathway that could lead to a significant effect for a receptor.
- Stage 2 – screening review of long list to consider relevance of each possible Major Event to the Project taking account of good practice mitigation measures, design standards, existing legal requirements, protective provisions / legal protections, codes and standards already in place to safeguard the environment.
- Stage 3 – identify Major Events where likely significant effects cannot be ruled out and require detailed consideration as part of the ES.

5.17.9 **Table 5.9** presents the output of the three-staged approach undertaken.

Study Area

5.17.10 The study area for the consideration of Major Events is the Scoping Boundary, as presented on **Figure 1.1: Location / Context** in **Volume 3**.

5.17.11 This has been selected based on professional judgement and represents a proportionate approach taking into consideration the nature and scale of the Project and the potential for impact pathways to environmental receptors.

Baseline Conditions

5.17.12 The baseline relevant to major accidents and disasters primarily comprises:

- Features external to the Project that present a potential source of hazard to the Project itself.
- Environmental receptors at risk of likely significant effects as a result of the Project's vulnerability to major accidents or disasters.
- Identified major accident and disaster risks that currently exist within the local areas that could affect the Project or be exacerbated by the Project.
-

5.17.13 The baseline conditions described for major accidents and disasters are derived from the following information sources:

- National Risk Register (Ref 5.12).
- Control of Major Accident Hazards (COMAH) 2015 Public Information Search (Ref 5.13).
- Chapter 6-16 of this Scoping Report.

5.17.14 It is considered reasonable and proportionate to exclude certain receptor groups from the start. Construction workers, as a receptor, have been excluded from the assessment. This is because existing legal protection is considered to be enough to minimise risk from Major Events to a reasonable level. Legislation in force to protect workers in the workplace include:

- Construction (Design and Management) (CDM) Regulations 2015 (Ref 5.14).
- Management of Health and Safety at Work Regulations 1999 (Ref 5.15).
- Workplace (Health, Safety and Welfare) Regulations 1992 (Ref 5.16).
- Health and Safety at Work (HSWA) Act 1974 (Ref 5.17).

5.17.15 The following Major Events that are identified in the National Risk Register have been excluded from the assessment in **Table 5.9** due to the Project's geographic location:

- Earthquakes.
- Volcanic activity.
- Avalanches.
- Tsunami.
- Cyclones, hurricanes and typhoons.

Table 5.9 – Major Accidents and Disasters Assessment Relevant to the Study Area

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
Natural disasters			
1.0 Geological Disasters			
1.1 Landslips	Project infrastructure. Third party infrastructure such as roads, cycle routes, public rights of way and property as well as existing utility services. Landscape, ecology, heritage and hydrology receptors.	A description of geological units within the Scoping Boundary, derived from published British Geological Survey sources, is presented in **Chapter 10: Geology and Hydrogeology**. A Geotechnical Desk Study is presented in **Appendix 10A: Chesterfield to Willington East High Level Geotechnical Desk Study report** in **Volume 2**. This identifies that there is a moderate risk of landslides within the Scoping Boundary. In line with CDM Regulations, all structures must be designed so that they can be built and maintained safely, therefore, the site must be deemed it is or can be made safe and stable for the Project. The identification and management of geotechnical risk is an essential part of an infrastructure project's lifecycle and is an ongoing process throughout the design, construction, operation and decommission of an asset. A geotechnical risk register will continue to be maintained and updated throughout the lifetime of the Project to inform and be informed by the ground investigation strategy, project and geotechnical design measures and construction methods to ensure the Project remains stable throughout its lifecycle.	**Scoped Out** Adequate control to manage the potential for geotechnical risk as mandated through the CDM Regulations.
1.2 Sink holes/ground instability	Project infrastructure. Third party infrastructure such as roads, cycle routes, public	A description of geological units within the Scoping Boundary, derived from published British Geological Survey sources, is presented in **Chapter 10: Geology**	**Scoped Out** Adequate control to manage the potential

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
	rights of way and property as well as existing utility services. Landscape, ecology, heritage and hydrology receptors.	**and Hydrogeology**. A Geotechnical Desk Study is presented in **Appendix 10A: Chesterfield to Willington East High Level Geotechnical Desk Study report** in **Volume 2**. This identifies that although some localised risk, the Scoping Boundary generally has a low risk to ground stability hazards associated with collapsible ground, running sand, soluble rock, compressible ground and shrink-swell. In line with CDM Regulations, all structures must be designed so that they can be built and maintained safely, therefore, the site must be deemed it is or can be made safe and stable for the Project. The identification and management of geotechnical risk is an essential part of an infrastructure project's lifecycle and is an ongoing process throughout the design, construction, operation and decommission of an asset. A geotechnical risk register will continue to be maintained and updated throughout the lifetime of the Project to inform and be informed by the ground investigation strategy, project and geotechnical design measures and construction methods to ensure the Project remains stable throughout its lifecycle.	for geotechnical risk as mandated through the CDM Regulations.
1.3 Landfill accidents (pollution incidents /gas migration)	Ecology, hydrology, hydrogeology, soils, health and wellbeing receptors.	There is the potential for pollution incidents/gas migration associated with historic landfills. **Chapter 10: Geology and Hydrogeology** has identified historical landfills within the Scoping Boundary. Ongoing review of historic land uses will be undertaken for the ES and reported within the Geology and Hydrogeology assessment in the ES. This would also	**Scoped Out.** However, likely significant effects related to historic landfill will be addressed by the Geology and Hydrogeology

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		include the development of any embedded, good practice and additional mitigation measures to avoid likely significant effects. In line with CDM Regulations, all structures must be designed so that they can be built and maintained safely, therefore, the site must be deemed it is or can be made safe and stable for the Project. The identification and management of geotechnical risk is an essential part of an infrastructure project's lifecycle and is an ongoing process throughout the design, construction, operation and decommission of an asset. A geotechnical risk register would continue to be maintained and updated throughout the lifetime of the Project to inform and be informed by the ground investigation strategy, project and geotechnical design measures and construction methods to ensure the Project remains stable throughout its lifecycle.	assessment in the ES alongside any mitigation identified.
2.0 Hydrological Disasters			
2.1 Tidal flooding /wave/storm surge	Project infrastructure. Third party infrastructure, property and people in areas of increased flood risk.	A description of the baseline flood risk within the Scoping Boundary is set out in **Chapter 9: Hydrology and Land Drainage**. The Flood Risk Assessment (FRA) undertaken to be submitted in support of the DCO application will assess the vulnerability of the Project to flood risk and the risk that the Project could increase flood risk elsewhere. The detailed scope of the FRA will be agreed with relevant stakeholders and will be completed in accordance with Environment Agency Guidance to include for future uncertainty related to climate change.	**Scoped Out.** However, likely significant effects related to flood risk will be addressed through a flood risk assessment submitted with the DCO application.
2.2 Fluvial flooding			
2.3 Surface water flooding			
2.4 Groundwater flooding/major changes to			

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
groundwater levels/quality		This would adequately address any extreme events and ensure the Project is resilient. National Grid designs its infrastructure to either withstand a flood event or to be raised up out of the floodplain. The construction of the Project will incorporate appropriate post construction surface water management and land drainage systems if necessary.	
3.0 Meteorological Disasters			
3.1 Tornadoes	None.	Although there are tornadoes in the UK, their destructive force tends to be much less than in other parts of the world. There are around 30 tornadoes a year reported in the UK, these are typically small and short-lived. Due to strong tornadoes being a rarity in the UK, is not considered a threat to the Project. It is therefore not considered necessary to take this forward for further consideration.	**Scoped Out** No relevant impact pathway.
3.2 Cyclonic storms, gales and high winds	Project infrastructure. Third party infrastructure and property.	Storms and gales could result in damage to the overhead lines. However, they will be designed in line with UK standards which take into account environmental conditions including exposure to UK weather conditions. Overhead lines are designed to withstand extreme weather conditions, such as high winds and ice formation on the wires. If in an extreme scenario the overhead line were to be damaged, the monitoring system would detect the fault within milliseconds and the circuit would be tripped. This would occur before the overhead line (conductor) hits the ground and there would be no resulting risk of electrocution or fire.	**Scoped Out** The risk is not significantly different to other similar infrastructure in the locality and an impact pathway to a receptor is unlikely to occur.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		The risk of adverse weather conditions affecting the construction of the Project is limited. There would be procedures developed for working in areas liable to flooding, and for cessation of activities in extreme adverse conditions. When locating infrastructure, National Grid consider the topography of the land, including likely flood zones and rivers The design of the Project would account for all foreseeable weather conditions and potential disasters.	
3.3 Thunderstorms/lightning strikes	Project infrastructure. Third party infrastructure and property.	Storms of sufficient severity to cause damage to infrastructure are very rare in the UK. Lightning could potentially strike above ground installations including pylons. However, these have earthing protection against lightning strikes as set out in existing Technical Standards.	**Scoped Out** There are adequate design measures to manage the Project's vulnerability.
3.4 Fog	None.	Fog is one of the most common weather conditions in the UK, particularly throughout autumn and winter. Severe disruption to transport occurs when the visibility falls and may increase the likelihood of collisions and other risks. Should fog become an issue during the construction phase due to visibility, work would cease, where it is not safe to continue until conditions improve.	**Scoped Out** No relevant impact pathway.
3.5 Extreme temperatures: Heatwaves, low temperatures (sub-zero), blizzards and heavy snow	Project infrastructure.	This type of event could expose site infrastructure to greater heat intensity and exposure to sunlight. Heavy snow could cause disruption to workers and delivery vehicles and drivers during construction. High temperature records are now being broken across the UK with increasing frequency. Data sourced from the UK Met Office summarises the highest daily maximum	**Scoped Out** Design standards would manage the Project's vulnerability to extreme temperatures.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		temperature in the UK is 40.3°C, recorded in Coningsby, Lincolnshire in July 2022. The lowest daily minimum temperature on record in the UK is -27.2°C recorded in Altnaharra, Scotland in December 1995. In late February and early March 2018, the UK experienced a spell of severe winter weather with very low temperatures and significant snowfall. Climate change is set to lead to more extreme events over the coming years. The Project will be designed to existing National Grid standards, which include consideration of low and high temperatures. National Grid also undertakes regular inspections of the network using thermal imaging to assess damage from weather.	
3.6 Droughts	None.	Only considered to be a disaster due to water shortages for essential services and where there are indirect impacts on food production, loss of soils etc. The Project is not considered to be vulnerable, or a potential contributor, to drought. It is therefore not considered necessary to take this forward for further consideration.	**Scoped Out** No relevant impact pathway.
3.7 Wildfires	Project infrastructure and landscape planting.	In 2018, fire and rescue services dealt with a number of wildfires across the country. Security Scotland also experiences large, rural wildfires, most recently seen in Dumfries and Galloway in 2020. The Project would include standoff distances from wooded areas and landscape planting, in order to minimise the risk of vegetation contacting the overhead line and potentially igniting a fire. **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including CC04, which states that the	**Scoped Out** Adequate controls in place to manage the Project's vulnerability to wildfires.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		Contractor should use a short to medium range weather forecasting service from the Met Office, or other approved meteorological data and weather forecast provider, to inform short to medium term programme management, environmental control and impact mitigation measures e.g. health and safety plans to include supportive measures for working in extreme high or low temperatures.	
3.8 Air quality event	Ecology, hydrology, hydrogeology, health and wellbeing receptors.	Between 27 June and 7 July 2006, and between 13 and 23 July of the same year, the UK experienced two periods of extended hot weather with associated elevated ozone and harmful airborne particles. In the first episode, the combination of heatwave conditions, poor air quality and worsening of people's pre-existing conditions led to up to 540 deaths and up to 700 hospital admissions. The same factors led to up to 630 deaths and up to 830 hospital admissions in the second episode. Periods of elevated pollution over a widespread area, and lasting more than two days, can occur around 5 to 10 times a year dependent on seasonal weather conditions. As set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2,** a dust management plan, supported by compliance monitoring arrangements and corrective actions would be implemented by the Project during the construction phase. These measures would reduce the risk of a major air quality event in the case of extreme weather conditions. During operation of the Project there is unlikely to be any effect on air quality as maintenance vehicles would be very few and there are no emissions associated with the	**Scoped Out** Adequate controls would be implemented by the Project to minimise the risk of a major air quality event.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		operation of the Project itself even in the situation of an extreme weather event.	
4.0 Space Disasters			
4.1 Geomagnetic storms	Project infrastructure.	Solar wind shock waves can affect the earth's magnetic field. This disrupts electrical power and communications networks, and Global Positioning System. Geomagnetic storms also pose a threat to the electrical power grid, however, in designing the Project to applicable standards, resources and receptors would not be put at a greater risk as a consequence of the Project.	**Scoped Out** The Project would be designed to applicable standards.
4.2 Solar flares	Project infrastructure.	Solar flare events can interrupt electrical power, radio and other electronic communications networks. However, in designing the Project to applicable standards, resources and receptors would not be put at a greater risk as a consequence of the Project.	**Scoped Out** The Project would be designed to applicable standards.
5.0 Biological			
5.1 Disease epidemics and animal/plant diseases	None.	The construction and operation of the Project would not give rise to any disease epidemics. The development itself would be constructed following all necessary guidance and restrictions in place at the time of its construction. The Project would not be a source of any disease epidemics and spread during any outbreak would be controlled through containment of infected animals including prohibition of transportation. As set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2,** the Project will adopt strict biosecurity protocols when working between	**Scoped Out** No relevant impact pathway.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		livestock/poultry farms as well as handling and disposing of any diseased or invasive plants.	
Manmade / Technological			
6.0 Industrial and Urban Accidents			
6.1 COMAH sites	None.	There are no sites falling under the COMAH Regulations 2015 within the Scoping Boundary. The operations of COMAH sites are subject to the COMAH Regulations 2015, so all measures necessary to prevent a major accident and limit their consequences to people and the environment are in place and inspected by the competent authority. This includes a requirement to prepare a Major Accident Prevention Policy. Implementation of the above policy and procedures would limit the potential to impact on the Project. It is therefore not considered necessary to take this forward for further consideration.	**Scoped Out** No relevant impact pathway.
6.2 Major Accident Hazard Pipelines (MAHP)	Project infrastructure. Ecology, hydrology, hydrogeology, soils, health and wellbeing receptors.	High-pressure (pipelines operating at >7barg) natural gas supply transmission and distribution networks cross the Scoping Boundary. The construction of the Project may require crossing and works to and in proximity to MAHPs. Pipelines could fail and damage the Project. Consultation will be carried out with the pipeline operators, and agreements will be sought with regard to diverting or applying protective provisions to third party assets where needed. It is therefore not considered likely that the Project would increase the risk of utilities failure. The potential risk of construction related incidents should diversion works be required would be covered by safe	**Scoped Out** Adequate control to manage the potential risk from existing utility services as mandated through the CDM Regulations.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		working practices and current legislation. In all cases, no work shall be undertaken in the vicinity of a MAHP without prior engagement with the asset owner.	
6.3 Overhead electric power transmission and distribution networks	None.	Above-ground electrical transmission lines are present within the Scoping Boundary. During construction, any work required near electric overhead power lines would be adequately controlled and appropriate site-specific risk assessments completed which would consider such aspects as: • The voltage and height. • Size and reach of any machinery or equipment. • Safe clearance distances required. • Site conditions such as undulating terrain. • Competence, supervision, training and briefing to staff. The Project is not likely to lead to any increased risk of a major accident or disaster from an electricity utilities failure. There is a potential major accident involving electrocution during the operation and maintenance phase if there were to be a failure of the transmission infrastructure, or at the substations. Electrocution hazards are primarily protected by good design of the electrical systems and safe systems of work. The National Emergency Plan for Downstream Gas & Electricity sets out arrangements between government, industry, the regulator and other parties for safe and effective management of downstream gas and electricity supply emergencies.	**Scoped Out** Adequate control to manage the potential risk through implementation of design standards and safe systems of work.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
6.4 Nuclear	None.	No such facilities are located within the Scoping Boundary. The Office for Nuclear Regulation independently regulates nuclear safety and security at nuclear-licensed sites in the UK. Measures necessary to prevent a major accident and limit their consequences to people and the environment are in place and inspected by the competent authority. Health and Safety Executive-approved emergency arrangements are in place to respond to any site emergency. Operators of nuclear facilities are also obliged to consult with the emergency services, local authorities and other interested bodies. This is to ensure that advice is available and given, should that be necessary, to protect the public. Operators must prepare an Onsite emergency plan, and local authorities an Offsite emergency plan. Implementation of the above would limit the potential to impact the Project. It is therefore not considered necessary to take this forward for further consideration.	**Scoped Out** No relevant impact pathway.
6.5 Energy industry/fuel filling stations	Project infrastructure. Ecology, hydrology, hydrogeology, soils, health and wellbeing receptors.	There is no existing power stations located within the Scoping Boundary. The former Willington power station is located adjacent to the eastern boundary of the 400 kV Willington Substation. This facility was fully closed in 1999. The Project is proposing to connect into the existing Willington Substation. An initial desk study to identify potential contaminative land uses is presented in **Chapter 10: Geology and Hydrogeology** as well as **Figure 10.6: Potential**	**Scoped Out** However, likely significant effects related to current and historic land uses will be considered within the ES as part of the Geology and Hydrogeology assessment.

Major Event		Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
			Contaminative Land Uses. Existing petrol filling stations have been identified within the Scoping Boundary.	
6.6	Oil and gas refinery storage	None.	No facilities are within the Scoping Boundary. It is therefore not considered necessary to take this forward for further consideration.	**Scoped Out** No relevant impact pathway.
6.7	Mining/quarrying industry	Project infrastructure. Third party infrastructure such as roads, cycle routes, public rights of way and property as well as existing utility services. Landscape, ecology, heritage and hydrology receptors.	A description of coal mining activity within Scoping Boundary is presented in **Chapter 10: Geology and Hydrogeology**. Evidence of historic mining activities such as mine shafts and adits are present in Section 1 to Section 4 of the Scoping Boundary. Section 5 and Section 6 are not within a high development risk area and no mine shafts, adits have been identified in these areas. In line with CDM Regulations, all structures must be designed so that they can be built and maintained safely, therefore, the site must be deemed it is or can be made safe and stable for the Project. The Project, and the design of its structures (including the proposed new Chesterfield Substation, should this be included in the Project scope), will include (in accordance with best practice and industry guidance) suitable consideration of site-specific ground conditions, potential ground instability and geohazard risks. The identification and management of geotechnical risk is an essential part of an infrastructure project's lifecycle and is an ongoing process throughout the design, construction, operation and decommissioning of an asset. A geotechnical risk register will continue to be maintained and updated throughout the lifetime of the Project to inform and be informed by the ground investigation strategy, project and geotechnical design measures and construction methods to ensure the Project	**Scoped Out** Adequate control to manage the potential for geotechnical risk as mandated through the CDM Regulations.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		remains stable throughout its lifecycle. As such, it is considered that the construction of the Project and the operation and maintenance of the new infrastructure would not be adversely affected and would not generate any significant effects.	
6.8 Unexploded ordnance (UXO)	Project infrastructure. Third party infrastructure such as roads, cycle routes, public rights of way and property as well as existing utility services. Ecology, heritage and hydrology receptors.	**Chapter 10: Geology and Hydrogeology** indicates that the Scoping Boundary is within a low-risk area. There are however a number of strategic targets identified such as decoy, utility and industrial sites. The risk from UXO will be assessed further in a UXO desk study report at ES Stage and likely significant effects and any identified mitigation reported in the Geology and Hydrogeology assessment presented in the ES.	**Scoped Out** However, a description of UXO risk and management controls will be addressed by the Geology and Hydrogeology assessment in the ES.
6.9 Fires	Project infrastructure and landscape planting.	Fires could be initiated by construction related activities however standard control measures would be implemented by the appointed contractor to manage the risk of fire. Construction accidents are work-related accidents that could generally affect only one or two workers carrying out the task, the effects of which, do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers are required to manage the risk to their employees and others who could be affected by their activities and ensure that the risk is reduced to as low as reasonably practicable. This principle requires compliance with good practice as a minimum.	**Scoped Out** No relevant impact pathway.
7.0 Transport Accidents			

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
7.1 Road traffic incidents	Road users.	Transport accidents occur across the UK on a daily basis. During construction there will be an increase in heavy construction plant and equipment on the local road network which would form the entry and exit points for construction traffic and therefore may increase the risk of road traffic accidents. Access points will incorporate appropriate visibility splays, turning radii and speed limit reductions where necessary/appropriate. An outline CTMP will be submitted in support of the DCO application and will set out the proposed mitigation measures to minimise disruption on the road network. The operation of the Project would not result in increased traffic flow or changes to traffic composition which could have an adverse impact on highway safety. The Project is not likely to lead to any increased risk of a Major Event from road traffic accidents.	**Scoped Out** Adequate controls would be in place to manage disruption on the road network.
7.2 Bridge or structural failure	Third party asset owners.	Routing of construction traffic would take account of structural requirements such as weight limits or height restrictions. Condition assessments will also be undertaken in advance where appropriate.	**Scoped Out** Risks would be managed through the application of design standards.
7.3 Rail accidents	Rail users.	There are railway lines within the Scoping Boundary. The design of the railway crossing will be agreed with Network Rail and will comply with existing safety requirements, to protect the railway line. The Project is not likely to lead to any increased risk of Major Event from rail accidents.	**Scoped Out** Works related to rail assets would be designed in accordance with Network Rail requirements.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
7.4 Maritime / waterway accidents	None.	The Project is not likely to lead to any increased risk of a Major Event from marine vessel accidents. The crossings of any navigable rivers will comply with existing safety requirements to protect the waterways and will be coordinated with the asset owner.	**Scoped Out** Works related to waterways would be designed and coordinated with the asset owner.
7.5 Aviation accidents	None.	The Project is not likely to lead to any increased risk of a Major Event from aviation accidents. In all cases when planning to build a new overhead line, National Grid consult with the Civil Aviation Authority, National Air Traffic Service and the Ministry of Defence. Where there are airstrips or Ministry of Defence sites that might be affected, National Grid liaise with the sites to enable an understanding of the potential impacts on their operations, should a new overhead line be proposed in their vicinity and reduce adverse effects.	**Scoped Out** The Project would consult with relevant bodies to manage any potential risks.
8.0 Engineering Accidents / Failures			
8.1 Dam/reservoir failure	Project infrastructure. Third party infrastructure, property and people in areas of increased flood risk.	A description of the baseline flood risk from reservoirs is presented in **Chapter 9: Hydrology and Land Drainage**. This identifies that parts of the Scoping Boundary are at risk of reservoir flooding. The potential likely significant effects from reservoir flooding will be considered in the Flood Risk Assessment submitted in support of the DCO application and presented as part of the Hydrology and Land Drainage assessment in the ES. The Project is not expected to lead to any increased risk of Major Event from reservoir flooding.	**Scoped Out** Likely significant effects related to flood risk will be addressed through a flood risk assessment submitted with the DCO application.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
8.2 Flood defence failure	Project infrastructure. Third party infrastructure, property and people in areas of increased flood risk.	The Project would seek to avoid existing flood defences through the routing and siting of the infrastructure. The Project would comply with Environment Agency guidance by incorporating buffers between pylons and watercourses. These would typically be a minimum of 8 m wide increasing to 16 m where there are raised flood defences.	**Scoped Out** Potential risks can be managed through good design and agreements with asset owners / regulators.
8.3 Mast/pylon collapse	None.	There is potential for the above ground structures (e.g., pylons and overhead lines) to collapse during the operation and maintenance phase albeit a very small risk as appropriate. Health and Safety would be adhered to on site. The primary mitigation is to ensure that the elements of the Project are designed in accordance with National Grid standards, industry good practice and the anticipated environmental conditions. All aspects would be subject to risk assessment, and the ability to safely undertake works would be a material consideration in the design process. Under the CDM Regulations, all structures must be designed so that they can be built and maintained safely. The appointed competent designer must also 'design out' hazards where possible, by applying the hierarchy of controls and will produce a designer's risk assessment to demonstrate the application of the hierarchy.	**Scoped Out** Risks would be designed out as mandated through the CDM Regulations.
8.4 Buried strike to existing buried services	Third party infrastructure such as existing utility services.	The protection of buried services is achieved through existing safety controls embedded during the design and construction stages. These include analysis of up-to-date service information to identify the location of services, holding discussions with service providers to agree protective provisions and managing the risks to services. Measures to manage risk include undertaking service	**Scoped Out** Adequate control to manage the potential risk from existing utility services as mandated through the CDM Regulations.

Major Event		Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
			location surveys to track where services are located on the ground. Works would also take into consideration Health and Safety and Environment (HSE) guidance (2014), which provides advice on how to reduce any direct risks to people's health and safety, as well as the indirect risks arising through damage to services. These existing measures reduce the risk to as low as reasonably practicable for the Project to cause a service strike through human error. The Project is not likely to lead to any increased risk of a Major Event from buried strike to existing buried services.	
8.5	Damage to underground cables (proposed by the Project)	Project Infrastructure.	Underground cables that may form part of the Project are placed at a minimum depth of 1.1 m (deep enough so as not to be affected by agricultural activities). The cables and ducts are placed in cement-bound sand with a tile over the top as added protection. Landowners will be made aware of the route of the cable and associated land rights which would outline the activities that can take place over the cable. In the extremely unlikely event that the cable was damaged, the fault would be reported in milliseconds through the monitoring system and the system would be auto-isolated, making it safe pending investigations. The Project is not likely to lead to any increased risk of a Major Event from damage to underground cables.	**Scoped Out** Risks would be designed out as mandated through the CDM Regulations.
8.6	Utilities failure (gas, electricity, water, sewerage and communication)	Third party infrastructure such as existing utility services.	Many utilities are located near the Project. Further searches and engagement with statutory undertakers will be undertaken during the design development. The Project would be designed and constructed to appropriate design standards which include crossing of other utilities.	**Scoped Out** Risks would be designed out as mandated through the CDM Regulations.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		Agreement of protective provisions with the asset owner will be undertaken.	
9.0 Terrorism, Crime, Civil Unrest			
9.1 Chemical, Biological, Radiological or Nuclear (CBRN) threat	Project infrastructure.	Terrorism is the act of inflicting violence as a means of inflicting terror for political reasons. MI5 rates the current UK-wide threat level as 'SUBSTANTIAL' which means an attack in the UK is considered 'likely'. The National Risk Register (Ref 5.12) for the UK lists various types of terrorist attack as potential major accidents including attacks on publicly accessible locations, transport systems, infrastructure, as well as CBRN. The Project is not in publicly accessible locations or adjacent to an area where people will gather, for example, a transport system. As such, they also do not represent a potential target or vector for a CBRN attack. The substations associated with the Project will be in secure compounds and are not considered to be more at risk than existing infrastructure with similar standard protection measures in place. There is no history of terrorist threat to pylons and overhead lines in the UK. Even so, damage to overhead lines, pylons and substations, however caused, can be repaired more quickly than damage to underground cables and direct current converter stations. This makes overhead lines more resilient and flexible than buried assets.	**Scoped Out** The implementation of design and security measures would minimise the Project's vulnerability to threats. The Project is not considered to be at more risk than existing infrastructure.
9.2 Cyber-attack	Project infrastructure.	According to the National Risk Register, cyber-attacks occur almost constantly on key national and commercial electronic information, control systems and digital industries.	**Scoped Out** It is expected that the risk of cyber-attack at the Project is no

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		National Grid have security standards in place based on industry recognised standard to achieve high standards of adaptive and responsive cyber security. The design of the control systems would ensure that someone gaining access to the system could not remotely cause a Major Event by discharging electricity or causing a fire. It is anticipated that modern encryption methods would be embedded in the design of the facilities and would therefore present a more difficult target than existing electrical grid infrastructure.	greater than any other part of the transmission system.
9.3 Industrial action/rioting/civil unrest/protest groups	Project infrastructure.	The National Risk Register states that public disorder 'may be caused by a combination of long-standing grievances and a spontaneous response to a single incident.' The UK is a developed economy with a stable democratic political regime, such that prolonged civil unrest is considered extremely unlikely. Periodically, political protests may turn violent, but these are rarely widespread and are usually in response to a 'precipitating event'. During construction, the working areas would have security fencing around the sites and only authorised personnel would be admitted to the sites. Outside of working hours, the sites will have security measures such as: security guard/CCTV to check for trespassers that could result in sabotage or arson. There is the potential for hostile acts against the Project and the associated workforce, which could occur at any stage of the lifecycle of the Project. National Grid take safety and security very seriously and work closely with the police and security services when designing	**Scoped Out** The implementation of design and security measures would minimise the Project's vulnerability to threats.

Major Event	Potential Receptors	Description of the Risk and Control Measures	Proposed to be Scoped In or Scoped Out?
		equipment and the security measures needed to protect them.	

Summary

5.17.16 National Grid would apply a comprehensive risk management framework to reduce risks to manage the vulnerability of the Project to Major Event to be as low as reasonably practicable throughout the Project lifecycle.

5.17.17 **Table 5.9** has identified relevant environmental aspects that will form part of the EIA and will be reported in the ES. These relate to the following matters:

- Flood risk is considered within **Chapter 9: Hydrology and Land Drainage** of this Scoping Report and will be addressed as part of the FRA.
- Risks related to landfill, potential contaminative land uses and UXO have been reported in **Chapter 10: Geology and Hydrogeology** and will be further considered in the ES.

5.17.18 All other Major Events have been S**coped Out** and therefore a standalone major accident and disasters ES chapter is not proposed.

5.18 Climate Change Resilience

5.18.1 The need for the Project is to support the transfer and connection of green, renewable energy into the UK power infrastructure network. The Project would support the UK's target to achieve net zero emissions by 2050 through the connection in the East Midlands of new low carbon energy generation, and by reinforcing the transmission network. Therefore, the operational, medium to long-term benefits of delivering the Project on a national level are considered to outweigh any short-term impacts of greenhouse gas usage resulting from material use and construction activities.

5.18.2 The July 2021 NGET Climate Change Adaptation Report (Ref 5.18) provided National Grid's response to Defra's third-round reporting cycle, Climate Change Adaptation Reporting Power Cycle 3.

5.18.3 The NGET Climate Change Adaptation Report identifies the following medium-term risks relevant to the Project:

- Erosion, ground movement and scour.
- Flooding.
- Raised temperatures.
- Compound events.

5.18.4 In addition to these risks, the Climate Change Adaptation Report also identified the potential risks posed by increased lightning and storms involving high winds, although, it notes that there is not currently strong evidence for a change in frequency of strong winds and lightning.

5.18.5 This section presents a climate change resilience screening assessment of the potential impacts of current and future climate change on the construction, operation, and maintenance of the Project.

5.18.6 The climate change resilience screening assessment identifies the following:

- The existing and future environmental baseline conditions, established from desk studies.
- The results of the climate change resilience screening assessment, based on the information gathered and the analysis and assessments to date at this early design stage.

- The design and control measures that could prevent, minimise, reduce or offset the possible climate change impacts and summarising recommendations.

5.18.7 The climate change resilience screening assessment uses the following key terms and definitions:

- Climate change hazard – a weather or climate related event which has the potential to cause harm to receptors or infrastructure assets.
- Climate change impact – an impact from a climate hazard which affects receptors or infrastructure assets.
- Design and control measures – good practice mitigation measures and design standards inherent to ensure the resilience of the Project infrastructure and receptors.

5.18.8 Climate Change Resilience interfaces with all other topic chapters through the In-combination Climate Impacts assessment. The In-combination Climate Impacts is undertaken by assessing how identified receptors in the surrounding environment are affected by future climate parameters, informed by the future climate baseline. Inclusion of an In-combination Climate Impacts assessment has been scoped in, but this will be addressed at ES stage and captured within the relevant chapters as part of the assessments for their environmental topics. The In-combination Climate Impacts assessment is a qualitative assessment and will identify if any reported effects will be exacerbated or ameliorated by the effects of climate change and identify further mitigation where required. It will also assess whether the embedded measures will continue to be effective considering changes to climate.

Climate Change Resilience Screening Assessment Method

5.18.9 This section presents the methodology used for screening climate change risks on climate change receptors that may arise from the construction, operation, and maintenance of the Project.

5.18.10 The following staged approach was undertaken for the screening assessment:

- Stage 1: Define study area and temporal scope of the assessment.
- Stage 2: Identification of potential climate change hazard (e.g. drought, heatwaves).
- Stage 3: Identification of Project receptors (e.g. project assets, human health and landscape receptors).
- Stage 4: Climate change resilience screening assessment - identification of potential climate change impacts on receptors and identification of design and control measures.

Study Area

5.18.11 The study area for the climate change resilience screening assessment is the Scoping Boundary, as presented on **Figure 1.1: Location / Context** in **Volume 3**.

5.18.12 The description of the existing and future baseline climate variables and trends is based on the East Midlands region which is representative of projected climate change within the Scoping Boundary.

5.18.13 Consideration has only been given to climate change receptors (infrastructure and assets) identified and future asset typologies for which consent is being sought.

Temporal Scope

5.18.14 The temporal scope is the duration of the construction, operational and maintenance phase:

- **Construction phase:** Construction works are anticipated to commence in 2028 for a duration of approximately four years. To assess the likely impacts of climate change on the construction phase, climate projections for the 2030s (2030-2039) time-period have been used for construction activities, to represent a reasonable worst-case approach.
- **Operation (including maintenance) phase:** the design life of the Project is assumed to be 80 years; however, it is typically unusual for elements of National Grid's electricity transmission system to be decommissioned and sites reinstated. In general, assets will be replaced towards the end of their design life (which varies depending on the asset and its condition throughout its operational life). To assess the likely impacts of climate change on the operational phase, available UK Climate Projections for the 2040s, 2050s, 2060s and 2070s time periods have been used. This aligns with data currently available from the Met Office UK Climate Projections 2018 (UKCP18) 'regional' 12 km land projections, which provides data up until the period ending 2079.

Data Sources

5.18.15 The following data sources have been used to develop the climate change resilience screening assessment:

- UK Climate Change Risk Assessment (2022) (Ref 5.19).
- NGET Climate Change Adaptation Report (Ref 5.18).
- Met Office historic climate data, from the period 1991 – 2020 obtained from the weather stations closest to the Scoping Boundary to represent the climate trends for the East Midlands region and therefore the Scoping Boundary (Ref 5.20):
  - Watnall: Grid reference SK 50425 45561.
  - Ashover No 2: Grid reference SK 34978 62913.
  - Sutton Bonington: Grid reference SK 50625 26428.
  - Denstone: Grid reference SK 09200 39967.
- UKCP18 – Regional 12 km models for the East Midlands (Ref 5.21).

Existing and Future Baseline Conditions

5.18.16 The existing and future baseline conditions are presented in **Table 5.10**.

5.18.17 Met Office historic climate data (Ref 5.20), from the period 1991 – 2020, was obtained from the weather stations closest to the Scoping Boundary and allowed the identification of existing baseline conditions representative of the study area. These were identified as:

- Watnall: Grid reference SK 50425 45561.
- Ashover No 2: Grid reference SK 34978 62913.
- Sutton Bonington: Grid reference SK 50625 26428.
- Denstone: Grid reference SK 09200 39967.

5.18.18 The UKCP18 (Ref 5.21) have been developed to provide projections for future climate scenarios and trends. The UKCP18 data is the most robust source of information on the UK's future climate.

5.18.19 UKCP18 was used to identify probabilistic projections for pre-defined 20-year time periods (e.g. 2020–2039, 2040–2059 and 2060–2079). A range of possible Representative Concentration Pathways (RCPs), selected from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (Ref 5.22), have been used by UKCP18 to inform differing future emission trends. The four scenarios are RCP2.6, RCP4.5, RCP6.0 and RCP8.5. Scenario RCP8.5 represents a high-emission scenario resulting in a global average temperature increase of around 4°C for a 50th percentile probability of hazard occurring.

5.18.20 The UKCP18 projections represent average climate conditions and do not capture the full range of possible future climate change hazards (e.g. droughts, heatwaves and heavy rainfall events). Therefore, the UKCP18 climate change projections have been used qualitatively to identify how climate change hazards associated with climatic variables are likely to change over time.

5.18.21 By comparing the existing baseline climatic conditions (as identified through Met Office datasets) against the future climate change projections, an indication of the direction and degree of change can be determined.

5.18.22 The following climate variables were analysed for the climate change resilience screening assessment to provide a proxy for a qualitative review of potential climate change hazards:

- Mean annual air temperature (°C).
- Mean summer air temperature (°C).
- Mean winter air temperature (°C).
- Maximum summer air temperature (°C).
- Minimum winter air temperature (°C).
- Mean annual precipitation (mm/day).
- Mean summer precipitation (mm/day).
- Mean winter precipitation (mm/day).

Table 5.10 – Existing and future baseline conditions for selected climate variables

Climate Variable	Existing Baseline in East Midlands Region (1991-2020)	Future Baseline in the East Midlands Region			Description of Climate Trends and Potential for Climate Change Hazards
		2020-2039	2040-2059	2060-2079	
Mean annual air temperature (°C)	9.9	10.54	11.52	12.74	Average mean temperatures for England are expected to increase when compared to baseline. Consistent with global trends, the average annual temperature within the East Midlands region shows an increase of 2.84 °C across the lifetime of the Project when compared to the existing baseline. This is further supported by the seasonal average temperature for summer increasing by 4.19 °C and seasonal average temperatures for winter increasing by 2.29 °C leading to milder winters.
Mean summer air temperature (°C)	15.86	17.26	18.38	20.05	
Mean winter air temperature (°C)	4.44	4.99	5.77	6.73	
Maximum summer air temperature (°C)	22.02	21.84	23.23	25.23	Similar to the mean annual temperatures, maximum temperatures for the summer and winter seasons show a trend of increasing over the design life of the Project. This is an indication of more frequent extreme high temperatures during the summer and a higher frequency of heatwaves and an increased potential risk of wildfires from occurring over the design life of the Project. The frequency of extreme low temperatures occurring during the winter season are likely to decrease over the lifetime of the Project however more extreme diurnal temperature cycles may occur. This is noted as a medium term risk in the NGET Climate Change Adaptation Report.
Minimum winter air temperature (°C)	1.13	2.68	3.33	4.34	

Climate Variable	Existing Baseline in East Midlands Region (1991-2020)	Future Baseline in the East Midlands Region			Description of Climate Trends and Potential for Climate Change Hazards
		2020-2039	2040-2059	2060-2079	
Mean annual precipitation (mm/day)	2.14	2.29	2.24	2.20	Precipitation levels for the East Midlands region are projected to increase in the winter months but decrease during summer months. The projections show that over the lifetime of the Project, summer precipitation will decrease by 38% and winter precipitation will increase by 43%, when compared to the existing baseline. This, coupled with the temperature trends could lead to increased risk of drought and wildfire during the summer seasons. Although mean annual precipitation rates show a trend of reducing over the lifetime of the Project, the seasonal fluctuation and nature of rainfall (increased intensity, short duration), may result in additional runoff and scour. This is noted as a medium term risk in the National Grid Climate Change Adaptation Report.
Mean summer precipitation (mm/day)	2.19	1.76	1.57	1.36	
Mean winter precipitation (mm/day)	2.25	2.87	2.98	3.22	

Receptors

5.18.23 The climate change resilience screening assessment presented in **Table 5.11** includes all infrastructure and assets associated with the Project and identifies the Project's receptors within the study area that are vulnerable to the future climate change scenarios developed as follows:

- Construction phase receptors such as workforce, plant, equipment.
- Project assets such as pylons, overhead lines, the proposed new Chesterfield Substation (where this is brought into the Project scope) and operational workforce and their operation and maintenance as described in **Chapter 4: Description of the Project**.

Table 5.11 – Climate Change Resilience Screening Assessment for the Project

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
Construction Phase			
Material assets and equipment for construction of built assets: equipment	Extreme high temperatures and heatwaves	High temperatures or prolonged heat could impact the operational performance of equipment and may result in delays to construction programme.	Where possible, avoid using machinery and equipment in the hottest part of the day to avoid potential overheating. Ensure equipment is stored correctly and maintained as per operating guidance.
	Extreme low temperatures	Low temperatures could impact the operational performance of equipment and may result in delays to construction programme.	Ensure equipment is stored correctly and maintained as per operating guidance. Due to projected decreases in colder weather periods related to climate change this is not anticipated to result in a substantial impact.
	High winds and storms (compounding event)	Damage to materials and construction equipment may result in delays to construction programme and associated costs and/or unacceptable safety risks.	Where possible, avoid using machinery and equipment in high winds and storms. Ensure equipment is stored correctly and maintained as per operating guidance.
	Flood risk: tidal and fluvial	Heavy precipitation could lead to localised flooding impacting equipment on site and resulting in delays to construction programme and associated costs.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • HD15: The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			information. The contractor(s) will implement a suitable flood risk action plan, which will include appropriate evacuation procedures should a flood occur or be forecast. Ensure equipment is stored correctly to avoid damage during a flood event e.g. raising to an acceptable level where possible. Where appropriate, equipment should be removed from site in the event of flood warnings being issued.
Materials and equipment for construction of built assets: Structures and stockpiles	High winds and storms (compounding event)	High winds and summer and winter compound events may lead to an increased risk of dust generation or erosion of stockpiles, and an increased risk of surface water run-off and contamination.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • CC01: The Contractor will pay due consideration to the impacts of extreme weather events and related conditions during construction. Measures will include, for example: o Health and safety plans to prevent worker exhaustion due to heat supportive measures for working in high temperatures might include the provision of sunblock, sun hats and lightweight clothing, refreshment breaks and cooled water supply. o Temporary buildings designed with measures to cool summertime overheating. o Safety measures to mitigate against issues caused by high winds such as increase dust or damage to structures/construction plant.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			• CC04: The Contractor will consider all measures deemed necessary and appropriate to manage severe weather events. Measures will include, for example: o A minimum cover training of personnel and prevention and monitoring arrangements to manage severe weather events; and o As appropriate, construction method statements should also consider severe weather events where risks have been identified.
		High winds may lead to damage to temporary construction structures e.g. fencing.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • GG25: Fencing will be regularly inspected and maintained and removed as part of the demobilisation unless otherwise specified.
	Flood risk: tidal, fluvial and surface water	Increased risk of flooding could lead to erosion of stockpiles resulting in siltage of drainage assets.	**Chapter 9: Hydrology and Land Drainage** outlines measures to reduce the risk of pollution of the water environment during construction through removing pathways between sources and receptors.
Access routes to construction site e.g. to pylon and substation locations via temporary access tracks and temporary working areas	Extreme low temperatures	Viability of, and access to construction sites could be temporarily compromised due to icy conditions leading to associated disruption or hinderance of construction processes resulting in delays to	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • HD14: An Emergency Action Plan will be developed for the construction phase which will outline procedures to be implemented in

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		construction programme and associated costs.	case of unplanned events, including but not limited to site flooding and pollution incidents. Due to projected decreases in colder weather periods related to climate change this is not anticipated to result in a substantial impact. • CC02: The Contractor will consider all measures deemed necessary and appropriate to manage severe weather events. Measures will include, for example: o As appropriate, construction method statements should also consider severe weather events where risks have been identified.
	Flood risk: tidal, fluvial and surface water	Viability of, and access to construction sites could be temporarily compromised leading to associated disruption or hinderance of construction processes resulting in delays to construction programme and associated costs.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • HD14: An Emergency Action Plan will be developed for the construction phase which will outline procedures to be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents.
	Wildfires	Viability of, and access to construction sites temporarily compromised and associated disruption or hinderance of construction processes resulting in delays to construction programme and associated costs.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • CC05: An early warning system for wildfire detection and evacuation procedures for construction workers should be implemented alongside fire safety measures such as

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			clearance of vegetation around temporary structures (where appropriate), access to fire extinguishing equipment, and evacuation protocols developed.
Human health: Workers at construction sites	Extreme high temperatures and heatwaves	Increased heat stress/heat exhaustion for workers may lead to unacceptable safety risks.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • CC01: The Contractor will pay due consideration to the impacts of extreme weather events and related conditions during construction. Measures will include, for example: o Health and safety plans to prevent worker exhaustion due to heat supportive measures for working in high temperatures might include the provision of sunblock, sun hats and lightweight clothing, refreshment breaks and cooled water supply. o Temporary buildings designed with measures to cool summertime overheating. • CC04: The Contractor should use a short to medium range weather forecasting service from the Met Office, or other approved meteorological data and weather forecast provider, to inform short to medium term programme management, environmental control and impact mitigation measures e.g. health and safety plans to include supportive measures for working in extreme high or low temperatures. The contractor's Environmental
	Extreme low temperatures	Possible negative health implications for workers on construction site may lead to unacceptable safety risks.	

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Management System will consider all measures deemed necessary and appropriate to manage severe weather events and should as a minimum cover training of personnel and prevention and monitoring arrangements to manage severe weather events. As appropriate, construction method statements should also consider severe weather events where risks have been identified. • GG05: 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: o Pollution prevention and pollution incident response. o Dust management and control measures. o Location and protection of sensitive environmental sites and features. o Adherence to protected environmental areas around sensitive features. o Working hours and noise and vibration reduction measures. o Working with potentially contaminated materials. o Waste management and storage. o Flood risk response actions. o Agreed traffic routes, access points, etc. • HD14: An Emergency Action Plan will be developed for the construction phase which

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			will outline procedures to be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents. • HD15: The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The contractor(s) will implement a suitable flood risk action plan, which will include appropriate evacuation procedures should a flood occur or be forecast.
	Wildfires	Occurrences of wildfires in surrounding areas for construction workers may lead to unacceptable safety risks (e.g. smoke inhalation and in extreme cases harm to health).	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts including: • CC03: An early warning system for wildfire detection and evacuation procedures for construction workers should be implemented alongside fire safety measures such as clearance of vegetation around temporary structures (where appropriate), access to fire extinguishing equipment, and evacuation protocols developed. • HD14: An Emergency Action Plan will be developed for the construction phase which will outline procedures to be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
Environmental Receptors	Drought	Drought conditions may reduce availability of water supplies during construction e.g. impacts on the ability utilise to dust suppression measures	Efficient use of water during construction, especially in dry conditions (to reduce risk of dust generation). Minimise dust as far as reasonably practicable, in line with dust control measures set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** (e.g. reduce dust emissions through the effective transportation and storage of materials such as dampening down of dusts particularly where material is stockpiled), and the proposed monitoring regime.
	Flood risk: tidal, fluvial and surface water	Increased risk of precipitation leading to flooding could may result in erosion of stockpiles and mobilisation of contamination to the surrounding environment.	**Chapter 9: Hydrology and Land Drainage** outlines measures to reduce the risk of pollution of the water environment during construction through removing pathways between sources and receptors.
Operational Phase			
Substations	Extreme high temperatures and heatwaves	Increased occurrences of high temperatures could lead to: • Overheating of substation transformers, resulting in reduced capacity and life expectancy of the asset, in extreme cases, catastrophic failure. • Overheating of associated plant resulting in reduced capacity and life expectancy of the asset, in extreme cases, asset failure.	Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within temperature parameters. Acceptable temperature parameters to be confirmed with the design team at the detailed design stage. Existing robust earthing systems should be effective in mitigating the risk. **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts (including geology and hydrology): • GH01 - Geo-environmental and geotechnical intrusive and non-intrusive ground investigation and assessment would be

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		• Reduced soil moisture, increasing soil resistivity, resulting in a reduction of earthing system effectiveness. • Reduced capacity of conductors (the wires which carry the electricity from substations). • Ground movement which can impact on ground mounted structures such as transformer bases and switch house foundations, and cause breakage of earthing tape through shrinkage of susceptible soils. • Increased electricity demand during heatwaves could overload substation transformers resulting in tripping and loss of supply.	undertaken in accordance with current best practice including BS5930, BS10175 and Eurocode 7 which would inform, if required, a site remediation strategy, slope stability assessments, foundation design, and piling risk assessments where appropriate. This would be undertaken as part of the detailed pre-construction survey and design for implementation during construction. In line with National Grid's Climate Change Adaptation Report, the operator shall continue to monitor potential climate impacts on substations and seek to understand and make changes to National Grid Electricity NGET Policy, Procedure and Design Standards as necessary.
	Extreme low temperatures	Occurrences of extreme low temperatures could lead to reduction in operational performance of equipment within the substation.	Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within particular temperature parameters. In line with National Grid's Climate Change Adaptation Report, the operator shall continue to monitor potential climate impacts on substations and seek to understand and make changes to NGET

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Policy, Procedure and Design Standards as necessary.
	Freeze-thaw-cycles	Occurrences of freeze-thaw cycles and /or rapid fluctuations in ambient temperatures could lead to: • Increased erosion of asset foundations. • Localised ground movement, resulting in impacts to asset integrity.	Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within particular temperature parameters. Due to projected decreases in colder weather periods related to climate change this is not anticipated to result in a substantial impact. Existing risk management and resilience frameworks should be sufficient to manage any impacts.
	High winds and storms	High winds could increase the risk of wind-borne debris and may lead to faults and damage to substation assets.	Existing NGET design standards account for extreme weather conditions. Substation Equipment is designed to be resilient to a wind speed of 34 m/s (76 mph). NGET have seen instances of recent storm activities that have equalled and exceeded these standards, but the network and assets have performed as designed. NGET policy PS(T) 023 sets out requirements for primary insulation to be used in National Grid substations taking into account environmental conditions and project drivers.
	Lightning	Lightning events could result in short-circuit faults, triggering electrical protection and circuit breakers. In extreme events, lightning strikes could lead to asset damage.	National Grid Technical Specification (TS) 2.01 Part 1 (Relevant Electrical Standards - RES) Substations – Part 1 –Procedural (Ref 5.23), sets out the earthing requirements to manage the potential impact of lightning strikes on substation assets. In line with National Grid's Climate Change Adaptation Report, the operator shall continue to monitor potential climate impacts on substations and

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		Power surges may result in wider damages to the asset infrastructure.	seek to understand and make changes to NGET Policy, Procedure and Design Standards as necessary.
	Flood risk: tidal, fluvial and surface water	Periods of heavy rainfall could lead to: • Localised flooding and water ingress into assets which may result in damage to assets and wider network issues such as loss transmission. • Localised flooding which could result in stranded assets e.g. viability of, and access to assets may be temporarily compromised resulting in delays to maintenance or emergency repair activities.	**Chapter 9: Hydrology and Land Drainage** states that a FRA will be produced to inform the project design and the findings of the ES. The FRA will examine future flood risk over the development lifetime, and identify mitigation measures required to ensure flood resilience, taking climate change into account (in line with Environment Agency guidance). Further embedded design measures will be developed as the Project design evolves. This includes a minimum set-back distance between pylons and watercourses, flood mitigation measures for those substations which must, through further design development, be located in higher flood risk areas due a lack of alternative lower flood risk sites, and drainage design for substations to ensure no increase in flood or pollution risk arising from construction phase runoff.
	Wildfire	Occurrences of wildfires and associated smoke could damage conductors and may result in in arcing and tripping of circuits.	Wildfires impacting substations are mitigated to an extent through current NGET vegetation management policies (including use of Vegetation Management Optimisation, (Ref 5.24) where applicable). These policies do not currently extend to potential fire risk from arable land and peat.
	Drought	Specific sites on the project may be on substrate that is particularly vulnerable to drought and ground movement that could impact	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts (including geology and hydrology):

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		substation building infrastructure and other assets. Drought conditions could lead to reduced soil moisture which increases soil resistivity and a reduction in earthing system effectiveness. Where earthing design parameters are exceeded, system and public safety issues can arise with reduced touch potential distances or failure to fully dissipate fault current, leaving exposed metal components live.	• GH01 - Geo-environmental and geotechnical intrusive and non-intrusive ground investigation and assessment would be undertaken in accordance with current best practice including BS5930, BS10175 and Eurocode 7 which would inform, if required, a site remediation strategy, slope stability assessments, foundation design, and piling risk assessments where appropriate. This would be undertaken as part of the detailed pre-construction survey and design for implementation during construction. Ground investigation and assessment should be used to inform the detailed foundation design of substations. Monitoring plans should be implemented to refine understanding of risk occurring to ensure appropriate measures and response times are developed. Existing robust earthing systems should be effective in mitigating the risk.
Pylons	Extreme high temperatures and heatwaves	Periods of extreme high temperatures and heatwaves could lead to: • Drying out of the soil can lead to increased erosion potential. • Ground movement impacting on pylon foundations and cause breakage of earthing tape	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts (including geology and hydrology): • GH01 - Geo-environmental and geotechnical intrusive and non-intrusive ground investigation and assessment would be undertaken in accordance with current best practice including BS5930 , BS10175 and Eurocode 7 which would inform, if required, a site remediation strategy, slope stability assessments, foundation design, and piling

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		through shrinkage of susceptible soils. • Reduced soil moisture, increasing soil resistivity, resulting in a reduction of earthing system effectiveness.	risk assessments where appropriate. This would be undertaken as part of the detailed pre-construction survey and design for implementation during construction. Ground investigation and assessment should be used to inform the detailed foundation design of substations. It is anticipated that most pylon foundations along the route will be formed of 'piled' foundations, to mitigate this risk. Where ground conditions are not considered to be suitable, pad foundations may be specified. This will be considered further within the detailed design stage Continue to monitor and make changes to Policy, Procedure and Design Standards as necessary. Include requirements for regular maintenance and inspections following extended periods of high temperatures. Existing robust earthing systems should be effective in mitigating the risk.
	Freeze-thaw-cycles	Occurrences of freeze-thaw cycles and /or rapid fluctuations in ambient temperatures could lead to: • Increased erosion of asset foundations. • Localised ground movement, resulting in impacts to asset integrity.	Due to projected decreases in colder weather periods related to climate change this is not anticipated to be a substantial risk moving forward. Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within temperature parameters. **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts (including geology and hydrology): • GH01 - Intrusive ground investigations and assessment will be undertaken prior to

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			construction which will inform appropriate geotechnical design in relation to the Study Area/structure specific ground conditions including ground instability/adverse ground conditions.
	High winds and storms	High winds could increase the risk of wind-borne debris and may lead to damage to pylons.	Existing NGET design standards account for extreme wind conditions and consider different wind speeds and directions. The analysis does not consider the cumulative effects of windstorms, but does consider several variables/scenarios and takes into account pylon elevation and land cover assumptions. NGET is currently undertaking further innovation and analysis as part of the Whole Energy System Resilience Vulnerability Assessment (Ref 5.25) programme, and emerging outputs of this research should be considered during the detailed design stage. The risk of falling trees and other vegetation to be managed through current NGET vegetation management policies (including use of Vegetation Management Optimisation, (Ref 5.24) where applicable).
	Lightning	In extreme events, lightning strikes to exposed pylon assets could result in surges that could cause circuits to trip. Extreme cases of lightning strikes could lead to physical damage to the assets.	Earth wire is designed to provide some shielding to the phase conductors and absorb the current of a direct lightning strike, with this fault current being distributed along the earth wire and into the ground via towers and the substation earth mats. Protection and control measures for equipment for the network should continue to be monitored to manage the future level of risk of the hazard occurring.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
	Flood risk: tidal, fluvial and surface water	High velocity flood events could lead to: • Scour of pylon foundations, exert significant loads on structure and may result in damage to the pylon structures. • Riverbank or drainage ditch erosion in the vicinity of pylons, undermining foundations.	**Chapter 9: Hydrology and Land Drainage** states that a FRA will be produced to inform the project design and the findings of the ES. The FRA will examine future flood risk over the development lifetime, and identify mitigation measures required to ensure flood resilience, taking climate change into account (in line with Environment Agency guidance). Further embedded design measures will be developed as the Project design evolves. This includes a minimum set-back distance between pylons and watercourses. Suitable corrosion and pH resistant concrete formulas will be utilised for pylon foundations to minimise the risk, such that the new infrastructure and structures are not susceptible to significant effects resulting from ground instability or chemical damage of concrete, including flood risk. The water environment assessment within the ES will be supported by a FRA, which will consider the impacts of climate change on future flood risk (including reservoir flooding) and will be assessed in line with the most up to date Environment Agency guidance.
	Wildfire	Occurrences of wildfires could result in damage to pylons and earthwire. However, typically pylon structures are designed to withstand high temperatures.	Pylons will be constructed from materials that are compliant with national fire standards. Further embedded design measures will be considered as the Project design evolves, through engagement with the engineering design team, to ensure extreme weather and climate related impacts are minimised where possible. Measures will be incorporated into the future development of Project design principles.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Wildfires impacting pylons are mitigated to an extent through current NGET vegetation management policies (including use of Vegetation Management Optimisation, (Ref 5.24) where applicable).
	Drought	Increasing temperatures will, without precipitation, lead to drying of the ground causing it to shrink. Any structures built on this ground will be subject to movement which, as well as being amplified by the height of the structure, can lead to instability of the foundations. Pylons are more vulnerable to this movement. Earthing tape may also be broken through ground movement. As moisture in the soil reduces the soil resistivity increases, reducing the effectiveness of the earthing system. Where earthing design parameters are exceeded, system and public safety issues can arise with reduced touch potential distances or failure to fully dissipate fault current, leaving exposed metal components live.	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts (including geology and hydrology): • GH01 - Geo-environmental and geotechnical intrusive and non-intrusive ground investigation and assessment would be undertaken in accordance with current best practice including BS5930, BS10175 and Eurocode 7 which would inform, if required, a site remediation strategy, slope stability assessments, foundation design, and piling risk assessments where appropriate. This would be undertaken as part of the detailed pre-construction survey and design for implementation during construction. It is anticipated that most pylon foundations along the route will be formed of 'piled' foundations, to mitigate this risk. Where ground condition are suitable, pad foundations may be specified. This will be considered further within the detailed design stage. Existing robust earthing systems should be effective in mitigating the risk.
Overhead lines	Extreme high temperatures and heatwaves	Increased occurrences of high temperatures and heatwaves could lead to:	Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within particular temperature parameters in line with SQSS Code Documents (Ref

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
		• Thermal expansion of conductors and overhead lines that could lead to increased line sag that exceeds the overhead line UK design parameters, resulting in increased number of incidents where clearance limits are compromised and need for maintenance downtime, reducing network capacity. • Reduced ability for the conductor to operate at maximum efficiency (as the core temperature increases so does resistance within the conductor reducing its ability to carry current, thus reducing its capacity).	5.26). The SQSS Code Documents include operational criteria and management measures that address conditions that could increase the likelihood of a overhead line fault (e.g. high winds, lightning, very high or low ambient temperatures, high precipitation and flooding). Overhead line and support structures will be designed in accordance with BS EN 50341-2-9 (2017) National Normative Aspects and Technical Specifications to ensure the minimum ground to conductor clearances are maintained. Overhead line ratings vary across the seasons to take account of ambient temperature variations to ensure that lines are not overloaded. Ratings are typically lower in the Summer as a result. Typically, overhead line circuits are not run close to their maximum ratings for long periods of time for the purpose of fault contingency. Dynamic Line Rating may be used, where temperature and sag sensors on overhead lines allow line ratings to be changed in real time to respond to daily or even hourly variations in ambient temperature, as opposed to seasonal ratings currently used on the majority of lines. Further embedded design measures will be considered as the Project design evolves, through engagement with the engineering design team, to ensure extreme weather and climate related impacts are minimised where possible. Measures will be incorporated into the future development of Project design principles.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Additionally, future requirements should be included for regular maintenance and inspections following extended periods of high temperatures.
	Extreme low temperatures	Occurrences of extreme low temperatures could lead to: • Ice and snow gathering on overhead lines and insulators and may cause snow sleeves and/or flashover faults icing phenomena. • Increased mechanical tension resulting in line sag. • A reduction in operational performance of equipment.	Network assets to be manufactured to National Grid and international standards (where relevant) and designed to operate within particular temperature parameters. Due to projected decreases in colder weather periods related to climate change, this is not anticipated to be a substantial risk.
	High winds and storms (including summer and winter compound events)	High winds could increase the risk of wind-borne debris and may lead to damage to the overhead line.	Access to overhead lines may be restricted during a wind event but it is considered unlikely to have a severe impact on fault response due to the resilience of the network and relatively short storm duration. The risk of falling trees and other vegetation to be managed through current NGET vegetation management policies (including use of Vegetation Management Optimisation where applicable). The risk of falling trees and other vegetation to be managed through current NGET vegetation management policies (including use of Vegetation Management Optimisation where applicable). NGET is currently undertaking further innovation and analysis as part of the Whole Energy System

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Resilience Vulnerability Assessment (Ref 5.26) programme, and emerging outputs of this research should be considered during the detailed design stage. Any identified measures to minimise this potential risk will be incorporated into the future development of Project design principles.
	Lightning	Lightning events could result in short-circuit faults, triggering electrical protection and circuit breakers. In extreme events, lightning strikes on exposed overhead lines could lead to asset damage.	Earth wire is designed to provide some shielding to the phase conductors and absorb the current of a direct lightning strike, with this fault current being distributed along the earth wire and into the ground via towers and the substation earth mats. Over voltages and flashovers may still occur with lightning strikes on overhead lines but these faults will be cleared by protection systems which will open the breakers at each end of the line before closing them again shortly after, known as delayed auto reclose. Protection and control measures for equipment for the network should continue to be monitored to manage the future level of risk of hazard occurring.
	Wildfire	Occurrences of wildfires and associated smoke could damage conductors and may result in in arcing and tripping of circuits. Occurrences of wildfires could damage operational telecommunication systems and may result in faults, inability to control the network, or loss of power generation / supply.	Wildfires impacting overhead lines are mitigated to a large extent via current NGET vegetation management policies. Operation and maintenance plans for the Project should include requirements for inspections following wildfire. There is currently no mitigation available to reduce the risk of smoke causing arcing within conductors. A fire safety procedure should be developed for the operational phase that includes risks of wildfire.

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
Human Health receptors	Extreme high temperatures and heatwaves	Increased heat stress/heat exhaustion for maintenance workers may lead to unacceptable safety risks for maintenance workers.	Managed through adherence to NGET's health and safety procedures for operations and maintenance activities.
	Extreme low temperatures	Possible negative health implications for maintenance workers may lead to unacceptable safety risks for maintenance workers.	
	High winds and storms (including summer and winter compound events)	Increased risk of windblown debris may lead to unacceptable safety risks for maintenance workers.	
	Flood risk: tidal, fluvial and surface water	Heavy precipitation may lead to localised flooding and unacceptable safety risks for maintenance workers.	
	Wildfires	Occurrences of wildfires in surrounding areas for maintenance workers may lead to unacceptable safety risks (e.g. smoke inhalation and in extreme cases harm to health).	
Environmental receptors: landscape		Increased temperatures and drought conditions could compromise the landscape design (e.g. plants and shrubs die).	**Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** outlines measures relevant to the control and management of potential climate impacts: • GG03: A Construction Environmental Management Plan, a Landscape and

Identified Receptor	Climate Change Hazard	Potential Climate Change Impact	Design and Control Measure Identified
			Ecological Management Plan (LEMP), or equivalent, will be produced prior to construction.

5.19 Greenhouse Gas Emissions

Introduction

5.19.2 The Project will directly support the government's identified critical national priority for the provision of nationally significant low carbon infrastructure, as identified in NPS EN-1 in that it will contribute towards greater efficiency in constructing, operating and connecting low carbon infrastructure to the National Electricity Transmission System.

5.19.3 The need for the Project is to support the transfer and connection of green, renewable energy into the UK power infrastructure network. The Project would support the UK's net zero target to achieve net zero emissions by 2050 by adding capacity to accommodate increasing power flows from offshore wind and interconnections in Scotland and North-East England, to areas of demand south to the Midlands and beyond.

5.19.4 It is not considered that the Project, as electricity transmission infrastructure and a boundary reinforcement, will be the direct or indirect cause of either upstream electricity generation or downstream electricity consumption. Hence, it will not be the direct or indirect cause of emissions from upstream or downstream activities. The Project will facilitate the transport of electricity on the network in response to an identified projected increase in demand. The mix of electricity generation sources cannot be known at the time of undertaking the EIA and will likely change over time, especially in relation to government policy on decarbonisation of the energy sector. In addition, sources of electricity entering the network will likely be varied and subject to their own carbon assessments.

5.19.5 It is proposed that an assessment of likely significant effects resulting from greenhouse gas (GHG) emissions would be **Scoped Out** of the ES for the following reasons:

- The Project's greenhouse gas emissions would not materially impact the UK Government's ability to meet its international commitments to Net Zero by 2050 mandated through the statutory carbon budgets.
- The Project provides an alignment to best practice and net zero policy. Guidance published by the IEMA *"Assessing Greenhouse Gas Emissions and Evaluating their Significance*" (Ref 5.27), makes it clear that the crux of significance is not whether the Project emits GHG emissions, or even the magnitude of those emissions, but whether the Project contributes to reducing GHG emissions relative to a baseline and is consistent with a trajectory towards net zero. In this respect, the Project is supporting the UK in delivering its net zero targets.

5.19.6 Notwithstanding, the Applicant, as a promoter of NSIPs, recognises its role in supporting the UK's transition to net zero and in line with the requirements of NPS EN-1 will address the Project's GHG emissions through the development of a GHG emissions quantification to be submitted in support of the DCO application.

5.19.7 In setting out the requirements for promoters of NSIPs on electricity infrastructure, NPS EN-1 states:

5.19.8 "All proposals for energy infrastructure projects should include a Greenhouse Gas assessment as part of their ES"

5.19.9 Therefore, the GHG quantification would set out the following aspect:

- The Project's compliance with national policy in relation to GHG emissions.

- A whole life GHG assessment aligned to Publicly Available Standard (PAS) 2080: 2023: Carbon Management in Infrastructure (Ref 5.28), including spatial and temporal scope.
- A description of the data sources.
- An explanation of the steps that have been taken to drive down whole life Project GHG emissions, including the application of best available techniques for that type of technology.

Design and Control Measures

5.19.10 To support the Applicant's position in alignment with industry best practice and net zero policy, potential design and control measures have been identified to minimise GHG emissions. Embedded, good practice and additional mitigation measures, aligned to industry best practice and net zero policy, would be implemented within the preliminary design to reduce whole life GHG emissions.

5.19.11 The Project has been routed in accordance with Holford Rules to consider options to reduce the overall route length where possible, which therefore may lead to a reduction in the quantity of materials (and associated embodied carbon) required for construction. The detailed design process for the Project will be iterative and shall seek to minimise GHG emissions associated with the design of assets, construction and operation.

5.19.12 Embedded, good practice and additional mitigation measures, where practicable, may include but are not limited to:

- The integration of carbon as a weighted element within the design and construction decision-making process and the application of the carbon reduction hierarchy as set out in section 4.3 of PAS 2080:2023:
  - Avoid: Align the outcomes of the Project and/or programme of work with the net zero transition.
  - Switch: assess alternative solutions and then adopt one that reduces whole life emissions through alternative scope, design approach, materials, technologies.
  - Improve: Identify and adopt solutions and techniques that improve the use of resources and design life of an asset.
- Designing, specifying and constructing the Project with a view to maximising the operational lifespan and minimising the need for maintenance and refurbishment (and thus reducing the frequency of releasing associated GHG emissions).
- Applying the circular economy principles throughout the design stage with the intention to implement measures to design out waste and integrate circular economy principles which will include consideration of construction, operation, and end-of-life processes. Materials will be selected to minimise waste over the whole life cycle of the Project. More information can be found under 'Material Assets and Waste'.
- Maximising the potential for reuse of material recovered from the site. Alternatively, the use locally sourced materials, where available and feasible to minimise the distance materials are transported from source would be preferred.
- Where appropriate, and where design standards permit, the Project will endeavour to use materials with the highest recycled content, where this leads

to lower whole life carbon emissions and encourage their use through procurement exercises.

- The Project will consider a range of measures to reduce energy consumption (and associated emissions) during both construction and operation, as set out in **Chapter 4: Description of the Project** under '*Approach to energy consumption*'.
- Specifying efficient ancillary infrastructure and equipment (such as lighting and telecommunications) that is long-lasting and chosen for its durability and energy efficiency credentials.

5.20 Materials Assets and Waste

Material Assets

5.20.2 The Project would require the use of new materials during the construction stage. The main materials would include steel for the pylons, concrete for the foundations, insulator sets and aluminium conductors (wire) and the underground cables. Further information regarding materials would be included within the Project Description chapter within the ES, and a separate chapter is not proposed.

5.20.3 The material sources are unlikely to be identified until the detailed design stage of the Project, which would happen post-consent. Due to the nature of the Project assets, this means it will be difficult to use secondary sources during the construction stage as it can impact the operation and design life Project. NGET has existing processes in place to source materials from sustainable sources and to use recycled materials where these do not compromise the required design standards and operational life of the English Onshore Scheme.

5.20.4 Temporary materials such as those used for haul routes and site compounds, works cabins and security fencing would be required during construction. As is standard on large scale construction projects, it is assumed these would be reused at other construction projects after completion of the Project. Due to existing processes that NGET has in place to source and manage materials, this element is therefore **Scoped Out** of the ES as a separate environmental topic chapter.

Waste

5.20.5 Waste materials would be produced by the Project. NGET will adopt good construction and management practices to ensure that waste is minimised as far as reasonably possible and that the storage, transport and management of waste have no significant environmental effects.

5.20.6 The management and collection of waste arisings will be carried out under the requirements of the UK waste regulatory regime. The Main Works Contractor would produce a Site Waste Management Plan (SWMP) prior to construction (a draft SWMP would be included as an appendix to the outline CoCP within the DCO application). This would set out how the Project will apply the waste hierarchy throughout the detailed design and construction phases with measures to reduce the generation of waste in the first place as well as measures to reuse and recycle materials where practicable and limit quantities of waste disposed at landfill. It would also identify waste management facilities to recover and recycle Project waste. It is therefore proposed that materials would not be the subject of a separate environmental topic chapter in the ES and is **Scoped Out**. The effects of any waste producing activities would be addressed as part of the relevant environmental aspects and associated strategies, for

example the transport effects from the management of waste arisings would be considered in **Chapter 12: Traffic and Transport**.

5.21 References

Ref 5.1: Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping, version 7. (Online)

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6. Landscape and Visual

nationalgrid

Contents

6. Landscape and Visual

6.1 Introduction

6.1.1 This chapter presents how the landscape and visual assessment will consider the potentially significant effects on landscape and visual receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

6.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

6.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

6.2 Approach to Scoping

6.2.1 The approach to the scoping of the LVIA has drawn from previous experience of similar projects and professional judgement. Determining the scope of the LVIA has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the LVIA Study Area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

6.2.2 There are interrelationships related to the potential effects on landscape and visual receptors and other environmental topics. Therefore, this section of the scoping report must be read alongside the following chapters:

- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 8: Historic Environment.**
- **Chapter 12: Traffic and Transport.**
- **Chapter 15: Socio-economics, Recreation and Tourism.**

6.2.3 The Landscape and Visual chapter is supported by the following figures in **Volume 3**:

- **Figure 6.1: Provisional LVIA Study Area.**
- **Figure 6.2: Landscape Designations and Features (north).**
- **Figure 6.3: Landscape Designations and Features (south).**
- **Figure 6.4: Landscape Character (north).**
- **Figure 6.5: Landscape Character (central).**
- **Figure 6.6: Landscape Character (south).**

6.3 Key Regulatory and Planning Policy Context

Key Legislation

6.3.1 A summary of the key legislation considered in the scope of effects on landscape and visual is outlined below:

- The European Landscape Convention (Council of Europe, 2000): The European Landscape Convention (ELC) (Ref 6.1) was ratified in the UK in 2006. It defines landscape as: "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*". The ELC promotes an "all-landscapes approach" which recognises value in all landscapes. It identifies landscape as an important component of the environment and of people's surroundings in both town and country and whether it is ordinary landscape or outstanding.

National Planning Policy

National Policy Statements

6.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement for Energy NPS EN-1 (Ref 6.2) and National Policy Statement for Electricity Networks Infrastructure NPS EN-5 (Ref 6.3). EN-1 set outs broad guidance in relation to landscape and visual effects detail what a landscape and visual assessment should cover. EN-5 contains more specific guidance.

6.3.3 **Table 6.1** sets out the requirements of both NPSs for electricity networks infrastructure relevant to the LVIA and how these have been considered within this chapter and will be considered within the ES.

Table 6.1 – National Planning Policy relevant to the LVIA

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) 2024		
Section 5.10 Landscape and Visual	Landscape & Visual – general matters. 5.10.6 *'Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.'*	The Project will: be 'designed sensitively, given the [likely] siting, operational and other relevant constraints'; aim to 'minimise harm to landscape'; and provide 'reasonable mitigation' (including, if necessary off-site mitigation) 'where possible and appropriate'. Landscape and visual matters have already been and will continue to be considered at all stages of the Project's siting and design. This will allow demonstration of '*how negative effects have been minimised and how opportunities for creating possible benefits and/or enhancements have been recognised and/or incorporated into the design, delivery and operation of the'* Project. The visual assessment of the Project will include consideration of effects during construction (noting that these are temporary) and operation (including maintenance), and, if necessary, effects arising from possible light pollution.
	National Parks & other valued landscapes 5.10.7 *'National Parks, the Broads and AONBs have been confirmed by the government as having the highest status of protection in relation to landscape and natural beauty. Each of these designated areas has specific statutory purposes. Projects should be designed sensitively given the various siting, operational, and other*	Where the Project may be in the setting of a National Park, the highest status of protection in relation to landscape will be conferred, and effects upon its *'natural beauty'* and '*special qualities'* will be assessed. The Project will also have regard for valued local landscapes – in particular where a local authority's

Policy Reference	Policy Context	How it will be considered
	relevant constraints. For development proposals located within designated landscapes the Secretary of State should be satisfied that measures which seek to further purposes of the designation are sufficient, appropriate and proportionate to the type and scale of the development.' 5.10.8 *'The duty to seek to further the purposes of nationally designated landscapes also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. In these locations, projects should be designed sensitively given the various siting, operational, and other relevant constraints. The Secretary of State should be satisfied that measures which seek to further the purposes of the designation are sufficient, appropriate and proportionate to the type and scale of the development.'* 5.10.12 *'Outside nationally designated areas, there are local landscapes that may be highly valued locally. Where a local development document in England or a local development plan in Wales has policies based on landscape or waterscape character assessment, these should be paid particular attention. However, locally valued landscapes should not be used in themselves to refuse consent, as this may unduly restrict acceptable development.'* 5.10.16. *'The applicant should carry out a landscape and visual impact assessment and report it in the ES, including cumulative effects (see Section 4.3). Several guides have been produced to assist in addressing landscape issues.'*	development document has policies based on landscape character assessments. We will use such landscape character assessments (and other associated studies) as a means of assessing landscape impacts relevant to the Project (including cumulative impacts). Consideration would also be had for the effects upon 'landscape components' during construction (noting that these are temporary) and operation (including maintenance) of the Project.

Policy Reference	Policy Context	How it will be considered
	5.10.17 *'The landscape and visual assessment should include reference to any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project. The applicant's assessment should also take account of any relevant policies based on these assessments in local development documents in England and local development plans in Wales.'*	
Section 5.11 Land Use, Including Open Space, Green Infrastructure, and Green Belt	Green Belt 5.11.2 *'Green Belts, defined in a local authority's development plan in England or regional strategic development plans in Wales, are situated around certain cities and large built-up areas. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and permanence. For further information on the purposes of Green Belt policy see chapter 13 of the NPPF, or any successor to it.'* 5.11.8 'The ES (see Section 4.3) should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan. The assessment should be proportionate to the scale of the preferred scheme and its likely impacts on such receptors. For developments on previously developed land, the applicant should ensure that they have considered the risk posed by land contamination and how it is proposed to address this.'	There will be consideration (in the planning statement, submitted alongside the Environmental Statement) of whether the Project is '*inappropriate development'* within the meaning of Green Belt policy, and demonstration of the extent to which the Project may conflict with the purposes of the Green Belt. Where '*openness*' (being one of the essential characteristics of Green Belt) is an aesthetic and perceptual aspect of landscape character and visual amenity, it would be considered as part of the LVIA when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity.

Policy Reference	Policy Context	How it will be considered
	Users of Publicly accessible areas and paths 5.11.30 *'Public Rights of way, National Trails, and other rights of access to land are important recreational facilities for example for walkers, cyclists and horse riders. The Secretary of State should expect applicants to take appropriate mitigation measures to address adverse effects on coastal access, National Trails, other rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve or create new access. In considering revisions to an existing right of way, consideration should be given to the use, character, attractiveness, and convenience of the right of way.'*	The consideration of the visual effects of the Project upon users of public rights of way (PRoW), National Trails, public open space, open access land and promoted routes will take into consideration the current character and attractiveness of such routes and areas.
National Policy Statement for Electricity Networks (EN-5) 2024		
Section 2.9	Landscape & Visual Impact 2.9.14 '*Where the nature or proposed route of an overhead line will likely result in particularly significant landscape and visual impacts, as would be assessed through landscape, seascape and visual impact assessment, the applicant should demonstrate that they have given due consideration to the costs and benefits of feasible alternatives to the overhead line. This could include – where appropriate – rerouting, underground or subsea cables and the feasibility e.g. in cost, engineering or environmental terms of these. Applicants should note the position on nationally designated landscapes at section 2.9.20 below. '* 2.9.15 '*The ES should set out details of this consideration, including the applicant's rationale for eschewing feasible alternatives to the overhead line, and*	Consideration would be had to the landscape and visual effects (including the cumulative effects) of the Project and matters to reasonably mitigate such effects. There would be early identification of aspects of the Project that may cause widespread landscape & visual effects, and consideration of the costs (by others in the Project team) and benefits of feasible alternatives such as undergrounding and/or rationalisation/replacement of existing overhead lines. There would be special regard for nationally designated landscapes. We will demonstrate compliance with the Holford Rules and Horlock Rules, so far as reasonably possible, and the consideration of the mitigation techniques / approaches outlined in both documents.

Policy Reference	Policy Context	How it will be considered
	the mitigation cost-calculation methodology that this rationale may rely upon.' 2.9.16 '*The Holford Rules – guidelines for the routing of new overhead lines – were originally set out in 1959. These guidelines, intended as a common-sense approach to overhead line route design, were reviewed and updated by the industry in the 1990s, and they should be embodied in the applicants' proposals for new overhead lines.*	

Other National Policy

6.3.4 A summary of other relevant national policy considered in the scope of effects on landscape and visual includes:

- National Planning Policy Framework (NPPF) (Ref 6.4). In particular, Section 15 paragraphs 180, 182 which seeks '*protection and enhancement of valued landscapes*' (highlighting the issues of new development within, or within the setting of National Parks) and recognition of the '*intrinsic character and beauty of the countryside*'.

Regional and Local Planning Policy

6.3.5 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project specific to landscape and visual.

6.3.6 All local policy, specific to landscape and visual, would be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

6.3.7 Relevant guidance, specific to landscape and visual matters that has informed this Scoping Report and would inform the LVIA within the ES, comprises:

- National Grid Company plc (1992) and Scottish Hydro-Electric Transmission plc & (2003 notes). The Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines (Ref 6.5).
- National Grid Company (2009). The Horlock Rules: Substations and the Environment: Guidelines on Siting and Design (in pursuance of its duties under Schedule 9 of the Electricity Act 1989) (Ref 6.6).
- Landscape Institute and Institute for Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment – 3rd Edition (GLVIA3) (Ref 6.7).
- Landscape Institute (2013) GLVIA3 Statement of Clarification 1/13 10-06-13 (Ref 6.8).
- Natural England (2014). An Approach to Landscape Character Assessment (Ref 6.9).
- Planning Inspectorate (2015). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Ref 6.10).
- Scottish Natural Heritage (2017). Visual Representation of Wind Farms –Version 2.2 (Ref 6.11).
- Landscape Institute (2019). Technical Guidance Note 06/19 Visual Representation of Development Proposals (Ref 6.12).
- Landscape Institute (2019). Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19 (Ref 6.13).
- Natural England (2019). An approach to landscape sensitivity assessment – to inform spatial planning and land management (Ref 6.14).
- Landscape Institute (2021). Technical Guidance Note 02-21: Assessing landscape value outside national designations (Ref 6.15).

- Landscape Institute (2024). Technical Guidance Note 2024-01: Notes and Clarifications on Aspects of GLVIA3 (Ref 6.16).

6.4 Study Area

6.4.1 The extent of the LVIA's Study Area, as presented on **Figure 6.1: Provisional LVIA Study Area** in **Volume 3**, have been determined by the expected form and scale of the Project, the nature of the receiving landscape, and the landscape character and visual amenity receptors that may experience significant effects as a result of it.

6.4.2 Knowledge of the LVIA Study Area's landscape (gained from both desk study and field work), and professional judgement gained from experience of assessing other similar infrastructure indicates that tallest structures associated with such development (400 kV overhead line structures, approximately 50 m in height[1]) are potentially perceptible from up to 10 km away.

6.4.3 The emphasis of the LVIA will, however, be based on receptors lying within 5 km of the Scoping Boundary - where significant effects are most likely. Beyond 5 km such overhead line structures would form very small vertical components in views (when measured at arm's length they would have an apparent height of approximately up to 7.5 mm) and the build-up of layers of intervening landform, vegetation and buildings would markedly reduce their degree of visibility to the point that they form relatively indistinct constituents of people's overall visual experience.

6.4.4 Given, however, the relatively contrasting topography of the wider landscape surrounding the Project, and the presence of sensitive landscapes and visual receptors (such as Derwent Valley Mills World Heritage Site, Peak District National Park, and users of long distance paths and promoted views) within some of its more elevated areas, there is the potential for some significant effects to occur up to 7.5 km from the Scoping Boundary.

6.4.5 This could include viewpoints in these designated landscapes, or promoted locations outside of these where the topography allows more far-reaching views across the landscape which may incorporate the Project.

6.4.6 Therefore, whilst the provisional LVIA Study Area will in due course be refined and ultimately informed by Zone of Theoretically Visibility (ZTV) mapping and the ground truthing of its findings, the provisional extents have subsequently been set at 7.5 km from the Scoping Boundary. This greater breadth of LVIA Study Area would also allow identification of potential significant cumulative effects. Professional judgement will be used to decide whether any receptors that lie just outside the 7.5 km buffer should be included in the LVIA.

6.4.7 Should the final alignment comprise substantially long sections of underground cabling, the LVIA Study Area for these sections may be reduced in width, reflecting the fact that during operation there may not be any above ground structures along its length, but acknowledging the fact there may be significant effects from the subsequent cable sealing end compounds, from the construction of these and the cable burial works.

6.4.8 The Study Area would also include the area from which the proposed replacement substation at Chesterfield would be visible (where this is brought into the Project

[1] Localised requirements may prompt the need for taller pylons.

scope). As set out in **Chapter 4: Description of the Project** were such works to be incorporated within the Project scope, a separate ZTV for the likely proposed structures associated with this would be prepared.

6.5 Baseline Conditions (including future baseline)

Data Collection

6.5.1 The baseline within this Scoping Report has been informed by a desk study which has drawn on the following information sources:

- National Character Area Profiles.
- The East Midlands Regional Landscape Character Assessment (2010) (Ref 6.17).
- Local Landscape Character Assessments:
  - Peak District National Park – Landscape Strategy and Action Plan (2009) (Ref 6.18).
  - Landscape Character of Derbyshire (2013), and its associated Technical Support Documents (Ref 6.19).
  - Nottinghamshire Landscape Guidelines (2009) (Ref 6.20).
  - Leicester, Leicestershire and Rutland Landscape and Woodland Strategy (2001) (Ref 6.21).
- 1:25,000 and 1:50,000 Ordnance Survey (OS) maps.
- Aerial photography, Google Earth and Google Maps Street View.
- Terrain and slope analysis data.
- Open source GIS data.
- Data contained within the Management Plans of the Peak District National Park (Ref 6.22) and Derwent Valley Mills World Heritage Site (Ref 6.23).

6.5.2 In addition to the desk study described, this Scoping Report has been informed by initial site familiarisation visits. The site visits were undertaken in 2024, predominantly by car, but also by rail and on foot. The weather conditions during the visits allowed for good visibility. The purpose of the visits was to gain an overview of the general landscape character and visual resource in the wider landscape surrounding the Project.

Engagement with Stakeholders

6.5.3 The EIA will be informed by consultation and continued engagement with Landscape/ Planning Officers of Natural England, Derbyshire County Council and the relevant Local Authorities including the Peak District National Park Authority to ensure that specialist local views and expertise can be considered. This will include the agreement of matters such as the LVIA's methodology, receptors, representative viewpoints and visualisation types.

6.5.4 In addition, continued engagement will be undertaken with non-statutory stakeholders as required including, but not limited to, the National Trust and the Derwent Valley Mills World Heritage Site Partnership.

6.5.5 The principal feedback received from Non-Statutory Consultation with Statutory Environment bodies of relevance to this scoping chapter is included in **Table 6.2** below, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 6.2 – Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Derbyshire County Council – Landscape and Visual Team	As the majority of issues that need to be addressed relate to impacts on setting, this should be supported by a suitable Landscape Visual Impact Assessment (LVIA), developed in accordance with the Landscape Institute's guidelines for LVIAs. It would be expected that a detailed LVIA would make reference to the Areas of Multiple Environmental Sensitivity (AMES) study in its considerations and reflect on these sensitivities in route selection and/or mitigation.	An LVIA will be developed in accordance with the Landscape Institute's guidelines (set out in paragraph 6.3.7. The LVIA will also have regard for the AMES study as part of the consideration of the sensitivity of landscape receptors and, therefore the router selection and/or mitigation.
Derbyshire County Council – Landscape and Visual Team	LVIA should be applied in a truly iterative approach that considers the landscape and visual impacts of several route options and then how those identified impacts relate to the Holford Rules.	The matters of landscape and visual impact have been critical to the consideration of corridor options thus far (see the CPRSS - as described in Chapter 3: Main Alternatives Considered) and will continue to be so during the further stages of the Project's planning and design. Consideration of compliance with the Holford Rules (and the Horlock Rules for substations) have formed, and will continue to be part of this process.
Derbyshire County Council – Landscape and Visual Team	In the areas of the highest sensitivity, underground cable runs are generally preferred to pylons. Where underground runs are being considered, the extent of each run should be determined through a rigorous appreciation of the extent of effects that need to be mitigated, driven by the results and recommendations of a LVIA.	Areas of undergrounding will be reviewed in light of the NPS and Holford Rules. The results and recommendations of the LVIA will also be a key factor in helping determine where undergrounding is considered necessary.

Organisation and date	Summary of response	Consideration in the Scoping Report
Derbyshire County Council – Landscape and Visual Team	Twinning up with existing power line routes; in very general terms, it is considered that it is better to consolidate visual impacts rather than dispersing them, and creating new areas of harm particularly in relation to landscapes that have some recognised sensitivities at the county scale or where they form part of the setting to other important historic or natural assets.	Where considered to be necessary mitigation, reduction of wirescape through distribution network via rationalisation or undergrounding may be considered. The intensification of harm upon existing landscape and visual receptors, where the addition of further overhead lines in their vicinity may be proposed, will also be a factor in the consideration of effects within the LVIA.
Derbyshire County Council – Landscape and Visual Team	A development of this type, introducing tall pylons and overhead wires into the landscape, will create some adverse visual effects and in many cases, these will be difficult to mitigate. On the whole the use of the traditional lattice-type pylon is supported because in most situations this visually permeable structure does blend with a range of backgrounds or at least restricts its overall mass. However, where these masts are being proposed along sections of landscape with recognised landscape and visual sensitivities such as through the Amber Valley and to the west of Hardwick Hall and Park, then undergrounding the route would be the preferred option to help eliminate both landscape and visual harm.	The starting technical assumption for the Project is that steel lattice overhead lines will be used in accordance with National Grid's guidance and national planning policy.

Existing Baseline Conditions

6.5.6 The following paragraphs provide a description of the key landscape and visual receptors that are considered for scoping in and out of LVIA. Given the geographic extent and linearity of the Project these have been split into six geographic sections starting at the north.

Section 1: Chesterfield Substation to Stretton

Landscape Related Designations

6.5.7 As shown on **Figure 6.2: Landscape Designations & Features (north)** in **Volume 3**, there are no landscape-related designations within the Scoping Boundary between Chesterfield Substation and Stretton.

6.5.8 The LVIA Study Area surrounding this section contains a very small portion of the Peak District National Park – at its closest point approximately 7.6 km to the north-west of the Scoping Boundary at Stretton. Despite this being just outside of the LVIA Study Area and small in size, assessment of the possible impacts arising from changes within the setting of the National Park, given its sensitivity and the elevated nature of its landform, are considered relevant to the LVIA.

6.5.9 The Scoping Boundary between Chesterfield Substation and Stretton lies approximately 5.8 km from the Derwent Valley Mills World Heritage Site 'buffer zone' and 6.5 km from the 'core area' of the designation itself. Given this distance and the fact that that the 'core area' of the designation predominantly covers the base and lower slopes of the valley of the River Derwent past this section, intervening landform and vegetation are likely to combine to prevent intervisibility between these areas and this part of the Project. Accordingly, consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity for this section is not regarded relevant to the LVIA.

6.5.10 As shown on **Figure 6.2: Landscape Designations & Features (north)** in **Volume 3**, the West Yorkshire Green Belt is located approximately 100 m west of the Scoping Boundary, south of Birdholme and Hasland. Accordingly, analysis of the extent to which the Project may conflict with the openness characteristic of the West Yorkshire Green Belt is not considered relevant.

Landscape Character

6.5.11 The Chesterfield Substation and Stretton section lies within National Character Area (NCA) no.38 'Nottinghamshire, Derbyshire and Yorkshire Coalfield' (Ref 6.24).

6.5.12 Due to the potential for intervisibility with the Project from landscapes adjoining this NCA, that lie on the more upland areas immediately to the east and west of this section within the LVIA Study Area, the following NCAs are also relevant to the LVIA:

- No. 30 Southern Magnesian Limestone (Ref 6.25).
- No. 50 Derbyshire Peak Fringe and Lower Derwent (Ref 6.26).
- No. 51 Dark Peak (Ref 6.27).

6.5.13 The overall landscape character and individual characteristics described in the 'Profiles' for these NCAs have informed the descriptions contained in more local

landscape character assessment publications such as the *Landscape Character of Derbyshire (2013)* (Ref 6.19) the *Nottinghamshire Landscape Guidelines (2009)* (Ref 6.20) and the *Peak District National Park – Landscape Strategy (2009)* (Ref 6.18).

6.5.14 The following local character types described in these publications, which the Chesterfield Substation and Stretton section of the Scoping Boundary area lies within (as shown on **Figure 6.4: Landscape Character (north)** in **Volume 3**), are considered relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Village Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Estate Farmlands.

6.5.15 Due to the potential for intervisibility with the Project from landscapes adjoining these, the following other local landscape character types within the LVIA Study Area, are also considered relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Derbyshire Peak Fringe and Lower Derwent: Enclosed Moors and Heaths.
- Derbyshire Peak Fringe and Lower Derwent: Woodland Slopes and Valleys.
- Derbyshire Peak Fringe and Lower Derwent: Wooded Farmlands.
- Dark Peak: Enclosed Moorland.

Nottinghamshire Landscape Guidelines (2009):

- Magnesian Limestone Ridge: Limestone Farmlands.
- Nottinghamshire Coalfield: Coalfield Farmlands.

Peak District National Park – Landscape Strategy (2009):

- Slopes and Valleys with Woodland.
- Open Moors.
- Enclosed Gritstone Uplands.

Visual Receptors

6.5.16 The likely visual receptors to the Project between Chesterfield Substation and Stretton are:

- Users of two promoted long distance paths: Chesterfield Round Walk and Five Pits Trail.
- Users of National Cycle Route no. 67.
- Users of PRoW and local roads.
- Residents of Chesterfield and Clay Cross, and villages including: Hasland, Winsick, Temple Normanton, Grassmoor, Wingerworth, Tupton and North Wingfield, Sutton Scarsdale, Stainsby, Stretton, Newmarket, Holmewood, Heath, Aswith, Tibshelf, Lower Pilsley, Pilsley, Hardstoft, Morton, Stonebroom and other scattered settlement (including within the area of Sutton Springs Wood).
- Recreational users of Grassmoor Country Park, Hardwick Hall Park, Silverhill Wood Country Park, Bolsover Castle, and Sutton Scarsdale Hall.

- Visitors to three key views at: Hardwick Hall Park, Silverhill Wood Country Park and Bolsover Castle.
- Users of outdoor recreational facilities including Orchard Caravan Site and Timber Lane Picnic Site.

Section 2: Stretton to Ripley

6.5.17 As shown on **Figure 6.2: Landscape Designations & Features (north**) in **Volume 3**, there are no landscape-related designations within the Scoping Boundary between Stretton and Ripley.

6.5.18 The LVIA Study Area surrounding this section contains a very small portion of the Peak District National Park - approximately 7.25 km to the north-west of the Scoping Boundary at Handley. Despite this small size, assessment of the possible impacts arising from changes within the setting of this designation, given its sensitivity and the elevated nature of its landform, are considered relevant to the LVIA.

6.5.19 Other designations (shown on **Figure 6.2: Landscape Designations & Features (north)** in **Volume 3**) within the LVIA Study Area between Stretton and Ripley that are not considered relevant to the LVIA are:

- The Amber Valley Special Landscape Area (SLA), lies between 3.5 km and 2 km to the west of the Scoping Boundary from Oakerthorpe to Ripley. Given this distance and the fact that the SLA predominantly covers areas of landscape that are similar in topographical height to that within the Scoping Boundary past this section, intervening landform and vegetation are likely to combine to prevent widespread clear intervisibility between this area and the Project. Additionally, a landscape 'setting' to the SLA (outside of its boundary) has not been defined within the Amber Valley Local Plan (Ref 6.28) or its associated evidence base documentation. Accordingly, consideration of the presence of the SLA when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity for this section is not regarded relevant to the LVIA.
- The Derwent Valley Mills World Heritage Site 'buffer zone' and between 5.6 km and 2.45 km from the 'core area' of designation itself - from Shirland to Ripley. Given this distance and the fact that that the 'core area' predominantly covers the base and lower slopes of the valley of the River Derwent past this section, intervening landform and vegetation are likely to combine to prevent intervisibility between this area and the Project. Accordingly, consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity for this section is not regarded relevant to the LVIA.

Landscape Character

6.5.20 The Stretton to Ripley section lies within NCAs no.38 'Nottinghamshire, Derbyshire and Yorkshire Coalfield' (Ref 6.24) and no. 50 'Derbyshire Peak Fringe and Lower Derwent' (Ref 6.26).

6.5.21 Due to the potential for intervisibility with the Project from landscapes adjoining this NCA, that lie on the more upland areas immediately to the east and west of this section within the LVIA Study Area, the following NCAs are also relevant to the LVIA:

- No. 51 Dark Peak (Ref 6.27).
- No. 52 White Peak (Ref 6.29).

6.5.22 The following local character types, which the Stretton to Ripley section of the Scoping Boundary area lies within (as shown on **Figure 6.4: Landscape Character (north)** in **Volume 3**), are considered relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Derbyshire Peak Fringe and Lower Derwent: Woodland slopes and Valleys.
- Derbyshire Peak Fringe and Lower Derwent: Riverside Meadows.
- Derbyshire Peak Fringe and Lower Derwent: Wooded Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Village Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Estatelands.

6.5.23 Due to the potential for intervisibility with the Project from landscapes adjoining these, the following other local landscape character types within the LVIA Study Area, are also considered relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Derbyshire Peak Fringe and Lower Derwent: Enclosed Moors and Heaths.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Estate Farmlands.
- Dark Peak: Enclosed Moorland.

Peak District National Park – Landscape Strategy (2009):

- Slopes and Valleys with Woodland.
- Open Moors.
- Enclosed Gritstone Uplands.
- Limestone Hills and Slopes.
- Limestone Village Farmlands.
- Limestone Plateau Pastures.

Visual Receptors

6.5.24 The likely visual receptors to the Project between Stretton and Ripley are:

- Users of PRoWs and local roads.
- Residents of Clay Cross, Alfreton and Ripley, and villages including: Stretton, Handley, Mickley Estate, Woolley Moor, Newmarket, Morton, Stonebroom, Higham, Shirland, Wessington, Swanwick and Toadhole Furnace, Oakerthorpe Oakerthorpe/Fourlane Ends, South Wingfield, Swanwick, Pentrich, Hammersmith, Butterley, Heage, Lower Hartshay, Upper Hartshay and other scattered settlement.
- Recreational users of Ogston Reservoir and Alfreton Golf Club, and visitors to Ogston Hall (limited public access), Wingfield Manor (currently closed to visitors), Oakerthorpe Holiday Village and Woodside Grove Camping & Caravanning.
- Visitors to one key view: Crich Stand.

Section 3: Ripley to Morley

6.5.25 As shown on **Figure 6.2: Landscape Designations & Features (north)** and **Figure 6.3: Landscape Designations & Features (south)** in **Volume 3**, the Nottingham and

Derby Green Belt is located within parts of this section. Accordingly, consideration of whether or to what extent the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement. As outlined in GLVIA3 paragraph 5.4, where 'openness' (being one of the essential characteristics of Green Belt stated in paragraph 142 of the NPPF) is an aesthetic and perceptual aspect of this section's landscape character and visual amenity, it would be considered as part of the LVIA when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity.

6.5.26 The Derwent Valley Mills World Heritage Site lies closest to the Scoping Boundary through this section. Whilst on average the 'core area' lies between 2-3 km away there is one part that lies approximately 1 km from the Scoping Boundary (near Coxbench). Given, however, that the 'core area' of the designation predominantly covers the base and lower slopes of the valley of the River Derwent past this section, intervening landform and vegetation are likely to combine to prevent intervisibility between these areas and the Project.

6.5.27 At a separate point, the World Heritage Site 'buffer zone' practically adjoins the Scoping Boundary (between White Moor and Openwoodgate). The 'buffer zone' at this point, however, covers a larger area of predominantly late-20th century housing which, along with existing landform, is likely to prevent intervisibility between the World Heritage Site 'core area' and the Project. There may, however, be occasional views of the Project from the westernmost sections of the 'buffer zone' through this section.

6.5.28 To avoid duplication of effects across the Environmental Statement (and because GLVIA3 seeks a focus upon areas of landscape-protection rather than heritage protection), the LVIA will not assess the effects of the Project upon this designation. Instead, the LVIA will consider the contribution the presence of the designation makes to the conservation interest and cultural associations of the landscape within this part of the LVIA Study Area in order to inform judgments upon the 'value' (and subsequently, therefore, the 'sensitivity) of landscape character receptors.

6.5.29 The Amber Valley Special Landscape Area lies 1.6 km to the west of the Scoping Boundary near Morley Park. Given this distance and the fact that that the SLA predominantly covers areas of landscape that are similar in topographical height to that within the Scoping Boundary past this section, intervening landform and vegetation are likely to combine to prevent widespread clear intervisibility between this area and the Project. Additionally, as no landscape 'setting' to the designation (outside of its boundary) has been defined within the Amber Valley Local Plan or its associated evidence base documentation consideration of it is not considered relevant to the LVIA for this section.

6.5.30 The Peak District National Park is also not considered relevant to the LVIA for this section given that at its closest point it lies approximately 11 km away.

Landscape Character

6.5.31 The Ripley to Morley section straddles NCA no.38 'Nottinghamshire, Derbyshire and Yorkshire Coalfield' (Ref 6.24) and no.50 'Derbyshire Peak Fringe and Lower Derwent' (Ref 6.26) (as shown on **Figure 6.5: Landscape Character (central)** in **Volume 3**).

6.5.32 The following local character types, which the Ripley to Morley section of the Scoping Boundary area lies within (as shown on **Figure 6.5: Landscape Character (central)** in **Volume 3**), are considered relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Derbyshire Peak Fringe and Lower Derwent: Woodland slopes and Valleys.
- Derbyshire Peak Fringe and Lower Derwent: Gritstone Heaths and Commons.
- Derbyshire Peak Fringe and Lower Derwent: Wooded Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Village Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Estatelands.

6.5.33 Due to the potential for intervisibility with the Project from landscapes adjoining these, the following other local landscape character types within the LVIA Study Area, are also considered relevant to the LVIA:

Peak District National Park – Landscape Strategy (2009):

- Limestone Hills and Slopes.
- Limestone Village Farmlands.
- Limestone Plateau Pastures.

Visual Receptors

6.5.34 The likely visual receptors to the Project between Ripley are Morley are:

- Users of two promoted long-distance paths: Centenary Way (Derby) and Midshires Way.
- Users of PRoW and local roads.
- Users of one area of Open Access land: fields between Smalley and Shipley.
- Residents of Ripley, and villages including: Heage, Lower Hartshay, Upper Hartshay, Street Lane, Denby Bottles, Rawson Green, Coxbench, Kilburn, Lower Kilburn, Holbrook, White Moor, Openwoodgate, Horsley, Horsley Woodhouse, Denby Village, Smalley, Heanor Gate, Loscoe, Brackley Gate, Smalley Common, Stanley Common, Morley, and other scattered settlement.
- Recreational users of Ben's Well Campsite, Horsely Lodge Golf Club and Morley Hayes Golf Club.

Section 4: Morley to Ockbrook

6.5.35 As shown on **Figure 6.3: Landscape Designations & Features (south)** in **Volume 3**, parts of the Nottingham and Derby Green Belt are located in this section. Accordingly, consideration of the extent to which the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement. Where ‘openness’ is an aesthetic and perceptual aspect of this section’s landscape character and visual amenity, it would be considered as part of the LVIA when making judgements upon the sensitivity of the Study Area’s landscape character and visual amenity.

6.5.36 The ‘core area’ of the Derwent Valley Mills World Heritage Site designation lies approximately 3 km at its closest point to the Scoping Boundary, and the ‘buffer zone’ to this approximately 2.6 km away. Given these distances and the fact that that the

‘core area’ of the designation predominantly covers the base and lower slopes of the valley of the River Derwent past this section, intervening landform and vegetation are likely to combine to prevent intervisibility between these areas and the Project. Accordingly, consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area’s landscape character and visual amenity for this section is not regarded relevant to the LVIA.

6.5.37 The Amber Valley Special Landscape Area lies approximately 4.7 km, at its closest point to the Scoping Boundary along this section. As no landscape ‘setting’ to the designation (outside of its boundary) has been defined within the Amber Valley Local Plan or its associated evidence base documentation, consideration of it is not considered relevant to the LVIA for this section.

6.5.38 The Peak District National Park is also not considered relevant to the LVIA for this section given that at its closest point it lies approximately 18 km away.

Landscape Character

6.5.39 The Morley to Ockbrook section predominantly lies within NCA no.38 ‘Nottinghamshire, Derbyshire and Yorkshire Coalfield’ (Ref 6.24) (as shown on **Figure 6.5: Landscape Character (central)** and **Figure 6.6: Landscape Character (south)** in **Volume 3**).

6.5.40 Due to the potential for intervisibility with the Project from landscapes adjoining this section, immediately to the south and west, the following other NCAs are also relevant to this LVIA:

- No.69 ‘Trent Valley Washlands’ (Ref 6.30).
- No.50 ‘Derbyshire Peak Fringe and Lower Derwent’ (Ref 6.26).

6.5.41 The following local character types, which the Morley to Ockbrook section of the Scoping Boundary area lies within (as shown on **Figure 6.5: Landscape Character (central)** and **Figure 6.6: Landscape Character (south)** in **Volume 3**), are considered relevant to the LVIA for this section:

Landscape Character of Derbyshire (2013):

- Derbyshire Peak Fringe and Lower Derwent: Woodland slopes and Valleys.
- Derbyshire Peak Fringe and Lower Derwent: Gritstone Heaths and Commons.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Village Farmlands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Estatelands.
- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Plateau Farmlands.
- Trent Valley Washlands: Lowland Village Farmlands.

Visual Receptors

6.5.42 The likely visual receptors to the Project between Morley and Ockbrook are:

- Users of two promoted long distance paths: Centenary Way (Derby) and Midshires Way.
- Users of PRoW and local roads.

- Residents of villages including: Morley, Morley Smithy, Smalley, Smalley Common, Stanley Common, Brackley Gate, West Hallam, Dale Abbey, Spondon, Risley, Borrowash, Ockbrook, and other scattered settlement.
- Recreational users of Locko Park.

Section 5: Ockbrook to Aston-on-Trent

6.5.43 As shown on **Figure 6.3: Landscape Designations & Features (south)** in **Volume 3**, parts of the Nottingham and Derby Green Belt are located in this section. Accordingly, consideration of the extent to which the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement. Where 'openness' is an aesthetic and perceptual aspect of this section's landscape character and visual amenity, it would be considered as part of the LVIA when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity.

6.5.44 The 'core area' of the Derwent Valley Mills World Heritage Site designation lies approximately 7.5 km at its closest point to the Scoping Boundary, and the 'buffer zone' to this approximately 4.8 km away. Given this distance and the fact that the 'core area' of the designation predominantly covers the base and lower slopes of the valley of the River Derwent past this section, intervening landform and vegetation are likely to combine to prevent intervisibility between these areas and the Project. Accordingly, consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity for this section is not regarded relevant to the LVIA.

6.5.45 Due to their distances away from is section, the Amber Valley Special Landscape Area (which lies approximately 14 km, at its closest point to the Scoping Boundary along this section) and the Peak District National Park (approximately 27 km away) are not considered relevant to the LVIA for this section.

Landscape Character

6.5.46 The Ockbrook to Aston-on-Trent section predominantly lies within NCA no.69 'Trent Valley Washlands' (Ref 6.30) (as shown on **Figure 6.6: Landscape Character (south)** in **Volume 3**).

6.5.47 Due to the potential for intervisibility with the Project from landscapes adjoining this section, immediately to the north and south, the following NCAs are also relevant to the LVIA:

- No.38 'Nottinghamshire, Derbyshire and Yorkshire Coalfield' (Ref 6.24).
- No.70 'Melbourne Parklands' (Ref 6.31).

6.5.48 The following local character types, which the Ockbrook to Aston-on-Trent section of the Scoping Boundary area lies within (as shown on **Figure 6.6: Landscape Character (south)** in **Volume 3**), are considered relevant to the LVIA for this section:

Landscape Character of Derbyshire (2013):

- Nottinghamshire, Derbyshire and Yorkshire Coalfield: Coalfield Estatelands.
- Trent Valley Washlands: Lowland Village Farmlands.
- Trent Valley Washlands: Riverside Meadows.

Visual Receptors

6.5.49 The likely visual receptors to the Project between Ockbrook and Aston-on-Trent are:

- Users of one promoted long distance path: Derwent Valley Heritage Way.
- Users of PRoWs and local roads.
- Residents of villages including: Ockbrook, Spondon, Risley, Borrowash, Draycott, Ambaston, Boulton, Thurlston, Elvaston, Shardlow, Aston-on-Trent, Chellaston and other scattered settlement.
- Recreational users of Elvaston Park, Beechwood Park and the Trent & Mersey Canal.

Section 6: Aston-on-Trent to Willington Substation

6.5.50 As shown on **Figure 6.3: Landscape Designations & Features (south)** in **Volume 3**, there are no landscape-related designations within or near to the Scoping Boundary between Aston-on-Trent to Willington Substation.

Landscape Character

6.5.51 The Aston-on-Trent to Willington Substation section predominantly lies within NCA no.69 'Trent Valley Washlands' (Ref 6.30) (as shown on **Figure 6.6: Landscape Character (south)** in **Volume 3**).

6.5.52 Due to the potential for intervisibility with the Project from landscapes adjoining this section, immediately to the west and south, the following NCAs are also relevant to the LVIA:

- No.68 'Needwood and South Derbyshire Claylands' (Ref 6.32).
- No.70 'Melbourne Parklands' (Ref 6.31).

6.5.53 The following local character types, which the Aston-on-Trent to Willington Substation section of the Scoping Boundary area lies within (as shown on **Figure 6.6: Landscape Character (south)** in **Volume 3**), are relevant to the LVIA:

Landscape Character of Derbyshire (2013):

- Trent Valley Washlands: Lowland Village Farmlands.
- Trent Valley Washlands: Wet Pasture Meadows.
- Trent Valley Washlands: Riverside Meadows.

6.5.54 Due to the potential for intervisibility with the Project from landscapes adjoining these, the following other local landscape character types within the LVIA Study Area, are also considered relevant to the LVIA for this section:

Landscape Character of Derbyshire (2013):

- Needwood and South Derbyshire Claylands: Settled Farmlands.
- Melbourne Parklands: Estate Farmlands.

Leicester, Leicestershire and Rutland Landscape & Woodland Strategy (2001):

- Trent Valley.

Visual Receptors

6.5.55 The likely visual receptors to the Project between Aston-on-Trent and Willington Substation are:

- Users of PRoWs and local roads.
- Users of National Cycle Route no.6.
- Residents of villages including: Aston-on-Trent, Chellaston, Weston-on-Trent, Swarkestone, Barrow-on-Trent, Stenson, Findern, Willington, Tower Farm, Tarasivka, Stanton by Bridge, Ingleby, Repton, Sinfin/Stenson Fields and other scattered settlement.
- Recreational users of Swarkestone Sailing Club, Hill Farm Camping & Caravanning Park, Trent and Mersey Canal and Mercia Marina.

Future Baseline

6.5.56 The future baseline relates to known or anticipated changes to the current baseline, which should be assessed as part of the Project in the ES.

6.5.57 Ash (*Fraxinus excelsior*) trees within the LVIA Study Area are likely to be impacted by ash dieback. This is a disease of ash trees caused by a fungus of Asian origin called *Hymenoscyphus fraxineus* (*H. fraxineus*; formerly called *Chalara fraxinea*). The disease causes leaf loss and crown dieback in impacted trees and is usually fatal. Mapping by the Forestry Commission confirms the presence of ash dieback in Derbyshire, Nottinghamshire and Leicestershire (Ref 6.33). The future baseline therefore assumes that there would be loss of ash trees in the long term across the LVIA Study Area, but that other tree species would occupy gaps created in the short term, and overall levels of vegetation would remain similar to existing. An Arboricultural Impact Assessment (AIA) will record incidents of ash dieback during site surveys (see **Appendix 7A: Arboricultural Strategy** in **Volume 2**).

6.5.58 In contrast to the expected loss of ash trees, some positive landscape changes are also anticipated. These relate to agri-environment and woodland planting schemes which will continue to enhance the landscape. These include the Derwent Valley Forest and measures associated with emerging Environmental Land Management schemes which are replacing the European Union's Common Agricultural Policy in England.

6.5.59 As previously stated, it is recognised that no landscape is static and that the landscape across the LVIA Study Area is under pressures and continually changing - albeit over relatively long timeframes. Further to a review of the above, in terms of landscape character, it is considered that the character of the baseline landscape would not significantly change in the future during construction and operation (including maintenance).

6.5.60 Future baseline is also related to consented proposals which are not yet present in the landscape but are expected to be constructed, which may affect the landscape character or result in changes to visual amenity and views. This includes other high voltage electricity infrastructure and solar developments. These will be considered in the cumulative effects assessment chapter in the ES.

6.6 Mitigation Measures adopted as part of the Project

6.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology.**

Embedded Mitigation Measures

6.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives Considered)** has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced. This includes avoiding, as far as practicable, designated landscapes (such as the Peak District National Park, the Derwent Valley Mills World Heritage Site, and the Amber Valley Special Landscape Area), major settlements, areas of recreation, and woodlands.

6.6.3 During the Project's ongoing design process, the LVIA will inform modifications and refinements to the detailed design of the Project, including consideration of construction access routes, areas, and compounds, the detailed siting of overhead line structures, and the identification of any appropriate mitigation measures to reduce potential residual effects. The '*Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines*' (with National Grid Company plc (NGC) 1992) (Ref 6.5), will also continue to be used to inform the further stages of the siting and design process to minimise potential landscape and visual effects.

6.6.4 Other embedded measures that would also be explored include rationalisation and reconfiguration of the existing electricity network infrastructure with which the Project interacts (i.e. where required to facilitate the construction of the Project, or where it would permanently cross existing lower voltage overhead lines) the potential for sections of underground cables, and the potential use of alternative tower designs.

Good Practice Mitigation Measures

6.6.5 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Table 2.1** of **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

6.6.6 In addition, **Appendix 4A: Initial Outline Code of Construction Practice** presents the likely good practice mitigation measures relevant to the LVIA. These include but are not limited to the following overarching measures:

- Should planting be relied upon, an outline Landscape and Ecology Management Plan (LEMP), or equivalent, for the operation phase of the Project (to be submitted with the DCO application).
- Appointment of an Environmental Manager(s)/ Environmental Clerk of Works for the duration of the construction phase.

- Undertaking of a landscape pre-condition survey to ensure appropriate reinstatement is undertaken.
- Retention of vegetation and replacement of removed vegetation where practicable.
- Application of tree protection measures in accordance with British Standard (BS) 5386:2012: Trees in relation to design, demolition and construction. Recommendations.
- Reinstatement and / or restoration of temporarily used land following construction.
- Protection of sensitive areas during construction.
- Use of construction lighting with, where possible, the lowest luminosity necessary to safely perform each task, and positioned and directed to minimise glare and light spill towards sensitive visual receptors (in particular residential communities) and skyglow (particularly in respect of landscape character where dark skies may be a characteristic).

6.6.7 The outline LEMP (or equivalent), for the operation phase of the Project, would include mitigation measures (where required) such as:

- Landscape planting to reduce visual impact.
- Landscape planting to deliver wider landscape restoration to offset the residual harm by the introduction of new overhead line structures and other associated infrastructure.

Additional Mitigation Measures

6.6.8 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for landscape and visual. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

6.6.9 Due to the nature of overhead line structures, the Project is likely to give rise to effects on landscape and visual receptors that may not be fully mitigated. In consultation with stakeholders, landscape enhancement measures will be considered where practicable to help to offset the effects of the Project.

6.7 Likely Significant Effects

6.7.1 This section sets out the likely significant effects on landscape and visual arising from the construction and operation (including maintenance) of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

6.7.2 The effects upon landscape and visual receptors will be assessed during the following phases of the Project: peak construction year, year 1 of operation, and year 15 of operation.

6.7.3 The review of likely significant effects assumes that the embedded and good practice mitigation measures described in Section 6.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before

assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportionate assessment (Ref 6.35).

6.7.4 The likely significant effects of the Project have been split into:

- Landscape designations – covering international, national and locally designated landscapes.
- Landscape character.
- Views and visual amenities.

Landscape Designations – Construction and Operation (Including Maintenance)

Nationally Designated Landscapes

National Park

6.7.5 Despite being located outside of the boundary of the nationally designated Peak District National Park (**Figure 6.2: Landscape Designations & Features (north)** in **volume 3**), the Project has the potential to impact its characteristics and 'special qualities' during construction and operation (including maintenance) through possible impacts arising from changes within its setting.

6.7.6 There is potential for significant adverse effects during construction due to the scale and nature of the construction works, and during operation due to the scale and nature of the proposed overhead line structures.

6.7.7 The consideration of effects on the setting of nationally designated landscape and its setting are therefore proposed to be **Scoped In** during both construction and operation (including maintenance).

6.7.8 Given that the Project is not likely to involve any permanent lighting during its operation, and that lighting used during the construction and maintenance would be temporary, directional only and minimised where possible (as set out in Section 6.6 and in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**), significant effects on the characteristics and 'special qualities' of Peak District National Park are not anticipated at night. The assessment of effects on this designation at night are therefore to be **Scoped Out** of the ES.

Locally Designated Landscapes

Special Landscape Area

6.7.9 As shown on **Figure 6.2: Landscape Designations & Features (north)** and **Figure 6.3: Landscape Designations & Features (south)** in **Volume 3**, the Project will be located outside of the Amber Valley SLA. The distances from it to the Scoping Boundary ranges between 2.0 km and 14.0 km.

6.7.10 Given this distance and the fact that that the SLA predominantly covers areas of landscape that are similar in topographical height to that surrounding the Project, intervening landform and vegetation are likely to combine to prevent widespread clear intervisibility between them. Additionally, a landscape 'setting' to the SLA (outside of its boundary) has not been defined within the Amber Valley Local Plan or its

associated evidence base documentation. As such, consideration of the impacts of the Project upon the designation are **Scoped Out** of the LVIA during both construction and operation (including maintenance).

Green Belt

6.7.11 As shown on **Figure 6.2: Landscape Designations & Features (north)** in **Volume 3**, the Project will be located outside the West Yorkshire Green Belt. Given that there is no defined 'setting' to this Green Belt in the amplification of the local plan policies that seeks to protect it, consideration of the extent to which the Project may conflict with the purposes of it would not be considered within the LVIA or the Planning Statement.

6.7.12 The Nottingham and Derby Green Belt covers the stretch of the Scoping Boundary between Pentrich and Aston-on-Trent. Accordingly, consideration of the extent to which the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement and is therefore **Scoped Out** of the ES. Where 'openness' is an aesthetic and perceptual aspect of this section's landscape character and visual amenity, it would be considered as part of the LVIA when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity.

Landscape Character – Construction and Operation (Including Maintenance)

6.7.13 The construction and operation (including maintenance) of the Project have the potential to impact the overall character and/or the key characteristics of the local landscape character areas / types within the LVIA Study Area.

6.7.14 The local landscape character areas / types are those identified within Section 6.5 contained within the following published landscape character assessments:

- The Landscape Character of Derbyshire (2013) (Ref 6.19).
- Nottinghamshire Landscape Guidelines (2009) (Ref 6.20).
- Peak District National Park – Landscape Strategy (2009) (Ref 6.18).
- The Leicester, Leicestershire and Rutland Landscape & Woodland Strategy (2001) (Ref 6.21).

6.7.15 Given that the descriptions of the local landscape character areas / types contained within the local character assessments have generally been informed by the description of character contained in the NCAs (and in the regional level - East Midlands Regional Landscape Character Assessment, produced in 2010 (Ref 6.17)), assessment of the effects upon the NCAs and the regional character areas are **Scoped Out** of the LVIA in order to avoid duplication. The description of the NCAs' and regional character areas' overall character and key characteristics will, however, be used to inform the understanding of the landscape character baseline.

6.7.16 During construction, impacts on landscape character would likely arise from the introduction of construction activities, the presence of construction equipment and the direct loss or fragmentation of distinctive landscape elements both directly and within the setting of them, for example through:

- Vegetation clearance to allow for temporary work areas.
- Access and construction of the Project.

6.7.17 During operation (including maintenance) impacts would include the introduction of above ground infrastructure elements in the landscape such as the overhead line structures. Long term effects may also arise from the requirement for permanent tree clearance beneath the overhead line.

6.7.18 There is potential for the resultant effects upon the overall character and/or the key characteristics of the identified local landscape character areas / types to be significant, and adverse. The assessment of effects on them during construction and operation (including maintenance) is, therefore, proposed to be **Scoped In** to the ES.

6.7.19 Given that the Project is not likely to involve any permanent lighting during its operation, and that lighting used during the construction phase and any maintenance activities (during the operational phase) would be temporary, directional only and minimised where possible (as set out in Section 6.6 and in **Appendix 4A: Initial Outline Code of Construction Practice**), significant effects on the overall character and/or the key characteristics of these local landscape character areas / types are not anticipated at night, and are **Scoped Out** of the ES.

Views and Visual Amenity – Construction and Operation (Including Maintenance)

6.7.20 The identification of receptors who may experience impacts to their views and/or visual amenity as a result of the Project would initially be informed by ZTV mapping - which would indicate the areas from which the Project is theoretically visible. Field work would then be undertaken to ground truth the findings of the ZTVs and therefore more accurately identify visual receptors for scoping into the ES.

6.7.21 The assessment would not consider effects on visual receptors that are located wholly outside the ZTV, as they are highly unlikely to have views of the Project. Effects on visual receptors located outside of the ZTV are therefore proposed to be **Scoped Out** of the ES, during construction and operation (including maintenance).

Residential Communities

6.7.22 The initial routeing process has sought to limit potential effects on the views and visual amenity of residential communities. Through the iterative process of the Project's ongoing planning, development and mitigation there would be, where practicable, consideration of ways to reduce visual effects on residential communities further.

6.7.23 Given, however, the density of residential areas and settlements across the LVIA Study Area, the Project has potential to impact on the views and visual amenity of people living across it. As there is potential for some of these impacts to result in likely significant adverse effects during both construction and operation (including maintenance). Construction and operation (including maintenance) impacts on views experienced by such communities are therefore **Scoped In**.

6.7.24 Assessment of effects on private views from individual dwellings is not considered part of the scope of the ES on account of case law which deems that private individuals do not have a right to a view (as established in Aldred's Case (1610) 9 Co Rep 57b; (1610) 77 ER 816, [1558-1774] All ER Rep 622). Should it be considered that the 'Residential Visual Amenity Threshold' (as defined by the 'Residential Visual Amenity Assessment Technical Guidance Note 2/19' published by the Landscape

Institute in 2019 (Ref 6.13)) has been breached then a separate Residential Visual Amenity Assessment may be required. This would fall outside of the EIA process.

Recreational Receptors

6.7.25 The Project has potential to impact the visual amenity of people within the LVIA Study Area visiting and/or taking part in recreational activities which involve or depend upon appreciation of views of the surrounding landscape. This includes users of National Trails, regional trails or promoted routes, PRoWs, national and promoted cycle routes, visitor attractions, outdoor holiday accommodation, areas of public open space (including open access land defined in the CRoW Act 2000 (Ref 6.36) and public/country parks) and visitors to well-known and promoted viewpoints. There is potential for significant adverse effects during both construction and operation (including maintenance) upon such recreational receptors, and so they are to be **Scoped In** for the ES.

Drivers of Motorised Vehicles

6.7.26 Significant effects are not anticipated to occur to the views and visual experience of people travelling by motorised vehicle, due to the speed of travel, and the fact that there are no known promoted driving routes through the LVIA Study Area. Therefore, effects on people travelling by motorised vehicle are **Scoped Out** of the ES during construction and operation (including maintenance).

Railway Users

6.7.27 Significant effects are not anticipated to occur to the views and visual experience of people travelling by train, due to the speed of travel, and the fact that the only railway line within the LVIA Study Area that is promoted as a scenic route, i.e. the Derwent Valley Line between Derby and Matlock, lies predominantly at the base of the river valley with no anticipated intervisibility with the Project (approximately 1.5 - 11 km away). Therefore, effects on people travelling by train are **Scoped Out** of the ES during construction and operation (including maintenance).

Views and Visual Amenity at Night

6.7.28 Given that the Project is not likely to involve any permanent lighting during its operation, and that lighting used during the construction and maintenance would be temporary, directional only and minimised where possible (as set out in **Appendix 4A: Initial Outline Code of Construction Practice**), significant effects on all visual receptors are not anticipated at night and are therefore **Scoped Out** of the ES.

6.8 Proposed Assessment Method

6.8.1 This section sets out an overview of the proposed assessment methodology for LVIA within the ES at this time. Aspects of the methodology would be potentially developed further and/or refined as the LVIA baseline study is progressed and in consultation with stakeholders.

6.8.2 The methodology for undertaking the LVIA will be based on principles set out in the following good practice and guidance documents:

- Landscape Institute and Institute for Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment – 3rd Edition (GLVIA3) (Ref 6.7).
- Landscape Institute (2013) GLVIA3 Statement of Clarification 1/13 10-06-13 (Ref 6.8).
- Natural England (2014). An Approach to Landscape Character Assessment (Ref 6.9).
- Planning Inspectorate (2015). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Ref 6.10).
- Scottish Natural Heritage (2017). Visual Representation of Wind Farms –Version 2.2 (Ref 6.11).
- Landscape Institute (2019). Technical Guidance Note 06/19 Visual Representation of Development Proposals (Ref 6.12).
- Landscape Institute (2019). Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19 (Ref 6.13).
- Landscape Institute (2021). Technical Guidance Note 02-21: Assessing landscape value outside national designations (Ref 6.15).
- Landscape Institute (2024). Technical Guidance Note 2024-01: Notes and Clarifications on Aspects of GLVIA3 (Ref 6.16).

6.8.3 These not only establish good practice guidance for LVIA's but also comply with the requirements of NPS EN-1 (Ref 6.2) and NPS EN-5 (Ref 6.3).

6.8.4 GLVIA3 advocates that the assessment should be proportionate to the scale and nature of the proposals and should focus on the 'likely' significant effects, rather than every conceivable effect – an approach that aligns with the requirements of the EIA Regulations 2017 (Ref 6.37).

6.8.5 This approach provides greater opportunity to scope out particular receptors, where it can be demonstrated that significant effects would be unlikely to arise. The ultimate aim being to present more concise and meaningful assessments.

6.8.6 The assessment methodology involves a combination of quantitative and qualitative considerations and the application of professional judgement within a structured assessment framework. As set out in GLVIA3:

> '…whilst there is some scope for quantitative measurement of some relatively objective matters, …much of the assessment must rely on qualitative judgement, for example what effect the introduction of a new development or land use change may have on visual amenity, or about the significance of change in the character of the landscape and whether it is positive or negative' (Paragraph 2.23).
>
> 'In all cases there is a need for judgements that are made to be reasonable and based on clear and transparent methods so that the reasoning applied at different stages can be traced and examined by others.' (Paragraph 2.24).

6.8.7 Where relevant, the LVIA will consider any inter-relationship of baseline information and impacts from the Project between different aspects of the environment. For example:

- The baseline information collected for the biodiversity assessment (Chapter 7) and Arboricultural Impact Assessment will be used to better understand the contribution biodiversity-related designations or protected areas (such as Sites of

Special Scientific Interest, Tree Preservation Orders, and Ancient Woodland) located within the LVIA Study Area make to the landscape's conservation interest. These in turn will inform judgments upon the 'value' (and subsequently, therefore, the 'sensitivity) of landscape character receptors.

- The baseline information collected for the biodiversity assessment (Chapter 7) and Arboricultural Impact Assessment regarding the type, condition and species make-up of key areas of existing trees, woodland and hedgerow that may be harmed by the project. This will inform considerations upon the rarity and/or representativeness of such components within the landscape. These in turn will inform judgments upon the 'value' (and subsequently, therefore, the 'sensitivity) of landscape character receptors, and the planning of potential mitigation proposals.
- The baseline information collected for the Historic Environment Assessment (Chapter 8) will be used within the LVIA to better understand the contribution heritage designations (such as the Derwent Valley Mills World Heritage Site, Registered Parks & Gardens of Historic Interest, and built Conservation Areas) and heritage assets make to conservation interest and cultural associations of the landscape and to visual amenity within the LVIA Study Area. This will inform judgments upon the 'value' (and subsequently, therefore, the 'sensitivity) of landscape character receptors. Such awareness of heritage assets (and the components associated with them – such as 'designed' or 'recorded' views, where they are publicly accessible, will also inform judgements upon the sensitivity of visual receptors.
- The baseline information collected for **Chapter 15: Socio-economic, Recreation and Tourism** will be used to better understand the presence of publicly accessible recreational resources within the LVIA Study Area, and (where information is available) how well they are frequented by users.

6.8.8 To avoid duplication of effects across the Environmental Statement (and because GLVIA3 seeks a focus upon areas of landscape-protection), the LVIA will not assess the effects of the Project upon:

- Any biodiversity designations or protected area, such as Sites of Special Scientific Interest, Tree Preservation Orders, and Ancient Woodland – as these will be addressed in **Chapter 7: Ecology and Biodiversity**.
- Any heritage-related designations including the Derwent Valley Mills World Heritage Site, Registered Parks & Gardens of Historic Interest, and built Conservation Areas – as these are considered to be more heritage-related than landscape-related, and so will be addressed in **Chapter 8: Historic Environment**.
- Any recreational resource (such as country parks, campsites and National Trust properties) – as these would be addressed in **Chapter 15: Socio-Economics, Recreation and Tourism** (the LVIA would, instead, as recommended by GLVIA3, assess, where necessary, the effects upon the visual amenity of users of these only).

Further Data to be Gathered / Processed

6.8.9 In addition to the data sources listed in Section 6.5, the LVIA, within the ES, will be informed by additional research and analysis, third party data and data obtained through survey, such as:

- National, regional and local landscape character assessments.
- 1:25,000 and 1:50,000 Ordnance Survey (OS) maps.
- Aerial photography, Google Earth and Google Maps Street View.
- Terrain and slope analysis data.
- Open source GIS data.
- Data contained within the Management Plans of the Peak District National Park and Derwent Valley Mills World Heritage Site.
- Research into the cultural associations of the landscape of the LVIA Study Area.
- Production and analysis of ZTV maps.
- Ground-truthing seasonal field work to verify the ZTV and desk-based review of baseline landscape character, refine the LVIA Study Area, and to record baseline photography.
- Field work to help assess the landscape and visual impacts.
- Viewpoint surveys to record baseline visual amenity and take baseline photography, including photography for the purposes of LVIA-related visualisation production.

Zone of Theoretical Visibility (ZTV)

6.8.10 ZTV maps, which will illustrate the theoretical visibility of the Project up to 7.5km away during the operational phase will be produced to inform the assessment. Initial ZTVs will be generated in Geographic Information System (GIS) software using the OS Terrain 5 Digital Terrain Model) without the screening effects of buildings and vegetation included in them (which in reality are likely to preclude visibility of the Project from certain areas in the LVIA Study Area). These 'bare earth' ZTVs will provide the 'worst-case' scenario, and the largest geographical area from which the Project may be visible.

6.8.11 Following this, OS mapping layers containing inventories of known woodlands and buildings would be added and their locations extruded to average heights, so that a more accurate ‘screening features’ ZTV can be analysed. The ‘bare earth’ and ‘screening features’ ZTVs will be refined and updated as the assessment progresses and the design of the Project evolves.

Field Surveys

6.8.12 As the ZTVs will only illustrate the theoretical visibility of the Project, additional fieldwork will be undertaken to ground-truth their findings and understand the existing screening properties of non-mapped elements of the landscape in order to confirm locations from where the different elements of the Project would actually be visible.

6.8.13 The fieldwork will also provide the opportunity ground-truth the desk-based landscape character research undertaken and gain a better understanding and appreciation of the condition and value of the already established local landscape character areas / types found within LVIA Study Area, as set out in Section 6.4.

6.8.14 The surveys would be undertaken during summer and winter months to fully understand the range of general visibility through the landscape - as part of the landscape and visual baseline.

6.8.15 More intensive visual site surveys would be undertaken for a selection of agreed representative viewpoints. Viewpoints will be selected to represent the different

groups of people likely to be impacted by the Project and will be informed by the ZTV analysis, previous site visits, desk-based research on the location and distribution of community and recreation receptors. Viewpoints would generally be selected to represent several different receptor groups, for example on the edge of a settlement, on a promoted PRoW, at a high point or near to a cluster of properties. The location of the viewpoints would be agreed with statutory stakeholders (such as local planning authorities, Natural England, the Peak District National Park Authority and the National Trust), where relevant, prior to their establishment.

6.8.16 The collection of viewpoint photography from these locations would also assist in the creation of LVIA-related visualisations (i.e. wireframes and photomontages). For this reason, where possible all viewpoint photography would be captured in both winter months (when trees are not in leaf - i.e., a worst case) and summer months.

6.8.17 Visualisations would be used to consider and illustrate changes to views during the operation of the Project. Visualisations would be prepared in accordance with the Landscape Institute's 'TGN 06/19 Visual Representation of Development Proposals' (Ref 6.12). A number of the viewpoint locations will be illustrated with wireline visualisations, and some others with photomontages. Photomontages would generally show more detail than wireframes, by including, for example, the materiality of overhead line structures and detail of mitigation vegetation.

Sensitivity

Landscape Receptor Sensitivity

6.8.18 The sensitivity of landscape receptors (defined as high, medium or low – or intermediate levels between these) within the LVIA would be determined the consideration of their 'susceptibility' and 'value', see **Table 6.3**, and informed professional judgement. An explanation of the level of sensitivity given to each receptor would be set out in the LVIA so that it is clear how each judgement has been made.

Table 6.3 – Indicative Sensitivity of Landscape Receptors

Sensitivity of Landscape Receptors			
	Higher		Lower
Susceptibility	Attributes that make up the character of the landscape receptor offer very limited opportunities for the accommodation of change brought about by electricity transmission infrastructure without key characteristics being fundamentally altered, leading to a different landscape character.	→	Attributes that make up the character of the landscape receptor are resilient to change brought about by electricity transmission infrastructure.

Sensitivity of Landscape Receptors			
Value	Landscape receptors with high scenic quality, high conservation interest, recreational value, important cultural associations or a high degree of rarity. Landscapes designated at an international level (e.g. World Heritage Sites) or national level (e.g. National Parks).	→	Landscape receptors of poor condition and/or poor intactness, with limited aesthetic qualities. Areas that are not formally designated

6.8.19 It should be noted that whilst landscape designations at an international or national level are likely to be accorded the highest value rating, it does not necessarily follow that they also have a high susceptibility to all types of change, and conversely, undesignated landscapes may have high susceptibility to change (see GLVIA3, Para 5.46 & 6.47, Page 90).

Visual Sensitivity

6.8.20 The sensitivity of visual receptors (defined as high, medium or low – or intermediate levels between these) within the LVIA would be determined by the consideration of their 'susceptibility' and 'value', see **Table 6.4**, and informed professional judgement. An explanation of the level of sensitivity given to each receptor would be set out in the LVIA so that it is clear how each judgement has been made.

6.8.21 The susceptibility of visual receptors to changes to their views/visual amenity is a function of the occupation or activity of people experiencing the view and the extent to which their attention is focused on views (GLVIA 3, para 6.32).

6.8.22 The value attached to receptors' views or visual amenity, as defined in GLVIA3 (Para. 6.37, Page 114) is determined with reference to:

- Planning designations specific to views.
- Whether a view or visual amenity is recorded as important in relation to designated landscapes (such as views specifically mentioned in the special qualities of a National Park).
- Whether a view or visual amenity is recorded as important in relation to heritage assets (such as designed views recorded in citations of gardens and designed landscapes or views recorded as of importance in Conservation Area Appraisals).
- The value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature and art.

6.8.23 As such, a designated viewpoint or scenic route advertised on maps and in tourist information, or a viewpoint which is a significant destination in its own right, is likely to indicate a view of higher value. High value views may also be recognised in relation to the special qualities of a designated landscape or heritage asset, or it may be a view familiar from photographs or paintings.

6.8.24 Views experienced from viewpoints or routes not recognised formally or advertised in tourist information, or which are not provided with interpretation or, in some cases, formal access, are likely to be of lower value.

Table 6.4 - Indicative Criteria for Determining Visual Sensitivity

Sensitivity of Visual Receptors			
	Higher		Lower
Susceptibility	Viewers whose attention or interest is focused on their surroundings, including settlements / people engaged in outdoor recreation / visitors to heritage assets or other attractions where views of the surrounding area are an important contributor.	→	People whose attention is not on their surroundings (and where their visual setting is not important to the quality of life) such as people engaged in most outdoor sports / people at their place of work / upon main transport routes.
Value	Views may be recorded in management plans, guidebooks, and/or which are likely to be experienced by large numbers of people. Views may be associated with internationally or nationally designated landscapes; designed views recorded in citations for gardens and designed landscapes etc.	→	Views which are not documented or protected. Views which are more incidental, and less likely to be associated with somewhere people travel to or stop, or which may be experienced by smaller numbers of people.

Magnitude

6.8.25 GLVIA3 paragraphs 5.48 and 6.38 set out that the magnitude of the change (sometimes referred to as the nature of impact) that is likely to occur to a receptor as a result of the Project is determined by considering the following factors:

- Size/scale of the change.
- Geographical extent of the change.
- Duration and reversibility of the change.

6.8.26 The considerations of the size/scale of changes, their geographical extent and duration and reversibility will be considered together to derive an overall magnitude of predicted change for each receptor, which will be determined through informed professional judgement guided by the indicative criteria set out in **Table 6.5** and **Table 6.6**.

6.8.27 The magnitude of both landscape and visual change is described as large, medium-large, medium, medium-small, small, negligible or no change. The rationale in support

of the assessment will be set out for each receptor so that it is clear how each judgement has been made.

Table 6.5 – Indicative Magnitude of Landscape Change

Magnitude of Landscape change			
	Largest		Smallest
Size/Scale	Extensive loss of landscape features and/or elements, and/or change in, or loss of key landscape characteristics, and/or creation of new key landscape characteristics.	→	Limited loss of landscape features and/or elements, and/or change in or loss of some secondary landscape characteristics.
Geographic Extent	Change in landscape features and/or character extending considerably beyond the immediate site and potentially impacting multiple landscape character types/areas.	→	Change in landscape features and/or character extending contained within or local to the immediate site and impacting only a small part of the landscape character area / type.
Duration	Changes experienced for a period of around five years or more.	→	Changes experienced for a shorter period of up to five years
Reversibility	Change to features, elements or character which cannot be undone or are only partly reversible after a long period	→	A temporary landscape change which is largely reversible following the completion of construction, or decommissioning of the development

Table 6.6 – Indicative Magnitude of Visual Change

Magnitude of Visual change			
	Largest		Smallest
Size/Scale and Geographic extent	A large visual change resulting from the Project as the most notable aspect of the view, perhaps as a result of the development being in close proximity, or because a substantial part of the view is impacted, or because the development introduces a new focal point and/or provides contrast	→	A small visual change resulting from the Project resulting in a minor or generally unnoticed aspect of the view, perhaps as a result of the development being in the distance, or because only a small part of the view is impacted, and/or because

Magnitude of Visual change			
	with the existing view and/or changes the scenic qualities of the view.		the development does not introduce a new focal point or is in contrast with the existing view and/ does not change the scenic qualities of the view.
Duration	Visual change experienced over around five years or more.	→	Visual changes experienced for a shorter period of up to five years
Reversibility	A permanent visual change which is not reversible or only partially reversible following decommissioning of the Project.	→	A temporary visual change which is largely reversible following the completion of construction or decommissioning of the Project.

6.8.28 It should be noted that the construction phase magnitude of change judgement will not take into consideration the presence of any of the proposed overhead line structures, and instead will concentrate on the impacts of the construction activities required to erect these.

Significance

6.8.29 Judgements of sensitivity and magnitude are then combined to develop an informed assessment of the overall significance of effect both individually and cumulatively (when considered in combination with other consented or proposed developments) upon a receptor. Levels of landscape or visual effect would be categorised as major, moderate, minor or negligible / no effect (with potentially intermediate ratings, such as 'moderate/minor', being applied where required).

6.8.30 'Moderate' and 'major' effects are considered significant in the context of the EIA Regulations. Effects that are 'Major', 'Major / Moderate' or 'Moderate / Major' are considered 'significant' insofar that:

- Landscape assessment: the Project creates a fundamental and irreversible alteration to a receptor's overall landscape character and/or key landscape characteristics (after taking into account the embedded design, mitigation and enhancement measures) alters its overall integral character. This could include small but critical changes to very highly sensitive landscapes but could also be comprehensive changes to areas with more limited landscape sensitivity.
- Visual assessment: the Project becomes the defining element in a visual receptors' experience, considering the particular aspects of their 'sensitivity' (after taking into account the embedded design, mitigation and enhancement measures). This could include small but critical changes to the amenity of very highly sensitive visual receptors but could also be comprehensive changes to that experienced by visual receptors with more limited sensitivity.

6.8.31 Where the significance of the effect is considered to be 'moderate' reasoned professional judgement is used to determine whether or not this is 'significant'.

6.8.32 The nature of effects would be described as positive (beneficial), neutral or negative (adverse).

6.8.33 In line with GLVIA3, the development of an assessment of the overall significance of effect does not follow a rigid matrix approach, where it is defined simply by the level of sensitivity combined with the magnitude of change. This is because the significance of landscape and the visual effect is not always the same for similar receptors. Guided by the principles set out in **Plate 6.1** and the example descriptions/definitions detailed in **Table 6.7** and **Table 6.8**, it, instead, requires consideration of a greater amount of the variables that have been combined.

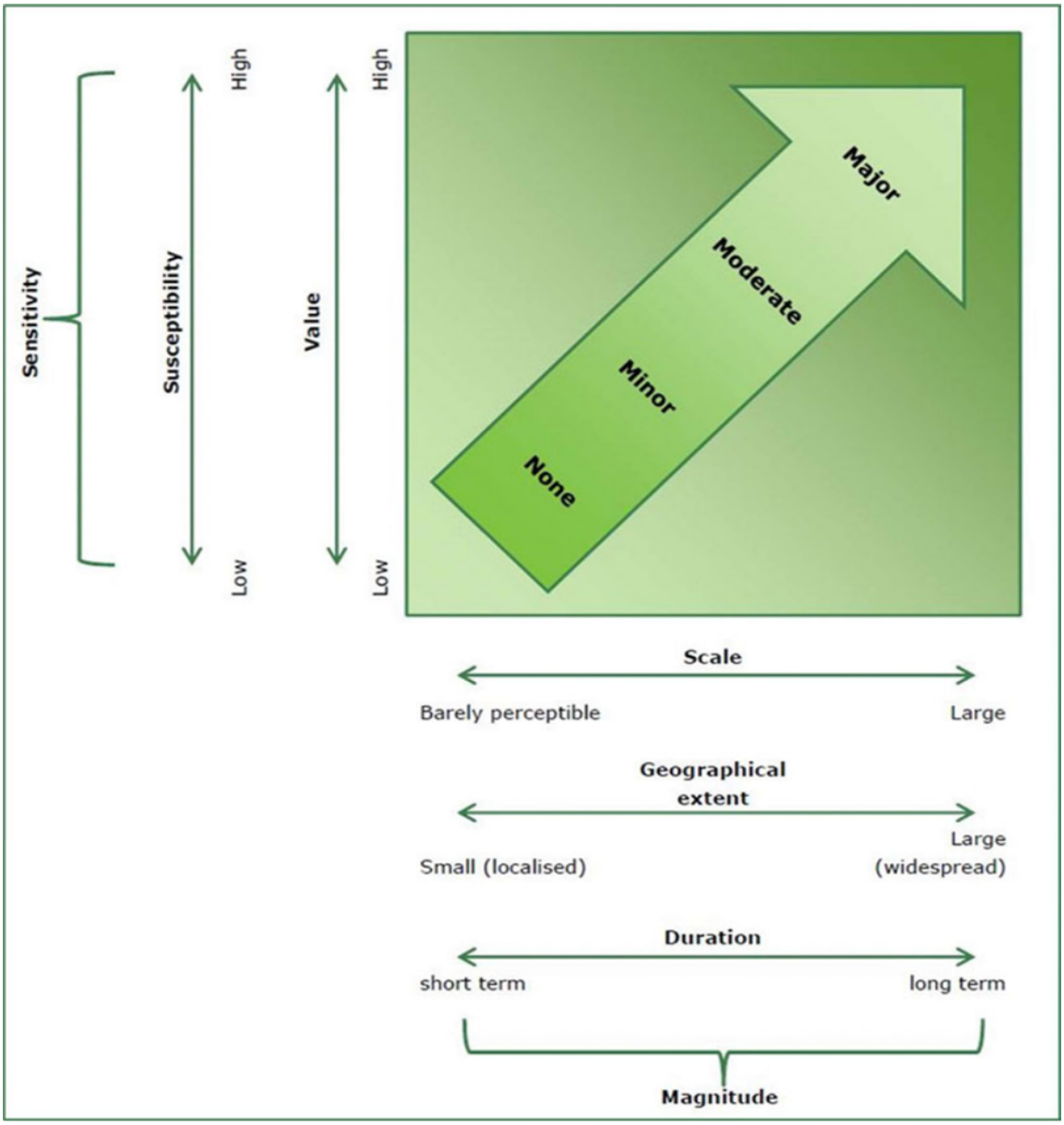

Plate 6.1 – Judging Levels of Effect – Landscape and Visual

6.8.34 The final decision on the level of effect and therefore significance ultimately relies on professional judgement and experience which, in the assessment, is informed by recognised guidance and supported through qualitative text to draw out the important issues, describe the effects and explain the underlying rationale.

Table 6.7 – Indicative Levels of Significance - Landscape Effects

Significance of effect	Description / Definition
Major	The Project would result in an obvious change in landscape features and character and is likely to impact a landscape with a moderate or high susceptibility to that type of change. This level of effect may also occur when a medium scale of effect acts on a nationally valued landscape. The effect is likely to be long-term and impact a relatively large area.
Moderate	The Project would result in a noticeable change in landscape characteristics and character and is likely to affect a landscape with a moderate susceptibility to that type of change. This level of effect may also occur when a smaller scale of effect acts on a more widely valued landscape, or a larger scale of effect acting on a landscape valued at a more local level. This level of effect may also occur when a large scale of effect occurs over a relatively short period or over a small area.
Minor	The Project would result in a small change in landscape characteristics and character over a long-term duration. This level of effect may also occur when a larger scale of effect is of short-term duration or confined to the site.
Negligible / No Effect	The Project would result in a barely perceptible or no change in landscape characteristics/character.

Table 6.8 – Indicative Levels of Significance – Visual Effects

Significance of effect	Description / Definition
Major	The Project would result in an obvious change in view and is likely to impact a visual receptor with a moderate or high susceptibility to that type of change. This level of effect may also occur when a medium scale of effect acts on a nationally valued view and/ or a high susceptibility receptor. The effect is likely to be long-term and impact a relatively large area or relatively large number of people.
Moderate	The Project would result in a noticeable change in a view and is likely to impact a viewer with a moderate susceptibility to that type of change and/ or locally valued view. This level of effect may also occur when a smaller scale of change acts on a higher susceptibility receptor or impacts a large number of people, or a larger scale of effect acting on a lower susceptibility receptor or impacting fewer people.

Significance of effect	Description / Definition
	This level of effect may also occur when a large scale of effect occurs over a relatively short period or over a small area/ impact few people
Minor	The Project would result in a small change in view over a long-term duration and is likely to impact a smaller geographic extent and/ or fewer people. This level of effect may also occur when a larger scale of effect is of short-term duration or is confined in its geographical extent
Negligible / No Effect	The Project would result in a barely perceptible or no change in views or visual amenity.

Limitations of Assessment

6.8.35 Assessment, site work, and photography will be undertaken from publicly accessible locations, such as the public highway, public open spaces, publicly accessible recreational areas/visitor locations and PRoWs. The assessment will predominantly, be based on views from the ground but will also include publicly accessible buildings and structures where necessary. It should not include private views from upper storeys of buildings or structures.

6.8.36 Screening and filtering of views by vegetation does not remain constant throughout the year, and as such the assessment will be primarily based on the worst-case scenario of winter views.

6.8.37 The assessment will consider the construction and operation (including maintenance) impacts of the Project. The principal information which will be used to inform the assessment of impacts on landscape and visual receptors will include the location of temporary construction and storage areas, access roads, the location, number and heights of pylons, and overhead lines, as well as other temporary or permanent infrastructure required to facilitate the Project. It may be that locations are not fixed as part of the application as a degree of flexibility may be required. The assessment will therefore be based on a worst-case assumption. Due to this flexibility, it may not be possible to provide accurate quantification of landscape elements which may be lost. Likewise, any wireframes and/or photomontages produced will only give an indication of how the Project might be perceived in a view.

6.9 Proposed Scope of the ES

6.9.1 The matters that are proposed to be scoped in and out of further assessment for landscape and visual are outlined in **Table 6.9**.

Table 6.9 – Proposed Scope of the ES

Matter	Phase	Scoped in / out	Justification
Derwent Valley Mills World Heritage Site	Construction and Operation (including maintenance)	**Scoped Out**	As this designation is considered to be more heritage-related than landscape-related, effects upon its outstanding universal value attributes will be addressed in Chapter 8: Historic Environmental Assessment rather than the LVIA. Consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity will, however, be made within the LVIA.
Peak District National Park	Construction and Operation (including maintenance)	**Scoped In**	Given that the Peak District National Park is located at its closest point less than 8 km from the Scoping Boundary, and because its elevation makes it likely for there to be some intervisibility from it to the Project, the LVIA will provisionally include consideration of the indirect effects upon the designation's natural beauty and special qualities in terms of the possible impacts arising from changes within its setting.
Amber Valley Special Landscape Area	Construction and Operation (including maintenance)	**Scoped Out**	The Scoping Boundary does not cross into any part of the Amber Valley Special Landscape Area. For this reason, and as no landscape 'setting' to the designation (outside of its boundary) has been defined within the Amber Valley Local Plan or its associated evidence base documentation, this is scoped out.
West Yorkshire and Nottingham and Derby Green Belt	Construction and Operation (including maintenance)	**Scoped Out**	The Project will be located outside of the West Yorkshire Green Belt. The Nottingham and Derby Green Belt covers the stretch of the Scoping Boundary between Pentrich and Aston-on-Trent. Accordingly, consideration of the extent to which the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement.

Matter	Phase	Scoped in / out	Justification
			As outlined in GLVIA3 paragraph 5.4, where 'openness' (being one of the essential characteristics of Green Belt stated in paragraph 142 of the NPPF) is an aesthetic and perceptual aspect of any section's landscape character and visual amenity, it would be considered as part of the LVIA.
Landscape Character	Construction and Operation	**Scoped In**	There is the potential for direct effects on the overall character and/or key characteristics of the identified local landscape character areas that intersect with the Project, and indirect effects on those local landscape character areas within the LVIA Study Area from which there is potential intervisibility with the Project. NCAs and regional-level landscape character areas will not be considered as landscape receptors. This is to avoid duplication in the assessment. Landscape elements (i.e. tree cover, field boundaries, landform, watercourses) will not be appraised as receptors in their own right but will be considered as part of the baseline in terms of contribution to landscape sensitivity. Likely impacts in terms of potential tree and hedgerow loss will be described in relation to each character area and cross references will be made to other chapters such as that covering Biodiversity and Arboriculture
Receptors that lie outside the ZTV of the Project	Construction and Operation (including maintenance)	**Scoped Out**	Significant effects on receptors outside the ZTV of the Project are considered unlikely.
Residential Communities within 5km of the Scoping Boundary	Construction and Operation (including maintenance)	**Scoped In**	The Project may form a noticeable and/or distinct component within the views experienced by people within 5km of the Project, and so potentially lead to significant visual effects.

Matter	Phase	Scoped in / out	Justification
Receptors beyond 5 km of the Scoping Boundary (with the exception of any very high sensitivity receptors up to 7.5 km from the Scoping Boundary that are identified during the LVIA)	Construction and Operation (including maintenance)	**Scoped Out**	At such distances and taking into account intervening landform, vegetation, built-form, significant effects on visual receptors, that are not highly sensitive, are considered unlikely beyond 5 km.
Recreational visual receptors within 5 km of the Scoping Boundary	Construction and Operation (including maintenance)	**Scoped In**	The Project may form a noticeable and/or distinct component within the views experienced by people within 5 km of the Project, and so potentially lead to significant visual effects.
Road users	Construction and Operation (including maintenance)	**Scoped Out**	Significant visual effects on people travelling by motorised vehicle are not anticipated due to the speed of travel, and the fact that there are no known promoted driving routes through the LVIA Study Area.
Rail users	Construction and Operation (including maintenance)	**Scoped Out**	Significant visual effects on people travelling by train network are not anticipated due to the speed of travel, and the fact that the only railway line within the LVIA Study Area that is promoted as a scenic route, i.e. the Derwent Valley Line between Derby and Matlock, lies predominantly at the base of the river valley with no anticipated intervisibility with the Project (approximately 1.5 -11 km away).

Matter	Phase	Scoped in / out	Justification
Landscape and visual effect at night	Construction and Operation (including maintenance)	**Scoped Out**	Project may not involve any permanent lighting during its operation, and that lighting used during the construction and maintenance would be temporary, directional only and minimised where possible.
Cumulative landscape and visual effects	Construction and Operation (including maintenance)	**Scoped In**	The potential for significant cumulative landscape and/or visual effects with other operational, consented and proposed development of a similar type and scale will be considered. A list of developments to be considered in the cumulative LVIA will be agreed with consultees through the EIA process.

6.10 References

Ref 6.1: Council of Europe (2000) *European Landscape Convention* ETS No.176 ratified on the 21 November 2006. Accessed May 2024. https://www.coe.int/en/web/landscape/the-european-landscape-convention

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7. Ecology and Biodiversity

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Contents

7. Ecology and Biodiversity

7.1 Introduction

7.1.1 This chapter presents how the ecology and biodiversity assessment will consider the potentially significant effects on ecology and biodiversity receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

7.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

7.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

7.2 Approach to Scoping

7.2.1 The approach to scoping has drawn from previous experience of similar projects and professional judgement. Determining the scope of the ecology and biodiversity assessment has included the following stages:

- Key regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

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

- **Chapter 6: Landscape and Visual Amenity.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 10: Geology and Hydrogeology.**
- **Chapter 11: Agriculture and Soils.**
- **Chapter 12: Traffic and Transport.**
- **Chapter 13: Air Quality.**
- **Chapter 14: Noise and Vibration.**

7.2.3 This chapter is supported by the following appendices in **Volume 2** and figures in **Volume 3**:

- **Appendix 7A: Arboricultural Strategy.**
- **Appendix 7B: Non-Statutory Designated Sites within the Scoping Boundary.**

- **Figure 7.1: Sites Designated for Biodiversity.**
- **Figure 7.2: Non-Statutory Sites Designated for Biodiversity.**
- **Figure 7.3: Priority Habitats and Ancient Woodland.**

7.3 Key Regulatory and Planning Policy Context

Key Legislation

7.3.1 A summary of the key legislation considered in the scope of effects on ecology and biodiversity is outlined below:

- Environment Act 2021 (His Majesty's Stationary Office (HMSO), 2021) (Ref 7.1).
- The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024 (HMSO, 2024) (Ref 7.2).
- Natural Environment and Rural Communities (NERC) Act 2006 (as amended) (HMSO, 2006a) (Ref 7.3).
- Wildlife and Countryside Act 1981 (as amended) (WCA) (HMSO, 1981) (Ref 7.4).
- The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitat Regulations')[1] (HMSO, 2017) (Ref 7.5).
- Hedgerow Regulations 1997 (HMSO, 1997) (Ref 7.6).
- The Management of Hedgerows (England) Regulations 2024 (HMSO, 2024) (Ref 7.7).
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (HMSO, 2019) (Ref 7.8).
- Badger Act 1992 (HMSO, 1992) (Ref 7.9).
- Countryside and Rights of Way Act 2000 ('the CRoW Act') (HMSO, 2000) (Ref 7.10).
- Salmon and Freshwater Fisheries Act 1975 (HMSO, 1975) (Ref 7.11).
- The Eels (England and Wales) Regulations 2009 (HMSO, 2009) (Ref 7.12).
- Animal Welfare Act (2006) (HMSO, 2006b) (Ref 7.13).
- Wild Mammals (Protection) Act 1996 (HMSO, 1996) (Ref 7.14).
- Town and Country Planning (Trees) Regulations 1999 (HMSO, 1999) (Ref 7.15).

National Planning Policy

National Policy Statements

7.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy (NPS EN-1) (Department for Energy Security and Net Zero, 2024) (Ref 7.16) and NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security and Net Zero, 2024) (Ref 7.17). **Table 7.1** sets out

[1] As amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 7.49)

the requirements of both NPSs relevant to ecology and biodiversity and how these have been considered within this chapter and will be considered within the ES.

Table 7.1 - National Planning Policy Relevant to Ecology and Biodiversity

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (NPS EN-1) 2024		
4.6 Environmental and Biodiversity Net Gain (BNG)	Energy Nationally Significant Infrastructure Projects (NSIP) proposals, whether onshore or offshore, should seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity, and the wider environment where possible.	Legal obligations in relation to NSIPs will be met, as set out in the Environment Act 2021 (Expected to come into force in Nov 2025). Enhancements should also achieve relevant wider strategic outcomes, for example by increasing habitat connectivity, enhancing other ecosystem service outcomes, or considering use of green infrastructure strategies.
5.4 Biodiversity and Geological Conservation	The applicant should ensure the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. *Protected species*: consent should not be granted where harm to a protected species and relevant habitat would result, unless there is an overriding public interest and the other relevant legal tests are met. Species of Principal Importance (SPI) and Habitats of Principal Importance (HPI): should be protected from the adverse effects of development. The applicant should demonstrate that "*during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access*	Impacts to the following sites will be avoided by amending the location of works or by timing the works appropriately. Where avoidance is not possible, works would be undertaken so as to minimise impacts, with mitigation used where significant impacts are unavoidable. Compensation would be used as a last resort. • International sites: (Listed or proposed Ramsar sites, potential Special Protection Areas (SPAs) and possible Special Areas of Conservation (SACs). • Sites of Special Scientific Interest (SSSIs). • Regional / Local sites including National Nature Reserves (NNR and Local Nature Reserves (LNR). • Ancient woodland, ancient trees, veteran trees and other irreplaceable habitats (as defined by The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations, 2024).

Policy Reference	Policy Context	How it will be considered
	arrangements" and "habitats will, where practicable, be restored after construction works have finished".	A similar approach to the mitigation hierarchy mentioned as outlined above will be taken with regard to protected species, SPIs and HPIs. As a minimum, all legal obligations would be met with regards to protected species, and habitats would, where practicable, be restored after construction works have finished.
National Policy Statement for Electricity Networks (NPS EN-5) 2024		
Paragraph 2.9.3 – 2.9.6	Sets the context for the applicant's assessment to consider potential adverse effects on birdlife. It notes that consideration needs to be made of the potential for large birds to collide with overhead lines during flight or be electrocuted when perching, both with the potential to cause injury/death. If there is a risk of this occurring, measures should be implemented to avoid or minimise this, including siting, visibility and design of lines and other infrastructure. This should be considered in the preparation of the ES.	Wintering and passage bird surveys will be undertaken, with results reviewed to determine any key crossing points. Mitigation would be employed to minimise bird collision risk with overhead lines and post-construction monitoring will be considered to assess any impacts.

Other National Policy

7.3.3 Other relevant national policy considered in the scope of effects on ecology and biodiversity includes the National Planning Policy Framework (NPPF; Department for Levelling Up, Housing and Communities, 2023) (Ref 7.18).

7.3.4 The NPPF sets out the Government's planning policies for England and how these are expected to be applied by Local Authorities within their Local Development Frameworks. Section 15 covers Habitats and Biodiversity and provides a list of principals that Local Planning Authorities should apply when determining planning applications. These include:

- If significant harm to biodiversity cannot be avoided, adequately mitigated or as a last resort compensated for then planning permission should be refused.
- Developments likely to have an adverse effect on a SSSI should not normally be permitted.
- Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland, and ancient or veteran trees) should normally be refused.

- Developments whose primary objective is to conserve or enhance biodiversity should be supported. Opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure net gains for biodiversity.

Regional and Local Planning Policy

7.3.5 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

7.3.6 All local policy, specific to ecology and biodiversity will be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

7.3.7 Relevant guidance, specific to ecology and biodiversity, that has informed this Scoping Report and will inform the assessment within the ES, comprises:

- UK Biodiversity Action Plan (UKBAP) (Joint Nature Conservation Committee (JNCC), 1994) (Ref 7.19).
- Lowland Derbyshire Biodiversity Action Plan (BAP), 2011-2020 (Lowland Derbyshire Biodiversity Partnership, 2011) (Ref 7.20).
- South Derbyshire Action Plan for Nature (Derbyshire Wildlife Trust (DWT), 2021) (Ref 7.21).
- A Green Future: Our 25 Year Plan to Improve the Environment (HMSO, 2018) (Ref 7.22).
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Second Edition v1.2 (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018 updated 2022) (Ref 7.23).
- Guidelines for Preliminary Ecological Appraisal: Second Edition (CIEEM, 2017) (Ref 7.24).
- Biodiversity Net Gain: Good Practice Principles for Development, A Practical Guide (CIEEM, 2019) (Ref 7.25).
- BSI Standards Publication BS 8683:2021 – Process for designing and implementing Biodiversity Net Gain – Specification (British Standards Institution, 2021) (Ref 7.26).

Biodiversity Net Gain

7.3.8 The Environment Act 2021 (Ref 7.1) introduces a mandatory requirement for 10% BNG for new developments to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. National Grid has committed to 10% BNG in Environmental value including as a minimum 10% BNG across all its construction projects. Based on current information available, it is understood that the 10% target for NSIPs will be mandatory by November 2025, and therefore mandatory for the Project.

7.3.9 In pursuit of achieving this commitment across the Project, the Department for Environment, Food and Rural Affairs (Defra) statutory biodiversity metric will be used to set a biodiversity baseline, quantify the impacts of change to the Project, inform landscaping design and action and calculate the extent to which mitigation,

compensation and enhancement measures incorporated into the design of the Project will deliver long term net gains for the environment and biodiversity.

7.3.10 Where required, biodiversity enhancement measures may include creation of new habitats and improvement of existing ecological features, for example, improving existing areas of grassland to improve their habitat condition by bringing them into more favourable management, or planting in strategic areas to create new ecological connections.

7.3.11 Delivery of these potential improvements will be sought through the provisions of the Development Consent Order (DCO) where practicable, and/or via third party agreements with landowners, and/or via the purchase of statutory biodiversity credits.

7.3.12 The realisation of these potential improvements will allow effective and valuable environmental benefits to be identified and will assist in meeting the aspirations of stakeholders with an interest in achieving wider environmental benefits on development projects.

7.4 Study Area

7.4.1 The extent of the study area for Environmental Impact Assessment (EIA) Scoping varies with the different ecological features based on the CIEEM guidelines (Ref 7.23). EIA Scoping sets out the initial study area as a starting point for baseline data collection. Following further assessment, this will ultimately be amended to form a Zone of Influence (ZoI) which is the area over which changes arising from construction and operation (including maintenance) could lead to ecologically significant impacts. The CIEEM guidelines require the assessment to be focused on a ZoI.

7.4.2 It is noted here that the ZoI varies between different biodiversity features and will be formalised through professional judgement of perceived impact pathways, survey work, desk-based assessment, best practice guidelines, and consultation with stakeholders. The ZoI for any receptors will be refined as more information becomes available regarding the potential ecological effects of the Project. In addition, as the iterative design process continues, the Scoping Boundary will be refined within the ES to comprise the proposed Order Limits plus the relevant buffer.

7.4.3 In summary the study areas to inform scoping are described in Table 7.2 and presented on Figure 7.1: Sites Designated for Biodiversity, Figure 7.2: Non-Statutory Sites Designated for Biodiversity and Figure 7.3: Priority Habitats and Ancient Woodland in Volume 3.

Table 7.2 - Initial Study Areas in Relation to the Scoping Boundary

Ecological feature	Initial study area to inform scoping
International sites designated for biodiversity	SACs within 20 km, extending to 30 km for SACs where bats are the qualifying interest. SPAs and Wetlands of International Importance (Ramsar sites) within 20 km of the Scoping Boundary.
National and local sites designated for biodiversity (statutory and non-statutory)	5 km from the Scoping Boundary

Ecological feature	Initial study area to inform scoping
Protected / notable species	2 km from the Scoping Boundary
Protected / notable habitat (including ancient woodland)	200 m from the Scoping Boundary (extended as necessary to account for hydrological connectivity)

7.5 Baseline Conditions (inc. Future Baseline)

Data Collection

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

- Aerial photography, Google Earth and Google Maps Street View.
- The Government's Multi Agency Geographic Information for the Countryside (MAGIC) website (Ref 7.19).
- UKBAP (Ref 7.20).
- Lowland Derbyshire BAP, 2011-2020 (Ref 7.21).
- South Derbyshire Action Plan for Nature (Ref 7.22).
- The British Trust for Ornithology (BTO) Wetland Birds Survey (WeBS) (BTO, 2024) (Ref 7.28).
- Derbyshire Biological Records Centre (DBRC, 2024) (Ref 7.29).
- Environment Agency records via the National Biodiversity Network (NBN) (2024) (Ref 7.30).
- National Water Vole Database and Mapping Project (McGuire & Morse, 2020) – Location of water vole *Arvicola amphibius* and American mink *Neovison vison* records (2009-2018) (Ref 7.31).

Engagement with Stakeholders

7.5.2 The EIA will be informed by consultation and continued engagement with stakeholders, including Derbyshire County Council and the relevant Local Authorities, Natural England, the Environment Agency and Forestry England. In addition, the National Trust, Royal Society for the Protection of Birds (RSPB), the Wildlife Trust, Woodland Trust, and local groups will be engaged to ensure that specialist local views and expertise can be considered as part of the EIA.

7.5.3 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024.

7.5.4 The principal feedback received from Non-Statutory Consultation with Statutory Environment bodies of relevance to this scoping chapter is included in **Table 7.3** below, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 7.3 - Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Natural England	District Level Licencing (DLL) for great crested newt (GCN) is available in the Derbyshire area and the Scoping Boundary is not within red risk zones, therefore suitable for DLL.	Engagement will continue with Natural England over the potential use of species licencing for GCNs, including the use of DLL.
Natural England	Wintering and passage bird surveys should be undertaken, with results reviewed to determine any key crossing points. The proposed Wintering Bird survey methodology is supported. Two-year surveying period for wintering birds will be dependent on the baseline.	Engagement will continue with Natural England regarding wintering and passage bird surveys.
Natural England	SPAs in proximity to the study area are generally habitat based however further scoping work is required to establish this.	Screening will be undertaken and discussed with Natural England. Where required, progression to subsequent stages of the HRA process may occur.
Environment Agency	A number of main river watercourses and associated tributaries are within the zone of influence or proposed to be directly crossed by the scheme. These watercourses provide important habitat for a number of migratory fish species. Fish species can be impacted by a number of construction activities, such as noise associated with piling and horizontal directional drilling, artificial lighting near watercourses, increased runoff of fine sediment and pollutants, loss of habitat through coffer-damming and risk of entrapment through over-pumping. Mitigation should be included to ensure that risks posed from such construction activities are negligible. In order to inform mitigation, baseline data is required.	Impacts on fish from the Project would be assessed for the construction and operational phases as part of the EIA.

Organisation and date	Summary of response	Consideration in the Scoping Report
Environment Agency	The scheme may involve converting existing overhead power cables to underground cables. There is evidence to suggest that electric and magnetic fields (EMFs) from power cables can result in avoidance or attractant behaviour by fish, as well as effecting egg and juvenile development.	The Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5 including the International Commission on Non-Ionizing Radiation Protection guidelines for EMFs and associated precautionary policy. An EMF report will be prepared as part of the Project. This is separate to the EIA process.
Environment Agency	The EIA should include a BNG Plan and a Habitat Management and Monitoring Plan.	The Project has a commitment to 10% BNG in line with the requirement proposed by the Environment Act 2021. Further engagement will be undertaken with the EA regarding provision of a Habitat Management and Monitoring Plan, or equivalent.
Canal and River Trust	Consideration to the Trent and Mersey Canal which is a valuable wildlife habitat and supports a wide range of protected species. Potential impacts on the biodiversity value of the canal and its surroundings are appropriately protected.	Impacts on canal wildlife habitat will be considered, including in terms of construction activities.

7.5.5 Engagement with relevant stakeholders will be ongoing up to the submission of the DCO with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.

Existing Baseline Conditions

7.5.6 A summary of the sites designated for biodiversity within the study area are listed below and shown on **Figure 7.1: Sites Designated for Biodiversity** and **Figure 7.2: Non-Statutory Sites Designated for Biodiversity** in **Volume 3**.

Statutory Designated Sites

7.5.7 No international sites designated for biodiversity are located within 2 km of the Scoping Boundary. Within 20 km, there are six SACs and one SPA. These are listed in **Table 7.4**.

7.5.8 No SACs designated for bats are located within 30 km.

Table 7.4 - International Sites Designated for Biodiversity within 20 km

Site	Designation	Distance from the Scoping Boundary	Designated for
South Pennine Moors	SAC	7.5 km west	Designated for its European dry heaths, Blanket bogs and Old sessile oak woods with Ilex and Blechnum in the British Isles. It also comprises the qualifying features Northern Atlantic wet heaths with cross-leaved heath *Erica tetralix* and Transition mires and quaking bogs.
Peak District Moors (South Pennine Moors Phase 1)	SPA	7.5 km west	The site supports breeding short-eared owl *Asio flammeus* (22 pairs; at least 2.2% of the Great British breeding population), merlin *Falco columbarius* (30 pairs; at least 2.3% of the Great British breeding population) and golden plover *Pluvialis apricaria* (435 pairs; at least 1.9% of the Great British breeding population).
Peak District Dales	SAC	8.0 km west	Designated for its Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites), *Tilio-Acerion* forests of slopes, screes and ravines and white-clawed crayfish Austropotamobius pallipes (River Dove). Additional qualifying features include presence of European dry heaths,

Site	Designation	Distance from the Scoping Boundary	Designated for
			Calaminarian grasslands of the *Violetalia calaminariae*, Alkaline fens, Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*), Calcareous rocky slopes with chasmophytic vegetation, brook lamprey *Lampetra planeri* and bullhead *Cottus gobio*.
Gang Mine	SAC	9.0 km west	Designated for its Calaminarian grasslands of the *Violetalia calaminariae*.
River Mease	SAC	12.8 km south	Designated for the presence of spined loach *Cobitis taenia* and bullhead. Additional qualifying features include presence of white-clawed crayfish (River Dove), otter *Lutra lutra* and Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation.
Bees Nest & Green Clay Pits	SAC	13.5 km west	Designated for the presence of GCN *Triturus cristatus* with additional qualifying feature Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites).
Birklands and Bilhaugh	SAC	14.6 km east	Designated for its Old acidophilous oak woods with *Quercus robur* on sandy plains.

7.5.9 One national site designated for biodiversity (Morley Brick Pits SSSI) is located within the Scoping Boundary. A further 16 sites are located within 5 km. Of the 17 sites, 16 are designated as SSSIs and one designated as a NNR**. Table 7.**5 presents the national statutory sites designated for biodiversity within 5 km of the Scoping Boundary.

7.5.10 The Scoping Boundary falls within three SSSI Impact Risk Zones (IRZs) (related to biodiversity) for projects involving pylons and overhead lines (or 'All Planning Applications') (**Table 7.5**). One of these IRZs is associated with sites of bird interest (Ogston Reservoir SSSI).

Table 7.5 - National Statutory Sites Designated for Biodiversity within 5 km

Site	Designation	Distance from the Scoping Boundary	Designated for
Morley Brick Pits*	SSSI	Within Scoping Boundary	The site consists of a series of flooded pits, originally dug for clay and which now contain acidic water colonised by a range of plants and animals several of which are becoming rare in Derbyshire.
Ogston Reservoir*	SSSI	0.1 km west	The water covers some 85 hectares and is an important wintering site for many wildfowl and a feeding site for wading birds on passage in late summer. The peripheral mosaic of semi-natural habitats is not only of botanical interest but, most importantly, provides a diversity of nesting and feeding sites for a wide variety of breeding birds of which over 70 species have been recorded.
Breadsall Railway Cutting	SSSI	0.7 km west	This site is important for a mosaic of habitats particularly grasslands which support many species which are now uncommon in the area. Scrub of various types has colonised parts of the cutting and at the eastern end has developed into woodland. The scrub provides nesting cover and winter food for a range of birds and is particularly noted for warblers. The site is notable for its large and diverse butterfly population which includes species of local distribution in Derbyshire such as holly blue *Celustrina argiolus* and species which are now recolonising the county such as gatekeeper *Pyronia chinate.*
Donington Park*	SSSI	1.6 km south	The site comprises a medieval deer park which contains a fine population of ancient oak trees possessing a rich associated invertebrate fauna, including a number of rare and uncommon species.

Site	Designation	Distance from the Scoping Boundary	Designated for
Dovedale Wood	SSSI	2.1 km east	The site comprises one of the best remaining ancient ash-wych elm woods in Nottinghamshire and is of Regional importance.
Crich Chase	SSSI	2.3 km west	Notified for supporting a diverse mosaic of semi-natural habitats, including woodland, scrub and unimproved neutral and acid grasslands, with a rich assemblage of grassland fungi, in particular its waxcaps *Hygrocybe*, fairy clubs *Clavariaceae* and pinkgills *Entoloma*.
Cromford Canal	SSSI	2.6 km west	The site consists of approximately six miles of disused canal and has been selected as an example of a eutrophic freshwater habitat with a rich submerged and emergent aquatic flora and a diverse marsh-wet grassland margin, supporting a very rich insect fauna.
Ticknall Quarries	SSSI	2.9 km south	The site consists of a number of disused quarries and has been selected for a number of adjacent habitats which include semi-natural ash woodland, limestone grassland, open water and small flushes.
Calke Park	SSSI	3.6 km south	The site encompasses the ancient deer park of the Calke Abbey Estate with its rich wood pasture which has concentrations of very large, old, stag-headed oak trees, as well as ancient limes *Tilia* sp. And beeches *Fagus sylvatica*. The exceptional deadwood invertebrate fauna of this site is dependent upon the conservation of these veteran trees and the future continuation of the wood pasture habitat.
Calke Park	NNR	3.6 km south	Calke Park NNR encompasses the ancient deer park of the Calke Abbey estate. The reserve includes rich wood pasture and has concentrations of very large, old, stag-headed oak trees as well as lime and beeches. (Similar boundary to the Calke Park SSSI, above).

Site	Designation	Distance from the Scoping Boundary	Designated for
Shining Cliff Woods	SSSI	3.7 km west	An ancient semi-natural oak Quercus spp. Woodland with areas of areas of wetter ground where springs or streams occur. Supports a range of mollusc species as well as hairy wood ant *Formica lugubris*. Many birds breed in the woods including pied flycatcher *Ficedula hypoleuca* and wood warbler *Phylloscopus sibilatrix* and in winter they are used by large flocks of brambling *Fringilla montifringilla*.
Teversal to Pleasley Railway	SSSI	4 km east	The site comprises one of the few remaining limestone grasslands in Nottinghamshire and is of Regional importance.
Carver's Rocks	SSSI	4.6 km south	The site consists of a number of habitats developed on an acid soil over sandstones. These include open water, eutrophic marsh, carr, oak-birch woodland and heath. The invertebrate fauna is extensive and diverse. It includes two nationally rare species; the digger wasp *Pemphredon morio* and the millipede *Cylindroinlus londinensis*, as well as nationally uncommon moths, beetles, hoverflies and sawflies.
Lockington Marshes	SSSI	4.6 km east	The site comprises one of the largest remaining areas of willow carr woodland in Leicestershire and a diverse complex of wetland habitat supporting an important invertebrate fauna with many nationally scarce species.
Kedleston Park	SSSI	4.7 km west	The main interest of Kedleston Park is the rich and diverse deadwood invertebrate fauna which is primarily dependent upon the large number of mature and overmature beech and pedunculate oak trees. The mosaic of habitats within the Park also supports a good bird community and a number of species otherwise rare on the outskirts of Derby breed within the site.
Breedon Hill	SSSI	4.8 km south	The site comprises the largest area of species-rich Carboniferous Limestone grassland in Leicestershire and is representative of such grassland habitat in the English Midlands.

Site	Designation	Distance from the Scoping Boundary	Designated for
Dimminsdale	SSSI	4.9 km south	This site contains ancient semi-natural woodland of a type uncommon in lowland Britain and one of the largest areas of unimproved acidic grassland remaining in Leicestershire.

*SSSIs with relevant IRZs falling within the Scoping Boundary

7.5.11 **Table 7.6** presents the local statutory sites identified within the study area. Three local statutory sites designated for biodiversity (all LNRs) are located within the Scoping Boundary, and a further 13 located within 2 km of the Scoping Boundary.

Table 7.6 - Local Statutory Sites Designated for Biodiversity within 2 km

Site	Designation	Distance from the Scoping Boundary	Designated for
Aston Brickyard Plantation	LNR	Within Scoping Boundary	Formerly containing a brickyard and a series of clay-pits, the site now comprises mature secondary woodland and an area of neutral grassland with a butterfly bank.
Williamthorpe	LNR	Within Scoping Boundary	The consists of three areas of open water, the largest of which has an extensive area of reedbed. The reedbed, one of the largest in Derbyshire plus the surrounding mudflats, provide ideal conditions for many species of birdlife with over 200 different species having been recorded.
Oakerthorpe	LNR	Within Scoping Boundary	A reserve with pond and woodland areas. The pond supports frogs, toads and smooth newts, and grass snake have been recorded here. Water vole are also resident.
Doe Lea	LNR	0.04 km east	A mix of woodland, scrub and reed bed which supports a variety of bird species.
Chellaston Brickworks	LNR	0.4 km north-west	Woodland and grassland habitats with a variety of invertebrates and birds.
Wessington Green	LNR	0.5 km west	The reserve contributes to the Lowland Derbyshire BAP and habitats include semi-natural grassland, mire, heathland, hedgerows and areas of scrub and woodland. Notable plants include sneezewort *Achillea ptarmica*, star sedge *Carex echinata* and bluebell *Hyacinthoides* sp. With locally rare lesser skullcap *Scutellaria minor* being of particular interest.
Hammersmith Meadows, Ripley	LNR	0.6 km east	(Unknown)
St Chad's Water	LNR	0.6 km east	The site contributes to the Lowland Derbyshire BAP and habitats include semi-natural grassland, swamp, standing

Site	Designation	Distance from the Scoping Boundary	Designated for
			open water and hedgerows. Kingfisher *Alcedo Atthis* can be seen here along with large numbers of damselflies and dragonflies.
Breadsall Railway Cutting	LNR	0.7 km west	The cutting has a variety of wildlife habitats uncommon to disused railways and not found elsewhere on the edge of Derby. Grasslands in the reserve are similar to old unfertilised hay meadows and the pastures which were once present in surrounding fields.
Red River	LNR	0.8 km east	(Unknown)
Sinfin Moor	LNR	0.8 km north	Habitats include scrub, grassland, woodland and two ponds. Hedgerows form an extensive network across the site and link to the neighbouring countryside forming wildlife corridors into residential areas of Sinfin.
Carr Wood	LNR	1.1 km east	The site comprises mixed woodland and unimproved grassland and is home to wide range of native flora.
Chaddesden Woods and Lime Lane Wood	LNR	1.3 km west	An ancient woodland with a variety of tree and fungi species, birds, bats and butterflies.
Elvaston	LNR	1.5 km north-west	Open parkland, woodland and more formal historical gardens.
Duffield Millenium Meadow	LNR	1.6 km west	Part of the Lowland Derbyshire BAP and includes flood plain grazing marsh, standing open water with associated vegetation, rivers, stream and hedgerows.
Belper Parks	LNR	1.6 km west	The reserve contributes to the Lowland Derbyshire BAP and habitats includes broad leaved woodland, scrub, semi-improved acid and neutral grassland and wetland.

Non-statutory Designated Sites

7.5.12 The desk study returned the locations of 361 non-statutory designated sites, containing Local Wildlife Sites (LWS), potential LWS (pLWS) and DWT reserves. **Table 7.7** provides a summary of these sites. Details of all sites within the Scoping Boundary are shown in **Figure 7.2: Non-Statutory Sites Designated for Biodiversity** in **Volume 3** and tabulated in **Appendix 7B: Non-statutory designated sites within the Scoping Boundary** in **Volume 2**.

Table 7.7 - Non-statutory Designated Sites Designated for Biodiversity within 2 km

Designation	Number of sites within Scoping Boundary	Number of sites within 2 km of Scoping Boundary
LWS	60	194
pLWS	21	74
DWT reserves	3	9

Habitats

Priority Habitats

7.5.13 The desk study has identified the following Priority Habitats within 200 m of the Scoping Boundary, which are shown on **Figure 7.3: Priority Habitats and Ancient Woodland** in **Volume 3**:

- Coastal and floodplain grazing marsh.
- Deciduous woodland.
- Good quality semi-improved grassland.
- Lowland dry acid grassland.
- Lowland fens.
- Lowland heathland.
- Lowland meadows.
- Reedbeds.
- Traditional orchard.

7.5.14 All habitats will be further assessed during field survey work to confirm the presence and extent of Priority Habitat.

Ancient Woodland

7.5.15 **Figure 7.3: Priority Habitats and Ancient Woodland** in **Volume 3** presents ancient woodland within the study area. There are 24 blocks of ancient woodland within 200 m of the Scoping Boundary, with 15 blocks located within the Scoping Boundary.

7.5.16 The ancient woodland identified includes all woodland that appears on maps before 1600. However, any woodland less than 2 ha was not included on the inventory, and so small woodlands and linear features are excluded from the inventory. Areas of unmapped ancient woodland will be identified through a combination of field surveys

(to determine if wooded areas support ancient woodland ground flora species and veteran and or ancient trees) and review of other desk-based sources such as historical mapping.

Other Habitats

7.5.17 Aerial imagery shows the dominant habitat throughout the Scoping Boundary to be agricultural land, predominately arable fields bounded by hedgerows, with woodland parcels, small residential areas and farms, golf courses and a few industrial buildings. Major roads, including the A617, M1, A61, A38 and A50, and the Midland Main Line and Castle Donington line railway lines, traverse the Scoping Boundary. Watercourses within the Scoping Boundary include the Trent and Mersey Canal, River Amber, River Derwent, River Trent and several brooks and agricultural ditches.

7.5.18 Connectivity from the Scoping Boundary is provided to the wider landscape through the network of hedgerows, agricultural ditches and open green spaces along with larger landscape features such as the railway lines and rivers, mentioned above.

Protected / Notable Species

7.5.19 A high-level assessment of the habitats from aerial imagery and MAGIC map within the Scoping Boundary suggests they have potential to support a variety of protected and notable species. This includes, but is not limited:

- Bats including the potential to support species through foraging, commuting and roosting within buildings, trees and underground mines.
- Badger *Meles meles* including habitats to support setts.
- Watercourses and terrestrial habitat suitable for use by otter.
- Watercourses that may support water vole, white-clawed crayfish and freshwater fish.
- Habitats which may support passage, wintering and breeding birds.
- GCN and the habitats that support hibernation and breeding.
- Common and widespread reptiles in distinct areas where habitats have good suitability.
- Habitats with the potential to support protected or notable invertebrate assemblages/species.
- Habitats with the potential to support SPI such as brown hare *Lepus europaeus* and common toad *Bufo bufo.*
- Veteran and ancient trees, important hedgerows and notable plant species.

7.5.20 Desk study information was obtained from the DBRC (Ref 7.28) and MAGIC for biological records (Ref 7.19) within 2 km of the Scoping Boundary in the last ten years. Records included the following:

- Bats:
  - No granted licence returns for maternity roosts from Natural England within the Scoping Boundary were found within the last ten years. Seven granted licence returns for maternity roosts were returned within 2 km. These were for common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* brown long-eared bat *Plecotus auritus*, whiskered bat *Myotis mystacinus*, Natterer's bat *Myotis nattereri* and noctule *Nyctalus noctula*.

- The desk study returned a total 482 records of bat species within 2 km of the Scoping Boundary, equating to 12 species, including two Annex II species; namely two records of barbastelle *Barbastella barbastellus* and one record of greater horseshoe *Rhinolophus ferrumequinum*. No Annex II species were recorded within the Scoping Boundary, with the nearest barbastelle recorded 1.5 km away, and the nearest greater horseshoe 1 km away.
- One hundred and forty-seven of these records were related to roost locations for seven species. No roosts of Annex II species were returned.
- Bats are known to roost within mines and hundreds of disused mine shafts are located within the vicinity of the Scoping Boundary (The Coal Authority, 2023 (Ref 7.32)). Five bat species are known to use the mines for hibernation roosts in Derbyshire and the Peak District (brown long-eared, Natterer's, Daubenton's *Myotis daubentonii*, Brandt's *Myotis brandti* and whiskered bats); two of these species have also been recorded roosting in mines in summer (Daubenton's and Natterer's).

- Water Vole:
  - The desk study returned 76 records of water vole within 2 km of the Scoping Boundary including burrows, latrines and feeding remains. Of these, 21 were recorded within the Scoping Boundary, including the most recent record from 2024. Record locations within the Scoping Boundary included several located close to the River Amber near South Wingfield and two records located near Hartshay Brook, Hartshay.
- Otter:
  - Ninety-one records of otter were returned by DBRC. Of these, 19 records were located within the Scoping Boundary, including a record from 2024. Several of these records were located along the River Amber and its tributaries near Ogston. Watercourses close to Willington also returned several records.
- Badger
  - The desk study returned a total 264 records for badger located within 2 km of the Scoping Boundary, including sightings, roadkill, field signs and sett locations. Fifty-six of these locations were within the Scoping Boundary.
- Hazel Dormouse:
  - No records of this species or granted licences returned from Natural England were returned within 2 km of the Scoping Boundary.
  - There have been reintroduction programs for hazel dormouse in the local area, including Calke Abbey in 2023 (4.6 km south of the Scoping Boundary) as well as in the Derwent Valley in 2003 and 2005.
- Other Notable Mammals:
  - The desk study returned 1,119 records of five species of SPI mammals. Of these records, 990 records were hedgehog *Erinaceus europaeus*, and the remaining records were hare *Lepus europaeus*, pine marten *Martes martes*, polecat *Mustela putorius* and harvest mouse *Micromys minutus*. All species except for harvest mouse were found within the Scoping Boundary.
  - There was one record of pine marten which was of a dead individual located on the A38 road near Ripley in 2018. Pine marten are afforded protection under Schedule 5 Section 9 of the WCA (protected from intentional damage or destruction to any structure or place used for shelter or protection).

- Birds:
  - The desk study returned a total 7,042 records of 189 species of bird within 2 km of the Scoping Boundary since 2014. Of these, 125 species across 1,168 records were located within the Scoping Boundary.
  - Sixty-eight species are listed within Schedule 1 of the WCA (1981), including 142 records of red kite *Milvus milvus* (15 within the Scoping Boundary), 139 records of barn owl *Tyto alba* (26 within the Scoping Boundary) and 125 records of kingfisher (28 within the Scoping Boundary).
  - The largest number of records returned were for skylark *Alauda arvensis* (186 records), song thrush *Turdus philomelos* (169 records), kestrel *Falco tinnunculus* (163 records) and yellowhammer *Emberiza citrinella* (155 records).
- Reptiles:
  - The desk study returned 60 records of three reptile species within 2 km of the Scoping Boundary; common lizard *Zootoca vivipara*, grass snake *Natrix helvetica*, and slow worm *Anguis fragilis*. Two of these records were located within the Scoping Boundary – both for grass snake, near Horsley Woodhouse.
- Amphibians:
  - The desk study returned a total 188 records of five amphibian species within 2 km of the Scoping Boundary; common toad *Bufo bufo*, common frog *Rana temporaria*, smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus* and great crested newt. Thirty-three of these records (including common toad, common frog and great crested newt) were located within the Scoping Boundary.
  - Survey licence return information (MAGIC) shows 21 records within the Scoping Boundary. Eight locations with GCN are within woodland north of Denby Bottles (east of Belper); one location near Street Lane (1.2 km north of the eight mentioned above); one location near High Bank (1.6 km north-east of the eight mentioned above) and one location near Bellington Wood, south of Ambaston. A further 21 records were also found within 500m of the Scoping Boundary, of which 19 are also close to High Bank.
- Fish:
  - The desk study returned 72 records of five internationally important species of fish within 2 km of the Scoping Boundary. These were eel *Anguilla anguilla* (SPI), spined loach (SPI), bullhead, brook lamprey and Atlantic salmon *Salmo salar* (SPI). Of the 72 records, 52 were for bullhead.
  - Records for spined loach, bullhead and brook lamprey were located within the Scoping Boundary. This included eight records for bullhead located along the River Amber between Ogston and South Wingfield. A record for each of bullhead and spined loach was located in Twyford Brook, near Twyford (close to River Trent), and bullhead and brook lamprey were located in the River Derwent, near Draycott.
  - One species of nationally important fish was recorded, namely Brown/Sea Trout *Salmo trutta* (an SPI). Three records were found within the Scoping Boundary, located in the River Amber near Ogston and Toadhole Furnace.

- White-clawed Crayfish:
  - The desk study returned one record of white-clawed crayfish within 2 km of the Scoping Boundary, which was over 1.5 km away. The record was from 2022 and comprised three individuals located within Halldale Brook, to the west of Bolsover.
- Terrestrial Invertebrates:
  - The desk study returned a total 363 records of protected or notable terrestrial invertebrates, comprising seven species of butterfly, 39 species of moth, ten species of beetle, two species of true bug, 12 species of true fly, and one flatworm. Fourteen species were located within the Scoping Boundary, including small heath (butterfly) *Coenonympha pamphilus*.
- Protected/Notable Plants:
  - The desk study returned a total 166 records of 54 protected/notable vascular plant species. Of these records, 15 species are protected/notable internationally, 19 nationally and 20 species locally. Thirteen of these species were located within the Scoping Boundary.
  - No non-vascular plant species were returned in the desk study.
  - One nationally protected/notable fungus species, namely coral tooth *Hericium coralloides,* was recorded in 2022 and located 1.8 km from the Scoping Boundary. This species is a SPI.
- Invasive Non-Native Species:
  - There were records of 24 invasive non-native species (INNS) returned. This comprised: ten bird species including Canada goose *Branta canadensis* and Mandarin duck *Aix galericulata*; one crustacean, namely signal crayfish *Pacifastacus leniusculus*; 12 plant species including Japanese knotweed *Reynoutria japonica* and giant hogweed *Heracleum mantegazzianum*; and two mammal species, namely muntjac deer *Muntiacus reevesi* and American mink *Neovison vison*.
  - Of these records, there were four bird species, signal crayfish, six plant species (New Zealand pigmyweed *Crassula helmsii*, Canadian waterweed *Elodea canadensis*, giant hogweed, floating pennywort *Hydrocotyle ranunculoides*, Himalayan balsam *Impatiens glandulifera* and Rhododendron *Rhododendron ponticum*), and one mammal (American mink) located within the Scoping Boundary.

Future Baseline Conditions

7.5.21 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 in the ES.

7.5.22 Large parts of land within the Scoping Boundary are located on agricultural land. The ecological conditions are unlikely to change significantly in the short term as current agricultural practices are likely to be maintained therefore the future baseline is likely to be the similar to the current baseline. Where changes arise from other future developments these will be considered in the cumulative assessment of the ES, as appropriate.

7.5.23 Due to climate change, it is possible that in the medium to long term the range of some species may be altered. Any potentially relevant changes to the baseline will be reviewed during the EIA process and, should any likely instances be identified, the

implications will be considered on a case-by-case basis within the EIA. A description of the potential future baseline will also be provided in the ES.

7.6 Mitigation Measures Adopted as Part of the Project

7.6.1 A number of mitigation measures will be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

7.6.2 An optioneering study (the Corridor and Preliminary Routing and Siting Study, as described in **Chapter 3: Main Alternatives Considered)** has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced. This includes avoiding, as far as practicable, statutory designated sites and ancient woodland.

7.6.3 A BNG equivalent to a minimum 10% uplift above the current baseline will be built into the Project through the design process.

7.6.4 GCN are widespread throughout the region and known to be present within the Scoping Boundary. Following agreement with Natural England, mitigation to minimise impacts to this species will be implemented via a DLL scheme, without field surveys.

7.6.5 Further embedded design measures will be developed as the Project design evolves.

Good Practice Mitigation Measures

7.6.6 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice (CoCP)** in **Volume 2**.

7.6.7 In addition, **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** presents the likely good practice mitigation measures relevant to ecology and biodiversity. These include but are not limited to:

- The Main Works Contractor(s) would comply with relevant protected species legislation. Appropriate licences would be obtained where necessary from Natural England or the Environment Agency for all works affecting protected species as identified by the ES and through pre-construction surveys. All applicable works would be undertaken in accordance with the relevant requirements and conditions set out in those licences.
- At sensitive crossing locations (e.g. rivers), existing access routes would be used as far as reasonably practicable and the width of any required working area kept to the minimum required to facilitate the works. If access upgrades are

required or a new crossing is needed, preference will be for use of temporary bridges or culverts to be installed.

- Where practical, sensitive sites including SSSIs, LNRs, local conservation site designations (LWS, pLWS and DWT Reserves), Ancient Woodland, Wildlife Trust, and RSPB reserves would be avoided when micro-siting the likely working areas.
- Vegetation would be retained where reasonably practicable to facilitate construction.
- To avoid destruction of active bird nests, where practicable, in any areas where vegetation clearance is required such works would be undertaken outside the breeding bird season (outside mid-March-August). Where this is not possible, vegetation removal would be undertaken with prior supervision, of a suitably experienced ecologist, of a suitably experienced ecologist, and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. However, for all breeding birds, should damage, or in the case of Schedule 1 species only, disturbance, be unavoidable, a derogation licence would be obtained from Natural England before proceeding.
- In compliance with legal requirements, sensitive removal of vegetation with the potential to support legally protected species (e.g. reptiles) would be used.
- Where the works require the crossing or removal of hedgerows, the gap will be reduced to the minimum width required for safe working. Where hedge removals are unavoidable, new hedgerow planting, on completion of works, will be planted and will include native, woody species of local provenance.
- In line with good practice, pollution prevention plans, or equivalent, would be drawn up to detail how ground and surface waters would be protected during construction and operation (including maintenance). These would include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning.
- In line with good practice, measures to minimise any risk of effects on ecological features from dust emissions would be informed by the construction dust risk assessment and set out within a Dust Management Plan (DMP) or equivalent. This is likely to include the use of standard dust suppression methods.
- Areas of temporary habitat loss would be reinstated, wherever practicable, following the completion of construction in each area. Areas of permanent habitat loss (and temporary habitat loss greater than 2 years) will be considered within the Project's BNG assessment.
- A lighting design of all temporary and permanent lighting would be developed once contractors are appointed; however, the principles of lighting design will be detailed at the time of the DCO application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals (Institution of Lighting Professionals, 2023). The lighting design would account for the potential effects on terrestrial ecology by taking measures to minimise lighting usage, minimise light spill, use the most appropriate wave lengths of light, and locate lighting in the most appropriate locations – this is to decrease the potential displacement and disturbance effects on light sensitive fauna such as bats.
- The use of tried and tested invasive species control and biosecurity measures, in accordance with Department for Food and Rural Affairs (DEFRA) guidelines,

to avoid the spread of non-native invasive species and infested materials would be applied.

- Where excavations are left uncovered overnight, a means of escape for mammals should be provided in the form of a ramp, or other means of escape.
- Works would be undertaken following precautionary working method statements, where required, to minimise impacts to protected/notable species and habitats. The presence of an Ecological Clerk of Works (ECoW) may also be required, for example checking for active bird nests or safely moving amphibians out of harms way. Specific protected species and/or habitats detailed within the precautionary method statement, and the associated mitigation measures, would be informed by the findings of the surveys undertaken to support the development of the ES.

Additional Mitigation Measures

7.6.8 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for ecology and biodiversity. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

7.7 Likely Significant Effects

7.7.1 This section sets out the likely significant effects on ecology and biodiversity arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

7.7.2 The review of likely significant effects assumes that the embedded and good practice mitigation measures described in Section 7.6 and outlined within **Appendix 4A: Initial Outline CoCP** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportionate assessment (IEMA, 2017 (Ref 7.33)).

7.7.3 The identification of likely significant effects for ecology and biodiversity receptors has followed CIEEM guidance (Ref 7.24) and presented in a ‘source –pathway –receptor’ format. **Table 7.8** presents the outcomes of the appraisal and sets out the Project’s relevant construction, operation and maintenance activities (the source), the impacts likely to arise from the activities (the pathway) and the ecological feature (the receptor) where likely significant effects cannot be ruled out at this stage following the application of embedded and good practice mitigation.

7.7.4 There is the potential for the Project to affect both terrestrial and freshwater habitats and species of biodiversity value within the likely ZoI, as set out in Section 7.5.

7.7.5 As a linear development which is largely overhead lines with the potential for short sections of below-ground cabling and, should it be brought into the scope of the Project, a proposed new Chesterfield Substation, the Project would result in predominantly short-term and temporary impacts to facilitate the construction. As such the majority of ecological features would only be subject to negative effects during construction.

7.7.6 Operation (and maintenance) impacts are limited to areas affected by the proposed pylons, overhead lines and proposed new Chesterfield Substation (should it be brought into the Project scope).

7.7.7 Ecological features identified within **Table 7.8** are **Scoped In** for further assessment in the ES. Where an ecological feature is not identified against a construction impact within **Table 7.8**, there is an assumption of that feature being **Scoped Out** for that particular construction impact.

7.7.8 While there are a range of potential impact pathways on ecological features during the construction phase, no impact pathways as a result of the operation (and maintenance) of the Project are anticipated, with the exception of lighting impacts near the proposed new Chesterfield Substation (where this is brought into the Project scope), and impacts related to birds (including bird species associated with Ogston Reservoir SSSI and Peak District Moors (South Pennine Moors Phase 1) SPA.

7.7.9 In relation to the potential effects from EMFs, the Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN-5 including the International Commission on Non-Ionizing Radiation Protection guidelines for EMFs and associated precautionary policy. An EMF report will be prepared as part of the Project. This is separate to the EIA process is not considered further in the Ecology and biodiversity assessment scope.

Table 7.8 - Impact Pathways

Activity	Impact	Embedded and Good Practice Mitigation	Ecological Feature Scoped into the ES
	Construction		
General construction activities, e.g. human presence and movement	Noise and physical activities leading to disturbance	The Main Works Contractor would comply with relevant protected species legislation. All applicable works would be undertaken in accordance with the relevant requirements and conditions set out in the relevant licences. Precautionary working method statements would be implemented to minimise impacts to protected/notable species and habitats. Implementation of likely noise control measures as set out in **Chapter 14: Noise and Vibration**.	Qualifying features of Peak District Moors (South Pennine Moors Phase 1) SPA and Ogston Reservoir SSSI, Wintering/passage birds, Breeding birds (including barn owl and kingfisher), All protected and notable plant and animal species.
	Introduction and / or spread of INNS, resulting in habitat loss / modification	Implementation of invasive species control and biosecurity measures.	All protected and notable plant and animal species; protected or notable habitats, including ancient woodland, HPIs and watercourses and rivers; designated sites within the Scoping Boundary, including Morley Brick Pits SSSI, Aston Brickyard Plantation LNR, Williamthorpe LNR and Oakerthorpe LNR.
Culverting of watercourses	Disturbance, direct killing or reduced chance of survival of individual animals through aquatic habitat loss/damage or restriction of passage and severance	Preference for the use of existing crossings / accesses. Where new crossings are required, works would be kept to minimum widths to facilitate the works. Implementation of pollution prevention plans setting out control measures for the safeguarding of ground and surface waters during the	Amphibians, fish, water vole, otter, kingfisher and aquatic habitats; River Mease SAC, reptiles, white-clawed crayfish.

Activity	Impact	Embedded and Good Practice Mitigation	Ecological Feature Scoped into the ES
	Hydrological changes in surface water and groundwater	construction and operation (including maintenance) phases.	Aquatic habitats; River Mease SAC; sites designated for biodiversity (which are hydrologically connected to the Scoping Boundary), amphibians , fish, water vole, otter, white-clawed crayfish.
Use of construction vehicles / machinery	Noise/vibration disturbing surrounding features	Implementation of likely noise control measures as set out in **Chapter 14: Noise and Vibration**.	Qualifying features of Peak District Moors (South Pennine Moors Phase 1) SPA and Ogston Reservoir SSSI, Wintering/passage birds, bat roosts, badger, otter, dormouse breeding birds (including barn owl and kingfisher), reptiles, water vole, fish. white-clawed crayfish.
	Air quality changes through dust and changes in pollutant levels caused by vehicle emissions	Implementation of likely dust control measures as set out in **Chapter 13: Air Quality**.	All protected and/or notable species and habitats, including ancient woodland and HPIs; designated sites within the Scoping Boundary, including Morley Brick Pits SSSI, Aston Brickyard Plantation LNR, Williamthorpe LNR and Oakerthorpe LNR as well as relevant LWSs, pLWSs and DWT reserves; Peak District Moors (South Pennine Moors Phase 1) SPA; River Mease SAC.
	Increase in vehicles and new haul road resulting in an increased risk of collisions	The requirement for mitigation will be informed by surveys.	Badger, otter, brown hare.
Habitat removal – earthworks	Habitat fragmentation through working areas creating barriers to species dispersal	Where practicable, vegetation would be retained and where required, vegetation removal will be reduced to smallest amount possible. The Project will avoid sensitive sites, wherever possible.	All protected and notable plant and animal species.

Activity	Impact	Embedded and Good Practice Mitigation	Ecological Feature Scoped into the ES
	Direct killing or reduced chance of survival of individual animals and local species populations through habitat loss/damage	Areas of temporary habitat loss would be reinstated like-for-like or better, wherever practicable, following the completion of construction in each area. Areas of permanent habitat loss (and temporary habitat loss greater than 2 years) would be considered within the project BNG assessment. The crossing and removal of hedgerows will be avoided, but where required will be kept to minimum required for safe working. Precautionary working method statements would be implemented to minimise impacts to protected/notable species and habitats. Where excavations are left uncovered overnight, a means of escape for animals would be provided.	
	Indirect effects causing direct killing or reduced chance of survival of individual animals by removal of habitats used for foraging, commuting or shelter		
	Direct removal/degradation of irreplaceable/priority habitats e.g. ancient woodland	Where practicable, vegetation would be retained, and where required, vegetation removal will be reduced to smallest amount possible. The project will avoid sensitive sites, wherever possible.	Nationally and locally designated sites; protected or notable habitats; trees; hedgerows; vascular/non-vascular plants & fungi.
Habitat removal – vegetation clearance	Damage or destruction of nests	Where practicable, vegetation would be retained, and the Project would avoid sensitive sites, where practicable. Areas of temporary habitat loss would be reinstated like-for-like or better, wherever practicable, following the completion of construction in each area. Areas of permanent habitat loss (and temporary habitat loss greater than 2 years) will be considered within the project BNG assessment BNG.	Qualifying features of Peak District Moors (South Pennine Moors Phase 1) SPA and Ogston Reservoir SSSI, Breeding birds (including barn owl and kingfisher), dormouse.
	Direct loss of roosts		Roosting bats.
	Direct loss of protected/ notable habitats		All protected and/or notable habitats including ancient woodland and HPIs; designated sites within the Scoping Boundary, including Morley Brick Pits

Activity	Impact	Embedded and Good Practice Mitigation	Ecological Feature Scoped into the ES
		Crossings and removal of hedgerows will be avoided wherever possible or else kept to the minimum required for safe working. Precautionary working method statements would be implemented to minimise impacts to protected/notable species and habitats.	SSSI, Aston Brickyard Plantation. LNR, Williamthorpe LNR and Oakerthorpe LNR as well as relevant LWSs, pLWSs and DWT reserves.
	Indirect effects causing direct killing or reduced chance of survival of individual animals by removal of habitats used for foraging, commuting or shelter		All protected and/or notable animal species.
Habitat removal – buildings/ structures	Damage or destruction of nests	All applicable works would be undertaken in accordance with the relevant requirements and conditions set out in any protected species licences. Precautionary working method statements, where required, would be implemented to minimise impacts to protected/notable species and habitats.	Breeding birds (including barn owl))
	Direct loss of roosting habitat or roosts		Roosting bats
Lighting	Light pollution through security lighting used at working areas spilling onto surrounding habitats	Implementation of temporary lighting measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations.	All protected and/or notable species
	Operation (including maintenance)		
Habitat changes	Risk of direct collision, electrocution, and new perching spots for raptors, caused by overhead lines	The requirement for mitigation will be informed by surveys.	Qualifying features of Peak District Moors (South Pennine Moors Phase 1) SPA; Migrating and breeding birds associated with Ogston Reservoir SSSI and other relevant locally designated sites; Other migrating birds; breeding birds.

Activity	Impact	Embedded and Good Practice Mitigation	Ecological Feature Scoped into the ES
Lighting	Light pollution through security lighting used at new substation (where this is brought into Project scope) spilling onto surrounding habitats	Minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations.	All protected and/or notable species

7.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

7.8.1 In addition to the data sources listed in Section 7.5, the assessment within the ES will be supported by the following additional information and surveys:

- Aerial imagery and desktop habitat mapping.
- Natural England Open Data Geoportal will be consulted for protected species licence returns and risk zones, and freshwater ecology datasets.
- Local Planning Authority Tree Preservation Orders.
- Defra National LiDAR Program Digital Surface Model and Digital Terrain Model.
- Other information or data will be incorporated where considered appropriate.

Proposed Methodology for Ecological Features

7.8.2 A combination of aerial imagery, desk-based habitat mapping and information about designated sites will inform decision making in the development of the proposed Order Limits. Information relating to species and habitats will then be used to inform the specific location of works.

7.8.3 Further baseline data collection will consist of a programme of field surveys as outlined in **Table 7.9**. The final scope of surveys will be subject to discussion and agreement with Natural England and other statutory consultees. This programme will be regularly reviewed in light of the results of the surveys, ongoing consultation and the evolution of the design of the Project.

7.8.4 The surveys outlined in **Table 7.9** are anticipated to be undertaken in late 2024 through 2025 to inform the assessment of potentially significant effects on ecological features. The proposed field survey programme is based on the results of the desk study and industry guidance.

7.8.5 Dates of field surveys will depend on the availability of land access however it is likely that it will be necessary to split surveys across 2024 and 2025 for wintering/passage bird surveys and it is anticipated that all other surveys will be completed in 2025, subject to land access.

7.8.6 However, all surveys will be undertaken in the appropriate season to inform the ES. Further engagement with Natural England and other consultees regarding the indicative field survey programme set out in **Table 7.9** will take place as the scope of works is refined.

7.8.7 An arboricultural survey will also be undertaken to inform the Project design and impact assessment. Information relating to the proposed arboricultural strategy for the Project is set out in **Appendix 7A: Arboricultural Strategy** in **Volume 2**.

Table 7.9 - Optimal Survey Period and Methodology by Ecological Feature

Ecological feature	Optimal survey period	Survey area and methodology
Extended habitat survey (UKHab)	April to September	A UKHab classification survey (UKHab Ltd, 2023 (Ref 7.34)). and ecology walkover for protected species suitability of selected areas to inform the design process where potential habitats present may have greater influence on the Project. This survey will also include INNS.
Bats – summer /maternity roosts	Any time of year	Ground Level Tree Assessments (GLTA) of trees and Preliminary Roost Assessments (PRA) at ground level on any buildings of selected areas likely to be impacted within the Scoping Boundary where there is potential for significant impact, or within close proximity of works. Further summer/maternity roosting bat surveys will be undertaken of selected areas, where necessary. Survey methodology will be guided by Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023 (Ref 7.35)).
Bats – activity (foraging and commuting)	April to October	Bat activity surveys will be undertaken using static bat detectors only, where these are considered required. This is due to any impacts on commuting bats being temporary, short- to medium-term and relatively small-scale, and hedgerows would be replaced post-construction. No impacts to foraging bats are anticipated. Surveys will focus on features that are considered to be of moderate or high value to commuting bats, and where significant impacts are anticipated. Survey methodology will be guided by Collins Guidelines (Ref 7.35).
Bats – hibernation roosts	November to March (ideally January and February)	Ground Level Tree Assessments (GLTA) of trees and Preliminary Roost Assessments (PRA) at ground level on any buildings at selected areaslikely to be impacted within the Scoping Boundary where there is potential for significant impact, or within close proximity of works. Bat hibernation surveys will be undertaken where deemed necessary in response to project design and baseline survey and desk-based results. Survey methodology will be guided by Collins Guidelines (Ref 7.35).

Ecological feature	Optimal survey period	Survey area and methodology
Water vole	Mid-April to June and July to September	Surveys to be undertaken along all watercourses within the Scoping Boundary deemed suitable to support water vole and where significant impacts are likely. Standard methodology to be used for presence/absence surveys (e.g. Dean et al, 2016 (Ref 7.36)).
Otter	Not seasonally dependent but periods of high water to be avoided.	Surveys to be undertaken in conjunction with water vole surveys where practicable. Standard methodology to be used (Chanin, 2003 (Ref 7.37)).
Badger	Not seasonally dependent.	Assessments to be conducted in conjunction with UKHab classification survey and ecology walkover where access allows. Surveys will identify the location of active badger setts following best practice guidelines (Scottish Natural Heritage, 2003 (Ref 7.38)) within the Scoping Boundary and beyond, up to a minimum of 30m.
Hazel dormouse (*Muscardinus avellanarius*)	April to November	Where suitable woodland and connected scrub/hedgerow habitat is found within areas that are likely to be significantly impacted by works. Surveys would be in accordance with the Dormouse Conservation Handbook (2006) (Ref 7.39).
Barn owl	Timed to avoid the main breeding season (i.e. excluding March to June).	Potentially suitable breeding sites (buildings and trees) within and beyond (where accessible) the Scoping Boundary where significant impacts are anticipated. Surveys will be undertaken in accordance with survey methods outlined in Gilbert et al (2001).
Kingfisher	March to June	Surveys will be undertaken on suitable watercourses within the Scoping Boundary that are anticipated to be significantly impacted, in accordance with survey methods outlined in Gilbert et al (2001) (Ref 7.40).
Wintering/passage birds	September to March	There is the potential for disturbance of birds associated with the Ogsten Reservoir SSSI site, crossing land within the Scoping Boundary during passage. Wintering/passage bird surveys will be undertaken at locations that may comprise key habitats used by passage or overwintering birds, e.g. large waterbodies, marsh/fen habitats, as well as a range of habitats representative of the habitat types across the Scoping Boundary. The methodology and survey locations will be discussed with Natural England.

Ecological feature	Optimal survey period	Survey area and methodology
Breeding birds	April-July	There is the potential for disturbance of breeding birds within suitable habitat such as trees, hedgerows and arable fields within the Scoping Boundary. Where deemed necessary, surveys will be undertaken at targeted locations only, and where impacts are assessed likely to be high. The methodology and survey locations will be discussed with stakeholders.
Reptiles	March to October (avoiding periods of extreme weather conditions)	Surveys will be undertaken where there is good habitat suitability, reptile records are present in the local area, and where impacts are assessed likely to be high. Surveys will only be conducted where it is considered that displacement methods will be challenging. Methodology will be followed which draws heavily upon guidance produced by Herpetofauna Groups of Britain and Ireland (HGBI, 1998 (Ref 7.41)), Froglife (1999 (Ref 7.42) and 2015 (Ref 7.43)) and Natural England (2022) (Ref 7.44). A precautionary working method statement would be implemented during construction for all other locations of suitable habitat.
Fish	Species- and location dependent	Following the review of existing data and habitat suitability assessment, the most appropriate scope and method of survey will be agreed with the local Environment Agency team on a location-by-location basis. Where required, surveys will target areas where there are anticipated to be significant impacts to watercourses used by fish/migratory fish species.
White-clawed crayfish	May-October (avoiding periods of high river flow)	Surveys will be undertaken on watercourses where significant impacts are anticipated and a habitat suitability assessment indicates the need. Surveys will use standard methods as outlined in Peay (2003) (Ref 7.45), including stone turning and torch surveys where water levels allow. Trapping may be undertaken where required.
Terrestrial invertebrates	Species-dependent	Affected and unavoidable locations within the Order Limits where the habitat survey identifies habitat as being potential significant habitat for terrestrial invertebrates. The survey methodology would be dependent on the target species.
Hedgerows	June to September	Hedgerows will be assessed as part of the UKHab classification survey. Hedgerow Regulations surveys will subsequently be undertaken on those which

Ecological feature	Optimal survey period	Survey area and methodology
		are found to be species-rich, to determine whether they qualify as an 'Important' hedgerow (as detailed under The Hedgerows Regulations (Ref 7.7)).
National Vegetation Classification (NVC)	May to August	Notable habitats including woodland, wetland and grassland identified as particularly diverse during the UKHab classification survey (and where these are likely to be impacted significantly by works) will be surveyed where necessary using standard NVC methods.
Vascular, non-vascular plants and fungi	Species/Taxon group-dependent	Notable habitats or notable species identified within the Scoping Boundary during the desk study and UKHab classification survey (and where these are likely to be impacted significantly by works) will be surveyed where necessary using standard NVC methods or specialist survey techniques, as required.

Proposed Assessment Method

7.8.8 Following a series of detailed desk and field based ecological assessments, an Ecological Impact Assessment (EcIA) will be undertaken to assess the potential impacts of the Project on biodiversity, once all impact avoidance and mitigation measures have been agreed.

Important Ecological Features

7.8.9 In accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) EcIA Guidelines, a number of characteristics contribute to the importance of ecological features (IEFs). These include for example (but not exclusively): the rarity of a species or habitat, legal protection/conservation status, ability to resist or recover from environmental change and uniqueness of an ecological feature, whether the species population size is notable in a wider context, the richness of assemblages of plants and animals and the presence of species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

7.8.10 The nature conservation importance of an ecological feature is represented on a geographic scale and is set out in **Table 7.10**.

Table 7.10 - Defining Importance of Ecological Features

Geographical Context of Importance	Criteria
International or European	• European designated sites including SPAs; potential SPAs; SACs; candidate or possible SACs. • Wetland of International Importance (Ramsar sites) and proposed Ramsar sites are also considered in the same manner in accordance with national planning policy. • Areas of habitat or populations of species which meet the published selection criteria for designation as a European Site based on discussions with Natural England and field data collected to inform the impact assessment, but which are not themselves currently designated at this level.
National (relating to the UK, specifically England)	• Statutory designated sites, comprising SSSIs and NNRs. 'Irreplaceable natural habitat' e.g., ancient woodland, veteran trees, blanket bog, limestone pavement, sand dunes, saltmarsh and lowland fen. • Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the impact assessment, and in agreement with Natural England.

Geographical Context of Importance	Criteria
	• SPI and HPI, Red listed and legally protected or notable species that are not addressed directly in Part 2 of the "Guidelines for Selection of Biological SSSIs" but can be determined to be of national importance using the principles described in Part 1 of the guidance. • Areas of Ancient Woodland, for example woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
Regional (East Midlands)	• Regularly occurring HPI or populations of SPI, Red listed and legally protected or notable species may be of regional importance in the context of published information on population size and distribution.
County (e.g., Derbyshire)	• LNR and non-statutory designated sites including: LWS. Areas which, based on field data collected to inform the impact assessment, meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local (towns, local country area e.g., Fenlads)	• HPI and SPI, Red listed and legally protected or notable species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	• Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (for example, hard standing used for car parking, as roads etc.)

7.8.11 Assigning importance to ecological features is based on professional judgement informed by available guidance and information and where necessary expert advice. CIEEM's EcIA guidelines state that only ecological features which are important and potentially affected by a scheme should be subject to detailed evaluation. For the purposes of this assessment, ecological features of 'Local' importance or higher are assessed as being IEFs and therefore considered with regards to the significance of effects. Ecological features of 'Site' importance or below are not considered sufficiently important to experience significant effects and are not assessed as being IEFs.

Scope of Ecological Impact Assessment (EcIA)

7.8.12 The EcIA will consider the potential effects of the English Onshore Scheme upon IEFs identified during the baseline survey and data collection, in accordance with the CIEEM EcIA Guidelines (Ref 7.24). This requires the identification of pathways available for an impact, either directly or indirectly, to result in a potential significant effect to the habitat and/or species. IEFs may be located within areas directly impacted by the English Onshore Scheme or the wider areas surrounding this (the 'zone of influence').

Identification and Characterisation of Potential Impacts

7.8.13 The potential impacts of the English Onshore Scheme during construction and operation and the potential ecological effects arising from them will be identified and characterised, taking into consideration the following parameters:

- Beneficial or adverse – whether the impact will result in net loss or degradation of an important ecological feature or whether it will enhance or improve it.
- Extent – the spatial area over which the environmental change may occur.
- Duration – the length of time over which the environmental change may occur. The duration of the impacts will be described as either 'short-term', 'medium-term' or 'long-term'. Short-term is considered to be up to 1 year, medium-term is considered to be between 1 and 10 years and long-term is considered to be greater than 10 years.
- Timing and frequency - consideration of the timing of events in relation to ecological change, for example, some impacts may be of greater magnitude if they take place at certain times of year (e.g., breeding season). The extent (see above) to which an impact is repeated may also be of importance.
- Reversibility – the extent to which impacts are reversible either through natural regeneration and succession or through active mitigation.
- Impacts on IEFs can be permanent or temporary, direct or indirect, and can be cumulative. These factors are brought together to assess the potential impact on the integrity or conservation status of a particularly important ecological feature.

7.8.14 Potential impacts are characterised initially in the absence of any mitigation, except where this is integral to the design of the English Onshore Scheme (design measures).

7.8.15 Collaboration and data exchange with other relevant disciplines such as air quality and arboriculture will be carried out to further inform the EcIA and assessment of potential impacts.

Assessment of Cumulative Impacts and Effects

7.8.16 Other projects or proposals which are due to occur within the same ZoI and within similar timeframes as the Project have the potential to results in cumulative effects on biodiversity and therefore the impacts of any relevant projects or proposals will be considered in combination with the Project.

Assessing Significance

7.8.17 Having characterised importance and potential impacts, the significance of the predicted effects on IEFs arising will be assessed. The assessment of likely significant effects as a result of the Project will be considered for both the construction and operational phases.

7.8.18 The CIEEM EcIA guidelines (Ref 7.24) define a significant effect in the context of an Ecological Impact Assessment as “an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general”. Significant effects, as defined by the CIEEM EcIA guidelines, are determined by assessing any deviation in the baseline conditions of a feature of ecological importance that may occur because of individual and cumulative impacts during the construction and operational phases of a development.

7.8.19 These effects will be expressed in terms of geographical scale, using the same scale detailed above, to define the importance of an ecological feature. The geographical scale at which an effect is significant can vary from the geographical importance of the ecological feature being assessed and in accordance with the CIEEM EcIA guidelines, this will be a function of the assessment. For this assessment, effects at a Local scale or higher are defined as “significant”.

7.8.20 Where a potential significant effect is identified, proposals for mitigation and compensation would be made with the aim of avoiding, preventing, reducing or, if possible, offsetting any identified significant adverse effects. Following the application of mitigation and compensation, the effects are reassessed to determine the residual effect.

Assumptions and Limitations

7.8.21 At the time of writing the limitations of this assessment are due to the use of desk-based and other publicly available information. The scope of the assessments will be reviewed once further data is gathered.

7.8.22 The detailed construction methodology for the Project has yet to be defined. This will be subject to further development during the process of iterative design and environmental assessment of the Project. It is assumed, however, that the scheme would be a 400 kV overhead line with an associated temporary online haul road, other associated temporary construction infrastructure and a proposed new Chesterfield Substation (where this is brought into the Project scope). The methodology of construction could change the types and/or severity of the potential effects assessed herein.

7.8.23 Scoping has been prepared based on the environmental baseline available at the time of writing, and the extent of the Scoping Boundary. A full programme of data gathering and surveys should be undertaken to fully inform the baseline of the assessment to be outlined within the ES.

7.9 Proposed Scope of the ES

Ecological Features Scoped In and Out For Further Assessment

7.9.1 The matters scoped in and out for further assessment for ecology and biodiversity are outlined in **Table 7.11**.

Table 7.11 - Ecological features Scoped In and Out for Further Assessment

Ecological feature	Phase	Scoped In or Out	Justification
Peak District Moors (South Pennine Moors Phase 1) SPA	Construction	**Scoped In**	Although this site sits outside the Scoping Boundary, it has been scoped in for potential impacts during construction, resulting from general construction activities. Likely significant effects on the SPA cannot be ruled out in the absence of a dedicated assessment and it is therefore scoped in. A Habitats Regulation Assessment (HRA) screening will be undertaken, which will include an assessment of any land that is 'Functionally Linked' to the SPA. Where required, progression to subsequent stages of the HRA process may occur.
	Operation (including maintenance)	**Scoped In**	There is the potential to impact birds associated with the site during the operation (and maintenance) phase. The addition of new overhead lines poses a potential collision risk to birds which will be fully assessed through bird survey work, which will inform the ES and HRA for the scheme.
River Mease SAC	Construction	**Scoped In**	Although this site sits outside the Scoping Boundary, it has been scoped in for potential indirect impacts during construction due to the potential hydrological connection between the SAC and the Scoping Boundary. A HRA screening will be undertaken to determine any significant effects, and this will include an assessment of any land that is ‘Functionally Linked’ to the site.
	Operation (including maintenance)	**Scoped Out**	No likely significant effects are anticipated as there are no perceivable pathways to impact this statutory designated site.
SACs: South Pennine Moors SAC, Gang Mine SAC, Bees Nest & Green Clay Pits SAC and Birklands & Bilhaugh SAC	Construction	**Scoped Out**	Designated for their habitats which are mainly impacted by air pollution and/or changes in hydrological conditions. It is considered unlikely that the Project would cause these impacts to these SACs, which are at least 7.5 km away at the nearest point and not hydrologically connected (where relevant), as they are outside of the ZoI. There are no perceivable pathways to impact this statutory designated site and no likely significant effects are anticipated during the construction and operational phase.
	Operation (including maintenance)	**Scoped Out**	

Ecological feature	Phase	Scoped In or Out	Justification
Peak District Dales SAC	Construction	**Scoped Out**	This site is located 8 km away from the Scoping Boundary. When considering the qualifying habitats and aquatic fauna of the SAC, impacts at this distance from works are not anticipated. There are no perceivable pathways to impact this statutory designated site and no likely significant effects are anticipated during the construction and operational phase.
	Operation (including maintenance)	**Scoped Out**	
Ogston Reservoir SSSI	Construction	**Scoped In**	Although this designated site sits outside the Scoping Boundary, it has been scoped in for potential indirect impacts (e.g. pollution events) and potential noise and disturbance of qualifying breeding birds during construction due to being adjacent to the Scoping Boundary and with potential hydrological links to the Scoping Boundary. It also has a relevant IRZ within the Scoping Boundary.
	Operation (including maintenance)	**Scoped In**	Although the risk is considered to be low, the pathways to impact breeding birds associated with Ogston Reservoir SSSI during the operational phase include potential collision risk, electrocution and the increased risk of perching spots for raptors which may reduce breeding activity.
Morley Brick Pits SSSI	Construction	**Scoped In**	This designated site is located within the Scoping Boundary. Although careful consideration will be made to avoid the site as far as practically possible at the design phase, likely significant effects cannot be ruled out. Therefore, this site is scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact this statutory designated site during operation. Therefore, no likely significant effects are anticipated.
Other national sites designated for biodiversity (14 SSSIs and one NNR)	Construction	**Scoped In**	Although all of these designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect impacts (e.g. pollution events) during construction due to being located within 5 km or with potential hydrological links to the Scoping Boundary. In addition Donington Park SSSI has relevant IRZs within the Scoping Boundary. These sites are scoped in for further assessment.

Ecological feature	Phase	Scoped In or Out	Justification
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these statutory designated sites during operation.
Aston Brickyard Plantation LNR, Williamthorpe LNR and Oakerthorpe LNR	Construction	**Scoped In**	These locally designated sites are located (or partially located) within the Scoping Boundary. Although careful consideration will be made to avoid the sites as far as practically possible at the design phase, there is a risk of direct impacts to the LNRs. Therefore, these sites are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these statutory designated sites during operation.
Other Local sites designated for biodiversity (LNRs)	Construction	**Scoped In**	Although all of these locally designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect impacts (e.g. pollution events) during construction due to being located within 2 km or with potential hydrological links to the Scoping Boundary. These sites are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.
60 LWSs, 21 pLWSs and 3 DWT reserves within the Scoping Boundary	Construction	**Scoped In**	These locally designated sites are located (or partially located) within the Scoping Boundary. Although careful consideration will be made to avoid the sites as far as practically possible at the design phase, there is a risk of direct impacts to the LWSs, pLWSs and DWT reserves. Therefore, these sites are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.

Ecological feature	Phase	Scoped In or Out	Justification
194 LWSs, 74 pLWSs and 9 DWT reserves outside the Scoping Boundary	Construction	**Scoped In**	Although all of these locally designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect impacts (e.g. pollution events) during construction due to being located within 2 km or with potential hydrological links to the Scoping Boundary. These sites are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.
Ancient woodland	Construction	**Scoped In**	Although careful consideration will be made to avoid ancient woodland as far as practically possible at the design phase, there is the potential for habitat damage/ modification through deterioration in local air quality arising from construction traffic. In addition, there is also potential for habitat degradation or damage from encroachment within root protection zones. Fifteen blocks of ancient woodland are located within the Scoping Boundary and a further nine within 200 m. Given the air quality impacts are unknown, impacts to ancient woodland are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact ancient woodland during operation.
Habitats of Principal Importance (HPI)	Construction	**Scoped In**	The Project may pass through and in close proximity to HPIs. The potential therefore exists for direct impacts during construction (e.g. direct loss of habitat) and indirect impacts (e.g. pollution events) during construction. Therefore, HPIs are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any HPIs during operation.
Hedgerows	Construction	**Scoped In**	Sections of hedgerow may require removal to facilitate construction (e.g. an open cut method of cable installation). It is currently unknown if any hedgerows within the Scoping Boundary meet the criteria to be classified as ‘Important’

Ecological feature	Phase	Scoped In or Out	Justification
			under the Hedgerows Regulations. The potential therefore exists for direct physical impacts during construction (e.g. direct loss of habitat) and indirect impacts during construction. Therefore, hedgerows are scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact hedgerows during operation.
Trees	Construction	**Scoped In**	Individual Trees and Tree Groups including irreplaceable Ancient and Veteran features have the potential to be directly or indirectly impacted by construction, either by requiring removal or pruning works to facilitate construction or through construction impacts to Root Protection Areas. Impacts to Trees, Tree Groups and Woodlands will be assessed as per **Appendix 7A: Arboricultural Strategy** in **Volume 2**.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact trees during operation.
Vascular, non-vascular plants and fungi	Construction	**Scoped In**	Given the extent of the Scoping Boundary and numerous watercourses it contains, there is potential for terrestrial and aquatic protected/ notable vascular and non-vascular plants, fungi and INNS to be present. Further survey work is required to inform potential impacts. In the absence of appropriate mitigation, the Project has the potential for adverse effects and these receptors are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact these receptors during operation.
Bats	Construction	**Scoped In**	Woodland parcels, lone trees and buildings within or adjacent to the Scoping Boundary are likely to provide opportunities for roosting bats. Woodland edges/rides, networks of hedgerows, and other linear features, such as railway

Ecological feature	Phase	Scoped In or Out	Justification
			lines, rivers and canals within the Scoping Boundary are likely to provide opportunities for commuting and foraging bats. Bats are therefore at risk of direct impacts during construction (e.g., impacts to roosts, habitat loss/ fragmentation), including potential impacts to foraging/commuting routes.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on bats, therefore these receptors are scoped in for further assessment.
Water vole	Construction	**Scoped In**	Water vole are present within the Scoping Boundary. American mink (a predator of water vole) are also widespread (McGuire & Morse, 2020). The Scoping Boundary contains networks of watercourses and ditches which would be suitable for both species. There is a risk of direct impacts during construction as a result of, for example, loss/ damage to burrows during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Water vole are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on water vole, therefore this receptor is scoped in for further assessment.
Otter	Construction	**Scoped In**	Three rivers, as well as canals and ditch networks, and adjacent parcels of woodland are present within the Scoping Boundary. These habitats may be suitable for otter holt creation, commuting and foraging and otter have been recorded within the River Trent. There is a risk of direct impacts during construction as a result of, for example, loss/ damage to holts/ couches during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Otter are therefore scoped in for further assessment

Ecological feature	Phase	Scoped In or Out	Justification
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on otter, therefore this receptor is scoped in for further assessment.
Badger	Construction	**Scoped In**	The Scoping Boundary comprises an extensive network of rural habitats demarcated by hedgerows and small woodland parcels; therefore it is anticipated that badger will be widespread. Badgers may be impacted during construction through, for example, habitat loss/fragmentation and loss of/ damage to/ disturbance of setts which would constitute a breach of legislation. Badgers are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on badger, therefore this receptor is scoped in for further assessment.
Hazel dormouse	Construction	**Scoped In**	Although no records of dormouse were returned during the desk study, there have been reintroduction programs in the local area. Whilst the distance of reintroductions are sizable from the Scoping Boundary, suitable habitats are likely present within the Scoping Boundary to support hazel dormouse and they are therefore precautionarily scoped in at this time..
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on hazel dormouse, therefore this receptor is scoped in for further assessment.
Pine marten	Construction	**Scoped Out**	One record of this species was returned from eight years ago during the desk study. A handful of individual records have been found in the local area within the past 20 years. The species is considered to be largely absent from the Scoping Boundary, and, if any populations are present, they are likely to be small and isolated. A dedicated survey for this species is likely to be unviable and is not considered to be proportionate.
	Operation (including maintenance)	**Scoped Out**	

Ecological feature	Phase	Scoped In or Out	Justification
			It is considered there are no perceivable pathways to impact pine marten during both construction and operational phases and pine marten are therefore scoped out.
Other notable mammals including SPI species: brown hare, hedgehog, and harvest mouse	Construction	**Scoped Out**	Given the rural location of the Project and wider landscape connectivity, terrestrial mammals such as hedgehog and brown hare are anticipated to be present within the Scoping Boundary. Harvest mouse are also present, though not common within Derbyshire, with presence reported in Ogston Reservoir SSSI. Negative impacts to these species could occur during construction as a result of habitat removal/ fragmentation. In addition, nocturnal species may also be impacted by operational lighting and any temporary lighting required during construction. These impacts are anticipated to be largely temporary and as habitats would be reinstated to equal or better condition, with embedded mitigation measures during works, impacts are anticipated to be minor. As a result, other notable mammals are scoped out of further assessment for the construction and operational phases.
	Operation (including maintenance)	**Scoped Out**	
Barn owl	Construction	**Scoped In**	The Scoping Boundary comprises an extensive network of rural habitats with associated farm buildings, demarcated by hedgerows and small woodland parcels, therefore it is anticipated that Barn owl will be present. Negative impacts to barn owl could occur during construction as a result of habitat removal/ fragmentation. In addition, barn owl may also be impacted by operational lighting and any temporary lighting required during construction.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on barn owl, therefore this receptor is scoped in for further assessment.
Kingfisher	Construction	**Scoped In**	Three rivers (River Amber, River Derwent and River Trent), as well as canals and ditch networks are present within the Scoping Boundary. These habitats may be suitable for breeding kingfisher and may be impacted during construction works on or adjacent to watercourses.

Ecological feature	Phase	Scoped In or Out	Justification
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on kingfisher, therefore this receptor is scoped in for further assessment.
Other breeding birds	Construction	**Scoped In**	There will likely be some direct loss of suitable breeding bird habitat during the construction phase, including trees, hedgerows and arable fields. Surveys may be required to determine areas where breeding birds may be significantly impacted across the Scoping Boundary.
	Operation (including maintenance)	**Scoped In**	Although the risk is considered to be low, the pathways to impact breeding birds during the operational phase include potential collision risk, electrocution and the increased risk of perching spots for raptors which may reduce breeding activity. Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could also cause impacts.
Wintering/passage birds	Construction	**Scoped In**	Ogston Reservoir SSSI is designated for wintering and passage birds and is located within 100 m of the Scoping Boundary. In addition, there are several locally designated sites which support wintering and passage birds located within 2 km (Arcadis, 2024) (Ref 7.48). Functionally linked land for wintering birds at Peak District Moors (South Pennine Moors Phase 1) SPA is not considered to be present within the Scoping Boundary (as determined by the Wintering Bird Technical Note; Ref 7.48). Surveys are required to target wintering and passage birds to determine locations of functionally linked land and likely passage routes across the Scoping Boundary. Other key waterways crossing the scheme have been included within the scope. This is for the purposes of determining if/where there are areas where wetland species may be impacted during construction. The Wintering Bird Technical Note (Ref 7.48) outlines survey locations which, along with the survey approach, have been agreed with Natural England.
	Operation (including maintenance)	**Scoped In**	There is the potential to impact wintering and migratory birds during the operation (and maintenance) phase. The addition of new overhead lines poses

Ecological feature	Phase	Scoped In or Out	Justification
			a potential collision risk to wintering and migratory birds. Wintering and passage/migratory birds are therefore scoped in during operation..
Reptiles	Construction	**Scoped In**	It is considered unlikely that widespread presence, and/or large populations, of reptiles will be found due to the majority of habitats within the Scoping Boundary being agricultural land. However, common and widespread species of reptile are anticipated to be present within suitable habitat (where present) and are therefore at risk of direct impacts during construction (e.g., habitat loss/ fragmentation). In the absence of appropriate mitigation, reptiles are also at risk of killing/injury during construction. This would constitute a breach of legislation. Reptiles are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on reptiles, therefore these receptors are scoped in for further assessment.
Amphibians	Construction	**Scoped In**	Amphibians, such as common toad, may be negatively affected by direct impacts during construction (e.g., habitat loss/ fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction. Amphibians are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on amphibians, therefore these receptors are scoped in for further assessment.
Fish	Construction	**Scoped In**	Spined loach and Bullhead are located within River Mease SAC which is hydrologically connected to the site via River Trent. There is a risk of direct impacts during construction as a result of, for example, dewatering during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Fish, including migratory species, are therefore scoped in for further assessment.

Ecological feature	Phase	Scoped In or Out	Justification
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on fish, therefore these receptors are scoped in for further assessment.
White-clawed crayfish	Construction	**Scoped In**	White-clawed crayfish are located within River Mease SAC, which is hydrologically connected to the site via River Trent. Data from Environment Agency (via NBN) also show presence of white-clawed crayfish in the local area. Watercourses may be impacted by construction works, either directly or indirectly. There is a risk of direct impacts during construction as a result of, for example, dewatering during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. White-clawed crayfish are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on white-clawed crayfish, therefore this receptor is scoped in for further assessment.
Terrestrial invertebrates	Construction	**Scoped In**	The UKHab classification survey and desk study records will identify habitats, such as species-rich grassland and open mosaic habitats, which are able to support a range of terrestrial invertebrates. The Project extends through a largely agricultural landscape which has limited suitability for large invertebrate populations, protected species or notable assemblages. Any high value areas/habitats for invertebrates will be identified during the preliminary assessment, including the UKHab classification survey and desk study. There is potential for direct impacts during construction (e.g. habitat loss/ fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction. Terrestrial invertebrates are therefore scoped in for further assessment.
	Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (where this is brought into Project scope) could cause impacts on terrestrial invertebrates, therefore these receptors are scoped in for further assessment.

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8. Historic Environment

nationalgrid

Contents

8. Historic Environment

8.1 Introduction

8.1.1 This chapter presents how the historic environment assessment will consider the potentially significant effects on historic environment receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

8.1.2 As detailed in **Chapter 4 Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

8.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

8.2 Approach to Scoping

8.2.1 The approach to scoping has drawn from previous experience of similar projects and professional judgement. Determining the scope of the historic environment assessment has included the following:

- Key regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the ES.

8.2.2 There are interrelationships related to the potential impacts on the historic environment and other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 4: Description of the Project.**
- **Chapter 5: EIA Approach and Method.**
- **Chapter 6: Landscape and Visual.**
- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 10: Geology and Hydrogeology.**
- **Chapter 11: Agriculture and Soils.**
- **Chapter 15: Socio-economics, Recreation and Tourism.**

8.2.3 This chapter is supported by the following appendices in **Volume 2** and figures in **Volume 3**:

- **Appendix 8A: Designated Heritage Assets.**
- **Appendix 8B: Non-Designated Heritage Assets.**

- **Figure 8.1: Designated Heritage Assets.**
- **Figure 8.2: Non-Designated Heritage Assets including events.**

8.3 Key Regulatory and Planning Policy Context

Key Legislation

8.3.1 A summary of the key legislation considered in scope of effects on the historic environment is provided below.

8.3.2 This legislative framework provides legal protection for heritage assets of national significance as well as a mechanism by which such assets can be identified:

- Ancient Monuments and Archaeological Areas Act 1979 (Ref 8.1) (amended by the National Heritage Act 1983 (Ref 8.2) and 2002 (Ref 8.3)).
- Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref 8.4).
- The Hedgerows Regulations 1997 (Ref 8.5).
- The Levelling Up and Regeneration Act 2023 (Ref 8.6).

National Planning Policy

National Policy Statements

8.3.3 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy EN-1 (Ref 8.7) and NPS for Electricity Networks Infrastructure EN-5 (Ref 8.8). **Table 8.1** sets out the requirements of both NPS for electricity networks infrastructure and any other key national policy considerations relevant to the historic environment assessment and how these have been considered within this chapter.

Table 8.1 - National Planning Policy Relevant to the Historic Environment

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1)		
Paragraph 5.9.11	'*Where a site on which development is proposed includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact*.'	A standalone baseline assessment report will be developed and the results of this included in the Environmental Statement (ES). The baseline assessment will assess the significance of all relevant known heritage assets likely to be impacted by the Project, including any contribution from setting. It will include a review of the relevant Historic Environment Record (HER) as well as an assessment of the potential for previously unrecorded archaeological remains to be present. Furthermore, it will assess the significance (i.e. sensitivity) of the surrounding historic landscape. The ES will assess the potential likely significant effects of the Project on each individual asset. The scope of further evaluation including fieldwork will be discussed with consultees and, if required, the results will be included in the ES.
Paragraph 5.9.24	'*In considering the impact of a proposed development on any heritage assets, the Secretary of State should consider the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspects of the proposal*.'	A standalone baseline assessment report will be developed and the results of this included in the ES. The scope of further evaluation including fieldwork will be discussed with consultees and, if required, the results will be included in the ES.
Paragraph 5.9.30	'*Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II* listed buildings; grade I and II* registered parks and gardens; and World Heritage Sites, should be wholly exceptional*.'	The ES and supporting appendices will include an assessment of the significance of all heritage assets, including the contribution setting makes to that significance. The ES will assess the impact of the Project on the significance of impacted heritage assets and the potential for any harm or loss to occur.

Policy Reference	Policy Context	How it will be considered
		The Project design will aim to ensure that no designated asset will be removed or rendered unviable. Any harm to an asset which needs to feature in the planning balance will be clearly identified in the ES.
National Policy Statement for Electricity Networks (EN-5)		
Paragraph 2.9.17	*In brief, the Holford Rules* (guidelines for the routing of new overhead lines) *state that applicants should:* • *avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence.* The major areas of highest amenity value is defined in footnote 13 as *Internationally and nationally designated areas of highest amenity, cultural or scientific value are: National Parks; Areas of Outstanding Natural Beauty; Heritage Coasts; World Heritage Sites; Ramsar Sites; Sites of Special Scientific Interest; National Nature Reserves; Special Protection Areas; Special Areas of Conservation. Care should be taken in relation to all historic sites with statutory protection eg Ancient Monuments, Battlefields and Listed Buildings.'* • *avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers*	The ES and supporting appendices will include an assessment of the significance of all heritage assets, including the contribution setting makes to that significance. The ES will assess the impact of the Project on the significance of impacted heritage assets and the potential for any harm or loss to occur. The Project design will aim to ensure that no designated asset will be removed or rendered unviable. Any harm to an asset which needs to feature in the planning balance will be clearly set out in the ES.
Paragraph 2.9.19	*In brief the Horlock Rules* (guidelines for the design and siting of substations) *state that applicants should …seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections'*. This is defined in footnote 13 as '*Internationally and nationally designated areas of highest amenity, cultural or scientific value are: National Parks; Areas of Outstanding Natural*	The ES and supporting appendices will include an assessment of the significance of all heritage assets, including the contribution setting makes to that significance. The ES will assess the impact of the Project on the significance of impacted heritage assets and the potential for any harm or loss to occur.

Policy Reference	Policy Context	How it will be considered
	Beauty; Heritage Coasts; World Heritage Sites; Ramsar Sites; Sites of Special Scientific Interest; National Nature Reserves; Special Protection Areas; Special Areas of Conservation. Care should be taken in relation to all historic sites with statutory protection eg Ancient Monuments, Battlefields and Listed Buildings.'	The Project design will aim to ensure that no designated asset will be removed or rendered unviable. Any harm to an asset which needs to feature in the planning balance will be clearly set out in the ES.
Paragraph 2.9.25	'*The Secretary of State should only grant development consent for underground or subsea sections of a proposed line over an overhead alternative if they are satisfied that the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environments impacts that it presents, and that any technical obstacles associated with it are surmountable. In this context it should consider: …designated heritage assets and Heritage Coasts (including, where relevant, impacts on the setting of designated features and areas)… the potentially very disruptive effects of undergrounding on local communities, habitats, archaeological and heritage sites*….'	The ES and supporting appendices will include an assessment of the significance of all heritage assets, including the contribution setting makes to that significance. The ES will assess the impact of the Project on the significance of impacted heritage assets and the potential for any harm or loss to occur. The Project design will aim to ensure that no designated asset will be removed or rendered unviable. Any harm to an asset which needs to feature in the planning balance will be clearly set out in the ES.

Other National Policy

8.3.4 A summary of other relevant national policy considered in the scope of effects on the historic environment includes:

- NPPF (Department for Levelling Up, Housing and Communities, 2023) (Ref 8.9).
- The Infrastructure Planning (Decisions) Regulation (2010) Regulation 3 (listed buildings, conservation areas and scheduled monuments) (Ref 8.10).

Regional and Local Planning Policy

8.3.5 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

8.3.6 All local policy, specific to the historic environment would be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

8.3.7 Relevant guidance, specific to the historic environment, that has informed this Scoping Report and would inform the historic environment assessment within the ES, comprises:

- Chartered Institute for Archaeologists (CIfA) (2014, updated 2020) Standard and guidance for historic environment desk-based assessment (Ref 8.11).
- CIfA (2021) Regulations for Professional Conduct. Reading: The Chartered Institute for Archaeologists (Ref 8.12).
- CIfA (2014, updated 2022) Code of Conduct: Professional Ethics in Archaeology. Reading: The Chartered Institute for Archaeologists (Ref 8.13).
- CIfA, IEMA, IHBC (2021) Principles of Cultural Heritage Impact Assessment in the UK (Ref 8.14).
- Historic England (2008) Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment (Ref 8.15).
- Historic England (2015) Historic Environment Good Practice Advice in Planning Note 2 – Managing Significance in Decision-Taking (Ref 8.16).
- Historic England (2017) Historic Environment Good Practice Advice in Planning Note 3 (2nd edition)– The Setting of Heritage Assets (Ref 8.17).
- Historic England (2019) Statements of Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12 (Ref 8.18).
- Historic England (2021) Local Heritage Listing – Identifying and Conserving Local Heritage Advice Note 7 (2nd Edition) (Ref 8.19).
- International Council on Monuments and Sites (ICOMOS) (2011) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (Ref 8.20).
- ICOMOS (2022) Guidance on Heritage Impact Assessments in a World Heritage Context (Ref 8.21).
- National Planning Practice Guidance (2019) Historic Environment (Ref 8.22).

8.4 Study Area

8.4.1 The study area for the historic environment assessment comprises the Scoping Boundary plus a 250 m buffer surrounding the Scoping Boundary for non-designated assets. This study area will be used to consider archaeological potential in the Scoping Boundary. In addition, a wider study area of 2km around the Scoping Boundary for all designated assets has also been defined which will encompass any potential setting impacts.

8.4.2 The two study areas are considered appropriate based on the potential effects of this Project on historic environment assets, including consideration of physical impacts and impacts arising through change to setting from tall infrastructure, professional judgement, and previous experience of similar projects.

8.4.3 The study areas for the historic environment assessment are shown on Figure 8.1: Designated Heritage Assets and Figure 8.2: Non-Designated Heritage Assets in Volume 3.

8.4.4 As the iterative design process continues, the study areas would be refined to inform the assessment in the ES.

8.4.5 In certain locations, and in accordance with the approach for the Landscape and Visual assessment including Zone of Theoretical Visibility (ZTV), the study area may be increased, for example where topography allows for more distant views. This is to ensure that heritage assets, where their setting could be impacted, are included in the assessment.

8.5 Baseline Conditions (Inc. Future Baseline)

Data Collection

8.5.1 The baseline has been informed by a desk study which has included the following information sources:

- Data sets of designations from Historic England's National Heritage List for England (NHLE) (Ref 8.23).
- Historic England's Heritage at Risk Register.
- The Derwent Valley Mills World Heritage Site (DVMWHS) website (Ref 8.24) and management plan (Ref 8.25).
- Hardwick Setting Study (Atkins, 2016) (Ref 8.26).
- Conservation areas available as a data download from Historic England.
- Derbyshire Historic Environment Record (HER) data for known archaeological sites, monuments, find spots and events.

Engagement with Stakeholders

8.5.2 The EIA will be informed by consultation and engagement with stakeholders, including Historic England and Historic Environment Officers from Derbyshire County Council and Local Authority Conservation Officers as required to ensure that specialist local views and expertise can be considered as part of the EIA.

8.5.3 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024

8.5.4 The principal feedback received from Non-Statutory Consultation with statutory environmental bodies of relevance to this scoping chapter is included in **Table 8.2** below, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 8.2 - Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Derbyshire HER	Provided HER data for the Scoping Boundary, plus a 500 m buffer (a 500 m buffer was created to allow for future design development)	To inform baseline and allow for future design development
Derbyshire County Council – Conservation Team	The proposed scheme has the potential to impact on many historic built environment and archaeological receptors. Therefore, it is advised that a Heritage Impact Assessment (HIA) is produced.	A HIA will be produced to help identify and mitigate impacts for the next detailed phase of the scheme however this would not normally be produced at Scoping or PEIR stage.
Derbyshire County Council – Conservation Team	Where underground cable runs are considered, the extent of these should be determined through a rigorous appreciation of the extent of effects that need to be mitigated, driven by the results and recommendations of a Heritage Impact Assessment (HIA) and Landscape Visual Impact Assessment (LVIA). The HIA and LVIA should ideally be used as baseline evidence to help direct any mitigation measures for the detailed design phase of the scheme. These documents would be useful in assisting with a more contemporary application of the Holford Rules.	Any potential undergrounding will be supported by a HIA and LVIA as part of the ES. Detailed assessment such as HIA and LVIA will be undertaken at ES stage
Derbyshire County Council – Conservation Team	In refining proposals ‘twinning up’ with existing power line routes should be considered to consolidate visual impacts rather than dispersing them, creating new areas of harm to the setting of heritage assets.	Rationalisation, reconfiguration, and/or undergrounding of existing electricity networks infrastructure in the vicinity of the proposed development may be considered as mitigation if necessary.
Derbyshire County Council – Archaeology Team	Assessment of alternative routes needs to be robust to make a case for justifying impacts to designated heritage assets, and the assessment of	Alternatives considered during the process and the influences of such alternatives on the scheme have and will be transparently set out.

Organisation and date	Summary of response	Consideration in the Scoping Report
	these impacts would need to be detailed and accompanied by viewpoints and visualisations to allow for quantification of any harms.	
Derbyshire County Council – Archaeology Team	It is essential to avoid Scheduled Monuments and their immediate vicinities in terms of potential for nationally important archaeology.	Scheduled Monuments and their immediate vicinities will be avoided where practicable.
Derbyshire County Council – Archaeology Team	It is highly desirable to avoid major impacts that destroy or severely harm the significance of archaeological assets at high regional importance.	The project welcomes early consultation on archaeological assets of high regional importance so that they can be avoided where practicable
Derbyshire County Council – Archaeology Team	A detailed and robust desk-based assessment of the proposed route corridor needs to be undertaken in order to map out sensitivities with respect to both designated and undesignated below-ground archaeology. This should look at the known sites ('monument records') within Derbyshire HER, but also other layers of information within the HER and elsewhere that could firm up mapping of known archaeological sites and areas of potential.	A detailed and robust desk-based assessment of the proposed route corridor will be undertaken and will be referenced throughout the decision-making process.
Derbyshire County Council – Archaeology Team	The appropriate archaeological approach would be to use the desk-based stage as an initial trawl to identify smaller areas of higher potential/risk (either because of known archaeological assets or a low information base), and then target these for non-intrusive survey (typically geophysics), and then use this to target still smaller areas for intrusive survey (typically evaluation trenching).	At each stage we would need to intersect our understanding of archaeological potential/significance with the developing groundworks plans for the proposed route.
Derbyshire County Council – Archaeology Team	Ground impacts from pylons may be relatively limited and confined to the pylon base locations (although these would be harmful in archaeologically sensitive locations), but more extensive ground impacts are likely to be caused by access roads/tracks and easements, and by site and storage compounds and bunding, and so an	Following the confirmation of routing, the detail of pylon siting and potential undergrounding will inform the need for, and extent of archaeological investigation required prior to development. Indeed, the potential for impact upon archaeological assets will be just one of the factors for consideration in the detailed placement of pylons and construction

Organisation and date	Summary of response	Consideration in the Scoping Report
	understanding of these 'enabling' type works will need to form part of the heritage impact assessment process.	compounds. A detailed archaeological assessment will be required as part of the more detailed routing consideration.
Historic England	Corridors for HER search should be flexible to allow the resource to be well characterised and sound assessment to be made of archaeological potential. Staged process of assessment should involve an iterative process where each stage of investigation informs the next whilst being mindful of the need to use techniques in a complementary manner with an awareness of the limitations of techniques and existing data, the absence of evidence not equating to evidence of absence.	Acquiring HER data for the scoping boundary plus a 500m buffer has allowed for flex for the future design development and also will give adequate context for assessing archaeological potential. Assessment techniques will be used that are appropriate to the archaeological resource and ground conditions and after consultation with heritage stakeholders.
Historic England	Where early survey access is not possible in all areas, opportunities for best and earliest understanding in particular in areas of likely greater potential / disturbance or engineering complexity should maximised.	Point noted. We will agree the strategy for walkover survey and field evaluation with heritage stakeholders to target areas of most potential and highest risk.
Historic England	Setting assessment whilst necessarily tending to fixed search radii should be flexible in particular in respect of longer designed landscape relationships / views where professional judgement should be deployed.	ZTV to be used to refine study area for certain assets with long range views e.g. Bolsover Castle.
Historic England	HER, lidar, cartographic aerial photographic data should all be utilised and should inform geophysical and target trenching work as appropriate. Raw location data for Portable Antiquities Scheme data can be obtained on request from the PAS if you set out your justification (feel free to copy them this email as evidence that we as government's advisors recommend that you are allowed access).	The sources mentioned will be included in the desk-based assessment and this will be used to inform where to target geophysical survey and trial trenching and to interpret the results. Noted regarding PAS data.
Historic England	Archaeological prospection techniques should be appropriate both to the location and likely remains that are to be investigated, in that context bespoke	A detailed strategy for archaeological evaluation will be developed following on from the desk-based assessment. This will be done in consultation with

Organisation and date	Summary of response	Consideration in the Scoping Report
	strategies may be required for certain site types such as flint scatters, historic military engagements or aircraft crashes.	heritage stakeholders and will be bespoke to the archaeological resource and ground conditions, for example geo-archaeological investigation, metal detecting where required.
Historic England	In particular in areas of alluviation deposit modelling is important, and in instances where cable or drainage trenching is required, consideration should be given to hydrological impacts on buried remains, potentially occurring over time following an intrusion. Considerable previous work has been done on the paleo-channels of the Trent Valley including recent (HE funded) work to collate previous bore-hole data. Contact details have been provided regarding these.	It is noted that the route crosses river valleys including the Trent Valley. A bespoke evaluation strategy will be formulated with the input of the heritage consultees which will include for deposit-modelling if required. The information on previous work in the Trent Value is appreciated. Hydrological impacts to buried non-designated archaeological remains has been scoped into the assessment. However physical impacts to scheduled monuments including hydrological impacts has been scoped out for the reasons given in section 8.7.
Historic England	It will also be important to ensure that in addition to the pylon construction and sub-station sites the ES succeeds in keeping within its scope contractors and subcontractor / suppliers' ancillary facilities such as access roads, compounds and haulage yards. Temporary yards, tracks and hard standing can become permanent where landowners/tenants find them of use and the unplanned persistence of such features in the landscape should be well controlled.	Following the confirmation of routing, the detail of siting of pylons, substations and ancillary facilities will inform the need for, and extent of archaeological investigation required prior to development. Indeed, the potential for impact upon archaeological assets will be just one of the factors for consideration in the detailed placement of pylons and construction compounds. A detailed archaeological assessment will be required as part of the more detailed routing consideration. The unplanned persistence of temporary features in the landscape will be controlled.
Historic England	Selected Sites without prejudice to these or other potential impacts and their structured assessment: • Hardwick Hall(s) / Sutton Scarsdale / Bolsover Castle • South Wingfield	All these sites apart from Bolsover Castle fall within the 2 km study. The ZTV will inform if the study area needs to be extended to include assets with longer range views.

Organisation and date	Summary of response	Consideration in the Scoping Report
	• Ogston Hall • Derwent Valley Mills World Heritage Site and buffer zone • Heage Windmill, Morley Mound • Horsley Castle / Locko Park / Dale Abbey / Dale Abbey Windmill • Elvaston Castle and Parkland • Viking Cemetery at Heath Wood • Swarkeston Hall Ruins, Pavilion, Parkland and the Causeway and Bridge • Prehistoric landscape and sites at Willington / Swarkeston / Barrow upon Trent	
Canal and River Trust	Consideration to the Trent and Mersey Canal, together with routes of two former canals – Cromford Canal and the Derby and Sandiacre Canal – both of which are subject to restoration projects. The canal/s are an important historic feature in the landscape and potential impacts on its character, appearance and setting will need to be considered carefully including construction activities. Consideration should also be paid to several features separately listed as heritage assets in their own right in proximity to the canal/s.	Impacts on these heritage assets will be considered, including in terms of changes to appearance or setting during construction and operation.

8.5.5 Engagement with relevant stakeholders will be ongoing up to the submission of the Development Consent Order (DCO) with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.

Existing Baseline Conditions

8.5.6 The following section provides a summary of the baseline environmental conditions within the study area.

Designated Heritage Assets

8.5.7 The following designated heritage assets are situated within the scoping boundary and 2 km study area. These are summarised in **Table 8.3**, according to their location in relation to the Project, and are presented in full in **Appendix 8A: Designated Heritage Assets** in **Volume 2** and **Figure 8.1: Designated Heritage Assets** in **Volume 3**. The settings of all designated heritage assets and impacts to them will be assessed as part of the ES. Those designated heritage assets located closer to the Scoping Boundary will also inform archaeological potential.

Table 8.3 - Summary of Designated Heritage Assets

Designated Heritage Assets	Within Scoping Boundary	Between Scoping Boundary and 2km study area	Total
World Heritage Sites	0	1	1
Scheduled Monuments	6	21	27
Grade I Listed Buildings	2	30	32
Grade II* Listed Buildings	5	36	41
Grade II Listed Buildings	73	719	792
Grade I Listed Registered Parks and Gardens	0	1	1
Grade II* Listed Registered Parks and Gardens	0	2	2
Grade II Listed Registered Parks and Gardens	0	1	1
Conservation Areas	10	38	48
			945

8.5.8 There are no registered battlefields or protected wrecks within the 2km study area.

8.5.9 Of the designated assets within the Scoping Boundary and 2km study area listed above, 21 are listed on Historic England's 'Heritage at Risk Register' last updated in November 2023. These heritage assets have been identified as being at risk of being lost as a result of decay or inappropriate development. These assets have the

potential to be more impacted by the Project than other designated heritage assets and are presented in **Table 8.4**.

Table 8.4 - Heritage Assets on the 'Heritage at Risk Register'

Asset Type	Grade	Within Scoping Boundary	Between Scoping Boundary and 2km study area	Total
World Heritage Sites	-	0	0	0
Scheduled Monuments	-	3	3	6
Listed Buildings	Grade I	0	1	1
	Grade II*	1	6	7
	Grade II	0	2	2
Registered Parks and Gardens	Grade I	0	0	0
	Grade II*	0	1	1
	Grade II	0	0	0
Conservation Areas	-	0	4	4
				21

Non-Designated Heritage Assets

8.5.10 An initial examination of the data obtained from the Derbyshire HER has revealed 670 non-designated heritage assets within the 250m Study Area dating from all time periods, including multi-period sites. These include a Roman road, Medieval and Post-Medieval mines, Post-Medieval blast furnaces, Prehistoric enclosures and field systems (especially concentrated close to the River Trent), Medieval deerparks and villages. There are also several presently undated heritage assets (this could be due to lack of information or opportunity to investigate the assets). The data contains archaeological remains (in the form of findspots, crop or parch marks, features encountered during archaeological assessment or mitigation and areas where no archaeological remains have been encountered during investigation) and historic buildings.

8.5.11 Non-designated heritage data has been obtained from the Derbyshire HER and is summarised in Table 8.5 and presented in full in **Appendix 8B: Non-Designated Heritage Assets** in **Volume 2** and **Figure 8.2: Non-Designated Heritage Asset Gazetteer** in **Volume 3**. This data would be fully examined and assessed during the baseline report and within the ES to inform the archaeological potential within the entirety of the Scoping Boundary.

8.5.12 Events (archaeological investigations) are included in the non-designated asset data and in **Appendix 8B: Non-Designated Heritage Assets** in **Volume 2** and **Figure 8.2: Non-Designated Heritage Asset Gazetteer in Volume 3.** There are 323 events recorded in the Derbyshire HER within the 250m Study Area. This figure does not include desk-based assessments or desk-top studies, heritage impact assessments

or previous scoping reports which have been removed from the totals and from **Figure 8.2 in Volume 3**. Included events include excavations, watching briefs, fieldwalking surveys, geophysical surveys, ground investigations, trial trenching, earthwork surveys, aerial reconnaissance surveys and historic building recording/building surveys.

8.5.13 Locally listed buildings have not been included in either designated or non-designated heritage assets lists. Neither the Derbyshire HER nor the Historic England datasets included locally listed buildings. If the districts maintain local lists of buildings, they can be found on their respective websites. These will be researched and assessed in the ES.

8.5.14 The tabulated data in **Table 8.5** is divided up per district. It does not equate to an exhaustive list of non-designated assets, merely assets that are known and recorded on the HER; further assets are anticipated to be discovered via walkover and archaeological fieldwork. Archaeology includes findspots, monuments and sites, whilst built heritage comprises buildings.

8.5.15 It is currently unknown whether protected lanes or historic 'Important Hedgerows' are located within the Scoping Boundary or study area. These asset types would be fully examined and assessed during the standalone baseline assessment and within the ES.

Table 8.5 - Non-Designated Heritage Assets within Local Planning Authority Areas

Asset Type	Within Scoping Boundary	Outside Scoping Boundary, within 250m study area	Totals
North East Derbyshire District			
Archaeology	18	45	63
Built Heritage	40	30	70
Bolsover District			
Archaeology	3	7	10
Built Heritage	1	5	6
Amber Valley District			
Archaeology	70	65	135
Built Heritage	3	30	33
Erewash District			
Archaeology	54	38	92
Built Heritage	2	17	19
South Derbyshire District			
Archaeology	152	57	209
Built Heritage	10	23	33

Asset Type	Within Scoping Boundary	Outside Scoping Boundary, within 250m study area	Totals
City of Derby Unitary Authority District			
Archaeology	0	0	0
Built Heritage	0	0	0
			670

Historic Landscape Characterisation Areas

8.5.16 An initial examination of the historic landscape characterisation data, provided by the HER, shows there are large areas of agriculture that date from the Post-medieval to Modern periods. Also noted are commons, built or industrial areas (including coal mining), areas of boundary loss, meadows, parklands, woodlands (including ancient woodlands), areas of archaeological interest (including a Bronze Age cemetery and Iron Age Settlement), and enclosed fields (both regular and irregular). Historic landscape characterisation would be used to inform the baseline in the ES.

Future Baseline Conditions

8.5.17 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 in the ES.

8.5.18 No significant changes to the future historic environment baseline are anticipated.

8.5.19 Further heritage assets may be recorded and/or current records may be updated during field investigation works and would be added to the assessment in the ES where relevant.

8.6 Mitigation Measures Adopted as Part of the Project

8.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

8.6.2 Impacts to heritage assets of the highest value have been considered in the Project design. The Scoping Boundary has been designed to avoid, as far as practicable, physical impacts on designated heritage assets as set out in the Corridor and Preliminary Routeing and Siting Study (National Grid, 2024) as described in **Chapter 3: Main Alternatives Considered**. Impacts arising from changes within the setting of the highest value heritage assets have also been avoided as far as practicable. This includes to the Derwent Valley Mills World Heritage Site (NHLE reference: 1000100).

8.6.3 Further embedded design measures will be developed as the Project design evolves. This could include avoiding areas of high archaeological potential within the Scoping Boundary.

Good Practice Mitigation Measures

8.6.4 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**

8.6.5 In addition, **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** presents the likely good practice mitigation measures relevant to the historic environment. These include but are not limited to:

- The location of known archaeological remains, or areas where archaeological investigations would be undertaken (i.e. excavations), would be signposted/fenced off to avoid unintentional damage.
- Where a previously unknown heritage asset has been discovered, or a known heritage asset has proven to be more significant than foreseen at the time of application, the Project would inform the Local Planning Authority and discuss a solution that protects the significance of the new discovery, so far as is practicable within the Project parameters.
- Where practicable, maintain elements within the landscape such as vegetation and hedgerows (including re-instating hedgerows, fences and walls).

8.6.6 All of these standard measures would reduce potential impacts on heritage assets.

8.6.7 In addition, archaeological mitigation in the form of excavation and recording is likely to be required. This will be specified through a draft Heritage Mitigation Strategy, or equivalent, which would include an Outline Written Scheme of Investigation (WSI) to be submitted with the ES. This would be a single document with the mitigation strategy outlining the different types of mitigation per area and the outline WSI giving the methods.

Additional Mitigation Measures

8.6.8 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage no additional mitigation measures have been identified for the historic environment.

8.7 Likely Significant Effects

8.7.1 This section sets out the likely significant effects on the historic environment arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

8.7.2 The review of likely significant effects assumes that the embedded, good practice and additional mitigation measures described in Section 8.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2**, are in place before

assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportionate assessment (IEMA, 2022) (Ref 8.27).

8.7.3 The likely receptor groups that may receive significant effects of the Project have been split into:

- Archaeological remains: Defined as the material remains of human activity from the earliest periods of human evolution to the present. These may be buried traces of human activity, sites visible above ground, or moveable artefacts. This would include designated assets such world heritage sites, scheduled monuments of an archaeological nature as well as non-designated archaeological remains. Any archaeological remains within conservation areas would be addressed under archaeological remains.
- Historic Buildings and Conservation Areas: Including architectural, designed, or structures with a significant historical value including structures not usually thought of as buildings such as milestones and bridges. Historic buildings would also include conservation areas, listed building as well as non-designated buildings and structures.
- Historic landscapes: Including historic landscape character and the present landscape. Historic landscapes were formed by the results of the actions and interactions of natural and / or human factors and include designated sites such as World Heritage Sites, Registered Parks and Gardens and non-designated landscape features such as protected hedgerows.

8.7.4 The impacts on the historic environment are divided into two categories:

- Physical – the direct or indirect loss of, or damage to the fabric of a heritage asset that would occur during construction or operation of the Project.
- Setting – change to the setting of a heritage asset that would impact its value which would occur during the construction or operation of the Project.

Archaeological Remains

Construction – Physical Effect to Archaeological Remains

8.7.5 There is known archaeology as well as areas of archaeological potential present within the Scoping Boundary. As described in Section 8.6 the Project to date has been developed and would continue to be developed, to avoid designated archaeological remains such as Scheduled Monuments as any direct physical effect on a scheduled monument would be likely to be significant. Indirect physical damage to Scheduled Monuments brought about by construction activities changing existing groundwater regimes (both flows and quality) resulting in the desiccation of waterlogged deposits are not anticipated. Construction activities most likely to cause de-watering (underground cabling or deep foundations) will not be sited close to Scheduled Monuments. Additionally, none of the Scheduled Monuments within or adjacent to the Scoping Boundary except for one (Stainsby Defended Manorial Complex – NHLE 1015890) mention waterlogging in the reason for scheduling. Therefore, there is unlikely to be direct or indirect physical impacts on the designated archaeological assets within the Scoping Boundary. Through early engagement with consultees including DCC and Historic England, it will be possible to determine any planned changes to the boundaries of Scheduled Monuments potentially impacted by the Project and appropriately consider this through its design. For these reasons,

these likely significant effects have been **Scoped Out** for further assessment in the ES.

8.7.6 There is the potential for the Project to give rise to significant effects on both known and unknown non-designated archaeological remains that remain extant within the Scoping Boundary. A full list of non-designated assets within the Scoping Boundary, as identified by the Derbyshire HER, is provided as **Appendix 8B: Non-Designated Heritage Assets** in **Volume 2**.

8.7.7 Potential physical impacts to known and unknown non-designated archaeological remains during the construction phase comprise:

- Direct physical damage, whole or partial loss and truncation through the removal and / or excavation of archaeological deposits during construction.
- Direct physical damage, whole or partial loss and truncation resulting from construction activities such as the establishment of site access, haul roads, compounds and topsoil stripping, the installation of new infrastructure, new substation, trenchless crossings, and groundworks.
- Indirect physical damage due to construction activities changing existing groundwater regimes (both flows and quality) resulting in the desiccation of waterlogged deposits. These impacts would likely to be focused in areas of proposed underground cabling (either through open trench or trenchless installation) or deep foundations such as piled foundations. Effects to surface and groundwater would be reported in **Chapter 9: Hydrology and Land Drainage** and **Chapter 10: Geology and Hydrogeology**.

8.7.8 Due to the nature of the groundworks associated with the construction of the Project, direct impacts to non-designated buried archaeology are likely to occur. Good practice mitigation measures set out in Section 8.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** would be implemented to minimise physical impacts on known and unknown non-designated heritage assets during the construction phase. The likely significant physical impacts on non-designated archaeological remains during construction is **Scoped In** to the ES.

Operation (Including Maintenance) – Physical Impacts to Archaeological Remains

8.7.9 No physical impacts on archaeological remains are likely to occur as a result of operational and maintenance activities. Where inspections of the Project assets indicate the requirement for repairs and modifications of sub-surface features, such as pylon foundations and underground cables, these would be localised in nature and likely limited to areas of ground previously disturbed by the Project. Therefore, physical impacts on designated and non-designated archaeological remains during operation and maintenance are **Scoped Out** of the ES.

Construction and Operation (Including Maintenance) – Impacts on the Setting of Archaeological Remains

8.7.10 The Project construction activities have the potential to impact the setting of both designated and non-designated archaeological remains. Changes to the setting of archaeological remains during the construction phase are likely to occur as a result of the following factors:

- The presence of plant and machinery, construction traffic, compounds and work sites as well as the resultant visual intrusion on archaeological remains.

- Noise, dust, and light generated by the construction activities.

8.7.11 Factors such as these could impact the value of the assets. The presence of the new infrastructure during the operational phase of the Project has the potential to adversely impact the setting of archaeological remains.

8.7.12 Therefore, impacts resulting from changes to the setting of both designated and non-designated archaeological remains during the construction and operational phases (including maintenance) are **Scoped In** to the ES.

Historic Buildings and Conservation Areas

Construction – Physical Impacts to Historic Buildings

8.7.13 As highlighted in **Table 8.6**, a number of designated and non-designated historic buildings have been identified within the scoping boundary and the 2km study area. Direct physical impacts to designated historic buildings are not anticipated during the construction phase. Although there is the potential for settlement and subsidence to occur as a result of construction vibration and changes to the existing groundwater regime arising from activities such as groundworks, piling and ground compaction, these impacts are anticipated to be localised in nature and limited to areas in the immediate proximity of the proposed new Chesterfield Substation (where such works to be incorporated into the Project scope as described in paragraph 4.1.9 and paragraph 4.1.10 in **Chapter 4: Description of the Project**), compounds, piling activities at pylon bases and areas of undergrounding.

8.7.14 Direct and indirect physical impacts on designated historic buildings have therefore been **Scoped Out** for further assessment in the ES, although this would be subject to ongoing review during the design development.

8.7.15 Direct physical impacts on non-designated historic buildings cannot be fully ruled out at this early design stage. Ongoing review of the presence of non-designated historic buildings would be carried out during the design development to, where reasonably practicable, ensure the routing of the Project avoids the potential for direct physical impacts. Likely significant effects on non-designated historic buildings have been **Scoped In** to the ES.

8.7.16 **Table 8.6** identifies a total of 10 Conservation Areas within the Scoping Boundary and a further 38 within the 2km study area. Through the development of the preferred route alignment, the Project would seek to avoid direct and indirect physical impacts to Conservation Areas, where practicable, however, this cannot be ruled out at this stage. Likely significant effects related to the direct and indirect physical impacts on Conservation Areas during the construction phase are **Scoped In** to the ES.

Operation (Including Maintenance) – Physical Impacts to Historic Buildings

8.7.17 There is not anticipated to be any direct or indirect physical impacts to historic buildings (both designated and non-designated) and Conservation Areas from the operational and maintenance of the Project. Activities associated with the repair and maintenance of Project assets would be localised in scale and nature. Therefore, direct and indirect physical impacts to historic buildings and Conservation Areas during the operational phase is **Scoped Out** for further assessment in the ES.

Construction and Operation (Including Maintenance) – Impacts to the Setting of Historic Buildings

8.7.18 During the construction phase, there is the potential for impacts to the value of designated and non-designated historic buildings and Conservation Areas due to changes to their setting. Changes to the setting of a historic building during the construction phase are likely to occur as a result of the following factors:

- The presence of plant and machinery, construction traffic, compounds and work sites as well as the resultant visual intrusion on historic buildings.
- Noise, dust, and light generated by the construction activities.

8.7.19 During the operational phase, the presence of the proposed new infrastructure has the potential to change the setting of historic buildings (both designated and non-designated) and Conservation Areas resulting in an impact to the value of the asset.

8.7.20 There is potential for likely significant effects to the setting of designated and non-designated historic buildings during both the construction and operational (including maintenance) phases and these are therefore **Scoped In** to the ES.

Historic Landscape

Construction – Physical Impacts to Historic Landscapes

8.7.21 There is little potential for physical impacts on designated historic landscapes (including the Derwent Valley Mills World Heritage Site or any registered parks and gardens) to occur during construction as none lie within the Scoping Boundary. Therefore, likely significant effects from direct and indirect physical impacts to designated historic landscapes is **Scoped Out** of the ES.

8.7.22 There is potential for physical impacts to non-designated historic landscapes to arise during the construction phase including landscape features such as historic hedgerows. Potential adverse effects to historic landscapes may occur as a result of physical disturbance from construction activities, the physical removal of historic landscape features to accommodate the Project, such as hedgerows, or a change of land use of historic landscape character.

8.7.23 **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** sets out a range of good practice mitigation measures that would be implemented to minimise physical disturbance for example to retain important hedgerow during construction activities. In addition, where practicable, the Project would seek to reinstate important elements within the landscape such as vegetation and hedgerows.

8.7.24 At this stage, physical impacts on non-designated historic landscapes during construction are **Scoped In** to the ES.

Operation (Including Maintenance) – Physical Impacts to Historic Landscapes

8.7.25 There is not anticipated to be any direct or indirect physical impacts to designated and non-designated historic landscapes arising from the operational phase and maintenance activities. Physical impacts to historic landscapes during the operational phase is **Scoped Out** for further assessment in the ES.

Construction and Operation (Including Maintenance) – Impacts to the Setting of Historic Landscapes

8.7.26 As described in **Table 8.6**, there are no designated historic landscapes located within the Scoping Boundary, however the Derwent Valley Mills World Heritage site and four Registered Parks and Gardens have been identified within the 2 km study area. Changes to the setting of a historic landscape during the construction phase are likely to occur as a result of the following factors:

- The presence of plant and machinery, construction traffic, compounds and work sites as well as the resultant visual intrusion on historic buildings.
- Noise, dust, and light generated by the construction activities.

8.7.27 The Scoping Boundary lies on average between 2-7 km away from the 'core area' of the Derwent Valley Mills World Heritage site and 1-6 km from its 'buffer zone'. The closest the Scoping Boundary comes to the designation's core area is 1.0 km at Makeney. Given these distances and the fact that that the designation predominantly covers the base and lower slopes of the valley of the River Derwent outside the Scoping Boundary, intervening landform and vegetation are likely to combine to prevent intervisibility between these areas and the Project.

8.7.28 At its closest point, the Scoping Boundary lies adjacent to the World Heritage Site 'buffer'. At this point, in Belper, the 'buffer' covers a larger area of predominantly late-20th century housing which prevents intervisibility between the World Heritage Site and the Project.

8.7.29 Accordingly, assessment of the possible impacts arising from changes within the setting of the World Heritage Site through this section are **Scoped Out** of the ES.

8.7.30 There is the potential for impacts to the setting of Registered Parks and Gardens and non-designated historic landscapes during the construction and operation (including maintenance) phases of the Project. Potential impacts to the setting of historic landscapes may arise through the additional noise, dust, construction traffic and visual intrusion, whereas the introduction of new permanent infrastructure would also change the setting of the heritage asset during the operational phase.

8.7.31 **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** sets out a range of good practice mitigation measures that would be implemented to minimise impacts to setting of historic landscapes, from construction activities for example through control of noise, dust and measures to manage construction traffic.

8.7.32 There is the potential for beneficial effects on the setting and cultural associations of designated and non-designated landscapes in areas where the Project or existing infrastructure would be undergrounded.

8.7.33 Overall, there is the potential for adverse or beneficial effects on the setting of historic landscapes (both designated and non-designated) during construction and operation (including maintenance). Therefore, likely significant effects on the setting of Registered Parks and Gardens and non-designated historic landscapes are proposed to be **Scoped In** for further assessment in the ES for both the construction and operational (including maintenance) phases.

8.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

8.8.1 In addition to the data sources listed in Section 8.5, the assessment within the ES will be supported by the following additional third-party data information and surveys including:

- Local authority conservation area appraisals and management documents and their mapping.
- Historic landscape characterisation (HLC) mapping undertaken by local planning authorities.
- Archaeological reports (grey literature) on archaeological interventions within the Scoping Report Corridor as the key consideration area for archaeological potential.
- Published archaeological journals and monographs, local history books and pamphlets, including local history websites as appropriate.
- Historic maps, including OS, estate maps, enclosure maps, tithe maps and military plans, all available scales of OS maps would be utilised.
- Portable Antiquities Scheme (PAS) findspot data.
- Aerial photographs held by Historic England, local authorities and other appropriate repositories and other readily available remote sensing results such as LiDAR data.
- Geological mapping and borehole information as held by the British Geological Survey (BGS).
- Documentary, cartographic and other resources as deposited within local studies libraries, county libraries and archives, including historic OS maps, tithe, estate and other maps, and other relevant primary sources held at Derbyshire Archives, Nottinghamshire Archives, Leicestershire Archives and Staffordshire Archives, together with local studies library information.
- A Project walkover survey to assess known sites, assess their setting and to determine the potential for previously unrecorded heritage assets. This survey will focus on the final alignment of new permanent infrastructure as well as any associated temporary works including compounds, laydown areas, accesses and other above ground structures.
- Non-intrusive evaluation, such as a geophysical survey, of agreed areas in the Order Limits to defined in the DCO application.
- Monitoring of Geotechnical Investigation (GI) window sampling works, as well as collection of borehole logs to create topographic models as appropriate.
- Where necessary, targeted intrusive archaeological evaluation such as trial trenching or test pits within the Order Limits. The scope and extent of intrusive fieldwork will be defined alongside further evaluation of the Historic Environment undertaken as part of the ES and a detailed strategy will be produced.

Proposed Assessment Method

8.8.2 This section sets out the proposed methodology for the historic environment assessment of the ES. This builds on the general assessment methodology

presented in **Chapter 5: EIA Approach and Methodology** as well as DMRB LA 106 (Ref 8.28), DMRB LA 116 (Ref 8.29) and ICOMOS guidance (Ref 8.20 and Ref 8.21).

Value

8.8.3 The term 'value' would be used to describe the importance of a heritage asset, in preference to the term 'significance', in order to avoid confusion with the similar terminology, in particular, 'significant effects' as commonly used in EIA. The value of a heritage asset is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic, or historic (NPPF Annex 2, Glossary). These 'interests' map onto the 'values' set out in Conservation Principles 2008. The contribution of setting to the significance of a heritage asset would also be considered as part of the assessment of value, as per The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (Historic England, 2017). Each identified heritage asset will be assigned a value in accordance with the criteria set out in **Table 8.6** which is based on a combination of DMRB LA 106, DMRB LA 116 and ICOMOS (2011 and 2022) guidance.

8.8.4 Using professional judgement and the results of consultation, in addition to the guidance outlined, heritage assets are also assessed on an individual basis and regional variations and individual qualities are considered where applicable.

Table 8.6 - Criteria for Assessing the Value of Heritage Assets

Asset Value	Asset Categories
Very High	World Heritage Sites. Other heritage assets of recognised international importance. Assets that can contribute significantly to acknowledged international research objectives. Other buildings of recognised international importance. Historic landscapes of international value, whether designated or not. Extremely well-preserved historic landscapes with exceptional coherence, time-depth or other critical factors.
High	Scheduled Monuments (including proposed sites). Non-designated assets of clear national importance. Grade I and Grade II* Listed Buildings. Grade II listed buildings, Grade II Registered Parks and Gardens, and conservation areas that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade. Grade I and Grade II* Registered Parks and Gardens. Registered Battlefields. Non-designated historic landscapes of outstanding interest, high quality and importance, and of demonstrable national value. Well preserved historic landscapes with exhibiting considerable coherence, time-depth or other critical factors.

Asset Value	Asset Categories
	Assets that contribute significantly to acknowledged national research agendas.
Medium	Most Grade II listed buildings. Most Conservation areas. Most Grade II registered parks and gardens. Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens, or landscapes), or locally listed buildings, that can be shown to have demonstrable regional importance. Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth, or other critical factor(s). Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible.
Low	Locally listed buildings. Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens, or landscapes) that can be shown to have demonstrable local importance. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Historic landscape character areas whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	Assets identified on national or regional databases, but which have no archaeological, architectural, artistic, or historic value. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Landscapes with no or little significant historical merit.
Unknown	The importance of the resource has not been ascertained/is inaccessible. Buildings with some hidden (i.e. inaccessible) potential for historic significance.

8.8.5 In regard to placing a value on the Derwent Valley Mills WHS a nuanced and individualised approach will be taken that differentiates the buffer from the core WHS. This is in recognition of guidance in the WHS Management plan which acknowledges that the buffer does not have Outstanding Universal Value in itself but it does have a role in supporting Outstanding Universal Value.

Magnitude

8.8.6 Having identified the value of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to an asset arising from the Project Impacts may arise during construction, operation or maintenance and can be temporary or permanent. Impacts can affect the physical fabric of the asset or affect its setting.

8.8.7 The level and degree of impact (impact rating) is assigned with reference to a four-point scale as set out in **Table 8.7** and is based on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS, 2011). Updated ICOMOS guidance for Impact Assessment was released in 2022, however the 2022 document does not contain a value table. The 2011 document has therefore been used in conjunction with the 2022 document. In respect of historic environment an assessment of the level and degree of impact is made in consideration of any scheme design mitigation (embedded mitigation). If no impact on value is identified, the impact rating would be reported as 'no change'.

Table 8.7 - Factors Influencing the Assessment of Magnitude of Impacts

Magnitude of Impact rating	Description of Impact
Major	Changes such that the heritage value of the asset is totally altered or lost. Comprehensive change to elements of setting that would result in harm to the asset and our ability to understand and appreciate its heritage significance.
Moderate	Change such that the heritage value of the asset is significantly altered or modified. Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Minor	Changes such that the heritage value of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Negligible	Changes to the asset that hardly affect heritage value. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the heritage value of the asset.
No Change	No Change

Significance of Effect

8.8.8 Significance of effect will be derived using the matrix set out in **Table 8.8**. This may be informed by professional judgement which, where used, would be explained to give the rationale behind the values assigned. Significant effects in the context of the EIA Regulations 2017 would be effects of moderate or greater significance.

8.8.9 The assessment to classify the effect will take into consideration any embedded mitigation, the value of the asset (as described in **Table 8.6**) and the magnitude of impact (as described in **Table 8.7**). Effects can be neutral, adverse, or beneficial.

Table 8.8 - Assessment of Effect

	Heritage Value	Very High	High	Medium	Low	Negligible
Magnitude of Impact	**Major**	Very Large	Large/ Very Large	Moderate/ Large	Slight/ Moderate	Slight
	Moderate	Large/ Very Large	Moderate/ Large	Moderate	Slight	Neutral/ Slight
	Minor	Moderate/ Large	Moderate/ Slight	Slight	Neutral/ Slight	Neutral/ Slight
	Negligible	Slight	Slight	Neutral/ Slight	Neutral/ Slight	Neutral
	No Change	Neutral	Neutral	Neutral	Neutral	Neutral

8.8.10 For assets of unknown value (described in **Table 8.6**), a range of significance of effects would be given.

8.8.11 The ES reports on the significance of effect in accordance with EIA methodology. Very Large, Large and Moderate effects are considered to be significant. Within the NPS EN-1, impacts affecting the value of heritage assets are considered in terms of harm and there is a requirement for the decision maker to determine whether the level of harm amounts to '*substantial harm'* or '*less than substantial harm*'. The NPS EN-1 also notes that there should always be a presumption in favour of the conservation of an asset as, once lost, assets cannot be replaced. EN-1 states that proposals that preserve the elements of the setting that make a positive contribution to the asset (or which better reveal its significance) should be treated favourably. There is no direct correlation between the significance of effect as reported in the final ES and the level of harm caused to heritage significance. A major magnitude of impact on a high value heritage asset would, however, more often be the basis by which a decision maker would determine that the level of harm to the significance of the asset would be substantial. A moderate magnitude of impact is unlikely to meet the test of substantial harm and would therefore more often be the basis by which a decision maker would determine that the level of harm to the significance of the asset would be less than substantial. A minor or negligible magnitude of impact would still amount to a less than substantial harm however, a neutral effect is classified as no harm. In all cases determining the level of harm to the significance of the asset arising from development impact will be determined by professional judgement.

Assumptions and Limitations

8.8.12 This Scoping Report includes a high-level review of available data and presents a brief overview of the historic environment baseline. Given the scale of the Project, this assessment is only intended to identify potential pathways to significant effects for the purpose of defining a scope for the future assessment. It does not present all known or previously unrecorded historic environment receptors which will be presented in subsequent assessments.

8.8.13 Data supporting this report was obtained from third party sources and may include errors, omissions or duplications. All reasonable efforts were made to identify and rectify any such issues.

8.9 Proposed Scope of the ES

8.9.1 The matters that are proposed to be scoped in and out of further assessment for the historic environment are outlined in **Table 8.9**.

Table 8.9 - Proposed Scope of the ES

Matter	Phase	Scoped In/ Out	Justification
Physical impacts on designated archaeological remains	Construction	**Scoped Out**	The Project to date has been developed and would continue to be developed, to avoid designated archaeological remains such as scheduled monuments, therefore there is unlikely to be direct and indirect physical impacts on the designated assets within the Scoping Boundary
Physical impacts on non-designated archaeological remains	Construction	**Scoped In**	Likely significant effects due to the direct physical damage and truncation of non-designated archaeological remains cannot be ruled out. There is also the potential for indirect physical impacts due to changes to groundwater regimes. Further assessment will be undertaken in the ES.
Physical impacts on designated and non-designated archaeological remains	Operation	**Scoped Out**	No physical impacts on archaeological remains are likely to occur as a result of operational and maintenance activities. Where inspections of the Project assets indicate the requirement for repairs and modifications of sub-surface features, such as pylon foundations and underground cables, these would be localised in nature and likely limited to areas of ground previously disturbed by the Project.
Impacts on the setting of designated and non-designated archaeological remains	Construction	**Scoped In**	Factors such as an increase in noise, dust and visual intrusion have the potential to impact the value of designated and non-designated archaeological remains.
	Operation	**Scoped In**	The presence of the new infrastructure during the operational phase of the Project has the potential to adversely impact the setting of archaeological remains.
Physical impacts to designated historic buildings	Construction	**Scoped Out**	Direct and indirect physical impacts on designated historic buildings are not anticipated during the construction phase.

Matter	Phase	Scoped In/ Out	Justification
Physical impacts to non-designated historic buildings	Construction	**Scoped In**	Ongoing review of the presence of non-designated historic buildings would be carried out during the design development to, where reasonably practicable, ensure the routing of the Project avoids the potential for direct physical impacts, however, likely significant effects on non-designated historic buildings cannot be fully ruled out at this early design stage.
Physical impacts to Conservation Areas	Construction	**Scoped In**	A total of 10 Conservation Areas within the Scoping Boundary. The development of the preferred route alignment the Project would seek to avoid direct and indirect physical impacts to Conservation Areas, this cannot be ruled out during the construction phase at this stage.
Physical impacts to historic buildings and Conservation Areas	Operation	**Scoped Out**	Direct and indirect physical impacts to historic buildings (both designated and non-designated) and Conservation Areas are not anticipated. Maintenance activities would be localised in scale and nature.
Impacts to the setting of historic buildings and Conservation Areas	Construction and Operation	**Scoped In**	There is potential for likely significant effects to the setting of designated and non-designated historic buildings during both the construction and operational phases.
Physical impacts to designated historic landscapes including Derwent Valley Mills World Heritage Site and Registered Parks and Gardens	Construction	**Scoped Out**	There is little potential for physical impacts on designated historic landscapes to occur during construction as none lie within the Scoping Boundary.
Physical impacts to non-designated historic landscapes	Construction	**Scoped In**	There is potential for physical impacts to non-designated historic landscapes to arise during the construction phase including landscape features. Therefore, further assessment is required in the ES.

Matter	Phase	Scoped In/ Out	Justification
Physical impacts to designated and non-designated historic landscapes	Operation	**Scoped Out**	There is not anticipated to be any direct or indirect physical impacts to designated and non-designated historic landscapes arising from the operational phase and maintenance activities.
Impacts to the setting of Derwent Valley Mills World Heritage Site	Construction and Operation	**Scoped Out**	The Scoping Boundary lies on average between 2-7 km away from the 'core area' of the World Heritage Site. Given the distance and the fact that the designation predominantly covers the base and lower slopes of the valley of the River Derwent past the Scoping Boundary, intervening landform, 20th Century housing and vegetation are likely to combine to prevent intervisibility between the designated site and the Project.
Impacts to the setting of Registered Parks and Gardens and non-designated historic landscapes	Construction and Operation	**Scoped In**	There is the potential for impacts to the setting of Registered Parks and Gardens and non-designated historic landscapes during the construction and operation (including maintenance) phases of the Project.

8.10 References

Ref 8.1: HMSO (1979). Ancient Monuments and Archaeological Areas Act.

Ref 8.2: HMSO (1983). National Heritage Act 1983.

Ref 8.3: HMSO (2002). National Heritage Act 2002.

Ref 8.4: HMSO (1990). Planning (Listed Buildings and Conservation Areas) Act.

Ref 8.5: HMSO (1997). The Hedgerows Regulations 1997.

Ref 8.6: HMSO (2023). The Levelling Up and Regeneration Act 2023.

Ref 8.7: Department for Energy Security & Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Accessed 26th February 2024. Available at: https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf

Ref 8.8: Department for Energy Security & Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Accessed 26th February 2024. Available at: https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf

Ref 8.9: Department for Levelling Up, Housing & Communities (2023) *National Planning Policy Framework*. Available at: National Planning Policy Framework (publishing.service.gov.uk)

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Ref 8.11: CIfA (2020). Standard and Guidance for Historic Environment Desk Based Assessments. Reading: The Chartered Institute for Archaeologists.

Ref 8.12: CIfA (2021). Regulations for Professional Conduct: Professional Ethics in Archaeology. Reading: The Chartered Institute for Archaeologists.

Ref 8.13: CIfA (2022). Code of Conduct. Reading: The Chartered Institute for Archaeologists.

Ref 8.14: CIfA, IEMA, IHBC (2021). Principles of Cultural Heritage Impact Assessment in the UK. Lincoln: IEMA

Ref 8.15: Historic England (2008) Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment. London: English Heritage (Rebranded Historic England).

Ref 8.16: Historic England (2015). Historic Environment Good Practice Advice in Planning Note 2 (GPA 2) Managing Significance in Decision-Taking in the Historic Environment. London: Historic England.

Ref 8.17: Historic England (2017). Historic Environment Good Practice Advice in Planning Note 3 (2nd edition) (GPA 3) – The Setting of Heritage Assets. London: Historic England

Ref 8.18: Historic England (2019). Statements of Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12. London: Historic England

Ref 8.19: Historic England (2021). Local Heritage Listing: Identifying and Conserving Local Heritage Advice Note 7 (Second Edition). London: Historic England.

Ref 8.20: International Council on Monuments and Sites (ICOMOS) (2011). Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.

Ref 8.21: International Council on Monuments and Sites (ICOMOS) (2022). Guidance and Toolkit for Impact Assessments in a World Heritage Context.

Ref 8.22: Department for Levelling Up, Housing and Communities (2014 - Updated July 2019). National Planning Practice Guidance – Historic Environment. Accessed 22nd February 2024. Available at: https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment

Ref 8.23: Historic England (2024). The National Heritage List for England, Accessed 22nd February 2024. Available at: https://historicengland.org.uk/listing/the-list

Ref 8.24: Derwent Valley Mills (2024). Derwent Valley Mills World Heritage Site. Accessed 1st March 2024. Available at: https://www.derwentvalleymills.org/

Ref 8.25: Derwent Valley Mills (2020). Derwent Valley Mills World Heritage Site Management Plan 2020 – 2025. Accessed 1st March 2024. Available at: https://managementplan.derwentvalleymills.org/

Ref 8.26: Atkins (2016). Hardwick Setting Study (unpublished report for the National Trust)

Ref 8.27: IEMA (2017) Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice. Available at: https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia

Ref 8.28: Design Manual for Roads and Bridges (January 2020) LA 106 - Cultural heritage assessment. Highways England.

Ref 8.29: Design Manual for Roads and Bridges (September 2019) LA 116 - Cultural heritage asset management plans. Highways England.

Ref 8.30: Amber Valley Borough Council (June 1995). Belper Conservation Area Character Statement.

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Ref 8.32: CIfA (2020). Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment. Reading: The Chartered Institute for Archaeologists.

9. Hydrology and Land Drainage

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Contents

9. Hydrology and Land Drainage

9.1 Introduction

9.1.1 This chapter presents how the hydrology and land drainage assessment will consider the potentially significant effects on hydrology and land drainage receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

9.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

9.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

9.2 Approach to Scoping

9.2.1 The approach to scoping has drawn from previous experience of similar Projects and professional judgement. Determining the scope of the hydrology and land drainage assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental mitigation measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

9.2.2 There are interrelationships related to the potential effects on hydrology and land drainage and other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 10: Geology and Hydrogeology.**
- **Chapter 11: Agriculture and Soils.**

9.2.3 This chapter is supported by the following figures in **Volume 3**:

- **Figure 9.1: Water Environment Study Area and Receptors.**
- **Figure 9.2: Flood Zones.**

9.3 Key Regulatory and Planning Policy Context

Key Legislation

9.3.1 A summary of the key legislation considered in the scope of effects on hydrology and land drainage is outlined below:

- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (HMSO, 2017) (Ref 9.1).
- Part 5 of the Environment Act 2021 (HMSO, 2021) (Ref 9.2).
- The Land Drainage Act 1991 (HMSO, 1991) (Ref 9.3).
- The Flood and Water Management Act 2010 (HMSO, 2010) (Ref 9.4).
- The Water Resources Act 1991 (HMSO, 1991) (Ref 9.5).

National Planning Policy

National Policy Statements

9.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy EN-1 (Ref 9.6) and NPS for Electricity Networks Infrastructure EN-5 (Ref 9.7). **Table 9.1** sets out a summary of the key requirements of both NPSs relevant to hydrology and land drainage and how these have been considered within this chapter and will be considered within the ES.

Table 9.1 - National Planning Policy Relevant to Hydrology and Land Drainage

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) 2024		
Paragraph 5.8.13	*'A site-specific flood risk assessment should be provided for all energy projects in Flood Zones 2 and 3 in England or Zones B and C in Wales'.*	A Flood Risk Assessment (FRA) will be prepared for the Project with agreed scope in consultation with the Environment Agency / Local Lead Flood Authority (LLFA).
Paragraph 5.16.3	'*Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment, and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment*'.	The potential effects of the Project on the water environment, including on such aspects as water quality, water resources and physical characteristics, will be considered. The ES and FRA will include consideration of how the existing baseline could change in the future as a consequence of climate change.
Paragraph 5.16.12	*'The Secretary of State will need to give impacts on the water environment more weight where a project would have an adverse effect on the achievement of the environmental objectives established under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017*.'	The Project will be subject to a Water Framework Directive (WFD) Assessment that will set out the measures that will be adopted to ensure no adverse effects on the achievement of objectives set for water bodies with the Project's zone of influence. The WFD will be prepared with agreed scope with the Environment Agency.
Paragraph 5.16.14	'*The specific objectives for particular river basins are set out in River Basin Management Plans. The Secretary of State must refuse development consent where a project is likely to cause deterioration of a water body or its*	The Project will be subject to a WFD Assessment, consisting of information from **Chapter 7 Ecology and Biodiversity** and **Chapter 10 Geology and Hydrogeology**, that will set out the measures that will be

Policy Reference	Policy Context	How it will be considered
	failure to achieve good status or good potential, unless the requirements set out in Regulation 19 are met. A project may be approved in the absence of a qualifying Overriding Public Interest test only if there is sufficient certainty that it will not cause deterioration or compromise the achievement of good status or good potential.'	adopted to ensure no deterioration of water bodies with the Project's zone of influence.
Paragraph 5.8.36	'*In determining an application for development consent, the Secretary of State should be satisfied that where relevant:* • The application is supported by an appropriate FRA. • The Sequential Test has been applied and satisfied as part of site selection. • The proposal is in line with any relevant national and local flood risk management strategy. • In flood risk areas the project is designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere.'	A FRA will be prepared for the Project, evidencing application of the Sequential Test, in accordance with the requirements of national and local flood risk policies and strategies. The Project will embed flood resilience into its design and provide flood risk mitigation measures to prevent off site flood risk impacts.
National Policy Statement for Electricity Networks (EN-5) 2024		
Paragraph 2.3.3	'*Advises that the resilience of the project to the effects of climate change must be assessed in the Environmental Statement (ES) accompanying an application*'. Also stating that '*future increased risk of flooding would be covered in any flood risk assessment*'.	Both an ES and FRA will be produced that considers the potential effects of future climate change on water environment baseline conditions and flooding and will be assessed further within this chapter.

Policy Reference	Policy Context	How it will be considered
Paragraph 2.4.1	*“Applicants should set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to: flooding, particularly for substations that are vital for the electricity transmission and distribution network; effects of wind and storms on overhead lines; higher average temperatures leading to increased transmission losses; and earth movement or subsidence caused by flooding or drought (for underground cables)”*	A FRA will be prepared that assesses all applicable sources of flooding to the Project and identifies any mitigation measures required to ensure flood resilience, taking climate change into account.
Paragraph 2.6.2	*“Section 4.9 of EN-1 advises that the resilience of the project to the effects of climate change should be assessed in the Environmental Statement (ES) accompanying an application. For example, future increased risk of flooding would be covered in any flood risk assessment (see Section 5.8 in EN-1)”.*	As noted above, the FRA prepared for the Project will examine future flood risk over the development lifetime, and identify mitigation measures required to ensure flood resilience, taking climate change into account.

Other National Policy

9.3.3 A summary of other relevant national policy considered in the scope of effects on hydrology and land drainage includes:

- National Planning Policy Framework (NPPF)) (Department for Levelling Up, Housing and Communities, 2023) (Ref 9.8) as supported by the following Planning Practice Guidance (PPG):
  - Flood risk and coastal change last updated in 2022 (Ref 9.9).
  - Water supply, wastewater and water quality last updated in 2019 (Ref 9.10).

9.3.4 The relevant national policies within the NPPF and PPG are aligned with the National Policy Statement as summarised in **Table 9.1.**

Regional and Local Planning Policy

9.3.5 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

9.3.6 All local policy, specific to hydrology and land drainage would be reviewed and assessments undertaken with regard to relevant policies as part of the DCO application.

Guidance

9.3.7 Relevant guidance, specific to hydrology and land drainage, that has informed this Scoping Report and would inform the assessment within the ES, comprises:

- Advice Note 18: Water Framework Directive Assessments (Planning Inspectorate, 2024) (Ref 9.11).
- Various Construction Industry Research and Information Association publications that provide construction good practice for preventing pollution of the water environment, for example, C532: Control of Water Pollution from Construction Sites (Construction Industry Research and Information Association, 2001) (Ref 9.12).
- Design Manual for Roads and Bridges (DMRB) LA 113: Road drainage and the water environment (National Highways, 2020) (Ref 9.13).
- NPPF Flood Risk and Coastal Change PPG (Environment Agency, 2022) (Ref 9.14).
- Derbyshire County Council's Local Flood Risk Management Strategy (Derbyshire County Council, 2023) (Ref 9.15).
- The SuDS Manual (C753F) (Construction Industry Research and Information, 2015) (Ref 9.16).
- Flood Resilience and Resistance for Critical Infrastructure (C688) (Construction Industry Research and Information Association, 2010) (Ref 9.17).

9.4 Study Area

9.4.1 The study area for the hydrology and land drainage assessment comprises the Scoping Boundary plus a 500 m buffer.

9.4.2 This is considered an appropriate study area based on technical knowledge of similar projects and consideration of the distances over which potential significant effects can reasonably be expected to occur.

9.4.3 The study area is shown on **Figure 9.1: Study Area and Water Environment Receptors** in **Volume 3**. As the iterative design process continues, the study area would be refined within the ES to comprise the Order Limits plus a 500 m buffer.

9.4.4 The Flood Risk and WFD Assessments would be prepared based on more extensive study areas to ensure effects on flood risk are assessed at the local catchment scale and effects on WFD water bodies are considered within the relevant operational management catchments.

9.5 Baseline Conditions (inc. Future Baseline)

Data Collection

9.5.1 The baseline within this Scoping Report has been informed by a desk study which has drawn on the following information sources:

- Ordnance Survey mapping (Defra, 2022) (Ref 9.18), aerial mapping and Magic Maps (Defra, 2022) (Ref 9.19).
- Main River map for England (Environment Agency, 2024) (Ref 9.20).
- Catchment data explorer database of Cycle 2 and 3 WFD information (Environment Agency 2024) (Ref 9.21).
- Humber River Basin District River Basin Management Plan (Environment Agency 2018) (Ref 9.22).
- Long term flood risk map for England (Environment Agency, 2024) (Ref 9.23).
- The Flood Map for Planning (Environment Agency, 2024) (Ref 9.24).
- The Historic Flood Map (Environment Agency, 2024) (Ref 9.25).
- Active abstraction data (Environment Agency, 2024) (Ref 9.26).

Engagement with Stakeholders

9.5.2 The EIA will be informed by consultation and engagement with stakeholders, including the Environment Agency, the Canal and River Trust and the Lead Local Flood Authority (LLFA). In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

9.5.3 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024. No pre-scoping engagement has been directly undertaken for hydrology and land drainage, which is considered to be an appropriate approach and normal practice for this discipline.

9.5.4 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 9.2**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 9.2 - Summary of Engagement

Stakeholder	Summary of Response	Consideration in the Scoping Report
Environment Agency	Flood Risk - Large parts of the proposal site are located within: • Flood Zone 2 (medium probability), which land assessed as having between a 1% and 0.1% annual probability (1 in 100 year and 1 in 1000 year) of river flooding. • Flood Zone 3a (high probability), which is land assess as having a greater than 1% annual probability (1 in 100 year). Other parts are located within Flood Zone 1 on the Flood Map for Planning, having a less than 0.1% annual probability (1 in 1000 year) of river or sea flooding. Applicant advised to contact the relevant LPAs for further details regarding Strategic Flood Risk Assessments (SFRAs) to indicate extent of functional floodplain (FZ3b). Applicant advised of the Sequential Test and Exception Test for essential infrastructure to be permitted within Flood Zone 3a. Where development is located within Flood Zone 3b (functional floodplain), essential infrastructure that has passed the Exception Test should be designed and constructed to: • Remain operational and safe for users in times of flood. • Result in no net loss of floodplain storage. • Not impede water flows and not increase flood risk elsewhere. The development should remain operational during the design flood plus climate change flood event. We advise that the applicant to scope in flood risk when reviewing operation to ensure the proposed development is functional in times of a flood and remains safe. Applicant advised to identify the areas of Flood Zone 3b to help inform the sequential approach to locating infrastructure.	The water environment chapter in the ES will be supported by a Flood Risk Assessment (FRA), which will identify the level of flood risk associated with all elements of the Project during construction and operation and specify mitigation measures as appropriate. Flood risk mitigation (including flood plain compensation), where required, will be designed to be consistent with current statutory guidance, in order for the Project to be safe for its lifetime without increasing flood risk elsewhere.

Stakeholder	Summary of Response	Consideration in the Scoping Report
	Advice provided of local areas and communities sensitive to flood risk within the proposed cable corridor as: • Kilburn • Rawsons Green • Coxbench • Little Eaton Where the corridor crosses River Derwent there is a large area of Flood Zone 3, and a large area of Flood Zone 3 between the River Trent and A5132 in the south. It would be helpful to understand the proposed design life and whether the decommissioning phase will be included within the proposal. Referenced limitations to watercourse data held by the Environment Agency. Scope in to EIA for construction, operation and decommissioning phases effects of flood risk to the development and to third parties because of potential loss of floodplain storage and alterations to floodplain flow routes. Pylon footings should be located outside of active river channels. If pylons are installed on floodplains, then it should be ensured that placement does not interfere with channel movement, or future proposals to restore natural function/connectivity of any watercourse that is being crossed. Ideally, pylons should be located on older terraces, rather than on the current active floodplains.	
Environment Agency	**Modelling Data** - Hydraulic models for some watercourses within the project's area are available, but not all of them. Awareness raised of modelling limitations to Environment Agency or other risk management authority hydraulic models or developing hydraulic models. Detailed hydraulic modelling maybe required of ordinary watercourses depending on the proposed final route of the overhead cables and associated construction and decommissioning activities. Design and placement of any temporary or permanent crossings over watercourses required	Required watercourses will be identified and existing Environment Agency models will be reviewed to determine their limitations and whether any additional modelling is required to bring the model up to date. A review of fluvial hazard mapping will be undertaken and assessed in the ES.

Stakeholder	Summary of Response	Consideration in the Scoping Report
	Should be informed by site-specific hydraulic modelling.	
Environment Agency	**Climate Change** - Proposals will need to consider the future flood extent of the design flood plus climate change scenario; climate change projections will be influenced by the proposed design life of the development.	Where relevant, existing Environment Agency models will be reviewed to determine their limitations and if any additional modelling is required to bring the model up to date using the latest climate change guidance. The requirement to provide floodplain compensation is noted and will be taken into account when developing flood mitigation measures, as required.
Environment Agency	**Assets** - It would be beneficial to have a crossing register with the proposed crossing placement and type. This will enable Asset Performance teams to assess proposed crossing position in the context of flood risk and future adaptation of flood assets. Request to setback infrastructure from watercourses for the proposed. The Environment Agency highlights to the applicant that they will need to: • Survey the pre- works and post-works condition of the assets they will be interacting with and remediate any defects identified. • Monitoring vibrations and identifying safe levels which don't adversely affect assets. Key assets within the emerging preferred corridor include but not limited to: • Ambaston Ring Embankment defence • Shardlow Ring Embankment defence	Possible interactions between the Project infrastructure and Environment Agency assets will be avoided as far as practicable. Where interactions cannot be avoided, appropriate mitigation measures will be developed and agreed with the Environment Agency. A review will be undertaken to assess the potential interactions with EA assets and the Project. Potential impacts on buildings and structures due to construction vibration will be assessed as part of the ES, and potential areas of risk will be highlighted with reference to

Stakeholder	Summary of Response	Consideration in the Scoping Report
	• Shardlow Coppice Embankment defence Draycott Front Floodbank.	current guidance. Outline mitigation measures will also be provided where applicable. The contractor would conduct further detailed assessments based on the specific construction methods and determine specific mitigation measures on a case by case basis. This may include monitoring vibration levels during works, if appropriate.
Environment Agency	**Environmental Permit -** Works on or near main rivers and flood defences may need prior consent from the Environment Agency through the environmental permitting regime. If any of the works are likely to require a FRAP under the Environmental Permitting Regulations, the Environment Agency recommend the applicant consider early on whether they might consider the disapplication of the EPR and matters pertaining to FRAPs be considered as Protective Provisions under the DCO. The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and the Environment Agency advise them to consult at the earliest opportunity.	The Applicant will engage with the Environment Agency to discuss the most appropriate approach to Flood Risk Assessment Permit (FRAP) for the Project, such as a Letter of No Impediment.
Environment Agency	**Water Quality -** We would encourage water quality impacts to be scoped into the environmental impact assessment unless adequate detail can be provided regarding appropriate mitigation. We expect mitigation to be provided for the construction and operational phases of the project.	The constraints will be considered and assessed as part of the ES.
Environment Agency	**Water Resources -** Encouraged water resources impacts to be scoped in at the Environmental Impact Assessment planning stages. This should cover the consumptive uses of water that the scheme may require.	The constraints will be considered and assessed as part of the PEIR and ES.

Stakeholder	Summary of Response	Consideration in the Scoping Report
Environment Agency	**Groundwater / Drainage** - Geology and aquifer designations are not mentioned. Superficial and bedrock geology includes Principal, and Secondary A and B Aquifers. We therefore expect these to be addressed in due course. Consideration of the potential impact of pylon foundations on groundwater should be included in future assessments. This should include the effect of any necessary ground improvement, piling, and dewatering, including impact on nearby groundwater abstractions. Foundations might need to incorporate permanent drainage where they are within a floodplain, or where shallow groundwater is present. Within the proposed corridor, there are several historical landfill sites, and one active/authorised landfill, which will need to be considered. Some of these landfill sites are below the water table, and any disturbance could open a pathway to controlled waters. The north of the site is in a Coal Mining Reporting Area. Care will be needed when siting of masts, where shallow (coal) mine workings are present. The British Geological Survey (BGS) records extensive artificial deposits and infilled land, including mine and quarry waste, in this area. There is also significant faulting across the site, which can be a preferential pathway for contaminants to migrate into controlled waters. Careful consideration to routeing and siting of pylons will be required to seek to avoid these features and any adverse impacts on the works such as migration of contaminants and instability. Standard environmental controls would be in place during construction which would further reduce impacts. ... Water quality protection measures and drainage systems would be maintained throughout the construction phase." We welcome this and expect to see further details in due course. There are multiple groundwater abstractions along the development corridor. There is no specific mention of groundwater abstractions or private water supplies in the Corridor Preliminary Routeing and Siting Study. Impacts on these receptors should be considered and the applicant needs to ensure that subsurface works do not impact groundwater abstractions.	The constraints will be considered and assessed as part of the ES.

Stakeholder	Summary of Response	Consideration in the Scoping Report
Environment Agency	**Proposed Substation -** Risk of Flooding from Surface Water (RoFSW) model outputs at the proposed new sub-station location. Design of new Chesterfield substation to consider the 1 in 100 year plus higher central and upper climate change allowances for fluvial and pluvial flood risk. Site specific hydraulic modelling may be required at this location depending on the final layout in relation to surrounding watercourses. The proposed new substation footprint does not appear to be at risk from the Calow Brook based on the latest hydraulic modelling (Mott Macdonald, 2019). Substation should be located within Flood Zone 1 – a sequential approach should be applied to infrastructure on site. The finished floor level of sensitive equipment (e.g. the substation) should be 600 mm above the design flood plus climate change flood level.	In the event the Substation is brought into the project's scope, the constraints will be considered and assessed as part of the ES.
Environment Agency	**River Basin Management Plan –** Advise that the applicant completes a WFD assessment to determine any impacts to the WFD status of the waterbodies. The Environment Agency holds data on River Basin Districts and WFD Status on the Catchment Data Explorer, which can be found here: England | Catchment Data Explorer. The proposal is located within the Humber River Basin District, which includes the Don, Dearne and Rother Network and Trent Rivers Trust areas. The following catchments fall within the project area: • Don and Rother Management Catchment | Catchment Data Explorer • Derwent Derbyshire Management Catchment | Catchment Data Explorer • Trent Lower and Erewash Management Catchment | Catchment Data Explorer. We would advise that any biodiversity enhancements around waterbodies compliment the local environmental objectives and programmes of measures within the RBMP.	The Project will be subject to a WFD Assessment, consisting of information from **Chapter 7 Ecology and Biodiversity** and **Chapter 10 Geology and Hydrogeology**, that will set out the measures that will be adopted to ensure no deterioration of water bodies with the Project's zone of influence.
Environment Agency	**Projects within area** - Ongoing or upcoming developments within the cable corridor include, but are not limited to, the following:	Further engagement with the Environment Agency will be

Stakeholder	Summary of Response	Consideration in the Scoping Report
	• Thulston development - west of A6, Elvaston, Derbyshire (NGR: SK4000531954). • Infinity Park south of Derby approximately (NGR: SK3571531066). Ambaston Ring Embankment defence – which may be upgraded as part of the Our City Our River (OCOR) scheme.	undertaken to discuss these major projects.
Derbyshire County Council	**LLFA** - We think watercourses may be affected for construction of temporary or permanent access routes, we are happy to advise regarding watercourses that may be impacted as the scheme progresses, whether by permanent or temporary activities.	Further engagement with the LLFA will be undertaken to discuss watercourses that may be impacted.
The Canal and River Tust	It will be important to consider the Trent and Mersey Canal in refining the intended route, particularly where infrastructure may need to cross.	Further engagement with the Canal and River Trust will be undertaken to discuss the canal and how this may be impacted.

Existing Baseline Conditions

Surface Water Features

9.5.5 The study area crosses through the catchments of numerous watercourses from Chesterfield through the Humber river basin to the City of Derby. Water features within the study area range in scale. Examples of large Environment Agency main rivers that are regionally important include the River Trent, the River Rother, the River Derwent and the River Amber. The southern part of the study area includes the Canal and River Trust's Trent and Mersey Canal. These watercourses support several services, including water supply, receipt and dilution of wastewater discharges, navigation and amenity. Many small watercourses and drainage ditches, that function at the local scale, are located throughout the study area.

9.5.6 Other water features within the study area include numerous ponds and small reservoirs. Examples include Denby Dam Plantation, ponds within Higham Dairy Farm and Waterloo Plantation and lakes to the north of Ingleby. There are also larger reservoirs just outside of the study area (>1.5 km) such as Ogston Reservoir, Butterley Reservoir and Church Wilne Reservoir. Sites designated for their nature conservation interest, where surface waters play a role in sustaining the designated interest features, are also important receptors. Assessment of effects on such sites would be undertaken in collaboration with ecology and groundwater specialists and reported in **Chapter 9: Hydrology and Land Drainage** of the ES.

9.5.7 Water features are illustrated in **Figure 9.1: Study Area and Water Environment Receptors** in **Volume 3** and an overview of the baseline water quality and flood risk is provided in the paragraphs that follow.

Water Quality and Water Interests

9.5.8 The majority of the watercourses in the study area that are monitored under the Water Framework Directive (WFD) currently achieve 'moderate' or 'poor' overall status. The Calow Brook, Locko Brook (Rother from Source to Redleadmill), River Rother (from Redleadmill Brook to Spital Brook) are all designated as having 'poor' overall status. Reasons for failures are due to exceedances for priority hazardous substances. The River Amber, River Derwent, River Trent and Bottle Brook are designated as 'moderate' status. Reasons for not achieving 'good' status are shared by many of the watercourses, and include pollution from rural areas, and from wastewater discharges.

9.5.9 Several of the watercourses in the study area support water interests, supplying licensed abstractions for water supply to agricultural, industrial, and potable uses. Numerous watercourses also receive, dilute and transport permitted wastewater discharges. The locations of these abstractions and discharges are illustrated in **Figure 9.1: Study Area and Water Environment Receptors** in **Volume 3**.

Hydromorphology

9.5.10 Many of the watercourses in the study area, such as the River Amber and River Derwent, have been subject to modifications for the purposes of land drainage and flood defence and have a WFD designation of 'Heavily Modified Water Body' (HMWB). Many of the ordinary watercourses in the study area also serve a land drainage function and have a relatively low hydromorphological diversity.

Flood Risk and Land Drainage

9.5.11 Based on the online Environment Agency Flood Maps, the majority of the study area is at low risk of flooding from rivers and the sea (land in Flood Zone 1) as shown on **Figure 9.2: Flood Zones** in **Volume 3**. Most watercourses that flow through the study area have narrow floodplains, represented by Flood Zones 2 and 3. Watercourses with the most extensive floodplains are the River Derwent and River Trent. Floodplains of the River Rother, River Amber, Alfreton Brook, Hartshay Brook and Cuttle Brook also span the Scoping Boundary.

9.5.12 With reference to the Environment Agency maps, parts of the study area are also at risk of surface water flooding. Areas of particularly high risk (defined as an annual chance of flooding of 3.3% or greater) include South Wingfield, Coxbench and land to the east of Findern.

9.5.13 With reference to the Environment Agency risk of reservoir flood extents, which denote the extent of flooding if large, impounded reservoirs were to fail. Parts of the site are at risk of reservoir flooding.

9.5.14 Groundwater flooding occurs when groundwater rises to the ground surface. This may occur during winter and/or after prolonged or heavy rainstorms. There are generally two forms of groundwater flooding (i) ‘clearwater flooding’ associated with the water table rising to the surface in areas of permeable bedrock such as chalk; and (ii) ‘river-groundwater interaction’ where river leaves interact with permeable superficial deposits within river valleys, flooding areas far from the river without overtopping raised riverbanks.

9.5.15 Any overhead lines will not be at risk of groundwater flooding. If underground cables are required, due to the presence of a Secondary A bedrock aquifer and predominately unproductive superficial deposits, the risk of groundwater is considered to be low. The location of the substation is underlain by Secondary A superficial deposits, in the absence of a principal aquifer, the risk of groundwater is considered to be low.

9.5.16 The land drainage regime within the study area is largely governed by the topography and the permeability of underlying soils and geology. Formal (piped) drainage systems include those serving existing roads and areas of urban development. Agricultural land is also expected to be served by piped and open drainage systems.

Future Baseline Conditions

9.5.17 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 in the ES.

9.5.18 With regard to flood risk and land drainage, future baseline conditions would be forecast, drawing on current best practice guidelines (Ref 9.14) taking into account the likely impacts of climate change on rainfall intensities, and where applicable peak river flows. These future conditions would be referenced to factor climate change resilience into the Project design, for example with regards to managing surface water runoff from any operational infrastructure.

9.5.19 The implementation of future cycles of WFD management plans driving future improvements in the ecological and chemical quality of water bodies would also be considered when assigning value to hydrology and land drainage resources and receptors.

9.5.20 The effects of known future developments that share the same hydrological catchment as the study area would also be considered, in terms of the potential for these developments to impact on the status of water receptors.

9.6 Mitigation Measures Adopted as Part of the Project

9.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

9.6.2 An optioneering study (the CPRSS (Ref 9.27), as described in **Chapter 3: Main Alternatives Considered)** has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced. This includes avoiding international sites designated for nature conservation, including those with a supporting water interest, avoiding as far as practicable reservoirs and areas of higher flood risk, large ponds, minimising disruption to small watercourses, river crossing and ditches. Where river crossings are necessary, the narrowest point will be considered in the first instance to reduce changes to hydromorphology where practicable.

9.6.3 Further embedded design measures will be developed as the Project design evolves.

Good Practice Mitigation Measures

9.6.4 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

9.6.5 In addition, **Appendix 4A: Initial Outline Code of Construction Practice** presents the likely good practice mitigation measures relevant to hydrology and land drainage. These may include but are not limited to:

- Securing environmental permits and consents for all qualifying works e.g. dewatering of excavations, working in, over or under main rivers.
- Fuels, oils and chemicals would be stored responsibly, away from sensitive water receptors. Where practicable, they would 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 would be identified.
- All refuelling, oiling and greasing of construction plant and equipment would take place above drip trays and also away from drains as far as is reasonably practicable.
- Vehicles and plant would not be left unattended during refuelling.

- Appropriate spill kits would be made easily accessible.
- Potentially hazardous materials used during construction would be safely and securely stored including use of secondary containment where appropriate.
- Stored flammable liquids such as diesel would be protected either by double bunded tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume.
- Where practicable, stockpiles of soil would not be stored in close proximity to watercourses.
- Wash down of vehicles and equipment would take place in designated areas within construction compounds. Wash water would be prevented from passing untreated into watercourses.
- Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement from the appropriate authority (except in the case of an emergency).
- An Emergency Action Plan would be developed for the construction phase which would outline procedures to be implemented in case of unplanned events, including but not limited to extreme weather events and pollution incidents.
- Riverbank and in-channel vegetation would be retained where not directly affected by construction works and ecological mitigation and operation of the Project infrastructure. Natural bed substrate would be provided where temporary box culverts are installed to facilitate access and open span crossings of Main Rivers would be installed where crossings for access are required.
- Where construction activities take place in Flood Zone 3, main works construction compounds would be laid out in accordance with the Sequential Approach at the site level and incorporate flood resilience measures where necessary. Storage of construction equipment and materials at active work fronts and in temporary laydown areas would be done in such a way as to avoid forming barriers to floodplain flows. The Project will incorporate appropriate surface water drainage measures into its final design for the haul roads, access tracks, works compounds and laydown areas so that they do not lead to a significant increase in flood risk. Temporary haul routes within Flood Zone 3 and areas of high and medium risk of flooding from surface water will be removed at the end of the construction phase and the ground surface will be reinstated to pre-project levels.
- In accordance with Environment Agency guidance, buffers between pylons and watercourses will be adhered to where practicable.
- The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The contractor(s) will implement a suitable flood risk action plan, which will include appropriate evacuation procedures should a flood occur or be forecast.
- Active private water supplies and land drains would be identified with landowners through the landowner discussions. Appropriate measures would be considered during construction. In the event of a landowner or tenant reporting that installation activities have affected their private water supplies, an initial response would be provided. Where the installation works have affected a private water supply, an alternative water supply would be provided, as appropriate.

Additional Mitigation Measures

9.6.6 Additional mitigation comprise measures over and above any embedded and good practice mitigation measures. Relevant additional mitigation measures for hydrology and land drainage may include:

- The use of suitable sustainable drainage (SuDS) measures to manage construction worksite runoff.
- The use of SuDS to manage the operational surface water drainage.
- Working near and crossing watercourses and the associated designs would be discussed with the asset owners such as the Environment Agency, Lead Local Flood Authorities and Canal and River Trust in advance of the DCO submission. Pre-application advice would be sought to ensure designs meet with the likely conditions of any consents applicable to works on main river such as Flood Risk Activity Permits, SSSI consent and ordinary watercourse consent. Such conditions may include, for example, excavation set back distances from river banks and freeboard (a factor of safety) between water levels and crossing structure soffits.

9.7 Likely Significant Effects

9.7.1 This section sets out the likely significant effects on hydrology and land drainage arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

9.7.2 The review of likely significant effects assumes that the embedded, good practice and additional mitigation measures described in Section 9.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment (IEMA, 2022) (Ref 9.28).

Water Quality and Water Interests

Construction

9.7.3 Good practice mitigation measures within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** would reduce the risk of pollution to hydrology and land drainage receptors during construction by removing the pathway between the source and the receptors for most of the working environment.

9.7.4 The most sensitive sites regarding pollution risk are where temporary crossings would be required for access across watercourses during construction. These works would also follow the good practice measures set out within the Outline CoCP. In addition, any works linked to crossing watercourses for construction access, would be undertaken within the conditions set out within the relevant consents and permits from the relevant authorities. With the implementation of standard mitigation measures, no likely significant effects are anticipated, however, at this early stage when design details for watercourse crossing are unknown, it is proposed to **Scope In** this aspect into the ES.

9.7.5 Given the nature of the Project, during its construction there would be no new large scale consumptive water uses and no effects on the downstream continuity of flow in watercourses. The potential for likely significant effects on existing water interests

(surface water abstractions and discharges) is therefore negligible. No likely significant effects on water interests during construction are anticipated and this aspect is proposed to be **Scoped Out** of the ES.

9.7.6 During excavation of the underground cabling or deep foundations for the substation, there is potential for the groundwater regime to change slightly. This however is not likely to have a significant effect as the construction impacts will be very small and so will be **Scoped Out** of the ES. Consequent significant impacts on buried archaeological remains due to changes in groundwater flow and the associated hydrological regime are therefore unlikely, this is considered further in **Chapter 8: Historic Environment**.

Operation and Maintenance

9.7.7 During the operation of the Project, pollution impact pathways to surface watercourses would be very limited. This is because land would be reinstated following completion of construction works and there would be no operational discharges to surface watercourses, other than surface water drainage from the substation. Physico-chemical elements supporting WFD water body status would therefore be safeguarded.

9.7.8 Maintenance activities would be undertaken in accordance with National Grid's operational management procedures. No likely significant effects on water quality are therefore anticipated, and it is proposed that effects on surface water quality during operation and maintenance are **Scoped Out** of the ES.

9.7.9 As described for construction, the potential for likely significant effects on existing water interests (surface water abstractions and discharges) during operation and maintenance of the Project is negligible. It is proposed to **Scope Out** this aspect from the ES.

Hydromorphology

Construction

9.7.10 During construction of the Project, there would be potential for temporary physical disturbance to the beds and banks of watercourses, as well as wider river bank corridors at crossings for construction access. Some works within the floodplains of watercourses are also unlikely to be wholly avoided. Impacts would be relatively short-term in duration and impacts could be reduced through design. Whilst likely significant effects are not anticipated, at this early stage when design details for watercourse crossing and the potential extent of works within floodplains are unknown, it is proposed to **Scope In** this aspect into the ES.

Operation and Maintenance

9.7.11 On completion of the construction of the Project it is assumed that temporary access crossings of watercourses would be removed, and watercourses would be reinstated, including reinstatement of the river corridor vegetation and natural bed. Once the watercourses are reinstated, there would be no likely significant effects on hydromorphology during operation and therefore it is proposed to be **Scoped Out** of the ES.

Construction

9.7.12 As described in Section 9.5 whilst most of the study area is at low risk of flooding from rivers and the sea, the Project would cross watercourses with relatively extensive floodplains including the River Derwent, River Trent, River Rother, River Amber, Alfreton Brook, Hartshay Brook and Cuttle Brook. During construction there is the potential for the Project to increase flood risk through the creation of soil stockpiles and temporary works (e.g., haul roads, working areas, compounds and temporary storage of construction materials), that could result in the temporary loss of floodplain storage or impede flood flows. As described in Section 9.6, where construction activities take place in Flood Zone 3, main works construction compounds would be laid out in accordance with the Sequential Approach and incorporate flood resilience measures where necessary. Storage of construction equipment and materials at active work fronts and in temporary laydown areas would be done in such a way as to avoid forming barriers to floodplain flows. As likely significant effects cannot be ruled out at this stage, flood risk from rivers and the sea during the construction phase is therefore proposed to be **Scoped In** to the ES.

9.7.13 During construction there is also the potential for impacts on current land drainage systems and for there to be impacts on current rainfall runoff regimes. Flood risk from surface water during the construction phase is therefore proposed to be **Scoped In** to the ES.

9.7.14 With regard to other sources of flooding, including tidal, groundwater, reservoirs, sewers and other artificial sources, these would be reviewed as part of a Flood Risk Screening Assessment appended to PEIR, with a view to screening out any sources posing a low risk of flooding to the Project.

Operation and Maintenance

9.7.15 During operation most land required for construction would be returned to its pre-construction land use and so permanent impacts on watercourses and their floodplains are likely to be limited. However, there is potential for permanent above ground infrastructure in Flood Zone 3, as well as potential for operational runoff from impermeable surfaces of above ground infrastructure. There is also potential for vehicular access and temporary use of maintenance plant or equipment in proximity to watercourses within floodplains during maintenance, so this aspect is proposed to be **Scoped In** to the ES at this early stage, subject to further detailed assessment.

9.7.16 Given the size of the Project and the requirements set out within the NPS EN-1, a Flood Risk Assessment (FRA) would be produced that would assess flood risk to, and arising from, the Project over its operational lifetime, setting out any flood risk management and mitigation measures necessary to ensure that the Project is safe from flooding over its lifetime and does not increase flood risk from any source. The FRA will be submitted alongside the ES as part of the DCO submission.

9.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

9.8.1 In addition to the data sources listed in Section 9.5, the assessment within the ES will be supported by the following additional information and surveys:

- Field notes and photographs collected, for example during ecology surveys, to characterise attributes such as the hydromorphology of watercourses to be crossed, in addition to the high-resolution aerial imagery
- Flood data from Environment Agency flood models where this proves to be suitably robust following review.
- Site specific flood modelling as required.
- Drainage and flood data from Local Authority Surface Water Management Plans and Strategic Flood Risk Assessments.
- Further water quality data from the Environment Agency archive.
- Data defining surface water catchment areas and hydrological properties (e.g. rainfall, slopes, and soil permeability) from the Flood Estimation Handbook webservice.

Proposed Assessment Method

9.8.2 This section sets out the proposed methodology for the hydrology and land drainage assessment of the ES. This is based on guidance set out in the DMRB LA 113: Road Drainage and the Water Environment (Ref 9.13).

Sensitivity

9.8.3 Hydrology and land drainage receptors have been identified within the study area and the attributes and the services that these water bodies provide have been characterised using the baseline datasets collected to date. This information, supplemented by further desk study and review, would be used to assign to receptors one of the value (sensitivity) categories defined in **Table 9.3**. These values are based on Table 3.70 of LA 113 (Ref 9.13).

Table 9.3 - Criteria for Determining Sensitivity

Sensitivity	Description
Very High	Nationally significant attribute of high importance. Examples: Watercourse having a WFD classification shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0 m^3 /s[1]. Site protected under European legislation whose designated interest is dependent on the hydrological/surface water regime e.g. (SACs, SPA, Ramsar site) Land uses defined as essential infrastructure or highly vulnerable development under the NPPF, for example transport routes, electricity

[1] Q95 - Refers to the flow in cubic metres per second which is equalled or exceeded for 95% of the time in a typical year, representative of a summer, low flow, condition.

Sensitivity	Description
	generating power stations and grid and primary substations, emergency services stations and basement dwellings. River supporting a regionally important abstraction for potable water supply.
High	Regionally significant attribute of high importance. Examples: Watercourse having a WFD classification shown in a RBMP and Q95 <1.0 m^3s. Site protected under UK legislation whose designated interest is dependent on the hydrological/surface water regime e.g. SSSIs, NNRs, LWS, salmonid waters. Land uses defined as 'more vulnerable' under the NPPF, e.g. residential dwellings and educational establishments. River supporting a locally important abstraction for potable water supply.
Medium	Locally significant, of moderate quality and rarity. Examples: Watercourses not having a WFD classification shown in a RBMP and having a Q95 >0.001 m3 /s. Land uses defined as 'less vulnerable' under the NPPF e.g., buildings used for shops, offices and general industry. River supporting abstraction for non-potable water supply at the local scale.
Low	Lower quality. Examples: Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001 m3 /s. Land uses defined as water compatible e.g., docks, marinas and water transmission infrastructure.

Magnitude

9.8.4 The criteria for assigning impact magnitude, summarised in **Table 9.4** (drawn from Table 3.71 of DMRB, LA 113), consider the scale/ extent of the predicted change and the nature and duration of the impact. Whilst examples of each category of impact magnitude are provided in the guidance, professional judgement would be applied in assigning a magnitude of impact.

Table 9.4 - Criteria for Determining Magnitude of Impact

Magnitude of impact	Description
Large	Loss or extensive change to a fishery. Loss of regionally important public water supply. Reduction in water body WFD classification. Increase in peak flood level (>100 mm).

Magnitude of impact	Description
Moderate	Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/ industrial/agricultural supplies. Contribution to reduction in water body WFD classification. Increase in peak flood level (>50 mm).
Small	Potential for a low risk of pollution. Increase in peak flood level (>10 mm).
Negligible	No measurable change to baseline surface water quality or WFD water body status. Negligible change to peak flood level (≤ +/- 10 mm).

Significance

9.8.5 Significance will be derived using the matrix set out in **Chapter 5: EIA Approach and Methodology**. This may be informed by professional judgement which, where used, would be explained to give the rationale behind the values assigned. Significant effects in the context of the EIA Regulations 2017 would be effects of moderate or greater significance.

9.8.6 Overall significance would also be concluded for each aspect of hydrology and land drainage, taking into consideration the potential for the Project to affect more than one attribute of a particular water body.

Assumptions and Limitations

9.8.7 The detailed construction methodology for the Project has yet to be defined. This would be subject to further development during the process of iterative design and environmental assessment of the Project. The methodology of construction could change the types and/or severity of the potential effects assessed herein.

9.8.8 Scoping has been prepared based on the environmental baseline available at the time of writing, and the extent of the Scoping Boundary. A full programme of data gathering, and surveys should be undertaken to fully inform the baseline of the assessment to be outlined within the ES. The assessment of effects with regards to fluvial flooding would be informed by data from Environment Agency flood models where this is suitable potentially supplemented by site specific modelling.

9.9 Proposed Scope of the ES

9.9.1 The matters that are proposed to be scoped in and out of further assessment for hydrology and land drainage are outlined in **Table 9.5**.

Table 9.5 - Proposed Scope of the ES

Matter	Phase	Scoped in / out	Justification
Effects on surface water quality	Construction	**Scoped In**	Project wide but particularly at temporary watercourse crossings by haul routes and local to areas of topsoil stripping and excavations including for the laying of cable sections.
	Operation (including maintenance)	**Scoped Out**	No likely significant effects as no operational discharges would be generated and surface water drainage from operational infrastructure would be managed using suitable SuDS.
Existing water interests (abstractions and discharges)	Construction	**Scoped Out**	No likely significant effects on flow availability in watercourses supporting existing water interests.
	Operation (including maintenance)	**Scoped Out**	
Hydromorphology of watercourses	Construction	**Scoped In**	Project wide but particularly at temporary watercourse crossings by haul routes or through methods of laying the cables and where there are temporary works within floodplains.
	Operation (including maintenance)	**Scoped Out**	No likely significant effects as once the Project is installed and land temporarily affected is re-instated, there would be no disturbance to the beds, banks, flow regimes or riparian corridors of watercourses.
Flood risk from rivers	Construction	**Scoped In**	There are working areas in fluvial Flood Zone 3. Works have the potential to temporarily disrupt river flow and floodplain flow regimes.
	Operation (including maintenance)	**Scoped In**	Most land required for construction would be returned to its pre-construction land use and so impacts on rivers and their floodplains across the Project are likely to be limited. However, there is potential for permanent above ground infrastructure in Flood Zone 3, so this aspect is

Matter	Phase	Scoped in / out	Justification
			proposed to be scoped in at this early stage, subject to further detailed assessment.
Flood risk from surface water and effects on the land drainage regime	Construction	**Scoped In**	The Project has potential to cause temporary and permanent changes to impermeable land cover and potential for temporary disruption to existing land drainage routes during construction.
	Operation (including maintenance)	**Scoped In**	During operation most land required for construction would be returned to its pre-construction land use and so permanent impacts on watercourses and their floodplains are likely to be limited. However, there is potential for operational runoff from impermeable surfaces of above ground infrastructure.
Flood risk from groundwater	Construction	**Scoped In**	Piling for pylons may be required and so this aspect is proposed to be scoped in at this early stage. Due to the expected depth of the cable route and the minimal displacement of soils it is not expected that flood risk will increase from the cable route. However, this matter has been scoped in for completeness with the pylons.
	Operation (including maintenance)	**Scoped In**	
Flood risk from other sources (the sea, sewers, artificial waterbodies)	Construction	**Scoped Out**	Given the nature of the Project (overhead line and buried cable), it is of low vulnerability to flooding from other sources and has limited potential to impact on flood risk from these sources.
	Operation (including maintenance)	**Scoped Out**	

9.10 References

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10. Geology and Hydrogeology

nationalgrid

Contents

10. Geology and Hydrogeology

10.1 Introduction

10.1.1 This chapter presents how the geology and hydrogeology assessment will consider the potentially significant effects on geology and hydrogeology receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

10.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

10.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

10.2 Approach to Scoping

10.2.1 The approach to scoping has been drawn from previous experience of similar projects. Determining the scope of the Geology and Hydrogeology assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Outlining environmental measures.
- Predicting likely significant effects.
- Highlighting further data to be gathered.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the ES.

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

- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 8: Historic Environment.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 11: Agriculture and Soils.**
- **Chapter 13: Air Quality.**
- **Chapter 16: Health & Wellbeing.**

10.2.3 This chapter is supported by the following appendix in **Volume 2** figures in **Volume 3**:

- **Appendix 10A: Chesterfield to Willington East, High Level Geotechnical Desk Study report**
- **Figure 10.1: Bedrock Geology.**
- **Figure 10.2: Superficial Geology.**

- **Figure 10.3: Mineral Resources.**
- **Figure 10.4: Coal Mining.**
- **Figure 10.5: Groundwater Vulnerability.**
- **Figure 10.6: Potential Contaminative Land Uses.**
- **Figure 10.7: Groundwater Dependant Terrestrial Ecosystems / SSSIs.**

10.3 Key Regulatory and Planning Policy Context

Key Legislation

10.3.1 A summary of the key legislation considered in the scope of effects on geology and hydrogeology is outlined below:

- Environmental Protection Act (1990) (Ref 10.1) and associated statutory. guidance on contaminated land (Contaminated Land Statutory Guidance, 2012) (Ref 10.2).
- The Contaminated Land (England) (amendment) Regulations (2012) (Ref 10.3).
- Environmental Damage (Prevention and Remediation) Regulations (2015) (Ref 10.4).
- Environmental Permitting (England and Wales) Regulations (2016) (Ref 10.5).
- Landfill Directive 1999 (Ref 10.6).
- Water Resources Act (1991) (Ref 10.7).
- The Water Environment (Water Framework Directive) Regulations (2017) (Ref 10.8).
- The Water Supply (Water Quality) Regulations (2016) (Ref 10.9).

National Planning Policy

National Policy Statements

10.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** of this Scoping Report sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy EN-1 and NPS for Electricity Networks Infrastructure EN-5. **Table 10.1** sets out the requirements of both NPSs relevant to geology and hydrogeology and how these have been considered within this chapter.

Table 10.1 - National Planning Policy Relevant to Geology and Hydrogeology

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) (2024)		
Paragraph 5.4.17 (part)	'Where the development is subject to EIA, the applicant should ensure that the ES clearly sets out any effects on internationally, nationally, and locally designated sites of ecological or geological conservation importance…'	Sites designated for their geological conservation importance have been identified within Section 10.5 of this chapter and any potential for adverse effects on these features will be assessed within the ES.
Paragraph 5.4.19	'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'	Sites designated for their geological conservation importance have been identified within Section 10.5 of this chapter and any potential for adverse effects on these features will be assessed within the ES.
Paragraph 5.4.38	'To further minimise any adverse impacts on geodiversity, where appropriate applicants are encouraged to produce and implement a Geodiversity Management Strategy to preserve and enhance access to geological interest features, as part of relevant development proposals.'	Sites designated for their geological conservation importance have been identified within Section 10.5 of this chapter and any potential for adverse effects on these features will be assessed within the ES.
Paragraph 5.4.42	'As a general principle, and subject to the specific policies below, development should, in line with the mitigation hierarchy, aim to avoid significant harm to biodiversity and geological conservation interests, including through consideration of reasonable alternatives (as set out in Section 4.3 above). Where significant harm cannot be avoided, impacts should be mitigated and as a last resort, appropriate compensation measures should be sought.'	Sites designated for their geological conservation importance have been identified within Section 10.5 of this chapter and any potential for adverse effects on these features will be assessed within the ES.
Paragraph 5.11.8	'The ES (see Section 4.3) should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with	Potential sources of contamination have been identified within the Section 10.5 of this chapter and the potential

Policy Reference	Policy Context	How it will be considered
	the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan. The assessment should be proportionate to the scale of the preferred scheme and its likely impacts on such receptors. For developments on previously developed land, the applicant should ensure that they have considered the risk posed by land contamination and how it is proposed to address this.'	effects on these features will be considered and assessed with the ES.
Paragraph 5.11.17	'Applicants should ensure that a site is suitable for its proposed use, taking account of ground conditions and any risks arising from land instability and contamination.'	A ground investigation will be carried out pre-construction to inform construction design and suitability of ground conditions / land stability risks. Potential sources of contamination have been identified within Section 10.5 of this chapter and the potential effects of these features will be considered and assessed with the ES.
Paragraph 5.11.18	'For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination, and where contamination is present, applicants should consider opportunities for remediation where possible. It is important to do this as early as possible as part of engagement with the relevant bodies before the official pre-application stage.'	Potential sources of contamination have been identified within Section 10.5 of this chapter and the potential effects of these features will be considered and assessed with the ES
Paragraph 5.11.19	'Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.'	Mineral resources have been identified in Section 10.5 of this chapter. The potential effect will be considered and assessed within the ES.
Paragraph 5.16.7 (part)	'The ES should in particular describe…	Groundwater Source Protection Zones (SPZ) crossed by the study area have been identified within Section 10.5 of this

Policy Reference	Policy Context	How it will be considered
	any impacts of the proposed project on water bodies …. source protection zones (SPZs) around potable groundwater abstractions.'	chapter and the potential effects identified will be assessed within the ES.
National Policy Statement for Electricity Networks (EN-5) (2024)		
Paragraph 2.2.10 (part)	'*… applicants must take into account Schedule 9 to the Electricity Act 1989, which places a duty on all transmission and distribution licence holders, in formulating proposals for new electricity networks infrastructure, to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and …do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*."'	Geological receptors have been identified in Section 10.5 of this chapter. Potential effects on these features will be assessed in the ES.
Paragraph 2.9.25 (part)	'*In such cases the Secretary of State should only grant development consent for underground or subsea sections of a proposed line over an overhead alternative if they are satisfied that the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environmental impacts that it presents, the mitigation hierarchy has been followed, and that any technical obstacles associated with it are surmountable. In this context it should consider:* …. • The potentially very disruptive effects of undergrounding on local communities, habitats, archaeological and heritage assets, marine environments, soil (including peat soils), hydrology,	Geological receptors have been identified in Section 10.5 of this chapter. Potential effects on these features will be assessed in the ES.

Policy Reference	Policy Context	How it will be considered
	geology, and, for a substantial time after construction, landscape and visual amenity. (Undergrounding an overhead line will mean digging a trench along the length of the route, and so such works will often be disruptive – albeit temporarily – to the receptors listed above than would an overhead line of equivalent rating);'	

Other National Policy

10.3.3 A summary of other relevant national policy considered in the scope of effects on geology and hydrogeology includes:

- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023).

Regional and Local Planning Policy

10.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** of this Scoping Report sets out relevant regional and local policy considered by this Project.

10.3.5 In addition to those identified in **Chapter 2: Legislation, Regulatory and Planning Policy Context,** the following policies have been identified for geology and hydrogeology.

- Derbyshire and Derby Minerals Local Plan (amended 2002), adopted in 2000 (Ref 10.10).

Guidance

10.3.6 Relevant guidance, specific to geology and hydrogeology, that has informed this Scoping Report and will inform the assessment within the ES, comprises:

- Land Contamination: Risk Management (LCRM) (Ref 10.11).
- Groundwater Protection Guides, (Ref 10.12).
- BS10175:2001+A2:2017 Investigation of Potentially Contaminated Sites. Code of Practice (Ref 10.13).
- BS5930:2015+A1:2020 Code of Practice for Ground Investigations (Ref 10.14).
- BS EN 1997-1:2004+A1:2013 (Eurocode 7). Geotechnical Design – General Rules (Ref 10.15).
- Chartered Industry Research and Information (CIRIA) 552 Contaminated Land Risk Assessment, A guide to good practice (Ref 10.16).
- CIRIA C811 Environmental good practice on site guide (fifth edition) (Ref 10.17).
- CIRIA C532 Control of Water Pollution from Construction Sites (Ref 10.18).
- Design Manual for Roads and Bridges (DMRB) LA 109 Geology and Soils (Ref 10.19).
- DMRB LA 113 Road drainage and the water environment (Ref 10.20).
- Institute of Environmental Management and Assessment (IEMA) guide to: Materials and Waste in Environmental Impact Assessment. Guidance for a proportionate approach (Ref 10.21).
- The Environment Agency Guiding Principles for Managing and Reducing Land Contamination (GPLC2) (Ref 10.22).
- Environment Agency Groundwater Protection (2018) (Environment Agency, 2018).

10.4 Study Area

10.4.1 The study area for geology comprises the Scoping Boundary plus a 250 m buffer and is presented on **Figure 10.1: Bedrock Geology** in **Volume 3**.

10.4.2 With regards to ground conditions and contamination, the study area is defined to reflect the surrounding geological, hydrogeological and environmental (e.g. landfill sites) features and the distance over which significant effects can reasonably be considered to have the potential to occur.

10.4.3 Given the scale and nature of the Project, this is considered a robust yet proportionate approach. This additional buffer is based on professional judgement, knowledge of similar projects and the DMRB LA109: Geology and Soil (Ref 10.19). In addition, although not directly relevant for this project type, the proposed study area accords with the study area recommended in Guidance for the Safe Development of Housing on Land Affected by Contamination (Ref 10.23).

10.4.4 Established industry guidance states that off-site features within an area up to 250 m from the site boundary should typically be considered within the hazard identification stage. Features at greater distance should only be described if they are particularly large or have the potential to affect the land quality at the site or the wider environmental quality. A review of such features will be undertaken during the preparation of the ES.

10.4.5 The hydrogeology study area comprises the Scoping Boundary plus a 500 m buffer. This is considered to be a proportionate and suitable approach for the assessment. Hydrogeological receptors further from the Scoping Boundary are more susceptible to effects from the Project due to the mobile nature of groundwater and corresponding potential for the Project to affect receptors at a greater distance. This is presented on **Figure 10.5: Groundwater Vulnerability** in **Volume 3**.

10.4.6 As the iterative design process continues, the Scoping Boundary will be refined to comprise the proposed Order Limits plus a 250 m buffer for geology and 500 m buffer for hydrogeology within the ES.

10.5 Baseline Conditions (inc. Future Baseline)

Data Collection

10.5.1 The baseline assessment has been informed by a desk study which has drawn on the following information sources:

- Groundsure – Interactive map viewer (Ref 10.24).
- British Geological Survey (BGS) – GeoIndex Interactive Map viewer (Ref 10.25).
- The Coal Authority – Interactive Maps (Ref 10.26).
- Department for Environment, Food and Rural Affairs (Defra) – (MAGIC) Interactive Map (Ref 10.27).
- Derbyshire County Council – Local Plan and Policies Map (Ref 10.28).
- BGS – Mineral Resources map (Ref 10.29).
- BGS – BGS lexicon of named rock units (Ref 10.30).
- Environment Agency – Groundwater protection and vulnerability sources (Ref 10.31).

- Google Earth (Ref 10.32).
- Chesterfield to Willington East, High Level Geotechnical Desk Study report (100115272-SD-00-XX-RP-GE-0018) (Mott McDonald, 2024) (**Appendix 10A: Chesterfield to Willington East, High Level Geotechnical Desk Study report** in **Volume 2**) (Ref 10.33)
- Natural England online information (Ref 10.34).
- Zetica online UXO risk mapping (Ref 10.35).

Engagement with Stakeholders

10.5.2 The EIA will be informed by consultation and engagement with stakeholders, including the Environment Agency, the Coal Authority, Local Authorities and Derbyshire County Council. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

10.5.3 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024. No pre-scoping engagement has been undertaken for geology and hydrogeology, which is considered to be an appropriate approach and normal practice for this discipline.

10.5.4 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 10.2**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 10.2 - Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Environment Agency	Cinderhill Tar Pits is within the site boundary. This is designated as a special site under section 78C of Part 2A of the Environmental Protection Act 1990. Other historical acid tar pits are located on the west side of the A38 in this area. These should be considered in future reports and routeing.	Potential interactions and impacts on the Cinderhill Tar Pits and other historical acid tar pits will be considered, including in terms of construction activities.
Environment Agency	Within the proposed corridor, there are several historical landfill sites, and one active/authorised landfill, which will need to be considered. Some of these landfill sites are below the water table, and any disturbance could open a pathway to controlled waters.	Potential interactions and impacts on these features will be considered, including in terms of construction activities.
Environment Agency	The north of the site is in a Coal Mining Reporting Area. Care will be needed when siting of masts, where shallow (coal) mine workings are present. The British Geological Survey (BGS) records extensive artificial deposits and infilled land, including mine and quarry waste, in this area. There is also significant faulting across the site, which can be a preferential pathway for contaminants to migrate into controlled waters.	Potential interactions and impacts on these features will be considered as part of the engineering design development, including in terms of construction activities and methods.
The Coal Authority	There are recorded coal mining features present at surface and shallow depth identified within the emerging preferred corridor present at surface and shallow depth which include but are not limited to; mine entries, coal workings, former surface mine highwalls, mine gas sites and reported surface hazards. These features may pose a potential risk to surface stability, public safety and the environment.	Potential interactions with these features will be considered as part of the engineering design development, including in terms of construction activities and methods.
The Coal Authority	A summary commentary has been provided of the predominant coal mining legacy recorded within the emerging preferred corridor.	A summary of the coal mining features is provided in the baseline. The Project will continue to engage with the Coal Authority throughout the development of the design.
The Coal Authority	Regarding site specific requirements for the proposed infrastructure to be undergrounded, considering the recorded mining legacy for a	Provision of a Consultant's Mining Report will be sought for the refinement of design and to assist

Organisation and date	Summary of response	Consideration in the Scoping Report
	significant length of the emerging preferred corridor such requirements will bring the infrastructure into direct contact with potential ground instability associated with coal mining features. Areas that may be identified as conceivably requiring undergrounding so that the influence of mining legacy might be identified at an early a stage as possible due to the specific design challenges might arise. These could include, but not be limited to, mitigation or elimination of differential settlement, inundation settlement resulting from changes in groundwater hydrology and mine gas which could create hazardous environments either during construction or over the future operational timescales.	with preparation of Coal Mining Risk Assessments where applicable prior to non-intrusive and intrusive survey access.
The Coal Authority	Outside of former surface mining excavation areas where natural ground is expected to be encountered any early excavation into that natural ground at the locations of proposed pylons would be encouraged including any known features that may conceivably affect those locations.	The Coal Authority's adopted policy on mine entries is valid. The Project will continue to engage with the Coal Authority throughout the development of the design and will seek to avoid known mine entries and associated zones of influence where possible.
The Coal Authority	The occurrence of shallow mine workings where it is unavoidable, can generally be mitigated by remedial design solutions like drilling and pressure grouting, undertaken in accordance with industry guide CIRIA 758D. Investigations need to be comprehensive, site specific and determine the risk from former coal mining to sufficient depth.	Industry guide CIRIA 758D would be adhered to in relevant circumstances.
The Coal Authority	Construction works and associated temporary works need due consideration in regard to recorded coal mining features present.	Potential interactions with these features will be considered, including in terms of construction activities.
The Coal Authority	The adequacy, specification for remediation and associated recommendations is something that the Coal Authority can comment on through the pre-application advice service.	The Project will continue to engage with the Coal Authority throughout the development of the design and impacts on these features will be considered as part of the engineering design development, including in terms of construction activities and methods.

Existing Baseline Conditions

10.5.5 To assist in the description of the existing baseline, the study area for geology and hydrogeology have been divided into the following sections running from the north of the Project to the south for this report:

- Section 1: Chesterfield Substation to Stretton.
- Section 2: Stretton to Ripley.
- Section 3: Ripley to Morley.
- Section 4: Morley to Ockbrook.
- Section 5: Ockbrook to Aston-on-Trent.
- Section 6: Aston-on-Trent to Willington Substation.

10.5.6 The baseline described is supported by relevant figures in **Volume 3** to provide spatial context to the features identified within the study area.

Published Geology and Hydrogeology

10.5.7 **Table 10.3** summarises the predominant geological units (superficial and bedrock) and the corresponding aquifer designation for each section across the study area. The published geology is taken from BGS online viewer, and the aquifer designation has been identified from available information on the Defra MAGIC viewer. The geology is presented on **Figure 10.1: Bedrock Geology** and **Figure 10.2: Superficial Geology** in **Volume 3**.

Table 10.3 - Geological Units and Aquifers within Geology and Hydrogeology Study Area

Section	Geology	Aquifer Designation*
Section 1: Chesterfield Substation to Stretton	Superficial Deposits (where present)	
	Alluvium (clay, silt, sand and gravel)	Secondary A
	Bedrock Geology	
	Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
	Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
Section 2: Stretton to Ripley	Superficial Deposits (where present)	
	Alluvium (clay, silt, sand & gravel)	Secondary A
	Glacial Till (diamicton)	Secondary (undifferentiated)
	Bedrock Geology	
	Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A

Section	Geology	Aquifer Designation*
	Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
Section 3: Ripley to Morley	Superficial Deposits (where present)	
	Alluvium (clay, silt, sand & gravel)	Secondary A
	Glacial Till (diamicton)	Secondary (undifferentiated)
	Head deposits (clay, silt, sand & gravel)	Secondary A
	Bedrock Geology	
	Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
	Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
	Rossendale Formation (mudstone & siltstone)	Secondary A
	Rough Rock (sandstone)	Secondary A
Section 4: Morley to Ockbrook	Superficial Deposits (where present)	
	Alluvium (clay, silt, sand & gravel)	Secondary A
	Glacial Till (diamicton)	Secondary (undifferentiated)
	Glaciofluvial (sand and gravel)	Secondary A
	Bedrock Geology	
	Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone)	Secondary A
	Chatsworth Grit (sandstone)	Secondary A
	Rough Rock (sandstone)	Secondary A
	Rossendale Formation (mudstone & siltstone)	Secondary A
	Marsden Formation (mudstone & siltstone)	Secondary A
	Moira Formation (breccia)	Principal
	Tarporley Siltstone Formation (mudstone & siltstone)	Secondary B
	Chester Formation (sandstone, gravelly)	Principal
	Superficial Deposits (where present)	
	Alluvium (clay, silt sand & gravel)	Secondary A

Section	Geology	Aquifer Designation*
Section 5: Ockbrook to Aston-on-Trent	Glacial Till (diamicton)	Secondary (undifferentiated)
	Head (clay, silt, sand & gravel)	Secondary A
	Borrowwash Sand & Gravel	Secondary A
	Allenton Terrace Déposits (sand & gravel)	Secondary A
	Hemington Member (silt & gravel)	Secondary A
	Thrussington Member (diamicton)	Secondary (undifferentiated)
	Holme Pierrepont Sand & Gravel Member	Secondary A
	Bedrock Geology	
	Tarporley Siltstone Formation (mudstone & siltstone)	Secondary B
	Gunthorpe Member (mudstone / siltstone / sandstone)	Secondary B
	Cotgrave Sandstone Member	Secondary A
	Edwalton Member (mudstone)	Secondary B
	Branscombe Mudstone Formation	Secondary B
Section 6: Aston-on-Trent to Willington Substation	Superficial Deposits (where present)	
	Alluvium (clay, silt sand & gravel)	Secondary A
	Glacial Till (diamicton)	Secondary (undifferentiated)
	Oadby Member (diamicton)	Secondary (undifferentiated)
	Glaciolacustrine Deposits (clay, silt and sand)	Secondary A
	Glaciofluvial Deposits (sand & gravel)	Secondary A
	Thrussington Member (diamicton)	Secondary (undifferentiated)
	Egginton Common Sand & Gravel Member	Secondary A
	Beeston Sand & Gravel Member	Secondary A
	Findern Clay (clay, silt and sand)	Secondary B
	Head (clay, silt, sand & gravel)	Secondary A
	Holme Pierrepont Sand & Gravel Member	Secondary A

Section	Geology	Aquifer Designation*
	Hemington Member (silt & gravel)	Secondary A
	Etwall Sand & Gravel Member,	Secondary A
	Bedrock Geology	
	Branscombe Mudstone Formation	Secondary B
	Edwalton Member (mudstone)	Secondary B
	Gunthorpe Member (mudstone)	Secondary B
	Helsby Sandstone Formation	Principal
	Tarporley Siltstone Formation (mudstone & siltstone)	Secondary B
	Arden Sandstone Formation	Secondary A
	Cotgrave Sandstone Member	Secondary A
	Bowland Shale Formation (mudstone)	Secondary (Undifferentiated)
	Moira Formation (breccia)	Principal
	Chester Formation (sandstone and interbedded conglomerate)	Principal

*Aquifer Designations defined by the Environment Agency (Environment Agency, 2017) as follows:

1) Principal Aquifers : rock layers that "provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands".

2) Secondary A Aquifers: "permeable layers that can support local water supplies, and may form an important source of base flow to rivers".

3) Secondary B Aquifers : as "mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers".

4) The Secondary Undifferentiated : "where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value"

Minerals

10.5.8 Mineral safeguarding is the process of ensuring that non-minerals development does not needlessly prevent the future extraction of mineral resources of local and national importance. Mineral Planning Authorities designate strategic sites as preferred and/or reserve mineral sites for extraction within their spatial development plans, identifying sites where the principle of extraction has been accepted and the need for the release of minerals is proven.

10.5.9 Mineral Safeguarding Areas (MSAs) identify where resources are located to make relevant parties aware of the presence of the resources and ensure that their presence is considered when determining the acceptability of planning applications, so that these resources are not needlessly sterilised. The relevant Mineral Planning Authority is Derbyshire who have established the Derbyshire and Derby Minerals

Local Plan (Ref 10.10). The mineral local plan is in the process of being updated with a drafted plan available for review (known as the pre-submission draft policies map plan (Ref 10.28).

10.5.10 It should be noted that the study area is within an oil and gas licensed area (associated with some of the coal measures) as seen in the Derbyshire and Derby Minerals Local Plan. It is unclear exactly which sections of the study area it falls in due to Derbyshire and Derby's poor map quality (titled "Petroleum Exploration and Development Licence Areas"). However, roughly, it appears that Section 1, the northern part of Section 2, the southern part of Section 4, and Section 5 fall within the oil and gas licensed areas. Further consultation with the mineral planning authority will be undertaken to confirm the extent within the study area. **Figure 10.3: Mineral Resources** in **Volume 3** shows the mineral resources located around the study area.

10.5.11 A review of the Derby and Derbyshire Minerals Local Plan, Derbyshire and Derby Minerals Local Plan pre-submission draft policies map plan and the BGS Mineral Resources map (Ref 10.29), has been undertaken to assess the following mineral resources. Development affecting areas of coal resources are covered by a separate system of consultation operated by the Coal Authority.

Section 1: Chesterfield Substation to Stretton

10.5.12 A review of the available data indicates that Section 1 of the study area is located within a coal measures safeguarded resource area, including areas of shallow coal and worked areas of opencast coal. See **Figure 10.3: Mineral Resources** in **Volume 3**.

10.5.13 A review of the Derby and Derbyshire Minerals Local Plans indicates that there is one area of a proposed opencast constraint, within the area named Hardwick Hall.

Section 2: Stretton to Ripley

10.5.14 A review of the available data indicates that Section 2 of the study area is located within a coal measures safeguarded resource area, including areas of shallow coal and worked areas of opencast coal (see **Figure 10.3: Mineral Resources** in **Volume 3**).

Section 3: Ripley to Morley

10.5.15 A review of the available data indicates that Section 3 of the study area is located within a coal measures safeguarded resource area, including areas of shallow coal and worked areas of opencast coal. Part of the area is also within a sandstone/gritstone safeguarded area (see **Figure 10.3: Mineral Resources** in **Volume 3**).

10.5.16 A review of the Derby and Derbyshire Minerals Local Plans indicates that there is one area identified as a proposed opencast constraint, within an area named Horsley.

Section 4: Morley to Ockbrook

10.5.17 A review of the available data indicates that Section 4 of the study area is located within a coal measures safeguarded resource area, including areas of shallow coal and worked areas of opencast coal (see **Figure 10.3: Mineral Resources** in **Volume 3**).

10.5.18 There are no areas designated under the minerals local plan in Section 4.

Section 5: Ockbrook to Aston-on-Trent

10.5.19 A review of the available data indicates that Section 5 of the study area is partially located within Sand and Gravel - River Gravel safeguarded resources area (Ref 10.29).

10.5.20 A review of the Derbyshire and Derby Minerals Local Plan pre-submission draft policies map plan indicates that there is an area of existing permitted area and one allocated area within Section 5, named Elvaston (see **Figure 10.3: Mineral Resources** in **Volume 3**).

Section 6: Aston-on-Trent to Willington Substation

10.5.21 A review of the available data indicates that the majority of Section 6 of the study area is located within Sand and Gravel - River Gravel and sandstone/gritstone safeguarded resources area (see **Figure 10.3: Mineral Resources** in **Volume 3**).

10.5.22 A review of the Derbyshire and Derby Minerals Local Plan pre-submission draft policies map plan indicates that there are two areas of existing permitted areas and two allocated areas within Section 6, named Swarkestone South and North.

Coal Mining

10.5.23 The Coal Authority interactive map viewer (Ref 10.26) indicates that the majority of Sections 1 to 4 are within a high development risk area with numerous mine entries (mine shafts and adits) indicated throughout the study area.

10.5.24 As seen in **Figure 10.4: Coal Mining** in **Volume 3**, the mine shafts and adits appear to be particularly prevalent within Section 1, Section 2 and Section 3, with less noted within Section 4. A Consultant's Mining Report will be obtained from the Coal Authority to gain further understanding of the mining legacy within these sections. Further details regarding mining can be found in the High Level Geotechnical Desk Study report (Ref 10.33) presented in **Appendix 10A: Chesterfield to Willington East, High Level Geotechnical Desk Study report** in **Volume 2**.

10.5.25 Section 5 and Section 6 are not within a high development risk area and no mine shafts, adits have been identified in these areas.

Geo-Conservation

10.5.26 There are no UNESCO Global Geoparks located within the study area (Ref 10.27).

10.5.27 There are no geological Sites of Special Scientific Interest (SSSI) located within the study area (Ref 10.27).

10.5.28 No regional or local sites of geological importance were identified within the publicly available desk study data. Consultation with local geological and geo-conservation interest groups will be carried out to identify sites of regional and local importance to inform the developing Project design and supporting impact assessments presented in the ES.

Groundwater Vulnerability

10.5.29 The Environment Agency defines high vulnerability areas as “Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits”. Areas of low vulnerability are described by the Environment Agency as “Areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability”. Medium vulnerability is described as an intermediate between low and high vulnerability (Ref 10.36).

10.5.30 Defra’s MAGIC map (Ref 10.27) indicates the groundwater vulnerability within the majority of Section 1 and Section 2 of the study area is classified as a medium vulnerability area with small areas considered to be high. The northern part of Section 3 is of a medium vulnerability with areas of high vulnerability. The southern part of Section 3, and Sections 4, 5 and 6 all have areas of medium - high to high vulnerability with some small areas of low to medium – low vulnerability.

Groundwater Source Protection Zones

10.5.31 Source Protection Zones (SPZ) are non-statutory planning tools, used by the Environment Agency for informing a risk-based approach to planning and environmental permitting. It is a material consideration that the Project includes works both above and below ground and may, as a consequence, reduce the effectiveness of protection to groundwater afforded by any overlying or unsaturated zone strata.

10.5.32 SPZs are around strategic potable abstractions, typically those used for Public Water Supply or large-scale commercial use such as hospitals or food manufacturing. In addition to delineated (published) SPZ, any source of groundwater that is used for potable supply purposes would benefit from a minimum level of protection defined by unpublished SPZ with default radius of 50 m (SPZ 1, described in this document as SPZ1) and 250 m or 500 m (SPZ 2, described in this document as SPZ2). A third SPZ (described in this document as SPZ3) is defined as an area around a supply source within which all the groundwater ends up at the abstraction point, this could extend some distance from the source point.

10.5.33 **Figure 10.5: Groundwater Vulnerability** in **Volume 3** presents the SPZs noted within the study area. There are two SPZ which slightly encroach on the 500 m study area buffer in Section 6. One SPZ is within a SPZ3 (total catchment area) and another within both a SPZ3 and a SPZ2 (outer protection zone).

Groundwater Dependant Terrestrial Ecosystems

10.5.34 The “*WFD Regulations*” require Groundwater Dependent Terrestrial (as opposed to subterranean) Ecosystems to be identified and the pressures on them assessed. Where significant damage is occurring (or could occur) to a Groundwater Dependent Terrestrial Ecosystem (GWDTE) the associated groundwater body is considered at risk of not attaining good status under the “*WFD Regulations”.*

10.5.35 Assessment of risk to identified GWDTEs will therefore be included within the ES. Risks may be related to changes to water quality or changes to the quantity of water available to support the ecological site.

10.5.36 From available Environment Agency online information (Ref 10.37), GWDTEs are located within two areas of the study area. The Ogston Reservoir SSSI is located

within the 500 m buffer of Section 2 and the Morley Brick Pits SSSI is located within the Scoping Boundary of Section 4, see **Figure 10.7: Groundwater Dependant Terrestrial Ecosystems / SSSIs** in **Volume 3** for locations.

10.5.37 Ogston Reservoir (SSSI) lies in the valley of the River Amber south of Chesterfield. The water covers some 85 hectares and is an important wintering site for many wildfowl and a feeding site for wading birds on passage in late summer. The peripheral mosaic of semi-natural habitats is not only of botanical interest but, most importantly, provides a diversity of nesting and feeding sites for a wide variety of breeding birds. Almost all of the fringing grasslands are semi-natural neutral swards representing relict examples of formerly widespread species-rich types.

10.5.38 Morley Brick Pits (SSSI) consists of a series of flooded pits, originally dug for clay and which now contain acidic water colonised by a range of plants and animals several of which are becoming rare in Derbyshire.

Potentially Contaminative Land Uses

10.5.39 Whilst the majority of the study area appears to be agricultural land, there have been areas of historical coal mining activities with mine shafts and adits recorded within the study area. Several historical and authorised landfills are located within parts of the study area as detailed below. A review of aerial imagery has shown a number of potential contaminative land uses which are included in **Figure 10.6: Potential Contaminative Land Uses** in **Volume 3**. Based on this evidence there is potential for contaminated land to exist within the study area.

10.5.40 **Figure 10.6: Potential Contaminative Land Uses** in **Volume 3** shows the locations of the sites across the study area.

Section 1: Chesterfield Substation to Stretton

10.5.41 Land use is characterised as agricultural as highlighted by the number of farms identified on **Figure 10.6: Potential Contaminative Land Uses** in **Volume 3**. Other examples of land uses noted within Section include the existing Chesterfield Substation at Calow Lane, a petrol station on the A617 and A6175 and industrial parks associated with Holmewood and Clay Cross. A large solar farm is located directly south of the Scoping Boundary at Clay Cross and a sewage treatment works is located approx. 1.46 km east of Clay Cross with the buffer zone.

10.5.42 There are five historical landfills within the 250 m study area buffer and four historical landfills within the Scoping Boundary. One authorised landfill is located within the 250 m study area buffer.

Section 2: Stretton to Ripley

10.5.43 The predominant land use in Section 2 is agriculture with a number of farms noted.

10.5.44 Other features of note include the railway corridor that runs north to south within the centre of Section 2, Sewage Treatment works approximately 250m east of South Wingfield.

10.5.45 There is one historical landfill within the 250 m study area buffer and three within the Scoping Boundary. No authorised landfill sites are identified.

Section 3: Ripley to Morley

10.5.46 Section 3 follows the general southerly direction of the A38 transport corridor, although large areas of farmland and agricultural buildings are noted.

10.5.47 A large industrial park and pottery factory are located on the B617 to the south of Ripley There are eleven historical landfills within the Scoping Boundary.

10.5.48 Feedback was obtained through non-statutory consultation highlighting a potential historical contaminative land use in the Denby Bottle area associated with the disposal of acid tar wastes in old clay pits. The tar pits are located either side of the A38 near Cinderhill. Their location, which is within the Scoping Boundary, is shown on **Figure 10.6: Potential Contaminative Land Uses** in **Volume 3**. Further investigation, including consultation with stakeholders, regarding this contaminative source will be carried out in preparation of the ES

Section 4: Morley to Ockbrook

10.5.49 Section 4 of the Scoping Boundary is largely rural and dominated by farms and agricultural businesses.

10.5.50 There are two historical landfills within the Scoping Boundary. There are two small historical landfills within the 250 m study area buffer.

Section 5: Ockbrook to Aston-on-Trent

10.5.51 Although the land use in Section 5 is predominantly agricultural, other features include the Trent Valley crematorium at the A50/A6 junction, a quarry approximately 900m north of Shardlow. An industrial area is noted directly to the west of Shardlow.

10.5.52 There are eight historical landfills within the Scoping Boundary and there are five historical landfills within the 250 m study area buffer.

Section 6: Aston-on-Trent to Willington Substation

10.5.53 Key features of note within Section 6 include numerous small-scale industrial parks, sand and gravel quarry, located west of Barrow upon Trent, Willington Power Station and the existing Willington Substation.

10.5.54 There are ten historical landfills within the Scoping Boundary and two within the 250 m study area buffer. There are two authorised landfills within the Scoping Boundary which extend into the 250 m study area buffer.

Unexploded Ordnance (UXO)

10.5.55 The online Zetica UXO risk maps (Ref 10.35) indicates that the Scoping Boundary is within a low-risk area. There are however a number of strategic targets identified such as decoy, utility and industrial sites. The risk from UXO will be assessed further in a UXO desk study report at ES Stage when the Scoping Boundary has been refined.

Future Baseline Conditions

10.5.56 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 in the ES.

10.5.57 There are no foreseeable significant changes anticipated in relation to geology and hydrogeology either prior to, or during, the construction and operational phases. It is assumed that any man-made changes (for example due to new developments) would be appropriately permitted and operated to prevent or limit adverse impacts to ground conditions or controlled waters.

10.5.58 Derbyshire County Council are currently in the process of drafting a new minerals local plan up to 2038 (Ref 10.28), when adopted it will replace the current local plan adopted in 2000 with a first alteration already adopted in 2002. A pre-submission draft plan dated 2023 is available which has been reviewed as part of this report, it is assumed that any changes to the local plan will not have any major changes to the mineral safeguarding areas already defined within this report.

10.6 Mitigation Measures Adopted as Part of the Project

10.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

10.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives**) has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects may be avoided. This includes avoiding geological SSSIs, mining shafts and adits, authorised and historic landfills, groundwater source protection zones and international sites designated for nature conservation, including those which support ecosystems that rely on groundwater.

10.6.3 As part of the Project's design process, a number of embedded environmental measures will be proposed to reduce the potential for impacts on geology and hydrogeology receptors. These measures will evolve as the EIA progresses, and in response to consultation, and will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

Good Practice Mitigation Measures

10.6.4 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed by National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Table 2.1** of **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2.**

10.6.5 In addition, **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** presents the likely good practice mitigation measures relevant to geology and hydrogeology. These include but are not limited to:

- Geo-environmental and geotechnical intrusive and non-intrusive ground investigation and assessment would be undertaken in accordance with current best practice including BS5930, BS10175 and Eurocode 7 which would inform, if required, a site remediation strategy, slope stability assessments, foundation design, and piling risk assessments where appropriate. This would be undertaken as part of the detailed pre-construction survey and design for implementation during construction.
- Construction methods such as appropriate piling techniques (if required) to minimise the risk of mixing of aquifer bodies through the creation of new pathways would be utilised. Foundation Works Risk Assessments would be undertaken in accordance with the Environment Agency guidance Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination (Environment Agency, 2001) to understand potential impacts on controlled waters (where it has not been possible to avoid through design). Where required, this would include suitable mitigation measures to minimise potential effects.
- Use of appropriate occupational health and safety measures e.g., Personal Protective Equipment (PPE), and statutory health and safety compliance (e.g. compliance with the Confined Spaces Regulations, 1997 in relation to ground gas from working in confined spaces/trenches) to minimise the risks associated with anticipated/unexpected contamination. This would be based on risk assessment informed by site specific information.
- Use and storage of chemicals would be undertaken in accordance with the Environment Agency and Government Pollution Prevention for business guidance.
- The control of earthworks or materials movement (including any re-use of materials) under appropriate Environmental Permits, exemptions or CL:AIRE The Definition of Waste: The development industry Code of Practice (CL:AIRE, 2011).
- Any temporary dewatering activities or abstraction from watercourses during construction would be undertaken in accordance with Environment Agency guidance, and if required, an Abstraction Licence and Environmental Permit (for the discharge) and would be limited to the depth and time required to facilitate construction activities.
- Establishment of a protocol in the event of any unexpected contamination being discovered during the construction phase.
- Consultation with local authority and coal authority prior to construction to ensure minimal mineral sterilisation.

Additional Mitigation Measures

10.6.6 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for geology and hydrogeology. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

10.7 Likely Significant Effects

10.7.1 This section sets out the likely significant effects on geology and hydrogeology arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

10.7.2 The review of likely significant effects assumes that the embedded and good practice mitigation measures described in Section 10.6 and outlined within the at **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment.

10.7.3 The likely significant effects have been described in the following factors:

- Geology and minerals.
- Hydrogeology.
- Contaminated land.

Geology and Minerals

Construction and Operation (Including Maintenance) – Geohazards and Land Instability

10.7.4 Geohazards and land instability has the potential to adversely impact the Project and third-party assets. The area is noted as having a legacy of mining resulting in the potential for historical shafts and infrastructure. Geohazards (including risks from historical mining) and land instability will be considered and managed through the developing engineering design and not within the ES.

10.7.5 The Project, and the design of its structures (including the proposed new Chesterfield Substation), will include (in accordance with best practice and industry guidance) suitable consideration of site-specific ground conditions, potential ground instability and geohazard risks. The identification and management of geotechnical risk is an essential part of an infrastructure project's lifecycle and is an ongoing process throughout the design, construction, operation and decommission of an asset. A geotechnical risk register would continue to be maintained and updated throughout the lifetime of the Project to inform and be informed by the ground investigation strategy, project and geotechnical design measures and construction methods to ensure the Project remains stable throughout its lifecycle. As such, it is considered that the construction of the Project and the operation and maintenance of the new infrastructure would not be adversely affected and would not generate any significant effects. Therefore, geohazards and land instability related to the construction, maintenance and operation of the Project is proposed to be **Scoped Out** of the ES.

Construction and Operation (Including Maintenance) – Degradation of Geological Resources and Sites of Geological Importance

10.7.6 There are no SSSIs designated for their geological interest identified within the geology study area.

10.7.7 No sites of regional or local geological importance have been identified within the geology study area using the publicly available information. Further review and engagement with the local authorities and geodiversity groups will be undertaken to

identify any key geological receptors, which, if identified, will be described within the baseline of the ES. Where practicable, the Project would be routed to avoid any physical impacts on sites of geological importance during the construction of the Project. Equally, no physical impacts would be expected to occur during the operation and maintenance of the Project. Therefore, the degradation of sites of geological importance during the construction and operational phase is proposed to be **Scoped Out** of the ES.

10.7.8 This aspect will remain under review as the Project design and assessment progresses should any features be identified through consultation with the relevant bodies.

Construction and Operation (Including Maintenance) - Sterilisation of Minerals within the Scoping Boundary

10.7.9 The Scoping Boundary crosses areas safeguarded as coal measure resources within the Derbyshire and Derby Minerals Local Plan. The Scoping Boundary also crosses an area of sand and gravel which is safeguarded. Further consultation with the mineral planning authority is required as part of the development of the Project proposals to minimise the impacts on economic mineral resources and infrastructure.

10.7.10 As the potential for significant effects cannot be ruled out at this stage, potential effects on safeguarded minerals and infrastructure are proposed to be **Scoped In** for further assessment in the ES.

Hydrogeology

Construction – Changes to Groundwater Flows and Levels

10.7.11 As set out in **Table 10.3**, the Scoping Boundary crosses geological units that potentially support groundwater resources, including Principal aquifers, Secondary A and Secondary B aquifers. In addition, two GWDTEs have been identified within the study area. There is potential for the Project construction activities, such as dewatering, to result in temporary and localised changes to groundwater levels and flows. Likely significant effects could occur where changes to flows and levels intersect with sensitive receptors such as groundwater abstractions, surface water baseflows and GWDTEs.

10.7.12 Any dewatering activities during construction would be undertaken in accordance with Environment Agency guidance (Ref 10.38). All instances of dewatering will be assessed to identify the requirement for an abstraction licence and environmental permit (for the discharge). Dewatering activities would be limited to the depth and time required to facilitate the construction activities. Significant effects are unlikely to occur when all the following criteria are met:

- Drawdown from dewatering is less than 1.5m below rest water level.
- Dewatering lasts for 100 days or less.
- There are no groundwater sensitive receptors within 500m of the dewatering.

10.7.13 As well as dewatering, ground disturbance during the construction phase also has the potential to result in changes to groundwater flow regimes either through the introduction of new flow paths through piling of foundations and installation of new permeable structures and backfill materials or the barrier effect from new

impermeable structures and backfill materials. There is also the potential to create new connections between groundwater bodies.

10.7.14 The scale and nature of the planned works are such that no significant barriers to flow are envisaged. The same is true for the creation of new flow pathways during the construction of piled foundations within the new pylon bases, open cut and trenchless crossings. **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** includes a commitment to undertake a Foundation Works Risk Assessment once the proposed foundation solutions are known. This would provide an assessment of the risk of the creation of new flow pathways and any appropriate mitigation measures required.

10.7.15 Detailed Project construction proposals are yet to be determined and further investigation through intrusive and non-intrusive survey is required to characterise ground conditions in the study area. Therefore, the potential for significant effects cannot be ruled out at this stage. Likely significant effects to groundwater levels and flows during the construction phase are therefore **Scoped In** for further assessment in the ES.

Operation (Including Maintenance) – Changes to Groundwater Flows and Levels

10.7.16 The Project has the potential to cause disruption of shallow groundwater flow pathways within aquifer units due to the presence of permanent below ground infrastructure, such as pylon base foundations. Based on the small overall dimensions of any foundations and cable ducts, both are likely to be insignificant compared to the groundwater body as a whole. In areas of large foundations such as the proposed Chesterfield Substation groundwater flow may be impeded due to large impermeable surfaces and engineered drainage which may impact the rates of water infiltration to groundwater. Dewatering activities would not be required during the operational phase of the Project, so no effect pathway is anticipated.

10.7.17 Likely significant effects are not expected to groundwater levels and flows during operation and maintenance, however, cannot be ruled out at this stage and are therefore **Scoped In** for further assessment in the ES.

Construction – Changes to Groundwater Quality

10.7.18 The creation of preferential flow pathways during the construction of the piled foundations within the new pylon bases, open cut and trenchless crossings may result in changes to the quality of groundwater either through the mobilisation of existing contamination. Likely significant effects could occur where changes to groundwater quality intersect with sensitive receptors such as groundwater abstractions, surface water baseflows and GWDTEs. **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** includes a commitment to undertake a Foundation Works Risk Assessment once the proposed foundation solutions are known. This would provide an assessment of the risk of the creation of new flow pathways and any appropriate mitigation measures required to control the risk of contaminants entering the groundwater body.

10.7.19 Likely significant effects cannot be ruled out at the current stage of design therefore this is proposed to be **Scoped In** to the ES during construction.

Operation (Including Maintenance) – Changes to groundwater quality

10.7.20 Works carried out during the operational phase, including maintenance, are not anticipated to result in any changes to groundwater quality through new flow paths. Therefore, likely significant effects from changes to groundwater quality are **Scoped Out** of further assessment in the ES.

Contaminated Land

Construction and Operation – Introduction of new Contamination

10.7.21 Construction and operational activities have the potential to result in pollution releases from new sources of contamination leading to new linkages to sensitive receptors. Sources of pollution could include runoff from construction materials and waste storage areas, accidental spillages and uncontrolled fuel leaks. Good practice controls would be set out within the CoCP to manage the storage and handling of construction materials, excavated soils and wastes as detailed in Section 10.6. For uncontrolled episodes, an emergency response/spill plan would be established with suitable response training set out for site workers. Site drainage would be established to manage runoff from working areas to prevent contaminant release to the water environment. These measures would also be adopted as part of any construction activities undertaken during the operational phase.

10.7.22 Likely significant effects during both the construction and operational phases are therefore proposed to be **Scoped Out** for further assessment in the ES.

Construction – Disturbance and Mobilisation of Existing Contamination

10.7.23 There is the potential for existing contamination to be encountered within the study area during construction of the Project. Ground disturbance and handling of potentially contaminated soils during earthwork operations including soil stripping, the excavation of cable routes, the placement of backfilling materials of the trenching may result in sensitive receptors (such as human health, controlled waters) being exposed. Appropriate controls to manage the storage and handling of construction materials, excavated soils and wastes as detailed in Section 10.6 and **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** would reduce the risks.

10.7.24 Further review of the study area is required to identify the presence of potential contamination sources as well as potential receptors and pathways. Likely significant effects from the mobilisation of existing contamination are **Scoped In** for further assessment in the ES.

Construction – Discovery and Disturbance of Unforeseen Contamination

10.7.25 The discovery and disturbance of unforeseen contamination during earthwork operations, excavations and soil stripping may result in exposure to sensitive receptors such as human health and controlled waters. As detailed in Section 10.6 a watching brief protocol would be specified for earthwork activities to observe for any unforeseen contamination, reducing the risk of disturbance and mobilisation. Suspected contaminated material would be handled and stored separately from other materials in line with the measures set out in the CoCP submitted in support of the DCO application. Likely significant effects are unlikely to occur and therefore are **Scoped Out** from further assessment in the ES.

Operation (Including Maintenance) – Disturbance and Mobilisation of Existing Contamination

10.7.26 In the event contamination, which has the potential to impact sensitive receptors, is identified on land required to construct the Project, this would be appropriately managed as part of the construction phase of the Project ensuring land is suitable for the proposed end use. Therefore, likely significant effects from existing (including unforeseen) are **Scoped Out** from further assessment in the ES.

10.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

10.8.1 In addition to the data sources listed in Section 10.5, the assessment within the ES will be supported by the following additional information and surveys:

- Review of historical mapping to establish the potential sources of contamination within the study area.
- Information held by local geological and geo-conservation interest groups.
- Field notes collected as part of targeted walkover surveys to review the potential sources of contamination, identified geological features and areas of GWTDEs.
- Minerals safeguarding assessment and consultation with relevant Mineral Planning Authority and Coal Authority.
- Obtain relevant information and undertake consultation with stakeholders such as local authorities and Environment Agency regarding contaminated land, private water supplies, abstraction points and GWDTEs.
- Further consultation with stakeholders to define the ground investigation strategy required to inform the ES. This would be undertaken after the review of historical mapping and the Project design has been progressed to understand the interaction between these elements.
- Engagement with relevant stakeholders will be ongoing up to the submission of the Development Consent Order (DCO) with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.
- A review of relevant information to determine UXO risk.

Proposed Assessment Method

10.8.2 This section sets out the proposed methodology for the geology and hydrogeology assessment of the ES. This is based on guidance set out in the DMRB LA 113: Road Drainage and the Water Environment (Ref 10.20), DMRB LA 109: Geology and Soils (Ref 10.19), IEMA Guide (Ref 10.21), Environment Agency LCRM (Ref 10.11), CIRIA C552 (Ref 10.16) and professional judgement.

Sensitivity

10.8.3 The criteria used to determine the value and sensitivity of receptors specific to geology and hydrogeology are set out in **Table 10.4**. This criterion is derived from Table 3.70 of DMRB LA 113: Road drainage and the water environment (Ref 10.20), Table 3.11 of DMRB LA 109: Geology and soils (Ref 10.19), Environment Agency LCRM (Ref 10.11), CIRIA C552 (Ref 10.16) and professional judgement.

Table 10.4 - Criteria for determining value / sensitivity

Sensitivity / Value	General Criteria
Very High	**Geology** Very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, SSSIs and Geological Conservation Review (GCR) where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such. **Minerals** Existing minerals sites. **Contamination / Hydrogeology** *Human Health*: • Very high sensitivity land use such as residential or allotments. *Surface Water:* • Watercourse having a Water Framework Directive (WFD) classification shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m3/s. • Site protected/ designated under European Commission (EC) or UK legislation (Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Ramsar site). Species protected by EC legislation. *Groundwater*: • Principal Aquifer providing a regionally important resource and/ or supporting a site protected under EC and UK legislation. • Groundwater locally supports Groundwater Dependent Terrestrial Ecosystems (GWDTE). • Groundwater Source Protection Zone (SPZ) 1.
High	**Geology** Rare and of national importance with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such. **Minerals** Mineral Preferred (Allocated) Areas. **Contamination / Hydrogeology** *Human Health*:

Sensitivity / Value	General Criteria
	• High sensitivity land use such as public open space and construction workers. *Surface water*: • Watercourse having a WFD classification shown in an RBMP and Q95 < 1.0m3/s. • Species protected under EC or UK legislation *Groundwater*: • Principal Aquifer providing locally important resource or supporting a river ecosystem. • Groundwater supports a GWDTE • SPZ2
Medium	**Geology** Regional importance with limited potential for replacement (e.g. Regionally Important Geological Sites - RIGS). Geology meeting regional designation citation criteria which is not designated as such. **Minerals** Mineral Safeguarded Areas and Mineral Consultation Area. **Contamination / Hydrogeology** *Human Health*: • Medium sensitivity land use such as commercial or industrial. *Surface Water*: • Watercourses not having a WFD classification shown in an RBMP and Q95 > 0.001m3/s. *Groundwater*: • Aquifer providing water for agricultural or industrial use with limited connection to surface water • Extensive non-licensed private water abstractions (i.e. supplying ten or more properties or supplying large farming/animal estates). • SPZ3
Low	**Geology** Local importance / interest with potential for replacement (e.g. non designated geological exposures, former quarry's / mining sites). **Minerals**

Sensitivity / Value	General Criteria
	Mineral present but outside of any Mineral Preferred Areas, Mineral Safeguarded Areas and Mineral Consultation Areas. **Contamination / Hydrogeology** *Human Health*: • Low sensitivity land use such as highways and rail. *Surface Water*: • Watercourses not having a WFD classification shown in an RBMP and Q95 ≤ 0.001m3/s. *Groundwater*: • Unproductive strata
Negligible	**Geology** No geological exposures, little / no local interest. **Minerals** No mineral identified. **Contamination** *Human Health:* • Undeveloped surplus land/ no sensitive land use proposed.

Magnitude

10.8.4 The criteria used to determine the magnitude of change for geology and hydrogeology are set out in **Table 10.5**. These values are based on Table 3.71 of DMRB LA 113 (Ref 10.20), Table 3.12 of DMRB LA 109 (Ref 10.19), Section 10.3 of IEMA Guide (Ref 10.21) and professional judgement. No beneficial changes are expected for geology receptors and therefore no such criteria is provided.

Table 10.5 - Criteria for Determining Magnitude

Magnitude	Description
Major	**Geology:** Loss of geological feature/designation and/or quality and integrity, severe damage to key characteristics, features or elements. **Minerals** More than one allocated mineral site is substantially sterilised by the development rendering it inaccessible for future use. **Contamination:**

Magnitude	Description
	• Human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. C4SLs) SP1010 (CL:AIRE 2014) with potential for significant harm to human health. Contamination heavily restricts future use of land. • Surface water: o Failure of both acute-soluble and chronic-sediment related pollutants in Highways England Water Risk Assessment Tool (HEWRAT; note National Highways was formerly known as Highways England) and compliance failure with EQS values Calculated risk of pollution from a spillage ≥2% annually (spillage assessment). o Loss or extensive change to a fishery. o Loss of regionally important public water supply. o Loss or extensive change to a designated nature conservation site. o Reduction in water body WFD classification. • Groundwater: o Loss of, or extensive change to, an aquifer. o Loss of regionally important water supply. o Potential high risk of pollution to groundwater from routine runoff – risk score >250 (Groundwater quality and runoff assessment). o Calculated risk of pollution from spillages ≥2% annually (Spillage assessment). o Loss of, or extensive change to, GWDTE or baseflow contribution to protected surface water bodies. o Reduction in water body WFD classification. o Loss of, or significant damage to, major structures through subsidence or similar effects.
Moderate	**Geology:** Partial loss of geological feature/designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. **Minerals** One allocated mineral site is substantially sterilised by the development rendering it inaccessible for future use. **Contamination**:

Magnitude	Description
	• Human health: o Contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. C4SLs) SP1010. o Significant contamination can be present. o Control/remediation measures are required to reduce risks to human health/make land suitable for intended use. • Surface water: o Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. o Calculated risk of pollution from spillages ≥1% annually and <2% annually o Partial loss in productivity of a fishery o Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies o Contribution to reduction in water body WFD classification • Groundwater: o Partial loss or change to an aquifer. o Degradation of regionally important public water supply or loss of significant commercial/industrial/agricultural supplies. o Potential medium risk of pollution to groundwater from routine runoff – risk score 150–250. o Calculated risk of pollution from spillages ≥1% annually and <2% annually o Partial loss of the integrity of GWDTE. o Contribution to reduction in water body WFD classification. o Damage to major structures through subsidence or similar effects or loss of minor structures.
Minor	**Geology:** Minor measurable change in geological feature/designation attributes, quality or vulnerability; minor loss of, or alteration to, one or more key characteristics, features or elements. **Minerals**

Magnitude	Description
	The development has the potential to adversely and substantially impact access to one or more allocated mineral site (in their entirety) placing their future use at risk. **Contamination / Hydrogeology:** • Human health: o Contaminant concentrations are below relevant screening criteria (e.g. C4SLs) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health. • Surface water: o Failure of either acute-soluble or chronic-sediment related pollutants in HEWRAT. o Calculated risk of pollution from spillages ≥0.5% annually and < 1% annually. o Minor effects on water supplies. • Groundwater: o Potential low risk of pollution to groundwater from routine runoff – risk score <150 . o Calculated risk of pollution from spillages ≥0.5% annually and <1% annually. o Minor effects on an aquifer, GWDTEs, abstractions and structures
Negligible	**Geology:** Very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature/designation. Overall integrity of resource not affected **Minerals** The development has the potential to adversely impact access to specific areas of allocated mineral sites, therefore reducing the minerals available[1]. **Contamination / Hydrogeology**: • Human health: o Contaminant concentrations substantially below levels outlined in relevant screening criteria (e.g. C4SLs) SP1010.

[1] Professional judgement applied as there is no definition for the criteria in IEMA guidance (IEMA, 2020).

Magnitude	Description
	o No requirement for control measures to reduce risks to human health/make land suitable for intended use. • Surface water: o No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants). o Risk of pollution from spillages <0.5%. • Groundwater: o No measurable impact upon an aquifer and/or groundwater receptors and risk of pollution from spillages <0.5% .
No Change	**Geology:** No temporary or permanent loss or disturbance of characteristics, features or elements **Minerals** No mineral sterilisation **Contamination / Hydrogeology:** • Human health: reported contaminant concentrations below background levels • Surface water: no loss or alteration of characteristics, features or elements; no observable impact in either direction • Groundwater: no loss or alteration of characteristics, features or elements; no observable impact in either direction

Significance

10.8.5 Significance will be derived using the matrix set out in **Chapter 5: EIA Approach and Methodology**. This may be informed by professional judgement which, where used, will be explained to give the rationale behind the values assigned. Significant effects in the context of the EIA Regulations 2017 will be effects of moderate or greater significance.

Assumptions and Limitations

10.8.6 The detailed construction methodology for the Project has yet to be defined. This will be subject to further development during the process of iterative design and environmental assessment of the Project. The methodology of construction could change the types and/or severity of the potential effects assessed herein.

10.8.7 Scoping has been prepared based on the environmental baseline available at the time of writing, and the extent of the Scoping Boundary. A site walkover has not been undertaken. A full programme of data gathering, and surveys should be undertaken to fully inform the baseline of the assessment to be outlined within the ES.

10.9 Proposed Scope of the ES

10.9.1 The matters that are proposed to be scoped in and out of further assessment for geology and hydrogeology are outlined in **Table 10.6**.

Table 10.6 - Proposed Scope of the ES

Matter	Phase	Scoped In / Out	Justification
Geology and Minerals			
Geohazards and land instability	Construction, operation and maintenance	**Scoped Out**	The Project, and design of structures, will include (in accordance with best practice and industry guidance) suitable consideration of site-specific ground conditions, potential ground instability and geohazard risks. As such, it is considered that the construction of the Project and the operation and maintenance of the new infrastructure would not be adversely affected and would not generate any significant effects.
Degradation of geological resources and sites of geological importance	Construction, operation and maintenance	**Scoped Out**	No SSSIs designated for their geological interest identified within the geology study area. No sites of regional or local geological importance have been identified within the geology study area using the publicly available information. Further consultation will be undertaken with the relevant bodies to identify any sites. Where practicable, the Project would be routed to avoid any physical impacts on sites of geological importance.
Sterilisation of minerals within the Scoping Boundary	Construction, operation and maintenance	**Scoped In**	The Scoping Boundary crosses areas designated as safeguarded within the Derbyshire and Derby Minerals Local Plan.
Hydrogeology			
Changes to groundwater flows and levels	Construction	**Scoped In**	The Project construction activities have the potential to change groundwater flows and levels, which support sensitive receptors identified within the baseline.
	Operation and maintenance	**Scoped In**	Likely significant effects are not expected to groundwater levels and flows during operation and maintenance, however these cannot be ruled out at this stage.

Matter	Phase	Scoped In / Out	Justification
Changes to groundwater quality	Construction	**Scoped In**	The Project construction activities may lead to the creation of new pollutant pathways and the reduction of groundwater quality supporting sensitive receptors.
	Operation and maintenance	**Scoped Out**	Works carried out during the operational phase, including maintenance, are not anticipated to result in any changes to groundwater quality through new flow paths.
Contaminated Land			
Introduction of new contamination	Construction, operation and maintenance	**Scoped Out**	Good practice controls would be set out within the CoCP to manage the storage and handling of construction materials, excavated soils and wastes whilst protocols would be established to manage accidental spillages and emergencies.
Disturbance and mobilisation of existing contamination	Construction	**Scoped In**	Appropriate controls in line with industry best practice would be put in place to manage risks associated with existing land contamination. Further review is required and therefore likely significant effects cannot be ruled out.
	Operation	**Scoped Out**	In the event contamination, which has the potential to impact sensitive receptors, is identified on land required to construct the Project, this would be appropriately managed as part of the construction phase of the Project ensuring land is suitable for the proposed end use.
Discovery and disturbance of unforeseen contamination	Construction	**Scoped Out**	A watching brief protocol would be specified for earthwork activities to observe for any unforeseen contamination, reducing the risk of disturbance and mobilisation. Suspected contaminated material would be handled and stored separately from other materials in line with the measures set out in the Outline CoCP submitted in support of the DCO application. Likely significant effects are not anticipated.

10.10 References

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11. Agriculture and Soils

Contents

11. Introduction

11.1 Introduction

11.1.1 This chapter presents how the agriculture and soils assessment will consider the potentially significant effects on agriculture and soils receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

11.1.2 As detailed in **Chapter 4: Description of the Project** there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

11.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

11.2 Approach to Scoping

11.2.1 The approach to scoping has drawn from previous experience of similar Projects and professional judgement. Determining the scope of the agriculture and soils assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Outlining study area and baseline conditions.
- Outlining environmental mitigation measures.
- Predicting likely significant effects.
- Stating the proposed scope of the Environmental Statement (ES).

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

- **Chapter 6: Landscape and Visual.**
- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 8: Historic Environment.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 10: Geology and Hydrogeology.**
- **Chapter 13: Air Quality.**

11.2.3 This chapter is supported by the following figures in **Volume 3**:

- **Figure 11.1: Soils Mapping.**
- **Figure 11.2: Provisional Agricultural Land Classification Mapping.**
- **Figure 11.3: Detailed Agricultural Land Classification Mapping (Post-1988).**
- **Figure 11.4: Agri-Environmental Schemes.**
- **Figure 11.5: Woodland and Forestry Schemes.**

11.3 Key Regulatory and Planning Policy Context

Key Legislation

11.3.1 A summary of the key legislation considered in the scope of effects on agriculture and soils is outlined below:

- Agricultural Land (Removal of Surface soil) Act (1953) (Ref 11.1) - “An Act to make it an offence to remove surface soil from land in certain circumstances; and for purposes connected therewith.”
- Environment Act 2021 (Ref 11.2) – “An Act to make provision about targets, plans and policies for improving the natural environment; for statements and reports about environmental protection; for the Office for Environmental Protection; about waste and resource efficiency; about air quality; for the recall of products that fail to meet environmental standards; about water; about nature and biodiversity; for conservation covenants; about the regulation of chemicals; and for connected purposes.”

National Planning Policy

National Policy Statements

11.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy EN-1 and NPS for Electricity Networks Infrastructure EN-5. **Table 11.1** sets out the requirements of both NPSs relevant to agriculture and soils and how these have been considered within this chapter.

Table 11.1 - National Planning Policy Relevant to Agriculture and Soils

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2024)		
Paragraph 5.11.12	Sets out the preference for the use of poorer quality land (Grades 3b, 4 and 5) over Best and Most Versatile (BMV) land (defined as land in grades 1, 2 and 3a).	The extent of BMV land within the Scoping Boundary will be assessed in the baseline. The Project will have regard to the location of BMV land, and the extent affected will be minimised through the evolution of the design. The likely impacts on BMV land will be assessed as part of the Agriculture and Soils chapter of the ES, with mitigation measures set out to minimise the effects. .
Paragraph 5.11.13	“Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed.”	The nature of the soils present will be assessed within the ES, informed through soil surveys and mitigation measures set out to minimise the potential impacts on soil properties and thus soil health.
Paragraph 5.11.14	“Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination.”	An outline Soil Management Plan will be submitted in support of the Development Consent Order (DCO) application and will be developed in line with current good practice.
Paragraph 5.11.34	This paragraph states that development should not be built on BMV land without justification, and poorer quality land should be used preferentially. Economic benefits of the land should also be accounted for.	The extent of BMV land will be determined through soil and Agricultural Land Classification (ALC) surveys. Where practicable, land of lower quality will be used in preference to that of higher quality.

Policy Reference	Policy Context	How it will be considered
National Policy Statement for Electricity Networks (EN-5) (Department for Energy Security and Net Zero, 2024)		
Paragraph 2.9.25 (final bullet point)	This paragraph highlights the requirement to minimise impacts on agricultural land and soil resources. That appropriate surveys should be undertaken to inform these assessments, and that mitigation should be in line with Defra Construction Code of Practice for Sustainable Use of Soils on Construction Sites.	The extent of BMV land will be determined through soil and ALC surveys. Where practicable, land of lower quality will be used in preference to that of higher quality. An outline Soil Management Plan will be submitted in support of the DCO application and will be developed in line with current good practice, including with reference to the Defra Construction Code of Practice for Sustainable Use of Soils on Construction Sites.
Paragraph 2.9.58	“There is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequences.”	The potential effect from electric and magnetic fields (EMFs) is covered in Section 11.7.

Other National Policy

11.3.3 A summary of other relevant national policy considered in the scope of effects on agriculture and soils includes:

- National Planning Policy Framework (NPPF) (Ref 11.3).

Regional and Local Planning Policy

11.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

11.3.5 Relevant local policy, specific to the agriculture and soils have been listed below.

- Local Plan for Bolsover District (Ref 11.4).
- Amber Valley Borough Local Plan (Ref 11.5).
- Derby City Local Plan Part 1 – Core Strategy (Ref 11.6).
- City of Derby Local Plan Review (Ref 11.7).
- South Derbyshire Local Plan Part 1 (Ref 11.8).
- South Derbyshire Local Plan Part 2 (Ref 11.9).

Guidance

11.3.6 Relevant guidance, specific to agriculture and soils, which has informed this Scoping Report and would inform the assessment within the ES, comprises:

- Safeguarding our Soils. A strategy for England (Ref 11.10).
- Guide to Assessing Development Proposals on Agricultural Land (Ref 11.11).
- Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (Ref 11.12).
- Specification for topsoil (BS3882:2015) (Ref 11.13).
- Agricultural Land Classification of England and Wales, Revised Criteria and Guidelines for Grading the Quality of Agricultural Land (Ref 11.14).
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 11.15).
- Construction Best Practice for Underground Cable Installation (Ref 11.16).
- Good Practice Guide for Handling Soils in Mineral Workings (Ref 11.17).
- A New Perspective on Land and Soil in Environmental Impact Assessment: Institute of Environmental Management and Assessment (IEMA) (herein the ‘IEMA Guidance’) (Ref 11.18).
- Design Manual for Roads and Bridges (DMRB) LA112: Population and Human Health (Ref 11.19).
- DMRB LA 109: Geology and Soils (Ref 11.20).

11.4 Study Area

11.4.1 The study area for agriculture and soils comprises the area directly impacted by the Project, which for the purposes of informing this Scoping Report, comprises the Scoping Boundary. This represents the extent that potential impacts associated with direct temporary or permanent disturbance of agriculture and soils is likely to occur. This is considered an appropriate study area based on professional judgement,

knowledge of similar projects and DMRB LA09: Geology and Soils. The study area for Agriculture and Soils is shown on **Figure 11.1: Soils Mapping** to **Figure 11.5: Woodland and Forestry Schemes** in **Volume 3**.

11.4.2 As the iterative design process continues, the study area would be altered and reduced within the ES to comprise the Order Limits, therefore the extent of land and associated soils impacted will not be the entire Scoping Boundary.

11.4.3 Three receptors which would be affected potentially by the Project are identified as follows:

- Agricultural land (including BMV land).
- Soils.
- Agricultural landholdings.

11.5 Baseline Conditions (inc. future baseline)

Data Collection

11.5.1 The baseline within this Scoping Report has been informed by a desk study which has drawn on the following sources of information:

- British Geological Survey (BGS) Geology Viewer (Ref 11.21).
- Agricultural Land Classification – Provisional (England) (Defra, 2024).
- Post-1988 Agricultural Land Classification (England) (Defra, 2024).
- Soil data and map from National Soils Resources Institute at Cranfield University (NSRI) (Ref 11.22).
- Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale maps (Ref 11.23).
- Climate data sets for ALC assessment (Ref 11.24).

11.5.2 The desk-based study will be supported by a detailed Agricultural Land Classification (ALC) survey to provide baseline information for the ES chapter. The ALC survey will be conducted at a density of a 100m grid, in line with the ALC guidelines (Ref 11.14).

Engagement with Stakeholders

11.5.3 Following receipt of the Scoping Opinion engagement with relevant stakeholders will be ongoing up to the submission of the DCO including but not limited to Derbyshire County Council, Natural England and the National Farmers Union (NFU), with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.

11.5.4 Natural England will be specifically consulted on the scope of the assessment and soil and ALC survey methodology prior to the survey commencing.

Existing Baseline Conditions

Soils

11.5.5 A Soil Association is a group of soil types with similar characteristics which typically are located together in the UK landscape. Twenty-one Soil Associations were identified within the Scoping Boundary (**Figure 11.1: Soils Mapping** in **Volume 3**) as follows:

- Neutral Restored Opencast: Restored opencast coal workings. Slowly permeable seasonally waterlogged compacted fine loamy and clayey disturbed soils. Often stony with thin topsoil. Risk of water erosion.
- Bardsey: Slowly permeable seasonally waterlogged loamy over clayey and fine silty soils over soft rock. Some well drained coarse loamy soils over harder rock.
- Rivington 1: Well drained coarse loamy soils over sandstone. Locally associated with similar soils affected by groundwater.
- Dale: Slowly permeable seasonally waterlogged clayey, fine loamy over clayey and fine silty soils on soft rock often stoneless.
- Fladbury 3: Stoneless clayey, fine silty and fine loamy soils affected by groundwater. Flat land. Risk of flooding.
- Dunkeswick: Slowly permeable seasonally waterlogged fine loamy and fine loamy over clayey soils associated with similar clayey soils.
- East Keswick 2: Deep well drained fine and coarse loamy soils. Steep slopes locally.
- Hodnet: Reddish fine and coarse loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar well drained reddish fine loamy soils. Slight risk of water erosion.
- Worcester: Slowly permeable non-calcareous and calcareous reddish clayey soils over mudstone, shallow on steeper slopes. Associated with similar non-calcareous fine loamy over clayey soils. Slight risk of water erosion.
- Whimple 3: Reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar clayey soils on brows. Slowly permeable seasonally waterlogged fine loamy and fine silty over clayey soils on lower slopes.
- Compton: Stoneless mostly reddish clayey soils affected by groundwater. Flat land. Risk of flooding.
- Salwick: Deep reddish fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some deep well drained coarse loamy soils. Some fine loamy soils affected by groundwater.
- Wharfe: Deep stoneless permeable fine loamy soils. Some similar soils variably affected by groundwater. Flat land. Risk of flooding.
- Fladbury 2: Stoneless clayey soils variably affected by groundwater some with sandy subsoils. Some similar fine loamy soils. Flat land. Risk of flooding.
- Wick 1: Deep well drained coarse loamy and sandy soils locally over gravel. Some similar soils affected by groundwater. Slight risk of water erosion.
- Salop: Slowly permeable seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils associated with fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging.
- Bromsgrove: Well drained reddish coarse loamy soils mainly over soft sandstone but deep in places. Associated fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Risk of water erosion.
- Arrow: Deep permeable coarse loamy soils affected by groundwater.
- Thames: Stoneless mainly calcareous clayey soils affected by groundwater. Flat land. Risk of flooding.
- Bridgnorth: Well drained sandy and coarse loamy soils over soft sandstone. Occasional deeper soils. Risk of water and wind erosion.

- Brockhurst 2: Slowly permeable seasonally waterlogged reddish fine loamy over clayey and clayey soils. Some reddish clayey alluvial soils affected by groundwater.

Agricultural Land Classification

11.5.6 Provisional ALC mapping for the study area is presented in **Figure 11.2: Provisional ALC Mapping** in **Volume 3.** It shows that the agricultural land within the Scoping Boundary is predominantly ALC Grade 3 and Grade 4 land. Grade 4 land is mostly located in the north of Dale Abbey, while Grand 3 land is primarily in the south of Dale Abbey. There is a small portion of ALC Grade 2 land, mainly spread in the south and east of Derby.

11.5.7 The Provisional ALC mapping does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises best and most versatile (BMV) agricultural land. This distinction can only be confirmed through a detailed ALC survey.

11.5.8 As illustrated in **Figure 11.3: Detailed ALC Mapping (Post-1988)** in **Volume 3**, detailed ALC surveys have been conducted previously at Aston-on-Trent, to the west of Draycott and to the east of Borrowash within the Scoping Boundary. This shows a mix of ALC grades being present, including Grades 2, 3a and 3b.

Land Use

11.5.9 Satellite imagery and site observations from the Project Team indicate that the agricultural land within the Scoping Boundary is predominately arable land and grassland. Field boundaries are lines with hedges, trees and roads throughout Scoping Boundary. Some areas of land within the Scoping Boundary are covered by Countryside Stewardship or Environmental Stewardship Agreements (see **Figure 11.4 Agri-Environment Schemes** in **Volume 3)** and there are more limited areas covered by Woodland Grant Schemes and Felling Licences (see **Figure 11.5: Woodland and Forestry Schemes** in **Volume 3**).

Future Baseline Conditions

11.5.10 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 in the ES.

11.5.11 The future baseline for soils and agriculture is not expected to change within the timeframe of the Project, during construction and operation, which is assumed to be approximately 80 years. The Met Office's UK Climate Projections (UKCP18) predict that the future climate will consist of warmer winters with more intense rainfall events. However, the overall annual rainfall is expected to remain consistent with current levels as there is expected to be a change to a larger volume in winter and lower volume in summer. The increased intensity of rainfall events will increase the risk of soil erosion and runoff, risking reducing topsoil thickness and thus land quality if not properly mitigated.

11.5.12 The global annual temperature is predicted to increase by 2°C. This increase in global temperature will increase soil surface cracking and the increased intensity of rainfall events may increase total field capacity days. However, these changes will be slight to negligible.

11.6 Mitigation Measures Adopted as Part of the Project

11.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology.**

Embedded Mitigation Measures

11.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives Considered**) has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced.

11.6.3 Further embedded design measures will be developed as the Project design evolves.

11.6.4 Temporary access would be provided as part of the construction approach to limit issues of severance and fragmentation to agricultural landholdings and farm activities as a result of the works. In terms of national food production and security at this stage of the Project it is unknown what type of farmland (i.e. arable or grassland) may be impacted by construction activities however this would relate to local agricultural businesses rather than impacts at a national scale. The loss of land during the construction phase would be temporary and measures would be taken to limit issues of severance and fragmentation to agricultural landholdings and farm activities as a result of the works by providing temporary access/ crossing points. During operation, there would be a minimal permanent loss of areas of agricultural land and associated soils for the permanent infrastructure.

Good Practice Mitigation Measures

11.6.5 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2.**

11.6.6 In addition, an outline Soil Management Plan will also be developed to set out soil mitigation measures to protect soil resources and agricultural land during the stages of preconstruction, construction, post construction and operation.

11.6.7 The outline Soil Management Plan would address the following aspects:

- Preconstruction planning:
  - Preparation of a Soil Management Plan (this would cover peat soils if these are confirmed to be present through the surveys).
- Site Preparation:
  - Vegetation clearance and removal of arisings.
  - Layout of construction accesses, haul routes, compounds, working areas and stockpile areas clearly marked on the ground.

- Soil Stripping:
  - Soils to be stripped according to the thickness of soil horizons and soil types with minimum mixing.
  - Soils to be stripped in the driest conditions possible with works stopped where necessary during wet ground conditions.
  - Minimisation of dust and silt-laden runoff generation.
- Soil Stockpiling:
  - Stockpiles to be located in appropriate locations to avoid increased flood risk, pollution of watercourses and topographic depressions. Best practice mitigation will be adopted to manage risk of cross-contamination of stockpiles.
  - Soils to be stockpiled in designated stockpile area according to temporary work design.
  - Topsoil and subsoil materials to be stockpiled separately and clearly identifiable.
  - Soils to be stockpiled in accordance with Soil Management Plan.
  - Material movements and stockpile content to be recorded.
- Soil Stockpile Maintenance:
  - Stockpiles to be seeded with low maintenance grass and clover mix to minimise risk of soil erosion and reduce the spread of weeds if stockpiled for over six months.
  - Vegetation cover to be managed during the summer months to control the spread of weeds.
- Soil Reinstatement:
  - On land to be returned to a landowner following temporary use during the construction phase soils will reinstated to recreate soil profiles and land quality similar to that recorded pre-construction.
  - On land for landscape planting or habitat creation, soil profiles to be created using available soil resources that support the required end use.
  - Where soils have been handled when wet or have become wet during stockpiling, they will be reconditioned before reinstatement.
  - Where practicable, all soils will be reused within the project. Where a surplus is generated as a result of permanent infrastructure this will be identified and reuse options developed (for example for landscape purposes, where the soil characteristics are appropriate, for areas of woodland planting).
- Soil Aftercare:
  - Reinstated soils will be checked by suitably qualified personnel to ensure that soils are restored correctly, and any required remediation implemented. The roles and responsibilities of those responsible for confirming the effectiveness of reinstatement would be detailed within the Soil Management Plan.

Additional Mitigation Measures

11.6.8 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for agriculture and soils. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable

development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

11.7 Likely Significant Effects

11.7.1 This section sets out the likely significant effects on agriculture and soils arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

11.7.2 The review of likely significant effects assumes that the embedded, good practice and essential mitigation measures described in Section 11.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportional assessment.

11.7.3 The likely significant effects have been split into:

- Soils and agriculture.
- Land use / Agricultural landholdings.

Soils and Agriculture

Construction – Temporary Loss of Agricultural Land (Including BMV Land)

11.7.4 During construction there would be a potential loss of BMV land (ALC Grades 1, 2 and 3a) from agricultural productivity. There would also be disturbance to soils, from construction activities such as establishment of access for overhead line or underground cable installation, diversion or removal of existing utilities, the excavation and soil stripping of working areas supporting the installation of underground cable trenches, pylon bases and foundations, the construction of the substation footprint (were such works to be incorporated into the Project scope) and areas required temporarily for compounds. There would also be the potential for impacts on the ecosystem services the soils provide.

11.7.5 Good practice mitigation measures for soil handling, storage and reinstatement, which would reduce effects on soils, are described in Section 11.6 and **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**. However, the baseline is not fully understood, and significant effects cannot be ruled out at this stage; therefore, the impact of construction on the temporary loss of agricultural land is proposed to be **Scoped In** to the ES.

Construction – Effects on Soil Quality Associated with Ecosystem Services

11.7.6 The stripping and stockpiling of soil resources would have a temporary effect on the soil ecosystem services provided. Successful reinstatement would therefore be critical in ensuring these functions are restored. As such the impact of the construction phase on soil quality and its associated ecosystem services is proposed to be **Scoped In** to the ES.

Operation Including Maintenance – Permanent Loss of Agricultural Land (Including BMV Land)

11.7.7 During operation, there would be a minimal permanent loss of areas of agricultural land and associated soils for the permanent infrastructure. The impact of operation on the land grades and soil types would be fully assessed and confirmed and as such permanent impacts on soils and ALC is proposed to be **Scoped In** to the ES.

11.7.8 Maintenance or repair works required described in **Chapter 4: Description of the Project** would be small scale and highly localised. Any activities that would result in disturbance to soils during the operation of the Project would be undertaken in accordance with good practice soil handling methods. No likely significant effects on soils or ALC during operational maintenance or repair activities are predicted, therefore this matter is proposed to be **Scoped Out** of the ES.

Operation Including Maintenance – Effects on Soils Quality Associated with Ecosystem Services

11.7.9 The majority of the land required for construction would be returned to its pre-construction land use (as agreed with the landowner) and where practicable any surplus soils would be reused within the project. As such, impacts on soil ecosystem functions are likely to be limited. Therefore, operational effects on soil quality and associated ecosystem services are proposed to be **Scoped Out** of the ES.

Land Use / Agricultural Landholdings

Construction – Land Use

11.7.10 During construction there would be potential impacts on agricultural operations due to disturbance (in particular where livestock are present), fragmentation, access restrictions or disruption to water supplies or land drainage. Commitments set out within the outline CoCP (to be submitted as part of the DCO application) to maintain access throughout construction, would reduce the effects to agricultural land use. Potential effects on land drainage are covered in **Chapter 9: Hydrology and Land Drainage**.

11.7.11 By the end of construction, all land required temporarily would be reinstated and construction phase impacts on agricultural operations would be dealt with through compensation agreements (which lies outside of the EIA process). However, potential environmental effects during the construction phase is proposed to be **Scoped In** to the assessment.

Operation Including Maintenance – Land Use

11.7.12 During operation and maintenance, there would be limited effects on agricultural operations. There is the potential for restrictions to existing activities immediately over or adjacent to buried cables or under overhead lines, however, these would be dealt with through compensation agreements (which lie outside of the EIA process). Any maintenance or repair works required which would result in disturbance to agricultural operations would be undertaken in accordance with standard practice. Therefore, no significant effects on agricultural landholdings during operation are anticipated and this aspect is proposed to be **Scoped Out** of the ES.

11.7.13 The majority of the land required during construction would be reinstated by the end of the construction phase. Any claims regarding compensation would be addressed outside of the EIA process. As such, potential economic effects on individual landowners and farmers are **Scoped Out** of the ES.

11.7.14 During operation, there may be concerns from landowners that EMFs could affect land use. However, paragraph 2.9.58 of EN-5 (Ref 11.25) states that, in relation to EMFs, "*there is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequence*". Therefore, this is proposed to be **Scoped Out** of the ES. Refer to **Chapter 16: Health and Wellbeing** for further information regarding EMFs.

11.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

11.8.1 The EIA assessment will be supported by an initial collation and review of available baseline data.

11.8.2 To fully inform the assessment on agricultural land and soils, an ALC and soil survey will be undertaken to determine the sensitivities of the soils and the grade(s) of agricultural land within the Proposed Development. The survey and assessment will be undertaken in accordance with the Soil Survey Field Handbook (Hodgson, 2022) and the ALC guidelines (Ref 11.14) and will characterise soil properties based on an examination of soil profiles, from which agricultural land grade as well as soil resilience can be calculated and assessed.

11.8.3 Surveys will also be undertaken where land use change would remove land from agricultural production, for example where new woodland planting is required to achieve Biodiversity Net Gain (BNG) requirements (**Chapter 7: Ecology and Biodiversity**).

11.8.4 Farm holding information collection will be conducted to inform impact assessment on agricultural landholding.

Proposed Assessment Method

11.8.5 This section sets out the proposed methodology for the agriculture and soils assessment of the ES. The agriculture and soils assessment will be based on guidance set out in IEMA guidance - A New Perspective on Land Soil in EIA (Ref 11.18) and DMRB LA112 (Ref 11.19).

Sensitivity

11.8.6 **Table 11.2** to **Table 11.6** set out the criteria which would be used to determine the sensitivity of receptors that have been identified within the study area, including agricultural land, soils and agricultural landholdings.

Table 11.2 - For determining sensitivity of Agricultural Land

Receptor Sensitivity (In-Situ Soils)	Soil Resource and Soil Functions
Very High	• Biomass production: ALC Grades 1 and 2. • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., SAC, SPA, Ramsar); Peat soils; Soils supporting a National Park, or Ancient Woodland. • Soil carbon: Peat soils. • Soils with potential for ecological / landscape restoration. • Soil hydrology: Very important catchment pathway for water flows and flood risk management. • Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Scheduled Ancient Monuments (SAMs) and

Receptor Sensitivity (In-Situ Soils)	Soil Resource and Soil Functions
	adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community / recreational / educational access to land covered by National Park designation. • Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access).
High	• Biomass production: ALC Grade 3a. • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., United Nations Educational, Scientific and Cultural Organisation (UNESCO) Geoparks, SSSI or Area of Outstanding Natural Beauty (AONB), Special Landscape Areas (SLAs) and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting seminatural vegetation (including the UKBAP Priority habitats or Section 6 habitats in Wales). • Soil carbon: Organo-mineral soils (e.g., peaty soils). • Soil hydrology: Important catchment pathway for water flows and flood risk management. • Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; historic parks and gardens; Regionally Important Geological Site (RIGS); Soils supporting community / recreational / educational access to RIGS and AONBs. • Source of materials: Surface mineral reserves that would be sterilised (i.e., without future access).
Medium	• Biomass production: ALC Grade 3b. • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g., LNRs, Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), SLAs; Non-Native Forest and woodland soils. • Soil carbon: Mineral soils. • Soil hydrology: Important minor catchment pathway for water flows and flood risk management. • Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest;

Receptor Sensitivity (In-Situ Soils)	Soil Resource and Soil Functions
	Soils supporting community/ recreational / educational access to land. • Source of materials: Surface mineral reserves that would remain accessible for extraction.
Low	• Biomass production: ALC Grade 4 and 5 or Urban soils. • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats / landscapes. Agricultural soils. • Soil carbon: Mineral soils. • Soil hydrology: Pathway for local water flows and flood risk management. • Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community / recreational / educational access to land. • Source of materials: Surface mineral reserves that would remain accessible for extraction.
Negligible	• As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions.

Table 11.3 - Criteria for determining sensitivity of Soils

Sensitivity of Topsoil and Subsoil	Soil Texture, Field Capacity Days (FCD) and Wetness Class
High Sensitivity (low resilience to structural damage)	• Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCDs) are 150 or greater. • Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater. • All soils in wetness class (WC) WCV or WCVI.

Sensitivity of Topsoil and Subsoil	Soil Texture, Field Capacity Days (FCD) and Wetness Class
Medium Sensitivity (medium resilience to structural damage)	• Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150. • Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225. • Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Low sensitivity (high resilience to structural damage)	• Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

Table 11.4 - Criteria for determining sensitivity of Agricultural Landholding

Sensitivity	Description of Agricultural landholdings
Very High	1) Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (daily).
High	1) Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (weekly).
Medium	1) Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).
Low	1) Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent)
Negligible	1) Areas of land which are infrequently used on a non-commercial basis.

Magnitude

11.8.7 The criteria for assigning impact magnitude, summarised in **Table 11.5** and **Table 11.6**, consider the scale/extent of the predicted change and nature and duration of the impact.

Table 11.5 - Magnitude Criteria for Agricultural Land and Soils

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20ha or loss of soil-related features set out in **Table 11.2** (including effects from 'Temporary Developments'*). or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha or gain in soil-related features set out in **Table 11.2** (including effects from 'temporary developments'*).
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20ha or loss of soil-related features set out in **Table 11.2** (including effects from 'Temporary Developments'*). or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20ha or gain in soil-related features set out in **Table 11.2**.
Minor	Permanent, irreversible loss over less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil related features set out in **Table 11.2** above. or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in **Table 11.2**.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

Table 11.6 - Magnitude Criteria for Agricultural Landholding

Magnitude of Impact (Change)	Description **Private property and housing, community land and assets, development land and businesses and agricultural land holdings:**
Major	1) Loss of resource and/or quality and integrity of resource; Severe damage to key characteristics, features or elements. e.g., direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and/or 2) Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision.
Moderate	1) Partial loss of/damage to key characteristics, features or elements, e.g., partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) Introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision
Minor	1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g., amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and/or 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.
Negligible	1) Very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g., acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and/or 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.
No Change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

Significance

11.8.8 Significance will be derived using the matrix set out in in **Table 5.3** in **Chapter 5: EIA Approach and Methodology**. This may be informed by professional judgement, which, where used, would be explained to give the rationale behind the values assigned. Significant effects, in the context of the EIA Regulations 2017 would be effects of moderate or greater significance.

Assumptions and Limitations

11.8.9 The detailed construction methodology for the Project has yet to be defined. This would be subject to further development during the process of iterative design and environmental assessment of the Project. The methodology of construction could change the types and/or severity of the potential effects assessed herein.

11.8.10 Scoping has been prepared based on the environmental baseline available at the time of writing, and the extent of the Scoping Boundary. A full programme of data gathering, and surveys should be undertaken to fully inform the baseline of the assessment to be outlined within the ES.

11.9 Proposed Scope of the ES

11.9.1 The matters that are proposed to be scoped in and out of further assessment for agriculture and soils are outlined in **Table 11.7**.

Table 11.7 - Proposed Scope of the ES

Matter	Phase	Scoped In/ Out	Justification
Temporary loss of agricultural land (including BMV land)	Construction	**Scoped In**	Soil and ALC surveys would be undertaken in relation to areas of significant permanent infrastructure, sections of the haul route through particularly sensitive soils (such as heavy soils prone to compaction) and soil stripping for cable installation. The assessment would detail, as standard mitigation, the requirements for soil handling and reinstatement. Land required temporarily would be fully reinstated to its pre-construction condition (or a condition agreed with the landowner).
Permanent loss of agricultural land (including BMV land)	Operation	**Scoped In**	The permanent loss of BMV land would be assessed as part of the ES based on detailed surveys.
Soil quality associated with ecosystem services	Construction	**Scoped In**	Stripping and stockpiling soils would have a temporary effect on the soil ecosystem services provided. Successful reinstatement would be critical in ensuring these functions are restored.
	Operation	**Scoped Out**	The majority of the land required for construction would

Matter	Phase	Scoped In/ Out	Justification
			be returned to its pre-construction land use (as agreed with the landowner) and so impacts on soil ecosystem functions are likely to be limited.
Land use / agricultural landholdings	Construction	**Scoped In**	The Project has the potential to impact agricultural operations due to disturbance, fragmentation, access restrictions or disruption to water supplies or land drainage. A proportionate approach would be taken, focusing on the most sensitive land uses.
	Operation	**Scoped Out**	The majority of land required for construction would be returned to its pre-construction land use during operation, therefore, impacts on agricultural landholdings across the Project are likely to be limited and not significant.

11.10 References

Ref 11.1: HMSO (1952). The Agricultural Land (Removal of Surface Soil) Act 1953.

Ref 11.2: HMSO (2021). Environment Act 2021.

Ref 11.3: Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework.

Ref 11.4: Bolsover District Council (2020). Local Plan for Bolsover District.

Ref 11.5: Amber Valley Borough Council (2024). Amber Valley Borough Local Plan.

Ref 11.6: Derby City Council (2017). Derby City Local Plan Part 1 – Core Strategy.

Ref 11.7: Derby City Council (2006). City of Derby Local Plan Review.

Ref 11.8: South Derbyshire Council (2016). South Derbyshire Local Plan Part 1.

Ref 11.9: South Derbyshire Council (2017). South Derbyshire Local Plan Part 2.

Ref 11.10: Defra (2011). Safeguarding our soils: A strategy for England [online]. Available at: https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england. [Accessed 29 April 2024].

Ref 11.11: Natural England (2021). Guide to Assessing Development Proposals on Agricultural Land. https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land.

Ref 11.12: The British Society of Soil Science (2022). Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction.

Ref 11.13: British Standards Institute (2015). Specification for topsoil (BS3882:2015).

Ref 11.14: Ministry of Agriculture, Fisheries and Food (1988). Agricultural Land Classification of England and Wales, Revised Criteria and Guidelines for Grading the Quality of Agricultural Land.

Ref 11.15: Defra (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

Ref 11.16: National Grid (2021) Construction best practice for underground cable installation.

Ref 11.17: Institute of Quarrying (2021). Good Practice Guide for Handling Soils in Mineral Workings

Ref 11.18: Institute of Environmental Management and Assessment (2022). A New Perspective on Land and Soil in Environmental Impact Assessment.

Ref 11.19: National Highways (2020). Design Manual for Roads and Bridges (DMRB) LA112: Population and human health.

Ref 11.20: National Highways (2020). DMRB LA109: Geology and Soils.

Ref 11.21: BGS (2024). British Geological Survey Geology Viewer.

Ref 11.22: National Soils Resources Institute at Cranfield University (NSRI) (2024). Soil data. Available online: LandIS – Land Information System – Digital Soils Data Families.

Ref 11.23: Natural England (2024). Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale maps.

Ref 11.24: The Met Office (1989). Climatological Data for Agricultural Land Classification.

Ref 11.25: Department for Energy Security and Net Zero (2024). Overarching National Policy Statement for Electricity Networks Infrastructure (EN-5).

12. Traffic and Transport

Contents

12. Traffic and Transport

12.1 Introduction

12.1.1 This chapter presents how the traffic and transport assessment will consider the potentially significant effects on traffic and transport receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

12.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

12.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

12.2 Approach to Scoping

12.2.1 The approach to scoping has been drawn from previous experience of similar projects and professional judgement. Determining the scope of the traffic and transport assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental mitigation measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

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

- **Chapter 6: Landscape and Visual.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 13: Air Quality.**
- **Chapter 14: Noise and Vibration.**
- **Chapter 15: Socio-economics, Recreation and Tourism.**
- **Chapter 16: Health and Wellbeing.**

12.3 Key Regulatory and Planning Policy Context

Key Legislation

12.3.1 A summary of the key legislation considered in the scope of effects on traffic and transport is outlined below:

- Transport Act 2000 (Ref 12.1).

- The Highways Act 1980 (Ref 12.2).
- New Roads and Street Works Act 1991 (Ref 12.3).
- Traffic Management Act 2004 (Ref 12.4).

National Planning Policy

National Policy Statements

12.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy NPS EN-1 and NPS for Electricity Networks Infrastructure NPS EN-5. **Table 12.1** sets out the requirements of both NPSs relevant to the traffic and transport assessment and how these have been considered within this chapter and will be considered within the ES.

Table 12.1 - National Planning Policy Relevant to Traffic and Transport

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) 2024		
Paragraph 5.14.5	Outlines requirements for an Applicant's assessment should significant traffic and transport effects be likely. The Applicant's ES should include a transport appraisal.	Baseline transport conditions in the traffic and transport study area will be described within the ES. The assessment will consider the likely significant transport effects during construction.
Paragraph 5.14.6	Identifies National Highways and the Highways Authorities as statutory consultees in relation to NSIP applications that are likely to impact the strategic/local road networks. Applicants should consult with National Highways and Highway Authorities as appropriate on the assessment and mitigation to inform the application for development consent.	The Project will consult with National Highways and the relevant Highway Authority throughout the development of the Project proposals. Records of engagement will be documented as part of the ES and agreements noted within relevant Statements of Common Ground.
Paragraph 5.14.7-5.14.8	States that "the applicant should prepare a travel plan including demand management and monitoring measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by active, public and shared transport". The Applicant should also consider disruption to services and infrastructure (roads, rail airports).	An Outline Construction Traffic Management Plan (OCTMP), including a Public Right of Way Management Plan (PRoWMP), will be prepared to accompany the DCO application which will also include a Construction Worker Travel Plan (CWTP) in accordance with this section of EN-1. The appropriate Highways Authorities will be consulted throughout the design process.
Paragraph 5.14.9	If additional transport infrastructure is needed or proposed, it should always include good quality walking, wheeling and cycle routes, and associated facilities (changing/storage etc.) needed to enhance active transport provision.	Additional transport infrastructure will be identified, if required, once the final route is agreed. An OCTMP will be prepared which includes a PRoWMP and a CWTP, will accompany the DCO application and include a construction worker travel plan in accordance with this section of EN-1. The

Policy Reference	Policy Context	How it will be considered
		appropriate Highways Authorities will be consulted throughout the design process.
Paragraph 5.14.18-5.14.20	A new energy NSIP may give rise to substantial impacts on the surrounding transport infrastructure and the Secretary of State should therefore ensure that the applicant has sought to mitigate these impacts, including during the construction phase of the development and by enhancing active, public and shared transport provision and accessibility. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the Secretary of State should consider requirements to mitigate adverse impacts on transport networks arising from the development. Applicants may also be willing to enter into planning obligations for funding infrastructure and otherwise mitigating adverse impacts.	Adverse impacts will be identified, and mitigation measures will be proposed to reduce impacts to an acceptable level. This will be reported as part of the ES. An OCTMP, PRoWMP and CWTP will be prepared as part of the mitigation package.
National Policy Statement for Electricity Networks Infrastructure (EN-5) 2024		
NPS EN-5 sets out the policies relating to electricity generation and its infrastructure, for consideration in conjunction with NPS EN-1. It does not specifically cover transport.		

Other National Policy

12.3.3 A summary of other relevant national policy considered in the scope of effects on the traffic and transport includes:

- NPPF (Ref 12.5).

Regional and Local Planning Policy

12.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

12.3.5 In addition to those identified in **Chapter 2: Legislation, Regulatory and Planning Policy Context**, the following policies have been identified for traffic and transport:

- Derbyshire Local Transport Plan, LTP3 2011-2026 (Ref 12.6).

12.3.6 Local policies will also be included once the final boundary is defined.

Guidance

12.3.7 Relevant guidance specific to traffic and transport that has informed this Scoping Report and would inform the assessment within the ES, comprises:

- Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (Ref 12.7).
- Environmental Assessment of Traffic and Movement ('IEMA Guidelines') (Ref 12.8).
- NRSWA Red Book - Safety at Street Works and Road Works: A Code of Practice (Ref 12.9).
- Planning Practice Guidance: Travel Plans, Transport Assessments and Statements (Ref 12.10).
- Department for Transport (DfT) Strategic Road Network and the Delivery of Sustainable Development, Circular 01/2022 (Ref 12.11).
- Future of Freight: A Long Term Plan (Ref 12.12).

12.3.8 All documents referenced above will be revisited prior to DCO submission to ensure that updated legislation and guidance are considered as part of the Project development.

12.4 Study Area

12.4.1 The study area for the traffic and transport assessment presented in the ES will include roads along the affected roads where (as per the IEMA Guidelines):

- Traffic flows are predicted to increase by more than 30% as a result of the Project (or the number of Heavy Goods Vehicles (HGVs) would increase by more than 30%).
- Within specifically sensitive areas where total traffic flow and HGV flow are predicted to have a net increase by 10% or more as a result of the Project.
- Areas likely to be significantly affected by temporary road restrictions and traffic management measures required to construct the Project

12.4.2 Sensitive areas are defined by the presence of sensitive receptors, such as hospitals, residential properties, community centres, conservation areas, schools, most

vulnerable road users, livestock or accident/collision clusters, located within 150 m of the construction vehicle routes.

12.4.3 The preferred route alignment for the Project has not yet been fully defined and therefore the proposed construction vehicle routes and site accesses have not been identified. Construction vehicle routes (and the study area) would therefore be determined as the design of the Project is developed and would be identified in the ES. The study area would be based on guidance outlined within the Environmental Assessment of Road Traffic (Ref 12.8).

12.4.4 The study area is within the jurisdiction of the following highway authorities:

- Derbyshire County Council (DCC).
- National Highways (NH).

12.4.5 In the absence of a confirmed study area, the baseline conditions describe traffic and transport features within the Scoping Boundary as shown in **Figure 1.1: Location / Context** in **Volume 3**.

12.5 Baseline Conditions (inc. Future Baseline)

Data Collection

12.5.1 The baseline within this Scoping Report has been informed by a desk study which has drawn on the following information sources:

- Ordnance Survey mapping of the Scoping Boundary.
- East Midlands Railway timetables[1].
- Cross Country Trains Train Timetable[2].
- Department for Transport Major Road Network[3].
- Google imagery.

Engagement with Stakeholders

12.5.2 The EIA will be informed by consultation and engagement with stakeholders including Derbyshire County Council, National Highways for highways, Network Rail/Train Operating Companies for rail and Water authorities, such as Environment Agency and Canal and River Trust, for navigable waterways. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

12.5.3 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024. There has been no pre scoping engagement.

12.5.4 The principal feedback received from both Non-Statutory Consultation and of relevance to this scoping chapter is included in **Table 12.2**, together with a response

[1] East Midlands Railway. Timetables. Accessed February 2024. https://www.eastmidlandsrailway.co.uk/timetables-updates

[2] Cross Country Trains. Train Timetables. Accessed February 2024. https://www.crosscountrytrains.co.uk/travel-updates-information/train-timetables

[3] Department for Transport (2024). Major Road Network. Accessed March 2024. Major Road Network (dft.gov.uk)

on how the comments have been considered in this Scoping Report, where applicable.

Table 12.2 - Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Derbyshire County Council Highways	There are no specific comments relating to highways at this stage. As the proposal is refined, the routing of construction traffic, measures associated with the crossing of the highway and the location and means of access to construction compounds, should be clarified and subject to detailed consultation with the Highway Authority.	The highways authority's request is noted by the Project. The referenced considerations will be reviewed and assessed in full with future dialogue undertaken with the Highway Authority.
Derbyshire County Council (Highways)	The route will inevitably cross many footpaths, bridleways and other Rights of Way. It is also likely that access arrangements for construction traffic and the establishment of construction compounds will impact upon the PRoW network. Careful consideration should be given to the location of such compounds and access routes to avoid conflict with PRoW users, and in particular, the intersection or proximity of construction traffic, pedestrians and equestrians.	Careful consideration will be given to the location of compounds and access routes to avoid conflict with PRoW users where possible.
Derbyshire County Council (Highways)	As the design progresses, it is considered that Rights of Way diversions and screen planting may need to be considered.	Where the Project may interact with PRoWs mitigation will be considered where appropriate.
Derbyshire County Council (Highways)	The proposal of extinguishments to PRoWs is to be discouraged.	The extinguishment of PRoWs will be avoided where possible.
National Highways	Regarding the consultation the primary concern is safeguarding the M1 Motorway, as well as the A38, A52, A50 and A6 trunk roads which the future infrastructure may share a physical interface. Siting of infrastructure requires further consideration in relation to potential impact on these assets, including construction and operation impacts. To help ensure the safe and efficient operation of the SRN a Transport Statement should be prepared in accordance with Planning Practice Guidance on Travel Plans, Transport Assessment and Statements (Ref 12.10) together with a CTMP.	A Transport Assessment/Statement (in accordance with Planning Practice Guidance on Travel Plans, Transport Assessment and Statements (Ref 12.10) and CTMP will be prepared as part of the EIA.

Organisation and date	Summary of response	Consideration in the Scoping Report
Network Rail (Asset Protection)	The following guidance notes should be adhered to when considering proposed crossings of Network Rail Assets: • ASPRO.GN001 General Guidance Note. • ASPRO.GN002 Access, minor works and inspections. • ASPRO.GNS Schedule. • ASPRO.SG002 Installation or maintenance of overhead power lines adjacent to or over the operational railway. • ASPRO.SG005 Developments and maintenance works adjacent to the operational railway. • ASPRO.SG007 Scaffolding. • CPA-Mobile-Cranes-Alongside-Railways-1801. • NR_L3_CIV_0063 - Piling, Drilling, Crane, MEWP and SMPT. operations adjacent to the railway. • NR_L2_CIV_191_05 – Network Rail Mining Standard.	The guidance notes provided will be reviewed in full and taken into consideration where future infrastructure may interact with Network Rail assets.
HS2 Ltd	From an HS2 scheme interface perspective it is noted that land identified as required for the Nationally Significant Infrastructure Project partially overlaps with land currently subject to HS2 Phase 2 safeguarding directions for the published Birmingham to Leeds line of route, specifically in the Clay Cross area. HS2 Ltd have no specific views to make on the proposed development in safeguarding terms at this non-statutory stage of the Chesterfield to Willington project but in light of this interface, any future DCO application will need to be considered in the context of potential safeguarding in place for future Northern Powerhouse Rail (NPR) schemes at the time of the application.	The proposals will be considered in the context of potential safeguarding in place for future NPR schemes.
Civil Aviation Authority	The UK Civil Aviation Authority's Airfield Advisory Team (AAT) has determined two general aviation sites within approx. 5 km distance from the boundary of the emerging preferred corridor (Grange Farm and West Hallam). More information is required in terms of terrain elevation for both the existing power lines and the proposed new	As additional information becomes available regarding the actual location of proposed infrastructure and associated terrain elevation and route, a more

Organisation and date	Summary of response	Consideration in the Scoping Report
	infrastructure in order to ascertain the extent of any impact on arrivals and departures on both runway headings.	accurate picture on aerodrome impact will emerge.
Civil Aviation Authority	Consideration of local noise abatement practices (if applicable) may be required as changes to procedures could have secondary effects on residents in proximity to the aerodrome if flight tracks over the ground are adjusted.	If flight tracks over the ground are adjusted as a result of proposed infrastructure consideration of local noise abatement practices (if applicable) will be considered.
Civil Aviation Authority	We recommend that National Grid engage with these aerodromes in the vicinity of the proposal as soon as is practicable. The views of the aerodrome owner/operators should be received and understood by the relevant stakeholders associated with this important national infrastructure project.	Contact will be made with the referenced aerodromes to understand views.
Canal and River Trust	Consideration to the Trent and Mersey Canal, together with routes of two former canals – Cromford Canal and the Derby and Sandiacre Canal – both of which are subject to restoration projects. Liaising with the Trust to ensure that potential risks to the canal structure can be minimised and appropriately managed. Protective provisions including compliance with the Code of Practice for Works Affecting the Canal and River Trust will be sought.	Impacts on these assets will be considered, including in terms of construction activities.

Existing Baseline Conditions

Road Traffic Flow Data

12.5.5 There are a number of roads within the Scoping Boundary which may form the proposed construction vehicle routes to/from the Project and the Strategic Road Network (SRN) and Major Road Network (MRN) as shown on **Table 12.3**. Once the location of the construction compounds and construction site access points are defined; the list of roads included in the baseline will be updated and baseline traffic flows will be obtained.

Table 12.3 - Summary of Roads within Scoping Boundary

Road Classification	Roads within Scoping Boundary
SRN/MRN	M1, A61, A6, A50, A52, A38
Primary	A610, A617, A5111, A5132, A514, A615, A516, A632, A6175, A6005, A6007, A608, A609, A6096, A6192.
Secondary	B6425, B5035, B6036, B6014, B6013, B6016, B6374, B6179, B5010
Local/Unnamed	Various

Collision Data

12.5.6 Collision data will be reviewed once the study area has been defined and agreed with the highway authorities.

Rail Network

12.5.7 The Scoping Boundary crosses the railway lines on the East Midlands Railway and Cross Country routes, part of Network Rail's Eastern region. The main route is the Midland Main Line (MML), which runs from London St Pancras, and reaches Sheffield at its most northerly point. The route takes in the whole of the East Midlands including Derby, Nottingham and Leicester and serves suburban commuter links outside London and longer distance services to the three biggest cities of the East Midlands and including East Midlands Parkway for connections to the region's airport.

12.5.8 **Table 12.4** presents the main rail lines and the daily frequencies during weekdays sourced from East Midlands Railway and Cross-Country Railways.

Table 12.4 - Summary of Rail Operations within Scoping Boundary

Railway Line	Operated by	Frequencies
Chesterfield – Loughborough	East Midlands Railways	44 per day
Matlock – Derby	East Midlands Railways	48 per day
Uttoxeter – Derby	East Midlands Railways	24 per day

Railway Line	Operated by	Frequencies
Uttoxeter – Burton on Trent	East Midlands Railway/Cross Country	18 per day
Derby – Burton on Trent	Cross Country	74 per day
Chesterfield – Derby	East Midlands Railway/Cross Country	46 per day
Tamworth – Derby	Cross Country	74 per day
Derby – Loughborough	East Midlands Railways	36 per day
Nottingham – Burton on Trent	Cross Country	44 per day
Loughborough – Burton on Trent	East Midlands Railway/Cross Country	48 per day

12.5.9 Network Rail is currently electrifying the railway line within the Midland Mainline region, with a renewal programme to 2024. Projects in the study area would be identified and any impact on the highway network would be analysed, if possible, to establish the baseline traffic conditions.

12.5.10 The railway service may impact the construction activities due to the location of the level crossings and may delay construction services. Weight restrictions on bridges over railway lines, and height restrictions on sections under railway lines, may affect the construction traffic route.

Waterways

12.5.11 The River Trent, River Rother, River Derwent, River Amber and Trent and Mersey Canal cross the Scoping Boundary. A number of smaller watercourses and drainage ditches are also noted within the Scoping Boundary.

Public Rights of Way, Long Distance Paths and National Cycling Routes

12.5.12 There are a number of PRoWs, long distance paths and NCRs within the Scoping Boundary which may cross or form part of the proposed construction vehicle routes to/from the Project. Once the location of the construction compounds and construction site access points are defined, the PRoWs, NCRs and any long-distance paths will be identified and presented in the baseline and baseline surveys will be obtained as necessary.

Future Baseline

12.5.13 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 in the ES. The future baseline will be based on peak construction traffic flows during the construction programme which will be identified as the Project details are progressed. The future baseline will be discussed and agreed with the highway authorities.

12.5.14 Future baseline traffic flows are not known at this stage and would be estimated to the required future year taking into account predicted traffic growth using an appropriate growth factor derived from Trip End Model Presentation Program (TEMPro). A consideration of any committed and cumulative developments within the

area and engagement with the local highway authority to understand any proposed transport network improvements will also form part of the assessment presented in the ES.

12.5.15 Future baseline walking, cycling, horse riding activity and livestock activity are not known at this stage, but increases may be realised due to new development in certain areas, and corresponding localised improvements to the network. This would be considered as part of the assessment presented in the ES.

12.5.16 A description of further information to be gathered to inform the future baseline for traffic assessment is provided in Section 12.8.

12.6 Mitigation Measures Adopted as Part of the Project

12.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

12.6.2 As part of the Project design process, a number of embedded environmental measures will be proposed to reduce the potential for impacts on traffic and transport receptors, including seeking to minimise crossings of transportation infrastructure to the extent practicable. These measures will evolve as the EIA progresses, and in response to consultation, and will be fed iteratively into the assessment process.

Good Practice Mitigation Measures

12.6.3 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2.**

12.6.4 In addition, **Appendix 4A: Initial Outline Code of Construction Practice in Volume 2** presents the likely good practice mitigation measures relevant to traffic and transport.

12.6.5 For traffic and transport, mitigation measures for the construction phase would be provided in the Outline CTMP which will include a PRoWMP and a CWTP, submitted with the DCO application. The extent of specific mitigation measures and their effectiveness would be discussed in advance with relevant stakeholders. Such measures may include the use of haul roads from dedicated or existing easements, suitable highways signage, implementation of temporary traffic controls and restrictions, and a construction staff travel plan. Through the proposed mitigation measures, the Project would aim to minimise disruption to existing motorised and vulnerable road users, local residents, businesses and other users of the surrounding local road network.

12.6.6 Crossing schedules will be developed for the overhead line and access works which set out crossing methodologies of all roads, railway lines, PRoWs and watercourse crossings.

Additional Mitigation Measures

12.6.7 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage no additional mitigation measures have been identified for traffic and transport.

12.7 Likely Significant Effects

12.7.1 This section sets out the likely significant effects on traffic and transport arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project.**

12.7.2 The review of likely significant effects assumes that the embedded, good practice and additional mitigation measures described in Section 12.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportionate assessment.

12.7.3 The assessment will look at increased traffic levels, driver delay/public transport delay, the effects of severance and amenities, fear and intimidation, collisions and road safety and parking and loading.

12.7.4 The likely significant effects of the Project have been split into:

- Traffic and transportation covering road networks.
- PRoWs and NCRs.
- Rail Network.
- Watercourses.

Traffic and Transportation

Construction – Effects on the Existing Road Network

12.7.5 The primary traffic and transportation effects associated with the Project would be a direct result of an increase in traffic flows on the surrounding roads used by construction vehicles. The traffic routing and construction programme or volume of construction traffic are not yet known. A separate Transport Assessment (TA) and OCTMP would be prepared for the Project to support the DCO application and would outline proposed mitigation to minimise disruption caused by the Project's construction.

12.7.6 The potential effects on receptors would be included in the assessment of construction traffic where the flows generated by the Project increase baseline traffic and HGV flows by 30% or 10% in specifically sensitive areas. These thresholds are used to determine which links within the traffic and transport study area should be considered.

12.7.7 Potential cumulative effects on the local highway network from this Project and all other relevant committed transport network schemes and developments would be assessed and taken into account when generating the predicted future baseline

vehicle flows. Committed developments that would be considered would be confirmed with relevant local authorities.

12.7.8 Resultant impacts with the potential for significant effects from the increase in traffic flows on the surrounding roads include:

- Increased severance to communities, walkers, cyclists and horse riders.
- Increased driver journey length and delay.
- Decline in highway safety including the increased risk of accidents caused by the transport of hazardous loads.
- Fear and intimidation and reduction in walker, cyclists and horse rider amenity.

12.7.9 The traffic and transport effects for the construction phase are therefore proposed to be **Scoped In** to the ES.

Operation and Maintenance – Effects on the Existing Road Network

12.7.10 During the operational phase (inc. maintenance) of the Project, traffic generated would be associated with infrequent repair and routine maintenance, and inspection activities. Based on projects of a similar nature and scale, it is envisaged that a small number of operational staff would operate and maintain the infrastructure (approximately 0 to 3 vehicles annually based on evidence from similar projects).

12.7.11 The impact of the traffic generated by the operational phase of the Project is expected to be substantially lower than during construction. It is therefore not anticipated to have a material effect on the transport network and receptors and is likely to be negligible as the predicted increase in future baseline traffic will be less than 10%. This approach has been successfully undertaken by National Grid on similar overhead line projects and is also suitable for this Project.

12.7.12 Traffic and transport effects during operation (inc. maintenance) are therefore proposed to be **Scoped Out**.

Construction – Effects on the Existing Rail Network

12.7.13 The scheme design would seek to avoid or minimise effects on operational rail infrastructure during the construction phase, however the following interactions could be required:

- Overhead line alignment: Where the overhead line routing crosses the railway, crossing methods will be employed to avoid any potential impacts on the operational rail infrastructure. However, there may be a requirement for service interruptions to facilitate netting of scaffolding protection over railways for overhead line crossings to facilitate overhead line stringing and vegetation clearance adjacent to the railway line.
- Construction traffic: Most construction routes would use existing crossings that would not exceed existing weight/height restrictions, and this would be confirmed with Network Rail. However, remedial or upgrade works may be required to railway bridges to accommodate temporary access works such as haul roads or side access on existing over-bridges to reach severed areas of land.

12.7.14 Where these are required, agreement would need to be sought with Network Rail for daytime or nighttime line blockages or possessions. Subject to discussions with Network Rail, where possible planned closures would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. Durations of closures would be limited as far as practicable. National Grid would liaise

with Network Rail to agree any additional measures that may be required as part of the works. With these measures in place, it is expected that effects would not be significant, and therefore the assessment of construction impacts on the railway network is **Scoped Out** from the ES.

Operation and Maintenance – Effects on the Existing Rail Network

12.7.15 The design life of the OHL seeks to minimise the impact on railway assets. Therefore, operational and maintenance traffic would be infrequent, and overhead line crossing methods will be employed to avoid any potential impacts on the operational rail infrastructure. Subject to discussions with Network Rail, any planned closure would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. National Grid would liaise with Network Rail to agree any additional measures that may be required as part of the works. Therefore, due to the limited impacts to railway services and journey times the assessment of operation and maintenance impacts on the railway network is **Scoped Out** from the ES.

Construction – Effects on the Existing Watercourses

12.7.16 Overhead line crossing methods will be employed to minimise any likely significant effects on the operation of watercourses. Relevant stakeholders would be engaged prior to works being undertaken.

12.7.17 It is anticipated that construction material and any surplus materials removed will be transported via the existing road network. As the Project progresses, if the use of the existing watercourses within the Scoping Boundary to transport construction material or removal of spoil is explored, the Environment Agency and Navigation Authority will be consulted, and the scope of the assessment will be reviewed.

12.7.18 Therefore, the assessment of construction impacts on the watercourse network is **Scoped Out** to the ES.

Operation and Maintenance – Effects on the Existing Watercourses

12.7.19 Similar to the approach taken to the crossing of other live transport networks, any requirements for crossings of existing watercourses during the operational and maintenance phase would be coordinated with the asset owner. Operation and maintenance traffic would be unlikely to use or affect the use of the watercourse network.

12.7.20 Therefore, the assessment of operation and maintenance impacts on the watercourse network is **Scoped Out** from the ES.

Public Rights of Way, Long Distance Paths and National Cycling Routes

Construction – Increase in Journey Times for Users of Public Rights of Way

12.7.21 Proposed diversions or closures of PRoW, NCR and long-distance paths have the potential to increase journey times for horse riders, walkers and cyclists. Where practical and feasible, continued access to and use of the PRoW and national cycling routes will be facilitated in order to minimise the number of diversions and temporary closures required and the impact on users. Where this is not feasible, the PRoW and national cycling routes will either be temporarily diverted, or if the route cannot be diverted, temporarily closed. Potential effects on users of PRoWs (walkers, cyclists and horse-riders) will be assessed and would include:

- Severance of PRoWs, national cycle routes and long-distance paths.
- Fear and intimidation and reduction in walker, cyclists and horse rider amenity.
- Increased journey time and delay to walkers, cyclists and horse riders.

12.7.22 The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and OCTMP (Including PRoWMP and CWTP) would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders. This is to be confirmed with the Local Highway Authority (LHA).

12.7.23 The traffic and transport effects for the construction phase are therefore proposed to be **Scoped In** to the ES.

Operation and Maintenance – Increase in Journey Times for Users of Public Rights of Way

12.7.24 At this stage, operational and maintenance traffic is expected to be very low and therefore will not affect journey times along PRoW, cycle routes and long-distance paths. However, any potential permanent closure or diversions on existing PRoW routes may affect journey times. Potential effects on users of PRoWs (walkers, cyclists and horse-riders) will be assessed. The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and OCTMP would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders. This is to be confirmed with the LHA.

12.7.25 At this stage, due to uncertainty of any permanent closure or diversions on the existing PRoWs, increase in journey times for users of public rights of way during Operation and maintenance is proposed to be **Scoped In** to the ES.

12.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

12.8.1 In addition to the data sources listed in Section 12.5, the assessment within the ES would be supplemented by the following additional information:

- Historic traffic count data (Road Traffic Statistics from the Department for Transport (DfT)) (Ref 12.13) on potential A-roads that may form the Project construction vehicle routes.
- Traffic surveys (including use of PRoWs) and a Road Safety Audit may be commissioned should baseline data be unavailable for all roads forming the proposed construction vehicle route to/from the Project and its connection to the SRN.
- Available data relating to public transit such as bus stop locations, as well as operational information for highways including bridges and restrictions, level crossings, Section 58 and 85 Restrictions, Clean Air Zones, special restrictions (including traffic sensitive times), and carriageway construction type.

Traffic Flow Data

12.8.2 Following consultation and once the location of the construction compounds and construction site access points are defined, a more detailed assessment of the impact on the road network including the strategic road network, A-roads, B-roads and local roads would be undertaken. This would provide a robust understanding of the ability

to accommodate construction traffic (including abnormal indivisible loads) and the mitigation works required in the form of new road infrastructure or improvements to existing road infrastructure. Where required, additional traffic flow data would be collected using Automatic Traffic Counts (ATCs) and Manual Classified Counts (MCC).

12.8.3 The data would present annual surveys of Annual Average Daily Traffic (AADT) and vehicle classification including HGVs. The AADT flows from the Historic DfT counts would be converted into average weekday traffic flows and 12-hour flows (07:00-19:00 hrs) by applying an appropriate factor. This would be based on a standard daily profile over a 24-hour period from the DfT's online road traffic statistics *Table TRA0307* (DfT, 2023[4]).

12.8.4 The traffic data would be used to establish the baseline. Future baseline flows would be estimated taking into account predicted traffic growth using an appropriate growth factor derived from TEMPro, as well as traffic from committed developments, to be agreed with the highway authorities. The impact of the Project construction traffic will be based on its proportional increase of the future baseline flows. Walking, Cycling and Horse-riding Routes and PRoW User Surveys

12.8.5 There are a number of routes used by pedestrians, cyclists and horse-riders within the Scoping Boundary. These include PRoW, footways/cycleways, long distance paths, existing carriageway facilities on the highway network and principle cycling routes from the National Cycle Network and local routes. Once the construction vehicle routes and the study area are defined, the impacted walking, cycling, horse-riding and livestock routes and PRoWs would be identified and assessed. Information on these would be sourced from the most current and available OS data, Sustrans, and Local Authorities.

12.8.6 Where required, user surveys of PRoWs would be undertaken over a 12-hour period (typically 07:00 to 19:00hrs). These include footpaths, cycle paths, bridleways and equestrian routes. The surveys would typically be undertaken on a weekend where the usage would reflect the highest level of demand, however this would be reviewed following consultation with the local authorities.

Public Transport

12.8.7 There are several bus routes in the study area. Once the construction vehicle routes and the study area are defined, the impacted public transport services, known at the time of writing the ES, would be identified and assessed. Bus routes and frequencies would be sourced from the local authorities and the relevant service providers to ensure the latest network information is considered in the assessment.

Collision Data

12.8.8 Three-year personal injury collision data would be obtained from NH for all roads that form the proposed construction vehicle routes to/from the Project and the SRN/MRN. Three-year injury collision data would be obtained from all local authorities for roads on the local highway network. A review of the latest collisions reported, obtained from Crashmap or from the local authority (to be agreed), would be undertaken to identify any collision cluster sites and to understand causation factors. Geographical Information Systems (GIS) software would be utilised to map these collisions. The analysis of collisions would help to identify principal areas of concern, and where

[4] https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra

needed, help with the development of potential mitigation measures relating to the increase in vehicle flow generated by the Project.

Existing Highway Schemes

12.8.9 All existing highway schemes along the proposed construction vehicle routes would be confirmed with National Highways and DCC Information regarding project construction programmes, temporary traffic management arrangements/phasing, available CTMPs or Transport Assessment, predicted operational traffic flows and any associated traffic modelling would be obtained where possible to understand baseline traffic conditions and inform the Project's approach in reducing its impact on the highway network.

Committed Highway Schemes

12.8.10 In addition to existing highway schemes, the timelines and details for all committed highways schemes along proposed construction vehicle routes would be confirmed by National Highways and the relevant Highway Authorities to understand future baseline traffic conditions on roads along proposed construction vehicle routes.

Committed Developments

12.8.11 All committed developments surrounding the construction vehicle routes would be confirmed with highway authorities. Where possible, information on their timeline and predicted traffic flows would be identified to understand future baseline traffic conditions on roads along proposed construction vehicle routes.

Potential Constraints and Restrictions

12.8.12 Site surveys would be undertaken to allow for a visual inspection of the potential construction vehicle routes, confirming findings of background data and identifying any unknown constraints or opportunities. This would include a review of all protected and quiet lanes identified from DCC.

12.8.13 If Abnormal Invisible Loads (AILs) are required for the Project, details of any existing carriageway width, height, and weight restrictions for the movement of such vehicles would be discussed with National Highways and the local highway authorities.

Baseline Mapping and Highway Boundary

12.8.14 Information on the road network that forms the construction vehicle route would be obtained from local authorities and National Highways, which would include baseline mapping and highway boundary information. OS mapping and satellite imagery would also be used.

Proposed Assessment Method

12.8.15 This section sets out the proposed methodology to assess the traffic and transport impacts during the construction phase of the Project and have been Scoped in. The following methodology and assessment criteria have been developed using DMRB LA 104: Environmental Assessment and Monitoring (Ref 12.7), new IEMA Guidelines (Ref 12.8) and relevant policies and legislation.

12.8.16 The proposed methodology is broadly based on assessment criteria developed for similar major infrastructure projects.

12.8.17 The assessment would examine a worst case in terms of traffic and transport effects, i.e., the peak period when the highest levels of construction traffic are expected to occur. It would be informed by a desk-based study with analysis of all data obtained, and discussions with the design team, in particular around anticipated construction traffic movements and proposed mitigation measures. Professional judgement would be applied, where there is an absence of relevant guidance or criteria, to determine whether significant effects may arise which have not been identified by the use of the assessment criteria (i.e., collision clusters and durations of diversion routes).

12.8.18 The assessment would include the identification of temporary traffic management, including road and PRoW closures and potential diversionary routes.

12.8.19 The assessment would take account of:

- Engineering estimates of the quantity of plant, equipment and materials required to be brought to and from site, to facilitate Project works.
- The assumed method of construction.
- Indicative construction programme and activity durations.

12.8.20 The following impacts would be assessed:

- Increase in traffic levels:
  - In order to first determine the scale and extent of the assessment, the following parameters would be considered:

12.8.21 The sensitivity of each road required for construction vehicle routes (to be discussed with each local authority).

12.8.22 The percentage increase in total traffic and / or HGVs as a result of the Project along each road on the construction vehicle routes. In accordance with the IEMA Guidelines, only links where increases in total traffic flow or HGV flows are in excess of 30% on any link (‘Rule 1’) or 10% on links through sensitive areas (‘Rule 2’) would be further assessed for effects (such as Driver and Public Transport Passenger Delay, Vulnerable Road Users Delay, Severance and Amenity, Accident and Road Safety and Parking and Loading).

- Driver delay and public transport delay to passengers
  - The following criteria based on professional judgement would be used to assess effects.

12.8.23 Where there is a change in traffic flow of greater than 30%. Net traffic and/or HGV flows of 30%, 60% and 90% are considered minor, moderate and major changes in magnitude.

12.8.24 Changes to bus services/bus stops or taxi facilities for over four weeks in any 12-month period.

- Pedestrian, Cyclist and Horse-Rider Delay, Severance and Amenity
  - The following criteria from the IEMA Guidelines and based on professional judgement would be used to assess effects.

12.8.25 Where there would be a temporary maximum increase in journey length along a road or other PRoW for pedestrians, cyclists or horse-riders for more than four weeks in any 12-month period.

12.8.26 Pedestrian severance occurs when there is difficulty experienced in crossing a heavily trafficked route. Changes in net traffic flows of 30%, 60% and 90% are considered to have minor, moderate and major effects in severity respectively.

12.8.27 The pedestrian amenity threshold, as set out in the IEMA Guidelines to assess the significance of change, is where the traffic flow is doubled (increase over 100%) or where the HGV flows are over 30%, 60% and 90% (considered to have minor, moderate, and major effects respectively). Pedestrian amenity is defined as the relative pleasantness of a journey and is considered to be impacted by traffic flow, traffic composition and footway width/separation from traffic.

12.8.28 Where a temporary increase is forecast of more than 30% in HGVs or total flow on a route intersecting a PRoW, bridleway or near an equestrian centre for more than four weeks in any 12-month period.

- Fear and intimidation.
  - The following criteria from the IEMA Guidelines and professional judgement would be used to assess effects.

12.8.29 Fear and intimidation occurs through a combination of traffic flow, speed, HGV composition and proximity to people or lack of protection caused by such factors as narrow pavements. Net traffic and/or HGV flows of 30%, 60% and 90% are considered minor, moderate and major changes in magnitude to the sensitivity and vulnerability of pedestrians, cyclists and horse-riders.

- Accidents and road safety
  - Accidents and safety are assessed using personal injury accident data obtained from highways authority records. The IEMA Guidelines recommend that professional judgement would be needed to assess the effects. The following criteria would be used to assess the effects.
  - Where junctions have had ten or more collisions in a three-year period.
  - Where links have recorded ten or more collisions per 100m lengths in a three-year period.
- Parking and loading
  - The IEMA Guidelines recommend that professional judgement is used to assess the parking and loading effects on receptors. The following criteria would be used.

12.8.30 Loss of more than four weeks in any 12-month period of one or more on street loading bay, five or more on street residential/ business bay; five or more cycle/motorcycle spaces or 20 general parking spaces or equivalent length of unrestricted kerbside spaces.

Sensitivity

12.8.31 Resources are the assets and facilities which may be impacted by the Project such as the highway network. Receptors are the users or beneficiaries of those resources such as pedestrians, cyclists and drivers who travel within the study area. Sensitive areas are defined by the presence of sensitive receptors and inadequate resources, such as community centres, schools, equestrian facilities, narrow well-used footways along busy roads, or accident black spots.

12.8.32 The criteria used to determine the value and sensitivity of receptors specific to traffic and transport are set out in **Table 12.5** These values are based on the IEMA 2023 Guidance.

Table 12.5 - Criteria for Determining Sensitivity / Value

Sensitivity / Value	Receptor	Type of Receptor
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident blackspots, retirement homes, urban/residential roads without footways that are used by pedestrians.	Residents, workers, pedestrians (sensitive groups such as children, elderly and disabled), cyclists and horse-riders using the highway and PRoWs.
Medium	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks and recreational facilities.	
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.	
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from impacted roads and junctions	

Magnitude

12.8.33 The expected traffic generated by the Project during construction would be quantified where appropriate and assessed against anticipated background traffic flows to outline the anticipated percentage increase in total vehicles and HGVs.

12.8.34 The methodology proposed for determining the magnitude of impact follows guidance set out by the DMRB LA 104 Environmental Assessment and Monitoring (Ref 12.7) together with professional judgement. The order of magnitude criteria is shown in **Table 12.6**.

Table 12.6 - Criteria for Determining Magnitude of Change (Impact)

Magnitude of Change	Change from baseline
Major	Total loss or major alteration to principal elements or features of the baseline conditions to the extent that post-scenario character or composition of baseline conditions would be fundamentally changed.

Magnitude of Change	Change from baseline
Moderate	Loss or alteration to one or more principal elements or features of the baseline conditions to the extent that post-scenario character or composition of the baseline conditions would be materially changed.
Minor	Minor shift away from baseline conditions. Changes arising would be detectable but not material; the underlying character or composition of the baseline conditions would be similar to the pre-scenario situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Significance

12.8.35 The significance of traffic and transport effects would be determined by considering the identified magnitude of impact on the receptors and their sensitivity.

12.8.36 Significance will be derived using the matrix set out in **Chapter 5: EIA Approach and Methodology**. This may be informed by professional judgement which, where used, would be explained to give the rationale behind the values assigned. Significant effects in the context of the EIA Regulations 2017 would be effects of moderate or greater significance.

12.9 Proposed Scope of the ES

12.9.1 The matters scoped in or out of further assessment for traffic and transport are outlined in **Table 12.7**.

Table 12.7 - Proposed Scope of the ES

Matter	Phase	Scoped In/Out	Potential Significant Effects
Assessment of traffic and transport impacts	Construction	**Scoped In**	To assess the potential increase in traffic flows against IEMA Rule 1 and Rule 2. A separate TA and Outline CTMP would also be prepared for the Project to include measures that control traffic.
	Operation	**Scoped Out**	The overhead lines, pylons and new substations are uncrewed, therefore operational traffic would be associated with infrequent repair and routine maintenance works. The impact of operational phase traffic from the Project would be expected to be significantly lower than the construction phase and is classed as negligible, as it is expected to be below 10% increase in future baseline flows. For this reason, operational traffic movements are not anticipated to have a material effect on the transport network and receptors. Scoping out an assessment of operational phase traffic and transport impacts is consistent with other National Grid projects.
Assessment of potential PRoW, long distance paths and cycle route diversions and closures	Construction	**Scoped In**	Where practical and feasible continued access to and use of the PRoW will be facilitated in order to minimise the number of diversions and temporary closures required and the impact on users. Where this is not feasible, the PRoW will either be temporarily diverted, or if the route cannot be diverted, temporarily closed. The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and OCTMP (including PRoWMP and CWTP) would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders.
	Operation	**Scoped In**	Any potential permanent closure or diversions on existing PRoW routes may affect journey times. Potential effects on users of PRoWs (walkers, cyclists and horse-riders) will be assessed. The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and OCTMP would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders.

Matter	Phase	Scoped In/Out	Potential Significant Effects
Assessment of impacts on the rail network	Construction	**Scoped Out**	Most construction routes would use existing crossings that would not exceed existing weight/height restrictions, and this would be confirmed with Network Rail. However, remedial or upgrade works may be required to railway bridges to accommodate temporary access works such as haul roads or side access on existing over-bridges to reach severed areas of land. There may be a requirement for service interruptions to facilitate netting of scaffolding protection over railways for overhead line crossings to facilitate overhead line stringing and vegetation clearance adjacent to the railway line. Agreement would need to be sought with Network Rail for daytime or nighttime line blockages or possessions. Subject to discussions with Network Rail, where possible planned closures would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. Durations of closures would be limited as far as practicable. National Grid would liaise with Network Rail to agree any additional measures that may be required as part of the works. With these measures in place it is expected that potential effects would not be significant.
	Operation	**Scoped Out**	The design life of the overhead line seeks to minimise the impact on railway assets. Operation and maintenance traffic would not affect the railway service. The overhead line would be designed to avoid interaction with any operational rail infrastructure and accesses to pylons for maintenance would be either side of operational railways avoiding the need for crossings where practicable. There may be a requirement for service interruptions to facilitate netting of scaffolding protection over railways for overhead line maintenance and vegetation clearance. Agreement would need to be sought with Network Rail for daytime or nighttime line blockages. Subject to discussions with Network Rail, where possible planned closures would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. Durations of closures would be limited as far as practicable. National Grid would liaise with Network Rail to agree any additional measures that may

Matter	Phase	Scoped In/Out	Potential Significant Effects
			be required as part of the works. With these measures in place it is expected that potential effects would not be significant
Assessment of impacts on the watercourse network	Construction	**Scoped Out**	Overhead line crossing methods will be employed to minimise any likely significant effects on the operation of the watercourse. Relevant stakeholders would be engaged prior to works being undertaken. It is anticipated that construction material and any surplus material removed will be transported via the road network. As the Project progresses, if the use of the existing watercourses within the Scoping Boundary to transport construction material or removal of spoil is explored, the Environment Agency and Local Authorities will be consulted and the scope of the assessment will be reviewed.
	Operation	**Scoped Out**	Similar to the approach taken to the crossing of other live transport networks, any requirements for crossings of existing watercourses during the operational and maintenance phase would be coordinated with the asset owner. Operation and maintenance traffic would be unlikely to use or affect the existing watercourse network.

12.9.2 As set out in **Table 12.7** and throughout this chapter, a separate TA and an OCTMP would be prepared in support of the DCO application.

12.9.3 The TA would set out transport issues relating to the Project and would identify what measures would be taken to mitigate the anticipated transport effects to improve accessibility, encourage sustainable travel, and improve the safety for all modes of travel. The assessment would support national and local planning policy and would be developed through consultation with all relevant stakeholders.

12.9.4 The OCTMP would be prepared to ensure that all traffic associated with the Project's construction works operate in a safe and compliant manner. The OCTMP would ensure the effects caused by construction traffic to receptors, including existing road users, local residents, properties, businesses and schools, are minimised where possible, while identifying potential mitigation measures if required.

12.10 References

Ref 12.1: HMSO (2000). Transport Act 2000. Available at Transport Act 2000 (legislation.gov.uk)

Ref 12.2: HMSO (1980). The Highways Act 1980. Available at Highways Act 1980 (legislation.gov.uk)

Ref 12.3: HMSO (1991). New Roads and Street Works Act 1991. Available at New Roads and Street Works Act 1991 (legislation.gov.uk)

Ref 12.4: HMSO (2004). Traffic Management Act 2004. Available at: Traffic Management Act 2004 (legislation.gov.uk)

Ref 12.5: Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework.

Ref 12.6: Derbyshire County Council, 2011. Local Transport Plan 2011 – 2026. Available at: Derbyshire Local Transport Plan Three (LTP3) 2011 to 2026 - full document

Ref 12.7: National Highways (2020) Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring.

Ref 12.8: IEMA Guidelines (2023). Environmental Assessment of Traffic and Movement.

Ref 12.9: Department for Transport (2013, amended 2014) Safety at Street Works and Road Works: A Code of Practice.

Ref 12.10: Department for Levelling Up, Housing and Communities (2014) Guidance: Travel Plans, Transport Assessments and Statements. Available at Travel Plans, Transport Assessments and Statements - GOV.UK

Ref 12.11: Department for Transport (DfT) (2022) Strategic Road Network and the Delivery of Sustainable Development, Circular 01/2022.

Ref 12.12: Department for Transport (DfT) (2022) Future of Freight: a long-term plan.

Ref 12.13: Department for Transport (2023). Road Traffic Statistics. Accessed March 2024. Map Road traffic statistics - Road traffic statistics (dft.gov.uk).

13. Air Quality

nationalgrid

Contents

13. Air Quality

13.1 Introduction

13.1.1 This chapter presents how the air quality assessment will consider the potentially significant effects on air quality receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

13.1.2 As detailed in **Chapter 4 Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

13.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

13.2 Approach to Scoping

13.2.1 The approach to scoping has drawn from previous experience of similar Projects and professional judgement. Determining the scope of the air quality assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental mitigation measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

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

- **Chapter 5: Environmental Impact Assessment Approach and Methodology.**
- **Chapter 7: Ecology and Biodiversity.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 12: Traffic and Transport.**
- **Chapter 16: Health and Wellbeing.**

13.2.3 This chapter is supported by the following figures in **Volume 3**:

- **Figure 13.1 Air Quality Constraints.**

13.3 Key Regulatory and Planning Policy Context

Key Legislation

13.3.1 A summary of the key legislation considered in the scope of effects on air quality is outlined below:

- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.
- The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019.
- Air Quality (England) (Amendment) Regulations 2002.
- Air Quality Standards Regulations 2010, as amended in 2016.
- Part IV of the Environment Act 1995.
- Environmental Protection Act (EPA) 1990.
- Environment Act 2021.
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.
- Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

National Planning Policy

National Policy Statements

13.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement for Energy NPS EN-1 (Ref 13.1) and the National Policy Statement for Electricity Networks Infrastructure NPS EN-5 (Ref 13.2). **Table 13.1** sets out the requirements of both NPSs relevant to air quality and how these have been considered within this chapter and will be considered within the ES.

Table 13.1 – National Planning Policy Relevant to Air Quality

Policy Reference	Policy Context	Section Considered
National Policy		
Overarching National Policy Statement for Energy (EN-1) 2024		
Paragraph 5.2.1	(part) 'Energy infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside and species'.	The air quality assessment will consider the impacts and resulting effects on sensitive human and ecological receptors, associated with construction, as described in **Table 13.6.**
Paragraph 5.2.2	'Legal limits for pollutants in ambient air are set out in the Air Quality Standards Regulations 2010 and for England, national objectives set out in the Air Quality (England) Regulations 2000 reiterated in the Air Quality Strategy, or for Wales, the Air Quality (Wales) Regulations 2000 and the Clean Air Plan for Wales. In addition, two fine particulate matter (PM2.5) targets were set under the Environment Act 2021 for England – an annual mean concentration target and a population exposure target. Internationally agreed emissions commitments are set in the National Emission Ceilings Regulations 2018 and establish limits for total UK emissions of key pollutants'.	Project effects will be evaluated in the context of the particulate matter less than 2.5 microns (PM2.5) Limit Value (LV), as set out in the Air Quality Standards Regulations (United Kingdom Government, 2010) and the Environment Targets (Fine Particulate Matter) (England) Regulations (United Kingdom Government, 2023). An assessment to evaluate the risk of potential non-compliance with the PM2.5 LV and fine particulate targets will be undertaken within the air quality study area if necessary.
Paragraph *5.2.3*	'For many air pollutants there is not a threshold below which there is no health impact so it is important that energy infrastructure schemes consider not just how a scheme may impact statutory air quality limits, objectives or targets but also measures to mitigate all emissions in order to minimise human exposure to air pollution, especially for those who are more susceptible to the impacts of poor air quality'.	The air quality assessment will consider mitigation measures to reduce human exposure to air pollution where practicable, in the form of embedded mitigation and additional mitigation to reduce likely significant adverse air quality effects.

Policy Reference	Policy Context	Section Considered
Paragraph 5.2.4	*'A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment. Eutrophication from air pollution results mainly from emissions of NOx and ammonia'.*	Paragraph 5.2.4 refers to the main emissions of energy infrastructure being from generating stations. While paragraph 5.2.4 refers to power generation, the Project has the potential to lead to eutrophication effects from vehicle exhaust emissions of nitrogen oxides (NO_X) and ammonia (NH_3) associated with the construction and operational phases of the Project. The air quality assessment will quantify impacts of nitrogen deposition at relevant ecological sensitive receptors if the Project is predicted to have an impact at such locations.
Paragraph 5.2.7	'Proximity to emission sources can have significant impacts on sensitive receptor sites for air quality, such as education or healthcare sites, residential use or sensitive or protected ecosystems. Projects near a sensitive receptor site for air quality should only be proposed in exceptional circumstances if no viable alternative site is available. In these instances, substantial mitigation of any expected emissions will be required'.	The air quality assessment will assess effects on sensitive receptors such as those described in paragraph 5.2.7 of NPS EN-1. If required, additional mitigation shall be implemented to reduce likely significant adverse air quality effects.
Paragraph 5.2.8	'Where the Project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES)'.	Screening of relevant data will be undertaken to determine where the Project is likely to have adverse impacts on air quality, the effects of which, will be assessed as part of the air quality assessment.
Paragraph 5.2.9	*'The ES should describe:* • *existing air quality concentrations and the relative change in air quality from existing levels;* • *any significant air quality effects, mitigation action taken and any residual effects, distinguishing between the Project stages and taking account of any significant emissions from any road traffic generated by the Project;*	Should screening of traffic data for any of the Project stages indicate that detailed assessment is required, then dispersion modelling will be undertaken as part of the air quality assessment to determine the impact of pollutant concentrations resulting from the Project at relevant sensitive human and ecological receptors.

Policy Reference	Policy Context	Section Considered
	• *the predicted absolute emissions, concentration change and absolute concentrations as a result of the proposed project, after mitigation methods have been applied; and* • *any potential eutrophication impacts'.*	
Paragraph 5.2.11	*'Defra publishes future national projections of air quality based on estimates of future levels of emissions, traffic, and vehicle fleet. Projections are updated as the evidence base changes and the applicant should ensure these are current at the point of an application. The applicant's assessment should be consistent with this but may include more detailed modelling and evaluation to demonstrate local and national impacts. If an applicant believes they have robust additional supporting evidence, to the extent they could affect the conclusions of the assessment, they should include this in their representations to the Examining Authority along with the source'.*	The air quality assessment will be based on the latest Defra tools, for example, the latest versions of the Emissions Factor Toolkit (EFTv12.0.1) sector removal tools shall be used, as well as the latest background maps.
Paragraph 5.2.12	*'Where a proposed development is likely to lead to a breach of any relevant statutory air quality limits, objectives or targets, or affect the ability of a noncompliant area to achieve compliance within the timescales set out in the most recent relevant air quality plan/strategy at the time of the decision, the applicant should work with the relevant authorities to secure appropriate mitigation measures to ensure that those statutory limits, objectives or targets are not breached'.*	If the Project leads to a breach of any relevant statutory air quality limits, objectives or targets, or affects the ability of a noncompliant area to achieve compliance within the timescales set out in the most recent relevant air quality plan/strategy, then relevant additional mitigation to reduce significant adverse air quality effects will be implemented.
National Policy Statement for Electricity Networks (EN-5) 2024		
There are no relevant considerations for air quality noted within EN-5.		

Other National Policy

13.3.3 A summary of other relevant national policy considered in the scope of effects on air quality includes:

- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023).

Regional and Local Planning Policy

13.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

13.3.5 All local policy, specific to air quality, will be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

13.3.6 Relevant guidance, specific to air quality, which has informed this Scoping Report and will inform the assessment within the ES, comprises:

- National Planning Policy Guidance (NPPG) (Ref 13.3).
- Local Air Quality Management Technical Guidance (LAQGM.TG (22)) (Ref 13.4) Department of Agriculture and Rural Affairs (Defra, 2022)) – provides best practice principles for the technical assessment of local air quality including the use of monitoring data, selection of receptors and verification procedure. LAQM.TG (22) also provides guidance for the application of Defra tools and resources used for the technical assessment of air quality.
- DMRB (LA 105) (Ref 13.5) National Highways, 2019) – applicable in screening the requirement for assessment of designated ecological sites and compliance risk assessment.
- IAQM v1.1 (Ref 13.6) A guide to the assessment of air quality impacts on designated nature conservation sites – This document has been produced by the IAQM to assist its members in the assessment of the air quality impacts of development on designated ecological sites. This document focuses on air quality assessments in support of Habitats Regulations Assessments (HRA), but its' principles can be used as the basis for assessing the air quality impact on national or local designated nature conservation sites.
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Ref 13.7)) (hereafter referred to as the 'IAQM construction dust guidance') - provides a mechanism for the assessor to consider both the magnitude of emissions and sensitivity of an area to define the level of risk of dust soiling and human health impacts during the construction phase. Defining the construction dust risk levels allows proportionate mitigation measures to be adopted.
- IAQM Guidance on land-use planning and development control: Planning for air quality v1.2 (Ref 13.8) (hereafter referred to as the 'IAQM development control guidance') – applicable in assessing the effect of changes in exposure of members of the public resulting from developments such as the Project. It provides guidance on how to decide whether an air quality assessment is required, how to undertake a suitable assessment of operational impacts and whether these are to be considered significant or not, and how to identify whether additional mitigation is required.

13.4 Study Area

13.4.1 At the time of writing this Scoping Report, traffic data and construction traffic routes were not available. For the purpose of defining the baseline for scoping, the Scoping Boundary has been used. This is based on professional judgement and knowledge of similar projects. This is presented on **Figure 13.1: Air Quality Constraints** in **Volume 3**.

13.4.2 Each of the following aspects of the assessment will have their own specific study areas which are based on the criteria outlined below. The specific study areas shall be presented on figures as part of the ES.

Construction Dust Risk Assessment

13.4.3 During the construction phase of the Project there is potential for fugitive dust emissions from construction activities. Dust is defined as solid particles that are suspended in air or have settled out onto a surface after having been suspended in air.

13.4.4 In accordance with the IAQM construction dust guidance (Ref 13.7), the study area for the construction phase dust risk assessment is:

- Up to 250 m from the locations of demolition, construction and earthworks activities for human receptors and up to 50 m for ecological receptors.
- Up to 50 m from the route(s) used by construction vehicles on the public highway, up to 250 m from the Project entrance(s).

13.4.5 The overhead-line alignment has not yet been finalised. Therefore, the construction dust study area will be revisited once this information becomes available; however, it will include:

- Up to 250 m from the edge of the Order Limits.
- The construction phase study area also includes the first 50 m of any road within 250 m from the main site entrance(s) used by the site construction vehicles.

Construction and Operational Phase Vehicle Emissions: Human Receptors

13.4.6 The number of vehicles associated with the construction, and operation/maintenance phases of the Project is not yet known.

13.4.7 The IAQM development control guidance (Ref 13.8) details its own indicative traffic flow change criteria that, if met, may highlight the need for an assessment. It is anticipated that detailed assessment of vehicle emissions will provisionally be **Scoped Out** for the operational/maintenance phase of the Project as traffic flows are largely expected to be below the IAQM screening criteria; however, it is anticipated that detailed assessment of vehicle emissions associated with the construction phase of the Project will provisionally be **Scoped In**. This will be confirmed upon receipt and screening of the traffic data. The screening criteria for vehicle emissions assessment is as follows:

- A change in Light Duty Vehicle (LDV) flows of >100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA), or >500 AADT elsewhere.

- A change in Heavy Duty Vehicle (HDV) flows of >25 AADT within or adjacent to an AQMA, or >100 AADT elsewhere.
- Where a road is realigned by 5 m or more and is within an AQMA.
- Where a junction is added or removed close to existing receptors.
- Where there are one or more substantial combustion processes where there is a risk of impacts at relevant receptors.

13.4.8 Any human sensitive receptors (e.g. residential properties, hospitals, schools and care homes) within 200 m of any traffic links that meet the above traffic screening criteria will form part of the study area. These will be assessed in a proportionate manner; those receptors closest to the roads comprising the study area and/or those receptors in existing areas of poor air quality will be assessed.

Construction and Operational Phase Vehicle Emissions Assessment: Ecological Receptor Impact

13.4.9 Effects from vehicle emissions on ecological receptors are screened in if the flow change criteria set in National Highways DMRB LA 105 guidance (hereafter referred to as DMRB LA 105) (Ref 13.7) are met. The guidance states relevant international, national, and locally designed sites of ecological importance within 200m of roads meeting one or more of the following criteria should be assessed:

- A change in LDV traffic flows ≥ 1000 AADT.
- HDV AADT >=200.
- A change in speed.
- A change in carriageway alignment by >=5m.

Compliance Risk Assessment

13.4.10 The requirement to undertake a compliance risk assessment will be evaluated in accordance with DMRB LA 105. An assessment will be carried out on those roads which both meet the DMRB traffic change criteria (described above) and intersect those roads forming part of Defra's Pollution Climate Mapping (PCM) model.

13.4.11 The compliance risk study area encompasses qualifying features (such as footpaths, residential properties, schools etc) which lie within 15 m of where the two road networks intersect.

13.4.12 The number of vehicles associated with the construction and operation/maintenance phases of the Project is not yet known, therefore at this stage it is not known whether the need for a compliance risk assessment is required. Confirmation of the need for a compliance risk assessment presented within the ES shall be confirmed upon receipt and screening of the traffic data.

13.5 Baseline Conditions (inc. Future Baseline)

Data Collection

Desk-Based Study

13.5.1 Baseline data has been collated to determine the existing air quality environment in the study area that are likely to be sensitive to changes in emissions resulting from

the Project. The baseline has been informed by a desk-based study which has drawn on the following sources of information:

- Defra UK Air website (Ref 13.9) - to establish predicted background concentrations for nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).
- Defra Air Quality Management Area (AQMAs) website (2024) – to identify AQMAs.
- Magic.Defra.gov.uk website (Ref 13.10) - to identify ecological sites in the Scoping Boundary.
- Chesterfield Borough Council Annual Status Report (Ref 13.11)
- Northeast Derbyshire District Council Annual Status Report (Ref 13.12).
- Bolsover District Council Annual Status Report (Ref 13.13).
- Amber Valley Borough Council Annual Status Report (Ref 13.14).
- Derby City Council Annual Status Report (Ref 13.15).
- South Derbyshire District Council Annual Status Report (Ref 13.16).

13.5.2 As well as the sources described above, a description of the existing baseline for ecological receptors is outlined in **Chapter 7: Ecology and Biodiversity.**

Engagement with Stakeholders

13.5.3 The EIA will be informed by consultation and engagement with stakeholders, including Derbyshire County Council, Natural England and Public Health England. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

13.5.4 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024. No pre-scoping engagement has been undertaken directly for air quality, which is considered to be an appropriate approach and normal practice for this discipline.

13.5.5 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 13.2**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 13.2 - Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Environment Agency	Where development involves the use of any non-road going mobile machinery with a net rated power of 37 kW and up to 560 kW, that is used during site preparation, construction, demolition, and/ or operation, at that site, it is strongly recommend that the machinery used shall meet or exceed the latest emissions standards set out in Regulation (EU) 2016/1628 (as amended). This shall apply to the point that the machinery arrives on site, regardless of it being hired or purchased, unless agreed in writing with the Local Planning Authority. This is particularly important for major residential, commercial, or industrial development located in or within 2 km of an Air Quality Management Area for NOx, and or particulate matter that has an aerodynamic diameter of 10 or 2.5 microns (PM_{10} and $PM_{2.5}$). Use of low emission technology will improve or maintain air quality and support LPAs and developers in improving and maintaining local air quality standards and support their net zero objectives.	Machinery used shall meet or exceed the latest emissions standards set out in Regulation (EU) 2016/1628 (as amended) unless agreed in writing with the Local Planning Authority.
Environment Agency	It is advised that item(s) of machinery must be registered (where a register is available) for inspection by the appropriate Competent Authority (CA), which is usually the local authority.	Where a register is available an inspection will be sought by the CA if in agreement.
Environment Agency	Non-Road Mobile Machinery includes items of plant such as bucket loaders, forklift trucks, excavators, 360 grab, mobile cranes, machine lifts, generators, static pumps, piling rigs etc. The applicant should be able to state or confirm the use of such machinery in their application to which this then can be applied.	Information on proposed plant to be used and considered in the EIA will be set out in the Environmental Statement

Existing Baseline Conditions

13.5.6 This section sets out the air quality information and data that will be relied upon to produce a detailed review of baseline conditions that will be contained within ES. The section is split into subsections, for each of the local authorities which cover the Scoping Boundary. These subsections are ordered sequentially following the route of the Scoping Boundary from north to south. Reference should be made to **Figure 13.1 Air Quality Constraints** in **Volume 3**.

13.5.7 The existing baseline for ecological receptors is outlined in **Chapter 7: Ecology and Biodiversity**.

Air Quality Management Areas and Local Authority Monitoring

13.5.8 As required by the Environment Act, the local authorities covering the study area have undertaken a review and assessment of air quality within their area of jurisdiction, producing Annual Status Reports (ASRs) which appraise local air quality over the most recent full calendar year. This process informs the declaration of AQMAs, which are areas where monitoring has concluded that there are exceedances of Air Quality Strategy (AQS) objectives.

13.5.9 A review has been undertaken of the most recently published ASRs, for each of the local authorities covering the study area. It should be noted that 2020 and 2021 monitoring data, reported in the 2021 and 2022 ASRs, would have been affected by the COVID-19 lockdowns and therefore do not reflect a typical year. Where only the 2021, 2022 and earlier ASRs are publicly available, more recent data will be sought from the local authorities to inform the ES.

13.5.10 Particulate matter ($PM_{2.5}$ and PM_{10}) has not been included in the baseline section, as review of the most recent ASRs for the local authorities covering the study area, shows that no monitoring of PM has been undertaken. The absence of PM monitoring from these ASRs, indicates that PM pollutant concentrations do not pose a risk to exceedances of the AQS objectives and therefore concentrations must be low in the vicinity of the study area.

13.5.11 Local authorities generally undertake air quality monitoring in those areas where people are likely to be exposed to higher pollutant concentrations (i.e. urban areas, transport corridors, near industrial installations) and do not generally carry out monitoring in areas where pollutant concentrations are low.

Chesterfield Borough Council

13.5.12 Whilst the scoping boundary does not overlap with the boundary of Chesterfield Borough Council (CBC), the northeastern edge of the scoping boundary is located approximately 70m east of CBC. Therefore, air quality data held by CBC was acquired and reviewed.

13.5.13 A review of the most recent available ASR published by CBC (published during 2024), indicates that NO_2 monitoring undertaken in 2023 shows no exceedances of the AQS objectives. The Chesterfield No1 AQMA was located approx. 3.5km to the north of the Chesterfield substation (declared for annual mean NO2) and is subject to a revocation order awaiting corporate approval. CBC note that detailed monitoring will continue in and around the area of the former AQMA.

13.5.14 The 2023 monitoring data presented in the 2024 ASR indicates that there are no monitoring sites which are located within the scoping boundary. The closest

monitoring site to the Scoping Boundary is diffusion tube site 23 which samples NO_2. Diffusion tube site 23 is located approximately 700m west of the Scoping Boundary near the Chesterfield substation, on Mansfield Road. In 2023, site 23 monitored an annual average NO_2 concentration of 18.1 $\mu g/m^3$ which is well below the AQS objective, indicating that pollutant concentrations within and close to the Scoping Boundary are low in the vicinity of Chesterfield Borough Council.

North-East Derbyshire District Council

13.5.15 A review of the most recent available ASR published by North-East Derbyshire District Council (NEDDC) (published during 2023), indicates that NO_2 monitoring undertaken in 2022 shows no exceedances of the AQS objectives and thus no AQMAs have been declared.

13.5.16 The 2022 monitoring data presented in the 2023 ASR indicates that apart from one site, the monitoring undertaken by NEDDC is located over 200 m away from the Scoping Boundary. The closest site to the Scoping Boundary is diffusion tube site 23 which samples NO_2. Diffusion tube site 23 is located approximately 200m north of the Scoping Boundary, on the A61 (High Street). In 2022, site 23 monitored an annual average NO_2 concentration of 19.9 $\mu g/m^3$ which is well below the AQS objective, indicating that pollutant concentrations within and close to the Scoping Boundary are low.

Bolsover District Council

13.5.17 A review of the most recent ASR published by Bolsover District Council (BDC) (published during 2023), indicates that monitoring of NO_2 undertaken in 2022 shows no exceedances of the AQS objectives. The closest monitoring site to the Scoping Boundary is diffusion tube site 1, which is located approximately 2.5 km north-east of the Scoping Boundary, on Town Street, Bolsover. In 2022 this site monitored an annual average NO_2 concentration of 21.2 $\mu g/m^3$, which is well below the AQS objective. Thus, indicating that pollutant concentrations near the Scoping Boundary are low.

13.5.18 Review of the 2023 ASR indicates that there are no AQMAs declared in 2022, as there are no exceedances of the annual mean NO_2 AQS objective.

Amber Valley Borough Council

13.5.19 In 2022, Amber Valley Borough Council (AVBC) did not undertake any monitoring, as the results of air quality modelling for previous years found that the AQS objectives were unlikely to be exceeded. There are no AQMAs declared within AVBC's area of jurisdiction. The above information indicates that air pollutant concentrations are likely to be low in the areas of the Scoping Boundary that fall within AVBC.

Erewash Borough Council

13.5.20 Baseline data for Erewash Borough Council (EBC) has been omitted at this stage, as EBC's ASR is not publicly available. Detailed baseline data shall be requested from EBC to inform the ES.

Derby City Council

13.5.21 The most recently available ASR for Derby City Council (DCC) is 2023, which summarises air quality within their area of jurisdiction during 2022.

13.5.22 A review of the ASR confirms that exceedances of the AQS objective for annual mean NO_2 have been identified, resulting in the current declaration of the following AQMAs:

- AQMA No 1: Ring Roads – Declared in 2001 – Located ~3km from Scoping Boundary.
- AQMA No 2: A52 – Declared in 2001 – Located ~2km from Scoping Boundary.

13.5.23 The Scoping Boundary is not located close to or within either of the DCC's AQMAs.

13.5.24 The closest monitoring sites to the Scoping Boundary from DCC's 2022 monitoring dataset, are diffusion tube sites KL1 and KL2. These are located approximately 2 km west of the Scoping Boundary, within AQMA No 2, adjacent to the A52 (Borrowash By-Pass). From 2018 to 2022, monitored NO_2 concentrations at these sites were well below the AQS objective. As the above sites are approximately 2 km from the Scoping Boundary, concentrations within the Scoping Boundary are likely to be lower than those recorded by DCC within their area of jurisdiction.

South Derbyshire District Council

13.5.25 The most recently available ASR for South Derbyshire District Council (SDDC) is 2023, which summarises air quality within their area of jurisdiction during 2022.

13.5.26 A review of the most recently available ASR indicates that there are no exceedances of the annual mean NO_2 AQS objective in 2022, as such no AQMAs have been declared.

13.5.27 The closest monitoring site to the Scoping Boundary is diffusion tube site SDDC22. This site is located approximately 400 m north of the Scoping Boundary on Wragley Way (near Sinfin). In 2022, the monitored annual average NO_2 concentration at this site was 19.1 $\mu g/m^3$ which is well below the AQS objective, indicating that pollutant concentrations near the Scoping Boundary are low.

Background Pollutant Concentrations

13.5.28 The character of the area within the study area is largely rural and suburban. Due to the nature of rural and suburban areas, background pollutants are generally observed to be low.

13.5.29 A review of the available modelled background concentrations for the Scoping Boundary and surrounding area has been carried out using Defra modelled annual mean background concentrations provided in 1 km x 1 km grid squares. Background concentrations for 2024 are well below the relevant AQS objective values for all pollutants. **Table 13.3** shows the average background concentrations for NO_2, PM_{10} and $PM_{2.5}$ for all the local authorities across the Scoping Boundary.

Table 13.3 – Summary of Modelled Defra Background Pollutant Concentrations (2024) in the Vicinity of the Scoping Boundary

Local Authority	2024 Predicted average background concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
	AQS Objective 40 µg/m^3	AQS Objective 40 µg/m^3	AQS Objective 20 µg/m^3
Chesterfield Borough Council	9.1	10.9	6.7
North-East Derbyshire District Council	8.7	12.0	7.0
Bolsover District Council	7.9	12.5	7.0
Amber Valley Borough Council	8.8	11.5	7.1
Erewash Borough Council	9.8	12.5	7.5
Derby City Council	10.6	13.5	8.0
South Derbyshire District Council	10.2	13.5	7.9

Future Baseline Conditions

13.5.30 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 in the ES.

13.5.31 Background pollutant concentrations are predicted to decrease in future years, as evidenced by trends observed from local authority monitoring data and future predicted Defra background map concentrations, which are presented in **Table 13.4.**

13.5.32 Defra provides future predicted background map concentrations to the current horizon year of 2030 (i.e Defra do not currently provide background estimates beyond 2030). Although the Project opening year is estimated as 2032, it is likely that pollutant trends would continue to reduce after 2030, although it should be noted that the rate of decrease is slower for PM_{10} and $PM_{2.5}$ than it is for NO_2 which is reflected by comparing the average concentrations in **Table 13.3** and **Table 13.4**.

Table 13.4 – Summary of Modelled Defra Background Pollutant Concentrations (2030) in the Vicinity of the Scoping Boundary

Local Authority	2030 Predicted average background concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
	AQS Objective 40 µg/m^3	AQS Objective 40 µg/m^3	AQS Objective 20 µg/m^3
Chesterfield Borough Council	8.1	10.8	6.6
North-East Derbyshire District Council	6.7	10.3	6.2
Bolsover District Council	7.8	12.9	7.2
Amber Valley Borough Council	7.1	10.9	6.7
Erewash Borough Council	9.5	12.5	7.7
Derby City Council	11.5	12.5	8.1
South Derbyshire District Council	7.4	12.0	7.2

13.5.33 Traffic emissions are likely to contribute to baseline air pollutant concentrations in the vicinity of the Project. While vehicle numbers are likely to increase, emissions (per vehicle) are predicted to decrease over time due to new technology, increasingly stringent emission regulations and cleaner fuel formulations.

13.5.34 Consented developments in the surrounding area may increase traffic flows in the vicinity of the Project. This may therefore result in localised increases in air pollutant concentrations as compared to the existing baseline.

13.5.35 In addition, the build out of any consented developments within the study area may result in a temporary increase in particulate concentrations resulting from fugitive dust emissions during construction works. The build out of any consented developments within the study area may also reintroduce new receptors.

13.6 Mitigation Measures Adopted as Part of the Project

13.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

13.6.2 An optioneering study (the Corridor Preliminary Routeing and Siting Study, as described in **Chapter 3: Main Alternatives Considered)** has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced. The Scoping Boundary has been designed to avoid, as far as reasonably practicable, settlements and residential areas and passes predominantly through rural areas, trying to keep a distance from designated ecological sites.

Good Practice Mitigation Measures

13.6.3 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

13.6.4 In addition, **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** presents the likely good practice mitigation measures relevant to air quality. These include but are not limited to the following overarching measures:

- The Construction Environmental Management Plan and other Environmental Control Plans (ECPs) shall include measures to manage environmental nuisance during construction. The contractor(s) shall undertake site inspections to check conformance to the relevant ECPs.
- 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, would be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- Plant and vehicles would conform to relevant applicable standards for the vehicle type. Vehicles would be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. Where applicable, all plant and vehicles would be required to switch off their engines when not in use and when it is safe to do so.
- Materials and equipment will not be moved or handled unnecessarily. The loading and unloading of materials from vehicles would be controlled, including cable drums and excavated materials.
- Earthworks and stockpiled soil will be protected by covering, seeding or using water suppression where appropriate.
- Site management procedures will include the logging of incidents/complaints.
- Monitoring activities would include site inspections, soiling checks, and checking compliance with the Dust Management Plan or equivalent.
- The site would be prepared and maintained where practicable to locate dust causing activities away from receptors, enclose specific operations with high potential for dust production, and cover stockpiles.
- Vehicle/machinery would be properly operated and supported by sustainable travel measures, such as complying with Non Road Mobile Machinery (NRMM)

standards, no idling, using mains electricity where reasonably practicable, and developing a construction phase travel plan.

- Operations activities would employ dust suppression, use enclosed chutes, and reduce drop heights.
- Where any demolition activities are envisaged, controlling measures such as damp down, avoid explosive blasting, soft strip interiors before demolition would be specified.
- Earthworks measures would include revegetating promptly, using hessian mulches and covering with topsoil.
- Construction activities would avoid scabbling, keep aggregates damp where practicable, ensure fine powder materials are delivered enclosed and stored in silos, and ensure bags are sealed after use.
- Trackout measures would be implemented to include washing access and local roads, avoid dry sweeping of large areas, ensuring vehicle-borne materials are covered, and installing hard surface haul routes.
- Wheel washing would be provided at each main compound access point on to the highway. An adequate supply of water would be made available at these locations at all times. Road sweepers would be deployed on public roads where necessary to prevent excessive dust or mud deposits.

13.6.5 Additional measures relating to air quality could include the following:

- Re-routing of construction vehicle traffic to avoid sensitive receptors should a significant air quality impact be predicted.

Additional Mitigation Measures

13.6.6 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for air quality. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

13.7 Likely Significant Effects

13.7.1 This section sets out the likely significant effects on air quality arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project.**

13.7.2 The review of likely significant effects assumes that the embedded and good practice mitigation measures described in Section 13.6 and outlined within the **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects.

13.7.3 The likely significant effects of the Project have been split into:

- Construction – dust, generators and construction traffic.
- Operation – maintenance traffic.

Construction

Dust

13.7.4 Construction dust is generated from activities such as earthwork operations, handling of construction materials and wastes. In addition, tracking vehicles on unpaved / unsurfaced haul roads and on the public highway has the potential to generate fugitive dust.

13.7.5 The effects of fugitive dust from construction are generally experienced through the suspension of dust particles in the air and deposition of dust and detritus on surfaces. Dust can affect human health, local amenity or ecological receptors (through deposition) within the local authority where activities are undertaken. The concentrations of suspended dust particles reduce with increased distance from the dust generating activities.

13.7.6 Section 13.6 sets out likely good practice measures that would be implemented to reduce the potential for fugitive dust during construction. A dust risk assessment will be carried out to support the Development Consent Order (DCO) application. This will follow the approach set out in the IAQM (Ref 13.7) Construction Dust Guidance by documenting the Project's compliance assessment and will be used to identify any further mitigation measures to be included within the Code of Construction Practice (CoCP) to be submitted with the DCO.

13.7.7 With these measures in place, the Project is unlikely to result in likely significant effects as a result of construction related dust as described in the IAQM Construction Dust Guidance, however assessment of construction dust is proposed to be **Scoped In** to the ES.

Generators

13.7.8 Emissions to air can arise from the use of generators. Such operations would be temporary and short-lived when considered on an annual basis. In addition, the good practice measures set out in Section 13.6 such as limiting use to only when a grid connection is not available, selecting generators with emissions abatement technology and locating generators as far away as possible from sensitive receptors would reduce the effects further.

13.7.9 With standard control measures in place, it is not expected that the emissions from the use of generators during construction would result in a likely significant effect, however information on generators will be reviewed during the ES and thus this is proposed to be **Scoped In**.

Traffic

13.7.10 During construction, there is the potential to change traffic flows on the local road network. Construction vehicles and plant would generate emissions from vehicles delivering materials and construction workings to and from the construction site. Emissions could affect receptors located close to the working areas and on construction routes along the local network.

13.7.11 While the emissions from the construction plant are generally considered not significant given their short-term use at any given location within the construction period, the potential for emissions from construction traffic on the public highway to combine with existing emissions in areas of high sensitivity (particularly in AQMAs) has the potential to create a significant effect.

13.7.12 Air emissions from the Project would be reduced through the implementation of good practice measures which would be outlined within the CoCP (submitted with the DCO application). Examples of the likely good practice measures which would be implemented during construction are set out in Section 13.6 including maintaining and operating construction vehicles in accordance with the manufacturer's recommendations and in a responsible manner.

13.7.13 In areas where concentrations of traffic-based pollutants are already in exceedance of the limit of 40µg/m^3 for NO_2, the addition of construction traffic in the area may result in a further deterioration of pollutant concentrations which may be significant. Emissions from construction traffic, is therefore proposed to be **Scoped In** for further assessment in the ES. Construction traffic will only be scoped into the assessment within the ES if the criteria outlined within Section 13.4 is met.

13.7.14 Diverted traffic is proposed to be **Scoped Out** as no likely significant effects are expected as it is anticipated that the volumes of diverted traffic would be lower than the relevant IAQM screening criteria, as detailed in Section 13.4.

Operation Including Maintenance

Traffic

13.7.15 In line with the screening criteria set out, it is assumed that there would be a negligible number of vehicles associated with operation and maintenance of the Project. Therefore, no likely significant effects in relation to air quality are expected, and this is proposed to be **Scoped Out** of the ES.

13.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the Environmental Statement

13.8.1 In addition to the data sources listed in Section 13.5, the assessment within the ES will be supported by the following additional information:

- Extent and nature of construction phase activities potentially leading to dust emissions.
- Projected traffic data for the construction phase.
- Extent and nature of NRMM during construction phase.

Proposed Assessment Method

Construction Dust Assessment

Outline Approach

13.8.2 The IAQM construction dust guidance is generally more readily applicable to discrete development sites rather than long construction corridors such as the one proposed. However, it is envisaged that the construction dust risk assessment will be broken down and reported in geographical sections to account for variations in sensitivity of area and the calculated dust emission magnitude from activities to ensure a proportional approach to the level of mitigation required.

Sensitivity

13.8.3 The sensitivity of the area to dust impacts, can be defined as low, medium, or high sensitivity, in accordance with IAQM construction dust guidance.

13.8.4 The influencing factors to define receptor sensitivity to dust impacts are as follows:

- High – where human receptors are expected to be present continuously for extended periods of time (e.g. residential properties, hospitals, schools and care home), and internationally or nationally designated ecological sites.
- Medium – where users will expect to enjoy a reasonable level of amenity and value could be diminished by dust soiling (e.g. parks and places of work), and nationally designated ecological sites.
- Low – where enjoyment of amenity will not reasonably be expected and exposure will be for limited periods (e.g. footpaths, shopping streets and car parks), and locally designated ecological sites.

13.8.5 It should be noted that a receptor is defined as a location that may be affected by dust emissions during demolition and construction.

Magnitude

13.8.6 The scale and nature of the works determines the magnitude of dust arising as small, medium or large.

13.8.7 The relevant criteria to define the potential magnitude of dust emissions includes the following factors:

- Small – demolition volume under 12,000 m^3; demolition activities less than 6m above ground level; total site area less than 18,000 m^2; soil type with large grain size; total building volume less than 12,000 m^3; construction material with low potential for dust release; less than 20 HDV trips per day; unpaved road length less than 50 m.
- Medium – demolition volume 12,000 m^3 - 75,000 m^3; demolition activities between 6 m – 12 m above ground level; total site area 18,000 m^2 – 110,000 m^2; moderately dusty soil type; potentially dusty construction material; total building volume 12,000 m^3 - 75,000 m^3; 20 to 50 HDV trips per day; unpaved road length 50 m – 100 m.
- Large – on-site crushing and screening; demolition volume greater than 75,000 m^3; demolition activities greater than 12 m above ground level; total site area greater than 110,000 m^2; more than 10 heavy earth moving vehicles active at any one-time; total building volume greater than 75,000 m^3; on site concrete batching; sandblasting; more than 50 HDV trips per day; unpaved road length greater than 100 m.

Significance

13.8.8 The IAQM construction dust guidance categorises the unmitigated risk of dust impacts on human health and amenity (rather than ascribe a significance of effect) as a means of identifying the level of dust emissions mitigation required to ensure that residual effects are ‘not significant’. A higher dust risk rating requires more stringent mitigation measures to limit residual effects. For all construction activities, the aim is to prevent significant effects on receptors through the use of effective mitigation measures. Experience shows that this is normally possible, thus the residual effect will normally be ‘not significant’.

Vehicle Emissions Assessment

13.8.9 Assessment of vehicle emissions will be undertaken should the screening of traffic data meet the criteria set out by the IAQM development control guidance. If these criteria are not exceeded, then the guidance considers air quality impacts associated with a project in terms of traffic emissions to be negligible and no further assessment is required.

Sensitivity

13.8.10 Should screening of the relevant data indicate that any of the IAQM criteria are met, then potential impacts at sensitive receptors will be assessed by calculating the impact in NO_2 and $PM_{2.5}$ and PM_{10} concentrations resulting from the Project.

13.8.11 LAQM.TG (22) defines a sensitive receptor as a location representative of human (or ecological) exposure to a pollutant, over a time period relevant to the objective that is being assessed against, where the Air Quality Strategy (AQS) objectives are considered to apply, as detailed in **Table 13.5**.

Table 13.5 – Examples of where the AQS Objectives Apply

Averaging period	Objectives should apply at	Objectives should not apply at
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean	All locations where the annual mean objective will apply, together with hotels and gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public will not be expected to have regular access.

Magnitude

13.8.12 Detailed dispersion modelling will be undertaken using Cambridge Environmental Research Consultant's (CERC) Atmospheric Dispersion Modelling System software (ADMS) to predict pollutant concentrations at worst case receptors within 200m of those roads which exceeded the IAQM traffic change criteria. The magnitude of change will be calculated, and total concentrations compared against relevant AQS objectives.

Significance

13.8.13 The significance of effects will be assessed in accordance with the IAQM development control guidance dependent upon the percentage change in concentration between the 'without and with Project' scenarios, relative to the relevant air quality objectives, as presented in **Table 13.6.**

Table 13.6 – IAQM Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	**% Change in concentration relative to Air Quality Assessment Level (AQAL)**			
	1	**2-5**	**6-10**	**>10**
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

13.8.14 The IAQM development control guidance notes that the impact descriptors in **Table 13.6** are for individual receptors only and the overall significance of effect should be determined using professional judgement, taking into the degree of impact and factors such as:

- The existing and future air quality in the absence of the development.
- The extent of current and future populations exposure to the impact.
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Assumptions and Limitations

13.8.15 There is limited detail available for NRMM during the construction and operation and maintenance phases and regarding the potential use of diesel generators at this stage. It is assumed that emissions would be temporary and transient in nature and therefore negligible in terms of air quality impacts and significance, however this will be confirmed in the air quality assessment once further information is available.

13.9 Proposed Scope of the Environmental Statement

13.9.1 The matters that are proposed to be scoped in and out of further assessment for air quality are outlined in **Table 13.7**.

Table 13.7 – Proposed Scope of the ES

Matter	Phase	Scoped In/ Out	Justification
Construction dust	Construction	**Scoped In**	During the construction phase there is potential for dust deposition and health impacts from elevated PM concentrations caused by construction activities. The DCO application will be supported by a construction dust risk assessment. This will document the Project's compliance in accordance with IAQM guidance and identify any further measures applicable to the Project to be included within the CoCP (submitted with the DCO).
Construction generators emissions	Construction	**Scoped in**	The use of generators would be localised, temporary and short-lived when considered on an annual basis. Good practice measures such as limiting their use and locating generators away from sensitive receptors would reduce the potential for likely significant effects. However information on the type of generators will be reviewed during the ES.
Construction traffic emissions	Construction	**Scoped In** (if the screening criteria are met or exceeded)	Potential for deterioration in local air quality (NO_2, NO_x, PM_{10} and $PM_{2.5}$) at local human and ecological receptors. This will be scoped out if criteria are not met. Diverted traffic is scoped out as there are no likely significant effects due to low expected changes in traffic flows.
Operational traffic emissions	Operation including maintenance	**Scoped Out**	No likely significant effects expected due to the low numbers of vehicle movements.

13.10 References

Ref 13.1: Department of Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Accessed February 2024. https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf

Ref 13.2: Department of Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Accessed February 2024. https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf

Ref 13.3: Ministry of Housing Communities and Local Government (2019). National Planning Policy Guidance for Air Quality. Accessed February 2024. https://www.gov.uk/guidance/air-quality--3

Ref 13.4: Department for Agriculture and Rural Affairs (2022). Local Air Quality Management Technical Guidance (LAQGM. TG (22)). Accessed February 2024. https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

Ref 13.5: National Highways (2019). DMRB LA 105. Accessed February 2024. https://www.standardsforhighways.co.uk/tses/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true

Ref 13.6: Institute of Air Quality Management (2020). A guide to the assessment of air quality impacts on designated nature conservation sites V1.1. Accessed October 2024. air-quality-impacts-on-nature-sites-2020.pdf (iaqm.co.uk)

Ref 13.7: Institute of Air Quality Management (2024). Assessment of dust from demolition and construction V2.2. Accessed February 2024. https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

Ref 13.8: Institute of Air Quality Management (2017). Guidance on land-use planning and development control: Planning for air quality V1.2. Accessed February 2024. https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

Ref 13.9: Department for Agriculture and Rural Affairs (2024). UK Air Background Maps. Accessed February 2024. https://uk-air.defra.gov.uk/data/laqm-background-home

Ref 13.10: Department for Agriculture and Rural Affairs (2024). Magic Map. Accessed February 2024. https://magic.defra.gov.uk/magicmap.aspx

Ref 13.11: Chesterfield Borough Council (2024). Annual Status Report.

Ref 13.12: Northeast Derbyshire District Council (2021). Annual Status Report

Ref 13.13: Bolsover District Council (2021). Annual Status Report

Ref 13.14: Amber Valley Borough Council (2023). Annual Status Report

Ref 13.15: Derby City Council (2023). Annual Status Report

Ref 13.16: South Derbyshire District Council (2023). Annual Status Report

14. Noise and Vibration

nationalgrid

Contents

14. Noise and Vibration

14.1 Introduction

14.1.1 This chapter presents how the noise and vibration assessment will consider the potentially significant effects on noise and vibration receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

14.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

14.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

14.2 Approach to Scoping

14.2.1 The approach to scoping has drawn from previous experience of similar Projects and professional judgement. Determining the scope of the noise and vibration assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

14.2.2 There is the potential for interrelationships related to the potential effects of noise and vibration and other environmental topics. Therefore, please also refer to the following chapters relating to these specific issues:

- Chapter 6: Landscape and Visual.
- Chapter 7: Ecology and Biodiversity.
- Chapter 8: Historic Environment.
- Chapter 10: Geology and Hydrogeology.
- Chapter 12: Traffic and Transport.
- Chapter 15: Socio-economics, Recreation and Tourism.
- Chapter 16: Health and Wellbeing.

14.2.3 This chapter is supported by the following figures in **Volume 3**:

- Figure 14.1: Noise and Vibration Study Area and Receptors.

14.3 Key Regulatory and Planning Policy Context

Key Legislation

14.3.1 A summary of the key legislation considered in the scope effects on noise and vibration is outlined below:

- Environment Act 2021 (Ref 14.1).
- Control of Pollution Act 1974 (Ref 14.2).
- Environmental Protection Act 1990 (Ref 14.3).

National Planning Policy

National Policy Statements

14.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement for Energy NPS EN-1 (Ref 14.4) and the National Policy Statement for Electricity Networks Infrastructure NPS EN-5 (Ref 14.5). **Table 14.1** sets out the requirements of both NPSs relevant to noise and vibration and how these have been considered within this chapter and how they will be considered within the ES.

Table 14.1 – National Planning Policy Relevant to Noise and Vibration

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (NPS EN-1) 2024		
Paragraph 5.12.1-5.12.4	These paragraphs of NPS EN-1 set the context of the potential adverse effects that excessive noise and vibration can have on human health, wildlife, and buildings. Noise can also have an adverse impact on the value of a landscape and quality of enjoyment in an area.	This will inform the assessment process, guiding the identification of receptors, mitigation measures, stakeholder engagement, and compliance monitoring to ensure the holistic evaluation and management of noise and vibration impacts throughout the Project lifecycle.

Paragraph 5.12.5	• Sets out "the factors that will determine the likely noise impact of a proposed development include:
	  • The inherent operational noise from the proposed development, and its characteristics.
	  • The proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces).
	  • The proximity of the proposed development to quiet places and other areas that are particularly valued for their soundscape or landscape quality.
	  • The proximity of the proposed development to sites where noise may have an adverse impact
		These considerations will guide the identification of potential noise impacts, the formulation of mitigation measures, and the safeguarding of sensitive receptors and environments throughout the project assessment and planning phases.

Policy Reference	Policy Context	How it will be considered
	on protected species or other wildlife, including migratory species. • The potential presence of unexploded ordnance on the seabed".	
Paragraph 5.12.6	States that: "Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: • A description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any temporal characteristics of the noise. • Identification of noise sensitive receptors and noise sensitive areas that may be affected. • The characteristics of the existing noise environment. • A prediction of how the noise environment will change with the proposed development. o In the shorter term, such as during the construction period.	This will inform the evaluation of noise impacts associated with the proposed development, identify potential risks to affected communities, and develop effective mitigation strategies to minimise adverse effects on health and quality of life.

Policy Reference	Policy Context	How it will be considered
	o In the longer term, during the operating life of the infrastructure. o At particular times of the day, evening and night (and weekends) as appropriate, and at different times of year. • An assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and quality of life / well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas. • If likely to cause disturbance, an assessment of the effect of underwater or subterranean noise. • All reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life".	
Paragraph 5.12.7	The nature and extent of the noise assessment should be proportionate to the likely noise impact.	By calibrating the assessment to the scale and nature of potential noise impacts and through proportionate definition of study areas, the evaluation process remains effective and ensures that mitigation measures are appropriately targeted to address identified concerns.

Policy Reference	Policy Context	How it will be considered
Paragraph 5.12.8	Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation.	Ensures that all aspects contributing to noise generation are considered in accordance with the Noise Policy Statement for England.
Paragraph 5.12.9	Paragraph states that: “Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance.” It further describes “For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.”	Integrating the principles of relevant British Standards and guidance into the scoping report ensures a systematic, standardized, and well-informed approach to assessing operational and construction noise. This not only enhances the accuracy and reliability of the assessment but also facilitates compliance with regulatory requirements and industry best practices.
National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) 2024		
Paragraph 2.9.26	All high voltage transmission lines have the potential to generate noise under certain conditions.	This informs the process of the need to include the high voltage transmission line noise as a relevant factor in the assessment of noise impacts associated with the proposed development.
Paragraph 2.9.27 - 2.9.36	These paragraphs set the context of the potential for adverse noise effects that may be associated with the operation of overhead lines and overhead line fittings such as spacers, insulators and clamps. Paragraph 2.9.34 notes that transmission line audible noise is “generally categorised as ‘crackle’ or ‘hum’, according to its tonal content.”	These paragraphs inform the potential effects associated with an overhead line project.

Policy Reference	Policy Context	How it will be considered
Paragraph 2.9.37 – 2.9.39	Paragraphs note the potential audible noise effects that can arise from substation equipment such as transformers, quadrature boosters and mechanically switched capacitors which can generate low frequency hum. NPS EN-5 also states that "For the assessment of noise from substations, standard methods of assessment and interpretation using the principles of the relevant British Standards are satisfactory."	In the process, audible noise effects originating from substation equipment (where such works are to be incorporated into the Project) and overhead line fittings will be duly considered.
Paragraph 2.9.40 – 2.9.42	It is noted within NPS EN-5 that: "For the assessment of noise from overhead lines, the applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors. For instance, the applicant may use an appropriate noise modelling tool or tools for the prediction of overhead line noise and its propagation over distance, such as an ISO 9613-2 or Technical Report TR(T)94. When assessing the impact of noise generated by overhead lines in wet weather relative to existing background sound levels, the applicant should consider the effect of varying background sound levels due to rainfall".	An assessment of the likely significant effects will be presented in the ES following appropriate guidance and methodology.

Other National Policy

14.3.3 A summary of other relevant national policy considered in the scope of effects on noise and vibration includes:

- National Planning Policy Framework (Ref 14.6).
- Noise Policy Statement for England (Ref 14.7).

Regional and Local Planning Policy

14.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

14.3.5 All local policy, specific to noise and vibration will be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

14.3.6 Relevant guidance, specific to noise and vibration, that has informed this Scoping Report and will inform the assessment within the ES, comprises the following. However, it is noted that the Project is still in development so changes to the following may become necessary:

- Institute of Environmental Management and Assessment (IEMA), Guidelines for Environmental Noise Impact Assessment (Ref 14.8).
- British Standard (BS) 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (Ref 14.9).
- BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (Ref 14.10).
- BS 7385-2:1993, Evaluation and measurement for vibration in buildings. Guide to damage levels from Groundborne vibration (Ref 14.11).
- BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound (BS 4142) (Ref 14.12).
- Calculation of Road Traffic Noise (CRTN) (Ref 14.13).
- Design Manual for Roads and Bridges LA 111: Noise and Vibration (Ref 14.14).
- National Grid Technical Report TR(E)564 ‘Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’ (Issue 1, 2021) (Ref 14.15).
- National Grid’s Policy Statement PS(T)134 Operational Audible Noise Policy of Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’ (Issue 2, June 2021) (Ref 14.16).
- National Grid Technical Guidance Note TGN(E)322 ‘Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’, (Issue 2, June 2021) (Ref 14.17).
- International Organisation for Standardisation (ISO) 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors: Part 2: Engineering method for the prediction of sound pressure levels outdoors (Ref 14.18).
- EN/430/NOTE2021. "Assessment of Overhead Line Noise for Development Consent Order Applications: Guidance for Consultants" (Ref 14.19).

14.4 Study Area

14.4.1 At the time of writing this Scoping Report, traffic data and construction traffic routes were not available. For the purpose of defining the baseline for the Environmental Impact Assessment (EIA) Scoping Report, the study area is defined from the Scoping Boundary; however, this will be refined as the EIA is developed with actual boundaries defined relative to the features and facets of the Project including the alignment, new elements and changes necessary to existing infrastructure. The study area is shown in **Figure 14.1 Noise and Vibration Study Area and Receptors** in **Volume 3**.

14.4.2 Study areas for the noise and vibration assessment will be defined as part of the ES. These study areas will be in accordance with appropriate guidance, as set-out below.

Construction Noise

14.4.3 For the ES the construction noise study area for noise impacts will comprise the closest Noise Sensitive Receptors (NSRs) within 300 m from the proposed Order Limits / construction works associated with the Project, excluding traffic on the public highway which is considered separately below. This is based on guidance in BS 5228-1 (Ref 14.9) and DMRB LA 111: Noise and Vibration (Ref 14.14).

Construction Traffic

14.4.4 Noise from construction traffic on the existing road network will be assessed for each applicable road affected and defined based on the traffic data. The assessment will consider the change in Basic Noise Level, calculated in line with the methodology described in technical memorandum CRTN (Ref 14.13), with a subsequent assessment of the impacts on NSRs within 50 m of routes where potential significant effects are identified.

Construction Vibration

14.4.5 The proposed study area for construction vibration impacts is vibration sensitive receptors (VSRs) within 100 m from the closest construction activity with potential to generate vibration impacts. This is based on guidance from BS 5228-2 (Ref 14.10) and DMRB LA 111: Noise and Vibration (Ref 14.14).

Operational Noise Overhead Lines

14.4.6 The proposed study area for the assessment of overhead line noise is NSR within 200 m either side of the overhead line alignment.

Operational Noise Static Plant

14.4.7 The proposed study area for operational static facility noise including Substations and Sealing End Compounds consists of the closest NSRs within 1 km of these facilities to enable assessment in accordance with ISO9613 (Ref 14.18), National Grid Technical Guidance and BS 4142 (Ref 14.12).

14.5 Baseline Conditions (Including Future Baseline)

Data Collection

Desk-Based Study

14.5.1 The baseline assessment has been informed by a desk study which has drawn on the following information sources:

- 1:25,000 and 1:50,000 Ordnance Survey maps.
- Aerial photography, Google Earth and Google Maps Street View.
- Terrain data.
- Open source GIS data.
- Noise Important Area data (NIAs).

14.5.2 The desk-based study has also been informed by baseline data obtained for other inter-related environmental topic chapters captured within the EIA scoping.

Engagement with Stakeholders

14.5.3 Following receipt of the Scoping Opinion engagement with relevant stakeholders will be ongoing up to the submission of the Development Consent Order (DCO) including but not limited to Derbyshire County Council, relevant District Council Environmental Health Officers, and relevant Statutory Bodies, with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.

Existing Baseline Conditions

14.5.4 The Scoping Boundary has been designed as far as reasonably practicable to avoid NSR and VSR, as set out in the Corridor and Preliminary Routeing and Siting Study (CPRSS) and described in **Chapter 3: Main Alternatives Considered**. This included avoiding settlements and residential areas passing predominantly through rural areas, with the majority of NSR and VSR being isolated dwellings and small settlements.

14.5.5 The Scoping Boundary does, however, pass in proximity to larger built-up areas. These have been split into their respective local authorities and presented in **Table 14.2.**

Table 14.2 – Settlements that Fall Within the Scoping Boundary

Settlement Name	Local Authority	Settlement Type
Calow Green	Northeast Derbyshire	Village
Temple Normanton	North East Derbyshire	Village
Heath	North East Derbyshire	Village
Sutton Scarsdale	North East Derbyshire	Village

Settlement Name	Local Authority	Settlement Type
North Wingfield	North East Derbyshire	Village
Lower Pilsley	North East Derbyshire	Village
Clay Cross	North East Derbyshire	Village
Stretton	North East Derbyshire	Village
Higham	North East Derbyshire	Village
Hallfield Gate	North East Derbyshire	Village
South Wingfield	Amber Valley Borough Council	Village
Oakerthorpe	Amber Valley Borough Council	Village
Swanwick	Amber Valley Borough Council	Village
Lower Hartshay	Amber Valley Borough Council	Village
Ripley	Amber Valley Borough Council	Village
Upper Hartshay	Amber Valley Borough Council	Village
Openwoodgate	Amber Valley Borough Council	Village
Denby Bottles	Amber Valley Borough Council	Village
Rawson Green	Amber Valley Borough Council	Village
Horsley Woodhouse	Amber Valley Borough Council	Village
Smalley	Amber Valley Borough Council	Village
Coxbench	Amber Valley Borough Council	Village
Horsley	Amber Valley Borough Council	Village
Morley	Erewash Borough Council	Village
Stanley	Erewash Borough Council	Village
Ockbrook	Erewash Borough Council	Village
Borrowash	Erewash Borough Council	Village
Draycott	Erewash Borough Council	Village

Settlement Name	Local Authority	Settlement Type
Shardlow	South Derbyshire District Council	Village
Thulston	South Derbyshire District Council	Village
Aston-on-Trent	South Derbyshire District Council	Village
Weston-on-Trent	South Derbyshire District Council	Village
Chellaston	South Derbyshire District Council	Village
Swarkestone	South Derbyshire District Council	Village
Barrow-upon-Trent	South Derbyshire District Council	Village
Twyford	South Derbyshire District Council	Village
Willington	South Derbyshire District Council	Village

14.5.6 In addition to these larger built-up areas, a series of non-residential NSRs and VSRs located within the scoping boundary have been identified. These have been split into their respective local authorities and presented in the **Table 14.3.**

Table 14.3 – Non-Residential NSRs Within the Scoping Boundary

Receptor Name	Local Authority	Receptor Type
Temple Normanton Junior Academy	Northeast Derbyshire	School
St Clements Church, Horsley	Amber Valley Borough Council	Place of Worship
Horsley Church of England Primary School	Amber Valley Borough Council	School
Coxbench Hall Residential Care Home	Amber Valley Borough Council	Care Home
Morley Primary School	Erewash Borough Council	School
Findern County Primary School	South Derbyshire	School

14.5.7 The Scoping Boundary crosses over or close to several main transport routes, including the following roads:

- Northeast Derbyshire: A617, M1, A6175 and A61.

- Amber Valley: A61, A615, A38, A610, A608 and A609.
- Erewash: A608, A6096, A52, A6005.
- South Derbyshire: A50, A6, A514 and A5132.

14.5.8 The following railway lines (North to South) are also within the Scoping Boundary:

- Erewash Valley Line.
- Midland Main Line.
- Castle Donnington Line.
- Derby to Birmingham (Proof House Junction) Line.

14.5.9 NIAs are determined via strategic noise maps and highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England. There are three NIAs related to road traffic noise and no NIAs related to rail noise within the Scoping Boundary. NIAs identified within the Scoping Boundary are presented in **Table 14.4** and shown on **Figure 14.1 Noise and Vibration Study Area and Receptors**. A further nine NIAs related to road traffic noise and two NIAs related to rail noise are located within 300 m of the Scoping Boundary.

Table 14.4 – NIAs Within the Scoping Boundary

NIA identification number	Associated Road/Railway	Responsible Authority
7762	A617 (Road)	Northeast Derbyshire
7971	A38 (Road)	Amber Valley
11643	A608 (Road)	Amber Valley

14.5.10 The noise climate is expected to vary within the Scoping Boundary depending on the nature of the area. For example, close to existing noise sources, such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels are expected to be lower.

14.5.11 Ecological and heritage sites that maybe affected by noise and vibration will be considered within **Chapter 7: Ecology and Biodiversity; Chapter 8: Historic Environment** and **Chapter 12: Traffic and Transport**.

14.5.12 It is assumed that existing vibration levels are negligible within the Scoping Boundary compared to construction vibration threshold values, which is likely to be the case even close to railways or busy main roads. The assessment will therefore consider potential construction vibration impacts against threshold values assuming no significant existing vibration sources.

Future Baseline Conditions

14.5.13 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 in the ES.

14.5.14 The future baseline noise levels are assessed by considering projected developments and changes in traffic patterns near NSRs in the Scoping Boundary. It is expected that road traffic noise will steadily increase due to the natural growth in road traffic flows over time. With regards to the modelling of traffic, the future baseline will also take into account traffic growth as a result of new development based on growth factors from the Department for Transport models. Ongoing engagement with local planning authorities will also identify any potential development which could also contribute to increases in future baseline ambient noise levels and these will be accounted for in the assessments where appropriate.

14.6 Mitigation Measures Adopted as Part of the Project

14.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology**.

Embedded Mitigation Measures

14.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives Considered)** has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects are avoided or reduced. The Scoping Boundary has been designed to avoid, as far as reasonably practicable, settlements and residential areas and passes predominantly through rural areas, with the majority of NSR and VSR being isolated dwellings and small settlements.

14.6.3 A range of embedded mitigation measures would be considered as part of the design of above ground infrastructure in order to reduce noise and vibration effects throughout the duration of the operational phase, these measures will be inherent in the evolving design of the Project:

- Substations and Sealing End Compounds (SEC) – Noise Control Measures:
  - Substation and SEC equipment proposed would include any required noise mitigation measures by design. This may include plant selection, siting, screening and enclosure (as appropriate).
- Substations and SEC – Vibration Control Measures:
  - Plant with moving parts, such as cooling equipment and transformers, substations and SEC equipment would be expected to be mounted on suitable anti-vibration mounts to protect the plant from potential vibration impacts and also to attenuate vibration generated by the plant.

14.6.4 Further embedded design measures will be considered as the Project design evolves.

Good Practice Mitigation Measures

14.6.5 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally

measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

14.6.6 In addition, **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** presents the likely good practice mitigation measures relevant to noise and vibration. These include but are not limited to the following overarching measures:

- The Construction Environmental Management Plan and other Environmental Control Plans shall include measures to manage environmental nuisance during construction. The contractor(s) shall undertake site inspections to check conformance to the relevant environmental Control Plans.
- Suitably experienced Environmental Manager(s) would be appointed for the duration of the construction phase. In addition, qualified and experienced Environmental Clerk of Works would be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the Code of Construction Practice. The Environmental Clerk of Work(s) would monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures.
- Construction workers would undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics would include but not be limited to:
  - Location and protection of sensitive environmental sites and features.
  - Adherence to protected environmental areas around sensitive features.
  - Working hours and noise and vibration reduction measures.
  - Agreed traffic routes, access points, etc.
- 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, would be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- Plant and vehicles would conform to relevant applicable standards for the vehicle type. Vehicles would be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. Where practicable all plant and vehicles would be required to switch off their engines when not in use and when it is safe to do so.
- Materials and equipment would not be moved or handled unnecessarily. The loading and unloading of materials from vehicles would be controlled, including cable drums and excavated materials.
- Contractors 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.
- BPM measures would be identified within the outline CoCP (submitted with the DCO application) and may include housing continuous noisy plant in acoustic enclosures, siting semi-static equipment as far as reasonably practicable away

from occupied buildings and fitting equipment with suitable enclosures or screening.

- In certain instances where construction noise or vibration may cause a significant adverse effect at nearby NSR, applications for prior consent under Section 61 of the Control of Pollution Act 1974 may be submitted to the relevant local authority to ensure that BPM are applied to control noise and vibration. This would be considered within the mitigation outlined in the outline CoCP to support the DCO application.

Additional Mitigation Measures

14.6.7 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage no additional mitigation measures have been identified for noise and vibration.

14.7 Likely Significant Effects

14.7.1 This section sets out the likely significant effects on noise and vibration arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

14.7.2 The review of likely significant effects assumes that the embedded and good practice mitigation measures described in Section 14.6 and outlined within **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects.

14.7.3 The likely significant effects of the Project have been split into:

- Construction.
  - Noise effects from construction activities.
  - Noise effects from construction traffic.
  - Vibration effects from construction activities.
  - Vibration effects from construction traffic.
- Operation:
  - Noise effects from the operation of overhead lines (Conductor System Noise).
  - Noise effects from the proposed new substation (e.g. transformers) (where this is brought into the Project scope), associated cooling plant, and proposed cable sealing end compounds.
  - Noise effects from the operation of underground cables.
  - Vibration effects from the operation of new infrastructure including overhead lines, the proposed new substation equipment (where this is brought into the Project scope), cable sealing end compounds and underground cables.
  - Noise and vibration effects from the maintenance of operational infrastructure including overhead lines, substations, cable sealing end compounds and underground cables.

Construction

Noise Effects from Construction Activities

14.7.4 Construction activities such as earthwork operations, the operation of fixed plant and the construction and removal of pylons, have the potential to cause noise impacts at NSR within 300 m of the construction activity. Impacts are dependent on the nature of the construction activities and the distance between the noise source and NSR.

14.7.5 The construction activities associated with pylons, conductors, trenchless crossings and underground cables are generally transient and of a relatively short duration at any one location, and together with the implementation of the good practice measures set out in Section 14.6, significant effects would be considered as part of the ES.

14.7.6 There is a greater likelihood of significant adverse effects from construction noise at static sites, such as construction compounds and substations where the duration of works may be medium to long term, although these can generally be avoided with the implementation of standard measures set out within the outline CoCP (to be submitted with the DCO application).

14.7.7 Assessment of construction noise impacts is **Scoped In** for further assessment to identify any potential construction noise 'hotspots' that will require further consideration during the construction phase. Construction noise hotspots may include areas of piling, areas supporting undergrounding or trenchless crossing installations or activities that required night-time working for example where certain operations such as cable pulling cannot be stopped once started. As likely significant effects cannot be ruled out at this stage, noise effects from construction activities at static sites such as substations and compounds are **Scoped In** to the ES.

Noise Effects from Construction Traffic

14.7.8 There is the potential for likely significant effects at NSR located within 50 m of roads identified as construction traffic routes, where it is considered that construction traffic will not significantly alter flows with the potential for an increase in road traffic noise of 1 dB(A) or more as a result of the addition of construction traffic to existing traffic levels.

14.7.9 Therefore, noise effects from construction traffic using the public highway is **Scoped In** to the ES.

Vibration Effects from Construction Activities

14.7.10 Construction activities such as piling, ground stabilisation and installation of underground cables have the potential to generate construction vibration resulting in nuisance at human VSR or damage to existing buildings and structures. The level of significance of effects from vibration would depend on the nature and duration of the construction activity, the distance between the vibration source and the receptor and the sensitivity of the receptor.

14.7.11 Ground borne vibration from general construction activities associated with the Project are unlikely to result in likely significant effects on the basis of the advice contained within the Transport and Road Research Laboratory (Ref 14.21)

Supplementary Report 328, namely that '*at distances greater than 20 m, the vibration levels measured were below the level of human perception because of attenuation in the ground and that it is unlikely that people would be disturbed by vibration from general construction activities at distances of 20 m or more.'*

14.7.12 However, it is not possible to fully rule out the likelihood of significant effects as the Project is still at an early design stage. Therefore, construction vibration effects are **Scoped In** to the ES.

Vibration effects from construction traffic

14.7.13 Vibration from traffic is caused by the road surface. Assuming the road surfaces used by construction traffic are well maintained and remain free from irregularities, such as potholes significant effects would not be expected, even at relatively short distances.

14.7.14 Vibration effects from construction traffic on the public highway are therefore **Scoped Out** of the ES.

Operation Including Maintenance

Noise effects from the operation of overhead lines (Conductor System Noise)

14.7.15 Conductor system noise is caused by corona discharge activity.

14.7.16 Corona discharge occurs when the conductor surface electric stress exceeds the inception level for corona discharge activity, a level of around 17 to 20 kV/cm. Most transmission line conductors are designed to operate below this threshold, and so usually operate quietly in dry weather conditions.

14.7.17 However, after a prolonged spell of dry weather without heavy rain to wash the conductors, contamination may accumulate sufficiently to result in increased noise. Under these circumstances the noise is referred to as 'dry noise'; However, these discharge sources are washed away through rainfall and the line will resume its normal quieter operation.

14.7.18 The highest noise levels generated by an overhead line generally occur during wet weather conditions; the noise level will depend primarily on the rate of rainfall. Fog may also give rise to increased noise levels, although these levels tend to be less than those during rain. Noise generated under these circumstances is referred to as 'wet noise'.

14.7.19 In line with National Grid's policy position regarding noise from overhead lines, and experience across its portfolio the design of the Project would be developed to avoid significant adverse impacts on health and quality of life and adverse impacts on health and quality of life are to be mitigated and minimised. It is not currently possible to fully rule out the likelihood of significant effects from conductor system noise as the Project is still at an early design stage, therefore, conductor system noise is **Scoped In** to the ES.

Noise Effects from Proposed New Substation (e.g. Transformers), Associated Cooling Plant, and Proposed Cable Sealing End Compounds

14.7.20 National Grid Electricity Transmission is proposing to develop a new 400 kV Chesterfield Substation in the vicinity of the existing substation site. This will

replace the existing substation, which would become redundant. Temporary diversions of the routes may also be required to maintain electricity supplies whilst the permanent works are undertaken. It is currently proposed that the new Chesterfield Substation would not form part of this Project, instead being provided by the Brinsworth to High Marnham project.

14.7.21 However, notwithstanding the default position being that such works would not be incorporated as part of this Project, there remains the possibility that they would be incorporated on a 'fall-back' basis to guard against any risk of delay to the delivery of this Project.

14.7.22 Therefore, assessment and consideration of static plant facilities such as the proposed new substation at Chesterfield (where these works to be incorporated into the Project scope) and proposed cable sealing end compounds will be required to be considered within the scope of the ES. Likely significant effects cannot be ruled out at this early stage of the Project design and therefore a noise assessment of any above ground static installations is **Scoped In** to the ES.

14.7.23 Specifically with regard to the proposed new Chesterfield Substation is the issue of transformer noise, which following commissioning is almost constant, with a hum occurring at exact harmonics of the supply frequency; 100 Hz and 200 Hz components are usually dominant. Transformers generally run continuously except for occasional maintenance and fault outages. Transformer coolers typically emit a broadband noise; however, their operation depends on temperature and loading. As described in Section 14.6, embedded noise mitigation measures would be factored into the proposed substation design. These may include (but are not limited to) plant selection, siting, screening and enclosure (as appropriate) and would reduce the likelihood of significant effects arising from the substation.

14.7.24 It is not proposed to replace the existing Willington substation within the scope of this scheme and therefore no new noise effects are anticipated. Assessment of the static plant facilities at the Willington substation is therefore **Scoped Out** of the ES.

Noise Effects from the Operation of Underground Cables

14.7.25 Undergrounding of cables is considered to significantly mitigate operational noise from cable surfaces to the point where they would not be audible above ground. As such likely significant effects would not be expected to occur where the Project is proposing to use underground cables. Therefore, noise effects from the operation of underground cables are **Scoped Out** of the ES.

Vibration Effects from the Operation of New Infrastructure Including Overhead Lines, New Substation Equipment, Cable Sealing End Compounds and Underground Cables

14.7.26 There are no sources of operational vibration proposed as part of the Project. Plant with moving parts, including cooling equipment and transformers, would include vibration isolation measures within the design as embedded mitigation such as the use of suitable anti-vibration mounts. Vibration would therefore not be expected to be perceptible even in very close proximity to plant. Operational vibration is therefore proposed to be **Scoped Out** of the ES.

Noise and Vibration Effects from the Maintenance of Operational Infrastructure Including Overhead Lines, Substations, Cable Sealing End Compounds and Underground Cables

14.7.27 Maintenance of the electricity transmission plant would be infrequent, localised and short term in duration. Maintenance activities would follow standard measures to reduce noise and vibration where required. Noise and vibration associated with operational maintenance is therefore proposed to be **Scoped Out** of the ES.

14.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the Environmental Statement

14.8.1 In addition to the data sources listed in Section 14.5, the assessment within the ES will be supported by the following additional information:

- Extent and nature of construction phase activities potentially leading to noise emissions.
- Traffic data for the construction phase.
- Extent and nature of static plant facilities associated with the operation of the Project.
- Baseline noise surveys (as described below).

Baseline Noise Surveys

14.8.2 Baseline noise surveys would be agreed with the Local Planning Authority (LPA) accounting for local parameters.

14.8.3 Generally, for the construction noise assessment where appropriate, worst-case lower thresholds will be used for the assessment of construction noise unless Defra strategic noise mapping data could be utilised to justify a higher threshold, where appropriate. Where surveys are carried out, they will be conducted in general accordance with the methodology described in BS 7445-1 (Ref 14.20).

14.8.4 The sound level meter will measure a range of parameters including the following:

- $L_{Aeq, T}$ – The A-weighted equivalent continuous sound pressure level over the measurement period T, representative of the ‘average’ sound pressure level over a given period, in this case 15 minutes.
- $L_{A10, T}$ – The $L_{A,10}$ is defined as the noise level that is exceeded for 10% of the measurement period and is usually regarded as a descriptor of road traffic noise.
- $L_{A90, T}$ – The L_{A90} is defined as the noise level that is exceeded for 90% of the measurement period and is usually regarded as a descriptor of the background noise level.
- $L_{A,max}$ – The $L_{A,max}$ is the maximum A-weighted noise level during the sample period, measured using a fast time weighting.

14.8.5 The measurement periods and durations will be appropriate and undertaken by methods including unattended long-term surveys for up to 7 days and where

equipment safety concerns arise attended surveys for key weekday and weekend time periods. Unattended surveys will be subject to the safety of equipment and land access provisions. All survey durations and locations will be consulted with the local planning authorities to discuss and agree locations, durations and specifics of the surveys in advance.

14.8.6 Microphones will be fitted with windshield and mounted between 1.3 m – 1.5 m above ground level. The measurement locations will be free-field, at least 3.5 m from any reflective surfaces, other than the ground, where possible. Otherwise, a suitable correction will be applied.

14.8.7 Weather conditions will be monitored during the survey through the use of long-term meteorological stations linked to sound level meter equipment or through handheld anemometers and subjective description of the prevailing weather conditions.

Construction Phase Noise Assessment Methodology

14.8.8 Construction noise impacts will be assessed in accordance with BS 5228-1.

14.8.9 Construction noise levels will be calculated within the study area in accordance with the methodology described in Annex F of BS 5228-1 relating to threshold Categories linked to baseline noise climates. The predicted construction noise levels at NSRs will be compared against the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method) as a result of baseline assumptions in a rural setting which will be verified through noise monitoring where necessary and agreed with the LPA. The Category A construction noise thresholds represent the lowest assessment criteria (typically used to assess impacts in rural areas) and are proposed to be used throughout the Project as a worst-case unless there is a justification for a higher threshold Categories B or C to be set (e.g., via noise survey or Defra noise mapping data) at specific locations.

14.8.10 The Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL) will be established in accordance with **Table 14.5**.

Table 14.5 – Proposed Construction Noise Assessment Thresholds for Residential Receptors

Time Period	LOAEL	SOAEL	
Weekdays 7:00am to 7:00pm, and Saturdays 7:00am to 1:00pm.	Baseline noise levels $L_{Aeq, T}$	14.8.11	75dB $L_{Aeq, T}$ *(1) *(2)
Weekdays 7:00pm to 11:00pm, Saturdays 1:00pm to 11:00pm, and Sundays 7:00am to 11:00pm.	Baseline noise levels $L_{Aeq, T}$	14.8.12	65dB $L_{Aeq, T}$ *(1) *(2)

Time Period	LOAEL	SOAEL	
Night-time 11:00pm to 7:00am.	Baseline noise levels $L_{Aeq, T}$	14.8.13	55dB $L_{Aeq, T}$ *(1) *(2)

Notes:

*(1) Based upon lowest eligibility for noise insulation as defined in Table E.2 of BS5228-1:2009 (+A1 2014). Additional note to noise insulation; in noisy environments an offer of insulation is made where a noise level 5 dB or more above the existing pre-construction ambient noise level for the corresponding times of day is measured; hence the threshold for SOAEL is set relative to the higher of these values and as such could increase in noisy environments with justification.

*(2) If the ambient noise level exceeds the SOAEL values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq, T}$ noise level for the period increases by more than 3 dB due to site noise.

14.8.14 Based on the information above a semantic magnitude of impact scale will then be applied relative to both environment, and health and quality of life impacts. The following impact magnitudes are proposed:

- **Negligible:** Below LOAEL (as defined in **Table 14.5**).
- **Minor:** Above or equal to LOAEL but below appropriate BS 5228-1 Category (**Table 14.5**).
- **Moderate:** Above or equal to appropriate BS 5228-1 Category but below an SOAEL (**Table 14.5**).
- **Major:** Above or equal to an SOAEL (**Table 14.5**).

14.8.15 Significant effects would be determined through criteria set out in DMRB LA 111, as described below.

Significance of Effects – Construction Noise

14.8.16 Significant effects for construction noise are then defined in accordance with DMRB LA 111 on the following grounds.

14.8.17 ‘Construction noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or,
- a total number of days exceeding 40 in any 6 consecutive months.’

Construction Phase Traffic Noise Assessment Methodology

14.8.18 The Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL) will be established in accordance with **Table 14.6**.

Table 14.6 - Construction Traffic Noise LOAELs and SOAELs

Time Period	Adverse effect level	$L_{night, outside}$ noise level (dB)	L_{A10} noise level (dB)
Day	LOAEL	n/a	55dB $L_{A10, 18hr}$ facade
	SOAEL	n/a	68dB LA10, 18hr facade
Night	LOAEL	40dB $L_{night, outside}$ (free field)	n/a
	SOAEL	55dB $L_{night, outside}$ (free field)	n/a

14.8.19 Noise from construction traffic on the public highway will be calculated in accordance with CRTN and assessed against the criteria detailed in DMRB LA 111: Noise and vibration (Ref 14.14).

14.8.20 The Baseline noise levels from roads within the construction traffic study area will be calculated in accordance with CRTN for the 'do-nothing' and 'do something' scenarios in the construction year. The calculated baseline noise level values will be compared to determine the magnitude of the impact in line with the semantic scale below.

- **Negligible:** Less than 1.0dB change in road traffic noise.
- **Minor:** Greater than or equal to a 1.0dB, but less than a 3.0dB, change in road traffic noise.
- **Moderate:** Greater than or equal to a 3.0dB, but less than a 5.0dB, change in road traffic noise.
- **Major:** Greater than or equal to a 5.0dB change in road traffic noise.

Significance of Effects – Construction Traffic Noise

14.8.21 Significant effects for construction traffic noise are then defined in accordance with DMRB LA 111 on the following grounds.

14.8.22 'Construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or,
- a total number of days exceeding 40 in any 6 consecutive months.'

Construction Phase Vibration Assessment Methodology

14.8.23 Construction vibration levels will be calculated and assessed in accordance with the methodologies described in BS5228-2. No vibration baseline study is proposed within the ES and construction vibration levels will be compared against fixed assessment criteria detailed in BS5228-2.

14.8.24 Vibration levels from construction activities will be calculated in accordance with the methodology described in Annex E of BS 5228-2. Construction vibration effect threshold levels, including applicable LOAEL and SOAEL. These are presented in **Table 14.7**.

Table 14.7 – Construction Vibration Effect Magnitudes at Residential Receptors

Vibration Level mm/s PPV (Peak Particle Velocity)	Effect	Observed Adverse Effect Level
<0.3mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	n/a
≥0.3 to <1.0mm/s	Vibration might be perceptible in residential environments.	
≥1.0 to <10mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.	LOAEL
≥10mm/s	Vibration is likely to be intolerable for any more than a brief exposure to this level in most building environments.	SOAEL

14.8.25 Based on the above a semantic magnitude of impact scale has been defined relative to environment, and health and quality of life impacts. As such, the following impact magnitudes are proposed to be applied to activities generating ground-borne vibration such as piling and ground stabilisation:

- **Negligible:** <0.3mm/s (as defined in **Table 14.7**).
- **Minor:** ≥0.3mm/s and <1.0mm/s (**Table 14.7**).
- **Moderate:** ≥1.0mm/s and <10.0mm/s (**Table 14.7**).
- Major: ≥10.0mm/s (**Table 14.7**).

14.8.26 Significant effects will then be defined in accordance with DMRB LA 111 on the following grounds:

14.8.27 ‘Construction vibration shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights.
- A total number of days exceeding 40 in any 6 consecutive months.’

Operational Phase – Noise Assessment (Overhead Lines)

14.8.28 The assessment of the overhead lines will be in accordance with the standard National Grid methodology for considering noise associated with overhead lines as NSIPs: National Grid Policy Statement PS(T)134 and its supporting technical guidance, TGN(E)322 and TR(E)564.

14.8.29 PS(T)134 describes a methodology for predicting and assessing the environmental impact due to audible noise caused by new, reconductored, diverted or uprated overhead transmission lines, considering noise generation associated with operating voltage, conductor system design and pylon geometry. To present a robust assessment the study will require to consider both “wet noise” and “dry noise”.

14.8.30 The health-based noise criteria set out within PS(T)134 will be used within the scope of the assessment as it takes account of UK policy and evidence from multiple sources, including the World Health Organisation and BS 4142:2014 + A1:2019. The guidance presents a three-tier ‘screening’ approach based on source to receptor distance.

- If predicted noise levels fail the Tier 1 test, a Tier 2 assessment is undertaken.
- If predicted noise levels fail the Tier 2 test, a Tier 3 assessment is undertaken.

14.8.31 This three-tier approach screens receptors out of further assessment where there would be no adverse impact and leads to a greater detail of assessment where the screening concludes a risk of adverse impacts.

- Tier 1 is a primary screening step based on ‘worst-case’ absolute wet noise effects and the pre-determined assessment criteria set out in PS(T)134.
- Tier 2 is a further screening step based on combined absolute wet noise and dry noise effects and recalculated assessment criteria which take account of the annual average rainfall rate in the assessment area. This step takes account of the fact that wet noise occurs during periods of wet weather and therefore does not occur all the time.
- Tier 3, where required is a full assessment following the principles of BS 4142:2014 + A1:2019 for both wet noise and dry noise.

Operational Phase Noise Assessment (Substation and Cable Sealing End Compounds) Methodology

14.8.32 BS 4142 provides a methodology and criteria for assessing new or existing industrial sound sources by comparing the operational sound (rating level) at the location of a sensitive receptor, with the background sound levels that are currently experienced without the development.

14.8.33 The rating level is defined as the specific sound level, with the addition of character corrections to consider certain acoustic features that could potentially increase the significance of impact. A penalty will be applied to the specific sound level if a tone, impulsive or other characteristic occurs or is expected to be present for new or modified sound sources.

14.8.34 The assessment methodology outlined in BS 4142 indicates that the greater the difference of the rating level in comparison with the background sound level (L_{A90}) the greater the significance of the impact, this is set out in **Table 14.8**.

14.8.35 In addition, context needs to be considered as qualified in the Standard, where "the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context".

Table 14.8 - Operational Noise Effect Magnitudes at Residential Receptors

Effect	Observed Adverse Effect Level
• ≤ L_{A90} -0dB • Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.	n/a
• > L_{A90} -0dB and ≤ L_{A90} +5dB • The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact.	LOAEL
• > L_{A90} +5dB and ≤ L_{A90} +10dB • A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.	
• > L_{A90} +10dB • A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.	SOAEL

14.8.36 Based on the above a semantic magnitude of impact scale has been defined relative to environment, and health and quality of life impacts. As such, the following impact magnitudes are applicable with regard to operational static plant noise, but it is qualified that context would also be accounted for in the derivation of Significant Effects:

- **Negligible:** < L_{A90} -0dB (as defined in **Table 14.8**).
- **Minor:** > L_{A90} -0dB and ≤ L_{A90} +5dB (**Table 14.8**).
- **Moderate:** > L_{A90} +5dB and ≤ L_{A90} +10dB (**Table 14.8**).

- **Major:** > L_{A90} +10dB (**Table 14.8**).

Sensitivity

14.8.37 NSR are determined based on property type and usage. The sensitivity of NSR is factored into the assessment criteria for noise and vibration impacts, with all considered receptors carrying the same level of sensitivity.

14.8.38 Sensitive receptors are defined as below, drawing from the guidance of DMRB LA111 relative to the setting of sensitive receptors.

- Residential dwellings.
- Hotels and Guest Houses.
- Schools and education premises.
- Hospitals and healthcare facilities.
- Care homes.
- Places of worship.
- Community facilities including libraries.

14.8.39 Areas primarily used of leisure activities, public rights of way, sports facilities, sites of historic or cultural importance, sites of ecological importance, and parks will be considered within the scope of the appropriate chapters and are not covered within the noise and vibration chapter but are considered in **Chapter 6: Landscape and Visual Amenity, Chapter 7: Ecology and Biodiversity, Chapter 8: Historic Environment** and **Chapter 16: Health and Wellbeing**.

14.8.40 Industrial and commercial receptors will not generally be considered as noise and vibration sensitive receptors within the assessment unless agreed otherwise during consultation with the Local Planning Authorities.

Limitations and Assumptions

14.8.41 The following limitations and assumptions have been identified:

- Assumptions have been made regarding the condition of the roads (including on site haul roads) when assessing the impact of construction traffic related vibration. Vibration is caused by irregularities in the road surface and for the purposes of the scope, there is an assumption that the roads used by construction traffic will be free from significant irregularities.
- The assumption is made that due to the predominantly rural setting of the Project, a proportionate approach to the assessment will be undertaken and baseline noise monitoring and data gathering will be undertaken as agreed with the LPA. An assumption is embedded in the assessment of construction noise that the lowest threshold criteria from within BS5228-1 will generally be used unless local circumstances or the LPA consultation dictate that monitoring will be advisable relating to specifics of the area or specifics of the activities. It is concluded that this will represent a robust and proportionate assessment of construction noise as limits below the lowest threshold of BS5228-1 will not be set in any situation within the study, and as such the assessment will present a worst-case assessment with regard to the potential for significant effects.

- Baseline noise surveys are required to ascertain the baseline noise levels of NSR in the vicinity of Substations. The data gathered by noise surveys as well as the context that a surveyor's observations will be used as the basis of static plant operational noise assessments. The nature of the monitoring will be controlled by external factors such as land access and equipment safety, which will be discussed and agreed with the LPAs as the works progress.

14.9 Proposed Scope of the Environmental Statement

14.9.1 The matters that are proposed to be scoped in and out of further assessment for noise and vibration are outlined in **Table 14.9**.

Table 14.9 – Proposed Scope of the ES

Matter	Phase	Scoped In/ Out	Justification
Construction noise effects from construction activities Static construction sites and compounds	Construction	**Scoped In**	Much of the construction activities supporting the overhead line, cable sealing end compounds, undergrounding are likely to be transient in nature, short term and controlled through good practice noise mitigation. Likely significant effects from static construction sites such as compounds and substations (where such works to be incorporated into the Project scope) cannot be ruled out at this stage as separation distances to NSRs have yet to be defined.
Noise effects from construction traffic	Construction	**Scoped In**	There is the potential for likely significant effects at NSR located within 50 m of roads identified as construction traffic routes.
Vibration effects from construction activities – human health receptors	Construction	**Scoped In**	Construction vibration from activities such as piling and ground stabilisation could result in perceptible vibration at NSR. Although likely significant effects to human NSR are unlikely to occur, it is not possible to fully rule out at this stage and will be considered further in the ES.
Vibration effects from construction Traffic – human health receptors	Construction	**Scoped Out**	Vibration from traffic is caused by the road surface. Assuming the road surfaces used by construction traffic are well maintained and remain free from irregularities, such as potholes significant effects would not be expected, even at relatively short distances Management of this would be set out in the CoCP within the DCO.

Matter	Phase	Scoped In/ Out	Justification
Noise effects from the operation of overhead lines (Conductor System Noise)	Operation (including maintenance)	**Scoped In**	Likely significant effects at NSR cannot be ruled out at this stage.
Noise effects from proposed new substation (e.g. transformers), associated cooling plant, and proposed cable sealing end compounds	Operation (including maintenance)	**Scoped In**	Embedded noise mitigation measures would be designed into the new proposed substation at Chesterfield to minimise likely significant effects at NSR. However, these cannot be ruled out at this stage. The existing Willington substation would be maintained therefore noise effects from the Willington substation are scoped out from the ES.
Noise effects from the operation of underground cables	Operation (including maintenance)	**Scoped Out**	Undergrounding of cables is considered to significantly mitigate operational noise from cable surfaces. Likely significant effects would not be expected to occur where the Project is proposing to underground existing overhead lines.
Vibration effects from the operation of new infrastructure including overhead lines, new substation equipment, cable sealing end compounds and underground cables	Operation (including maintenance)	**Scoped Out**	No likely significant effects from vibration would occur as plant with moving parts, including cooling equipment and transformers, would include vibration isolation measures within the design as embedded mitigation such as the use of suitable anti-vibration mounts.
Noise and vibration effects from the maintenance of operational infrastructure including overhead lines, substations, cable sealing end	Operation (including maintenance)	**Scoped Out**	No likely significant effects form noise and vibration would occur in relation to maintenance activities.

Matter	Phase	Scoped In/ Out	Justification
compounds and underground cables			

14.10 References

Ref 14.1: HMSO (2021). Environment Act 2021. Available at Environment Act 2021 (legislation.gov.uk)

Ref 14.2: HMSO (1974). Control of Pollution 1974. Available at Control of Pollution Act 1974 (legislation.gov.uk)

Ref 14.3: HMSO (1990). Environmental Protection Act 1990. Available at Environmental Protection Act 1990 (legislation.gov.uk)

Ref 14.4: Department of Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Accessed February 2024. https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf

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Ref 14.6: Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework.

Ref 14.7: Department for Environment, Food & Rural Affairs (2010). Noise Policy Statement for England.

Ref 14. 8: IEMA (2014). Guidelines for Environmental Noise Impact Assessment

Ref 14.9: British Standards Institution (2014). BS 5228-1:2009 (+A1:2014): Code of practice for noise and vibration control on construction and open sites. Noise. London: British Standards Institution

Ref 14.10: British Standards Institution (2014). BS 5228-2:2009 (+A1:2014): Code of practice for noise and vibration control on construction and open sites. Vibration. London: British Standards Institution.

Ref 14.11: British Standards Institution (1993). BS 7385-2:1993, Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration (BS 7385-2). London: British Standards Institution.

Ref 14.12: British Standards Institution (2019). BS 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound. London: British Standards Institution.

Ref 14.13: Department of Transport and Welsh Office (1988). Calculation of Road Traffic Noise (CRTN)

Ref 14.14: National Highways (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2.

Ref 14.15: National Grid Technical Report TR(E)564 ‘Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’ (Issue 1, 2021)

Ref 14.16: National Grid (2021) PS(T)134 ‘Operational Audible Noise Policy for Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’ Issue 2

Ref 14.17: National Grid Technical Guidance Note TGN(E) 322 ‘Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating)’, (Issue 2, June 2021)

Ref 14.18: International Organisation for Standardisation (ISO) 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors: Part 2: Engineering method for the prediction of sound pressure levels outdoors

Ref 14.19: EN/430/NOTE2021. "Assessment of Overhead Line Noise for Development Consent Order Applications: Guidance for Consultants".

Ref 14.20: British Standards Institution (2019). BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures (BS 7445). London: British Standards Institution.

Ref 14.21: Transport Research Laboratory (TRL) Limited (1997). Supplementary Report 328: Ground vibrations caused by road construction activities

15. Socio-economics, Recreation and Tourism

Contents

15. Socio-economics, Recreation and Tourism

15.1 Introduction

15.1.1 This chapter presents how the socio-economics, recreation and tourism assessment will consider the potentially significant effects on socio-economics, recreation and tourism receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

15.1.2 As detailed in **Chapter 4 Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

15.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

15.2 Approach to Scoping

15.2.1 The approach to scoping has been drawn from previous experience of similar projects and professional judgement. Determining the scope of the socio-economics, recreation and tourism assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

15.2.2 There are interrelationships related to the potential effects on socio-economics, recreation and tourism and other environmental topics. Therefore, please also refer to the following chapters of this Scoping Report:

- **Chapter 5: Environmental Impact Assessment Approach and Methodology.**
- **Chapter 6: Landscape and Visual.**
- **Chapter 11: Agriculture and Soils.**
- **Chapter 12: Traffic and Transport.**
- **Chapter 13: Air Quality.**
- **Chapter 14: Noise and Vibration.**
- **Chapter 16: Health and Wellbeing.**

15.2.3 This chapter is supported by the following figures in **Volume 3**:

- **Figure 15.1: Socio-Economic, Recreation and Tourism Study Area.**
- **Figure 15.2: Socio-Economic, Recreation and Tourism Receptors.**

15.3 Key Regulatory and Planning Policy Context

Key Legislation

15.3.1 A summary of the key legislation considered in the scope of effects on socio-economics, recreation and tourism is outlined below:

- Countryside and Rights of Way (CRoW) Act, 2000 (Ref 15.1)
- Equality Act, 2010 (Ref 15.2).
- Localism Act, 2011 (Ref 15.3).
- Environment Act, 2021 (Ref 15.4).

National Planning Policy

National Policy Statements

15.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement for Energy (NPS EN-1) (Ref 15.5) and National Policy Statement for Electricity Networks Infrastructure (NSP EN-5) (Ref 15.6). **Table 15.1** sets out the requirements of both NPSs and any other key national policy consideration relevant to socio-economics, recreation and tourism and how these have been considered within this chapter.

Table 15.1 – National Planning Policy relevant to Socio-economics, Recreation and Tourism

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (NPS EN-1) 2024		
Paragraph 5.13.5 and Paragraphs 5.13.9 to 5.13.11	Paragraph 5.13.5 of EN-1 states that “Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development’s socio-economic impacts correlate with local planning policies”. Paragraphs 5.13.9 to 5.13.11 of EN-1 state that “The Secretary of State should have regard to the potential socio-economic impacts of new energy infrastructure identified by the applicant and from any other sources that the Secretary of State considers to be both relevant and important to its decision”.	A high-level baseline outlining existing socio-economic conditions of the study area for the Project is provided in this chapter. The assessment will cover the likely significant effects during construction, operation and maintenance of the Project.

Policy Reference	Policy Context	How it will be considered
National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) 2024		
Paragraph 2.9.17	Paragraph 2.9.17 of EN-5 states "…the Holford Rules state that application should: …approach urban areas through industrial zones, where they exist; and when pleasant resident and recreational land intervenes between the approach line and the substation, carefully assess the comparative costs of undergrounding".	This chapter will identify key land-uses, including industrial zones, residential and recreational land.

Other National Policy

15.3.3 A summary of other relevant national policy considered in the scope of effects on socio-economics, recreation and tourism includes:

- National Planning Policy Framework (Ref 5.7).

Regional and Local Planning Policy

15.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

15.3.5 All local policy, specific to socio-economics, recreation and tourism will be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

15.3.6 There is no published or specific guidance for assessing socio-economic, recreation and tourism related effects as part of an EIA. However, the assessment presented in the Environmental Statement will be informed by the principles set out in:

- Planning Practice Guidance – Open space, sports and recreation facilities, public rights of way and local green space (Ref 15.8).
- The HM Treasury Green Book (Ref 15.9).
- Homes and Communities Agency (HCA) Additionality Guide Fourth Edition (Ref 15.10).
- Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (Ref 15.11).
- DMRB LA 112 Population and Human Health (Ref 15.12).

15.4 Study Area

15.4.1 Three study areas have been identified for socio-economics, recreation and tourism in order to assess the potential for significant effects. The study areas are detailed in **Table 15.2** and are shown on **Figure 15.1: Socio-economic, Recreation and Tourism Study Area** in **Volume 3.**

Table 15.2 – Study Areas and the Associated Topics

Study area	Description	Topic
Local study area	This comprises the Scoping Boundary. The Scoping Boundary represents the area in which temporary and permanent works have the potential to impact socio-economics, recreation and tourism receptors directly.	Community facilities Recreation and tourism assets Farm and quarry businesses
500 m study area	For the assessment of potential effects on businesses where visual effects are an economic consideration (for example, restaurants or wedding venues), a study area extending 500 m from the Scoping Boundary / local study area has been identified. Based on professional judgement, businesses situated beyond 500 m of the Scoping Boundary / local study area are deemed to experience a negligible effect if visual effects were to occur.	Businesses (where visual impact is likely to be an economic consideration)
Wider study area (local authority areas)	This comprises the spatial extent of the local authority areas through which the Scoping Boundary passes where the potential supply of labour would be located (North East Derbyshire District Council, Bolsover District Council, Amber Valley Borough Council, Erewash Borough Council, South Derbyshire District Council and Derby City Council) together with Chesterfield Borough Council (located adjacent to the Project).	Economy and employment

15.4.2 As the iterative design process continues, the study areas will be refined within the ES to comprise the Order Limits (for community facilities, recreation and tourism assets, and farm businesses), the Order Limits plus a 500 m buffer (for businesses where visual impact is likely to be an economic consideration) and the local authority areas through which the Order Limits pass for economy and employment.

15.4.3 As the design continues to evolve, the study areas for identifying relevant socio-economic receptors will be reviewed as part of the next phase of assessments.

15.5 Baseline Conditions (inc. Future Baseline)

Data Collection

15.5.1 The baseline within this Scoping Report has been informed by a desk-based study which has drawn on the following information sources:

- Office for National Statistics (ONS) (Ref 15.13).
- Nomis Census 2021 (Ref 15.14).

- English Indices of Deprivation 2019 (Ref 15.15).
- Visit England 2016 (Ref 15.16)
- Visit England 2024 (Ref 15.17).
- Ordnance Survey (OS) Mapping.
- Aerial Mapping.

Engagement with Stakeholders

15.5.2 To date no engagement has been undertaken with stakeholders specifically to discuss the socio-economics, recreation and tourism assessment. However, following receipt of the Scoping Opinion, engagement with relevant stakeholders listed below will be ongoing:

- North East Derbyshire District Council.
- Bolsover District Council.
- Amber Valley Borough Council.
- Erewash Borough Council.
- South Derbyshire District Council.
- Derby City Council.
- Chesterfield Borough Council.

15.5.3 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities and Natural England. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA. For example, with the National Trust, relevant tourism boards and representatives of local access, businesses and local community groups.

15.5.4 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between May and September 2024. No pre-scoping engagement has been undertaken for socio-economics, recreation and tourism, which is considered to be an appropriate approach and normal practice for this discipline.

15.5.5 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 15.3**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 15.3 – Summary of Engagement

Organisation and date	Summary of response	Consideration in the Scoping Report
Canal and River Trust	Consideration to the Trent and Mersey Canal which is an important free-to-access leisure and recreational resource which is valued by many people as a tranquil space. It is important to consider the potential impacts on all canal users and to ensure that the special character of the canal and its surroundings are appropriately protected.	The Canal and River Trust's comments in full are noted. Impacts on the canal will be considered, including in terms of construction activities.

Existing Baseline Conditions

15.5.6 The following section provides a summary of the baseline environmental conditions within the Study Area.

Population and Deprivation

15.5.7 There are seven local authorities within the wider study area. The total estimated population within the wider study area was approximately 904,000 in mid-2022, of which the Derby City Council area has the highest estimated population as shown in **Table 15.4**.

15.5.8 An increase in population can be seen across England when comparing the population estimate of mid-2012 and mid-2022. The change in population across the wider study area is lower than the regional (East Midlands) and England averages as shown in **Table 15.4**. However, the population change within South Derbyshire District specifically (14.0%) exceeds the average change observed across England (6.3%).

15.5.9 The English Indices of Deprivation 2019 provides statistics on relative deprivation in Lower Super Output Areas (LSOAs) (areas smaller than ward level) in England[1]. The average rank of local authority areas[2] within the study area out of the 317 local authorities in England is provided in **Table 15.4**. On average, the areas of Bolsover District, Chesterfield Borough and Derby City are among the most deprived areas, while South Derbyshire District is among the least deprived.

15.5.10 **Table 15.5** shows that the overall population age profile within the wider study area is largely in line with the regional and national averages. Looking at the age profile at the local authority level, it is observed that Derby City has the highest percentage of population in the age groups under 15 and 15-64, while concurrently having the lowest proportion of individuals aged 65 and above.

Table 15.4 – Population Size, Change in Population and Deprivation

Local authority	Population estimate (mid-2022)	Change in population (mid-2022 VS mid-2012)	Deprivation (IMD 2019 rank)
Chesterfield Borough	104,110	+0.3%	86
North East Derbyshire District	103,783	+4.3%	177
Bolsover District	81,553	+6.2%	58
Amber Valley Borough	126,944	+3.5%	167
Erewash Borough	113,080	+0.3%	168
South Derbyshire District	111,133	+14.0%	218
Derby City	263,490	+4.4%	90

[1] The Indices of Deprivation are based on 39 separate indicators organised against seven distinct domains of deprivation (income, employment, health deprivation and disability, crime, barriers to housing and services, living environment, and education and skills training). The seven domains are combined and weighted to calculate an Index of Multiple Deprivation (IMD) which shows levels of deprivation at local level.

[2] This measure is calculated by averaging all of the LSOA ranks in each local authority area after they have been population weighted. The 'average rank' is then ranked, where the rank of 1 (most deprived) is given to the area with the highest score.

Local authority	Population estimate (mid-2022)	Change in population (mid-2022 VS mid-2012)	Deprivation (IMD 2019 rank)
Wider study area	904,093	+4.6%	N/a
East Midlands	4,934,939	+7.4%	N/a
England	57,106,398	+6.3%	N/a

Source: ONS, 2024 (Ref 15.13); English Indices of Deprivation (Ref 15.15)

Table 15.5 – Age group (%) Of the Local Authorities and the Wider Study Area Compared to Regional and National Figures

Local authority	Aged 0-15 years (%)	Aged 15-64 years (%)	Aged 65 and above (%)
Chesterfield Borough	16.8%	61.2%	22.0%
North East Derbyshire District	16.6%	58.7%	24.8%
Bolsover District	17.2%	62.3%	20.4%
Amber Valley Borough	16.7%	60.4%	22.9%
Erewash Borough	17.1%	61.9%	21.0%
South Derbyshire District	18.9%	62.5%	18.6%
Derby City	20.1%	63.4%	16.5%
Wider study area	18.1%	61.8%	20.1%
East Midlands	18.1%	62.2%	19.7%
England	18.5%	62.9%	18.6%

Source: ONS, 2024 (Ref 15.13)

Table 15.6 – Economic Activity, Skills and Qualifications

Socio-economic indicator	Wider study area	%	East Midlands	%	England	%
Economically active (aged 16-64, excludes full-time student)	424,028	46.9	2,300,518	7.5	26,945,252	8.6
Level 4 qualifications or above (aged >16)	205,199	28.0	1,163,784	29.1	15,606,458	33.9
Level 3 qualifications (aged >16)	130,902	17.9	731,371	18.3	7,784,977	16.9
Level 2 qualifications (aged >16)	105,060	14.3	556,046	13.9	6,126,130	13.3
Level 1 and entry level qualifications (aged >16)	77,779	10.6	415,084	10.4	4,456,198	9.7
Other qualifications (aged >16)	19,246	2.6	113,31	2.8	1,268,468	2.8
1. Managers, directors and senior officials	46,800	11.2	272,040	12.0	3,403916	12.9
2. Professional occupations	72,507	17.4	397,272	17.5	5,356,649	20.3
3. Associate professional and technical occupations	48,964	11.7	271,177	11.9	3,499,749	3.3
4. Administrative and secretarial occupations	38,313	9.2	206,288	9.1	2,446,565	9.3
5. Skilled trades occupations	47,106	11.3	246,106	10.8	2,683,139	10.2
6. Caring, leisure and other service occupations	41,554	10.0	215,486	9.5	2,447,148	9.3
7. Sales and customer service occupations	33671	8.1	174,907	7.7	1,972,553	7.5
8. Process, plant and machine operatives	37,688	9.0	201,645	8.9	1,832,666	6.9
9. Elementary occupations	50,838	12.2	287,403	12.6	2,762,829	10.5

Note: The types of qualification included in each level are:

Level 1 and entry level qualifications: 1 to 4 General Certificate of Secondary Educations (GCSEs) grade A* to C, Any GCSEs at other grades, O levels or Certificate of Secondary Educations (CSEs) (any grades), 1 AS level, National Vocational Qualification (NVQ) level 1, Foundation General National Vocational Qualification (GNVQ), Basic or Essential Skills.

Level 2 qualifications: 5 or more GCSEs (A* to C or 9 to 4), O levels (passes), CSEs (grade 1), School Certification, 1 A level, 2 to 3 AS levels, VCEs, Intermediate or Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, Business and Technology Education Council (BTEC) First or General Diploma, The Royal Society of Arts (RSA) Diploma.

Level 3 qualifications: 2 or more A levels or Vocational Certificate of Educations (VCEs), 4 or more AS levels, Higher School Certificate, Progression or Advanced Diploma, Welsh Baccalaureate Advance Diploma, NVQ level 3; Advanced GNVQ, City and Guilds Advanced Craft, Ordinary National Certificate (ONC), Ordinary National Diploma (OND), BTEC National, RSA Advanced Diploma.

Level 4 qualifications or above: degree (Bachelor of Arts (BA), Bachelor of Science (BSc)), higher degree (Master of Art (MA), Doctor of Philosophy (PhD), Postgraduate Certificate in Education (PGCE)), NVQ level 4 to 5, Higher National Certificate (HNC), Higher National Diploma (HND), RSA Higher Diploma, BTEC Higher level, professional qualifications (for example, teaching, nursing, accountancy).

Other qualifications: vocational or work-related qualifications, other qualifications achieved in England or Wales, qualifications achieved outside England or Wales (equivalent not stated or unknown).

Source: Ref 15.14.

15.5.11 **Table 15.7** shows the dominant industries within the wider study area are “wholesale and retail trade, repair of motor vehicles and motorcycles” (16.9%), “human health and social work activities” (15.5%), and “manufacturing” (12.3%). The proportion of employees in “manufacturing” in the wider study area (12.3%) is also noticeably higher than the England average (7.3%). The data illustrates a noticeably higher blue-collar employment within the wider study area when compared with the national averages, consistent with the observations outlined in **Table 15.6**.

Table 15.7 – Employment by Industry

Industry	Wider study area	%	East Midlands	%	England	%
A: Agriculture, forestry and fishing	2,124	0.5	25,692	1.1	211,867	0.8
B: Mining and quarrying	640	0.2	3,743	0.2	40,130	0.2
C: Manufacturing	51,205	12.3	241,279	10.6	1,921,401	7.3
D: Electricity, gas, steam and air conditioning supply	2,591	0.6	17,386	0.8	152,142	0.6
E: Water supply; sewerage, waste management and remediation activities	3,827	0.9	17,275	0.8	190,302	0.7
F: Construction	37,895	9.1	200,927	8.8	2,288,550	8.7
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	70,695	16.9	400,228	17.6	3,958,259	15.0
H: Transport and storage	26,601	6.4	132,107	5.8	1,328,773	5.0
I: Accommodation and food service activities	18,205	4.4	100,686	4.4	1,291,556	4.9
J: Information and communication	12,529	3.0	70,015	3.1	1,246,568	4.7
K: Financial and insurance activities	6,845	1.6	49,524	2.2	1,007,530	3.8
L: Real estate activities	4,477	1.1	26,399	1.2	412,648	1.6
M: Professional, scientific and technical activities	19,207	4.6	110,043	4.8	1,768,507	6.7

Industry	Wider study area	%	East Midlands	%	England	%
N: Administrative and support service activities	19,169	4.6	109,673	4.8	1,399,037	5.3
O: Public administration and defence; compulsory social security	21,988	5.3	124,438	5.5	1,521,181	5.8
P: Education	38,653	9.3	222,562	9.8	2,601,727	9.9
Q: Human health and social work activities	64,703	15.5	329,112	14.5	3,856,651	14.6
R, S, T, U Other	16,072	3.9	91,239	4.0	1,208,385	4.6

Source: Ref 15.14

Community Facilities

15.5.12 Community facilities are a means of stimulating social inclusion and provide an important resource for the existing and future community. Community facilities include community centres / village halls, healthcare and education facilities (schools, colleges), places of worship and other facilities such as allotments.

15.5.13 There are some community facilities located within the local study area. **Table 15.8** and **Figure 15.2: Socio-Economic, Recreation and Tourism Receptors** in **Volume 3**, presents the community facilities initially identified as being within the local study area.

Table 15.8 – Community Facilities within the Local Study Area

Community facility category	Name	Local Planning Authority Area
Place of worship	All Saints Church, Heath	North East Derbyshire District Council
	All Saints' Church, South Wingfield	Amber Valley Borough Council
	St Clement's Church, Horsley	Amber Valley Borough Council
	St Andrew's Church, Twyford	South Derbyshire District Council
Village hall	Heath Village Hall	North East Derbyshire District Council
	Horsley Village Hall	Amber Valley Borough Council

Community facility category	Name	Local Planning Authority Area
School	Park House Primary School	North East Derbyshire District Council
	Horsley Church of England Primary School	Amber Valley Borough Council
	Morley Primary School	Erewash Borough Council
	Findern County Primary School	South Derbyshire District Council
Allotment	Barlow Hill Allotments	North East Derbyshire District Council
	Allotment located off Springvale Road	North East Derbyshire District Council

Business, Recreation and Tourism Assets

15.5.14 An initial review has been undertaken to identify businesses with the potential to be impacted by the Project (for example quarry businesses, wedding venues, hospitality businesses), recreation assets (including sports club and recreational land) and tourism assets (including tourist attractions and tourist accommodation) within the local study area, with the results provided in **Table 15.9** and presented on **Figure 15.2: Socio-economic, Recreation and Tourism Receptors** in **Volume 3**.

Table 15.9 – Business, Recreational and Tourism Asset within the Local Study Area

Name	Local Planning Authority Area
Manor House	North East Derbyshire District Council
Twin Oaks Hotel	North East Derbyshire District Council
Ilex Farm Camping, and Holly Cottage	North East Derbyshire
The Orchard Caravan Site	Bolsover District Council
Ironworks Farm, Street Lane	Amber Valley Borough Council
Ben’s well Campsite	Amber Valley Borough Council
Peppercorn Cottage	Amber Valley Borough Council
Morley Hayes	Erewash Borough Council
Hayeswood Lodge Luxury Accommodation	Erewash Borough Council
Hill Farm Camping & Caravan Park	South Derbyshire District Council
Martin Green Horsebox | Glamping holidays by the river	South Derbyshire District Council

Name	Local Planning Authority Area
Williamthorpe Local Nature Reserve	North East Derbyshire District Council
CRoW access land located off the A615 Matlock Road	North East Derbyshire
Parkhouse Green Play Area	North East Derbyshire
Clay Lane Play Area, Clay Cross	North East Derbyshire
King George's Field	Bolsover District Council
Baxter's Field	Bolsover District Council
Drury lowe millenium green	Amber Valley Borough Council
John Flamsteed Memorial Park	Amber Valley Borough Council
Kilburn Bike Park	Amber Valley Borough Council
Dobholes Lane Recreation Ground	Amber Valley Borough Council
Smalley Woods	Amber Valley Borough Council
Coxbench Wood	Amber Valley Borough Council
Oakerthorpe Local Nature Reserve	Amber Valley Borough Council
Morley Brickyards	Erewash Borough Council
Aston Brickyard Plantation Local Nature Reserve	South Derbyshire District Council
Willow Spiral	South Derbyshire District Council
King George V Playing Fields	South Derbyshire District Council
Williamthorpe Angling Club (Hallgate Pond)	North East Derbyshire
Pilsley Cricket Club	North East Derbyshire
Pilsley Community Football Club	North East Derbyshire
Pilsley Bowls Club	North East Derbyshire
Ilex Farm Equestrian	North East Derbyshire
Higham Farm Fishery	North East Derbyshire
Alfreton Golf Club	Amber Valley Borough Council
South Wingfield Cricket Club	Amber Valley Borough Council
Derbyshire Archery Club	Amber Valley Borough Council
Manor Farm	Amber Valley Borough Council
Denby Cricket Club	Amber Valley Borough Council

Name	Local Planning Authority Area
Heanor And District Model Flying Club	Amber Valley Borough Council
Springwood Riding Club	Amber Valley Borough Council
Smalley Lawn Tennis Club	Amber Valley Borough Council
Stainsby Hall Cricket Club	Amber Valley Borough Council
Morley Hayes Golf	Erewash Borough Council
South Derbyshire Saddle Club	Erewash Borough Council
B Jays fishery	South Derbyshire District Council
Swarkestone Cricket Club	South Derbyshire District Council
Lowes Lane Clay Shooting Ground	South Derbyshire District Council
Trent Adventure | Canoe hire adventures	South Derbyshire District Council
Willington Football Club Powerstation Pitches	South Derbyshire District Council
Clay Cross, Tunnel South Entrance	North East Derbyshire
Former Wingfield Station	Amber Valley Borough Council
Rock and Blues Custom Show Festival (Coney Grey Showground)	Amber Valley Borough Council
Furnaces at Morley Park Iron Works	Amber Valley Borough Council
Springwood Riding Club	Amber Valley Borough Council
Restored Derby Canal	Erewash Borough Council
Swarkestone Lock	South Derbyshire District Council
Type FW3/24 Pillbox (historical landmark)	South Derbyshire District Council
Stretton Manor Barn	North East Derbyshire
Oakerthorpe Holiday Village (including Amber Lodge)	North East Derbyshire
Horsley Lodge, Wedding Venue, Golf Club, Restaurant and Hotel	Amber Valley Borough Council
Stainsby Festival (Brunts Fields)	Bolsover District Council
Pawsome Pasture (dog park)	Erewash Borough Council
Tarmac Derby Mortar Plant	South Derbyshire District Council
Trent Valley Crematorium	South Derbyshire District Council

Name	Local Planning Authority Area
Tarmac Swarkestone Sand and Gravel Quarry	South Derbyshire District Council

15.5.15 The majority of agricultural land within the local study area is classified as Grade 2, Grade 3 and Grade 4. Based on the OS Mapping and aerial photography, the current farm businesses that fall within the local study area appear to be a combination of arable and pasture land. The number of individual farm businesses and their land parcels as registered under the Land Registry will be confirmed in the ES.

15.5.16 The following recreational routes are located within the local study area:

- Approximately 750 Public Rights of Way (PRoW).
- National Cycle Network (NCN) Route 67 and NCN Route 6.
- Centenary Way (Derbyshire), Derby Nomad Way, Midshires Way, Derwent Valley Heritage Way, Chesterfield Round Walk and Five Pits Trail long distance paths.
- Elvaston Castle Country Walk.
- Melbourne Country Walk.
- Amber Valley Routeways 2, 3, 5, 8, 11, 21.

15.5.17 There are further businesses, recreation and tourism assets (notably tourist accommodations) located within the 500 m study area from the Scoping Boundary. These will be reviewed and assessed as part of the ES. In addition, there are a number of tourism assets outside the 500 m study area from the Scoping Boundary which due to their scale and likely number of visitors may require further consideration. Examples include the Derwent Valley Mills World Heritage Site and the Ogston Reservoir.

15.5.18 The latest tourist accommodation census was completed in 2016. The audit covers serviced and non-serviced accommodation stocks across England. According to the 2016 audit, there were 17,622 bedspaces within the wider study area (as shown in **Table 15.10**). No further audit has been undertaken since 2016 in relation to accommodation stock. The England accommodation occupancy survey reports published by Visit England in 2023 suggests that the peak period in the East Midlands was in September 2023, with an 80% occupancy rate. Applying 20% spare capacity to the total number of beds suggested that there could be around 3,524 spare tourist bedspaces in the wider study area. It is acknowledged that the tourist accommodation census, completed in 2016, is now outdated. A comprehensive review and assessment of tourist accommodations and bedspaces will be conducted as part of the ES.

Table 15.10 – Number of Bedspaces in 2016

Type of accommodation	Wider study area	East Midlands	England
Hotels and similar establishments	13,824	99,855	1,788,626
Total serviced accommodation	13,824	99,855	1,788,626
Holiday dwellings	1,399	17,121	328,109
Tourist campsites	1,879	56,366	916,324

Type of accommodation	Wider study area	East Midlands	England
Other collective accommodation	520	14,412	158,725
Total non-serviced	3,798	87,899	1,403,158
Total accommodation	17,622	187,754	3,191,784

Source: Ref 15.16

Overview

15.5.19 In summary, over the last decade, the wider study area has experienced a growth in population. However, the growth is slightly below the East Midlands and England averages. Additionally, there is a lower proportion of economically active individuals in the wider study area, and a notably higher percentage of employees in the manufacturing sector when compared to the England average.

15.5.20 There are a number of community facilities, businesses, farm businesses, recreation and tourism receptors within the local study area. Additionally, visitor accommodation has been identified within a 500 m radius of the local study area.

15.5.21 There are both serviced and non-serviced accommodations within the wider study area, and an estimated 20% spare capacity is observed during peak periods.

Future Baseline Conditions

15.5.22 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 in the ES.

15.5.23 Population projection data from Nomis shows that the population in the wider study area is likely to increase by 4.3% by 2034, with the 0-15 age cohort expected to shrink in size. These projections are in line with the East Midlands and England projections.

15.5.24 Future development opportunities within the Scoping Boundary have been reviewed, for example major planning applications and employment allocations. Of these, there is one planning allocation and one proposed development within the Scoping Boundary which may affect the future baseline for socio-economics, recreation and tourism:

- Planning allocation of a housing and mixed-use development located north of Denby Bottles in Amber Valley District (policy number: H1b and ER2) (which may include community facilities and recreation assets).
- Proposed development of a housing development located south of Sinfin in South Derby District (reference number: DMPA/2019/1097) (which may include community facilities and recreation assets).

15.5.25 The future baseline for community facility, business, farm business, recreation and tourism assets over the medium to long term is highly uncertain. Visitor numbers and revenue are likely to fluctuate year-on-year, primarily due to external factors such as the economy, foreign exchange rate and the weather. Due to this uncertainty, this chapter has assumed the future baseline for the study areas will be unchanged from the current baseline to the completion of the Project, except where new development is expected to be delivered in line with allocated and planned development sites.

15.6 Mitigation Measures Adopted as Part of the Project

15.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology.**

Embedded Mitigation Measures

15.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives Considered**) has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects may be avoided. The Scoping Boundary has been designed to avoid as far as practicable sensitive socio-economics, recreation and tourism features.

15.6.3 This includes avoiding settlements, avoiding visitor attractions such as National Parks, World Heritage Sites, and Country Parks, avoiding major utilities, community facilities and existing industry where possible, and allowing for a wide enough corridor to avoid or reduce potential effects on socio-economic, recreation and tourism receptors as the Project design develops.

15.6.4 Further embedded design measures will be developed as the Project design evolves.

Good Practice Mitigation Measures

15.6.5 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed on other National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

15.6.6 In addition, **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** presents the likely good practice mitigation measures relevant to socio-economics, recreation and tourism include but are not limited to:

- Access to businesses, farm businesses, recreation and tourism assets would be maintained, where practicable, along their current alignments during construction.
- Alternative access would be provided if access would be inhibited during construction.
- PRoWs crossing the working areas would be managed in discussion with the relevant local authority PRoW officers. Disruption to access would be minimised where practicable during construction. Temporary diversions would be provided where possible, with clear signage to be provided at both ends to explain the diversion, duration of the diversion and a contact number for any concerns.
- Provision of training to construction workers, particularly in relation to working hours and the management of emissions (e.g. dust, noise, vibration).
- An outline Construction Traffic Management Plan (CTMP) would be prepared which would include commitments (where applicable) to reduce route impacts and journey mileage to, from and around the construction sites and manage access for

neighbouring business and the wider community. An Outline CTMP will be submitted with the DCO application.

15.6.7 Further measures are outlined within **Chapter 6: Landscape and Visual, Chapter 11: Agriculture and Soils, Chapter 12: Traffic and Transport, , Chapter 13: Air Quality, Chapter 14: Noise and Vibration** and **Chapter 16: Health and Wellbeing**.

Additional Mitigation Measures

15.6.8 Additional mitigation comprise measures over and above any embedded and good practice mitigation measures. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

15.6.9 No additional mitigation has been identified at this stage for socio-economics, recreation and tourism.

15.7 Likely Significant Effects

15.7.1 This section sets out the likely significant effects on socio-economics, recreation and tourism arising from the construction, operation and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

15.7.2 The review of likely significant effects assumes that the embedded, good practice and additional mitigation measures described in Section 15.6 and outlined **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the Institute of Environmental Management and Assessment (IEMA) as part of preparing a proportionate assessment.

15.7.3 The likely significant effects of the Project have been split into:

- Economy and Employment.
- Community Facilities.
- Business, Recreation and Tourism Assets.

Economy and Employment

Construction

15.7.4 There are likely to be significant beneficial direct and indirect (supply chains) employment generation and economic activity from the Project during construction, arising from a requirement to source construction workers from the local and wider labour market, including construction site workers, security workers and delivery drivers. Therefore, the economy and employment effects during construction are proposed to be **Scoped In** to the ES.

Operation (inc. Maintenance)

15.7.5 Given the nature of the Project as grid infrastructure (i.e. substation (where it is brought into the Project scope), pylons and overhead lines) there are not likely to be substantial amounts of direct (permanent operational substation staff) and indirect (supply chains) employment generated during operation from the Project. This is because the infrastructure can be operated remotely and would not generate a significant number of additional jobs in relation to routine inspection and maintenance. Operation phase economy and employment effects are therefore proposed to be **Scoped Out** of the ES.

Community Facilities

Construction

15.7.6 The Project would continue to make efforts to avoid direct impacts on community facilities. However, there is potential for existing community facilities to be affected by permanent land take and access disruption. Based on the potential for some disruption to community facilities this topic is therefore proposed to be **Scoped In** to the ES during construction.

Operation (inc. Maintenance)

15.7.7 During operation (inc. maintenance) the Project has the potential to cause permanent access disruption to community facilities through closure or diversions of existing access. Permanent land take from community facilities would be avoided where practicable, however, there is potential for some receptors to be permanently affected by land take and access disruption from the proposed pylons and overhead line. Where necessary, discussion would be undertaken with the relevant landowners. Based on the potential for permanent effects on community facilities, this topic is therefore proposed to be **Scoped In** to the ES during operation and maintenance.

Business, Recreation and Tourism Assets

Construction – Business, Recreation and Tourism Assets

15.7.8 Although the Project avoids businesses (e.g. quarry), tourism and recreation assets where practicable, there is potential for disruption to these assets during construction. This may include temporary access disruption, land take and effects on amenity (i.e., air quality, noise and visual amenity). There is also the potential for temporary disruption to particularly sensitive assets i.e., heavily used PRoW during construction. Therefore, potential effects on business, tourism and recreation assets during construction are proposed to be **Scoped In** to the ES.

Operation (inc. Maintenance) – Business, Recreation and Tourism Assets

15.7.9 There is the potential for the Project to impact business, recreation and tourism assets during operation (inc. maintenance), for example through permanent access disruption through closure or diversions of existing access, through potential permanent closure or diversions of PRoW and other recreational routes, through land take, or in relation to visual impacts. Permanent land take from businesses (e.g. quarry and farm), recreational and tourism assets would be avoided where practicable, however, there is potential for some receptors to be permanently affected by land take. Potential effects on business, recreation and tourism assets during operation are therefore proposed to be **Scoped In** to the ES.

Construction – Tourism Accommodation

15.7.10 Whilst there is likely to be some existing bedspace capacity within tourist accommodation provision in the wider study area, the rolling nature of the linear works and that construction activities in any particular area are likely to be short-term, the requirements for worker accommodation during construction are not likely to be significant. However, this matter will be kept under review as more information becomes available and the assessment progresses and is therefore proposed to be **Scoped In** to the ES.

Operation (inc. maintenance) – Tourism Accommodation

15.7.11 Requirements for accommodation for routine inspection and maintenance workers during operation would likely be limited and would not be of a magnitude to lead to significant effects on visitor accommodation. Therefore, this matter is proposed to be **Scoped Out** of the ES.

15.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

15.8.1 In addition to the data sources listed in Section 15.5, the assessment within the ES will be supported by the following additional information and surveys:

- PRoW usage surveys to be undertaken as part of the wider traffic and transport assessment.
- Engagement with relevant stakeholders to establish sensitive tourism and recreation assets.
- Further baseline information regarding community facilities, businesses, farm businesses, recreation and tourism assets.

Proposed Assessment Method

15.8.2 This section sets out the proposed methodology for the socio-economics, recreation and tourism assessment of the ES. In the absence of standard guidance the proposed methodology draws on professional judgement and experience on previous projects.

15.8.3 The economic and employment impact assessment will be informed by the principles set out in the HM Treasury Green Book which describes a methodology for defining the additional economic benefits arising from a project, programme or policy.

15.8.4 DMRB, whilst not specific to electricity infrastructure, will also provide some useful context for assessing land use and community impacts of linear infrastructure, such as DMRB LA 112: Population and Human Health (Ref 15.12).

Sensitivity

15.8.5 The proposed criteria for assessing and classifying levels of receptor sensitivity are defined in **Table 15.11**, based on professional judgement.

Table 15.11 – Criteria for Determining Sensitivity

Sensitivity	Description
High	Local economy and employment: • The area has a shortfall or constrained supply of appropriate labour and skills when compared to the regional and national averages. Changes in the area could lead to labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation). Community facility: • The level of use is very frequent (daily/weekly). Business, recreational and tourism asset: • Of international or national importance; or

Sensitivity	Description
	• For which annual visitor numbers exceed 100,000; or • Access between land and key agricultural infrastructure is required on a frequent basis (weekly as a minimum); or • A business for which loss of employment or closure will be deemed a nationally important issue (for example a strategic business or major employer).
Medium	Local economy and employment: • The area has a low/limited supply of labour and skills. Changes in the area could lead to labour market pressure or distortions. Community facility: • The level of use is reasonably frequent (monthly). Business, recreational and tourism asset: • Of regional importance; or • For which annual visitor numbers are between 10,000 and 100,000; or • Access between land and key agricultural infrastructure is required on a frequent basis (monthly); or • A business for which loss of employment or closure will be a regionally important issue. This level of sensitivity could also be applied where the loss of employment or closure of multiple small businesses within an area could be deemed a regionally important issue.
Low	Local economy and employment: • The area has a readily available labour force. Changes in the area is unlikely to lead to labour market pressure or distortions. Community facilities: • Level of use is infrequent (a few occasions yearly). Business, recreational and tourism asset: • Of local importance; or • For which annual visitor numbers are less than 10,000; or • Access between land and key agricultural infrastructure is required on a frequent basis (every other month or less frequent); or • A business for which loss of employment or closure will be deemed a locally important issue.

Magnitude

15.8.6 The proposed criteria for assessing and classifying levels of magnitude of impact are defined in **Table 15.12**, based on professional judgement.

Table 15.12 – Criteria for Determining Magnitude of Impact

Magnitude of impact	Description
High	Local economy and employment: • Number of employment opportunities is large in scale when compared to the combined local planning authorities' (i.e. those within the Wider Study Area) total number of employees within the sector (for example the construction employment opportunities to be generated by the Project will represent the majority of the combined local planning authorities' total number of employees in the construction sector). Community facility: • Loss of resource and/or quality and integrity of resource; or • Severe damage to key characteristics, features or elements (for example direct acquisition and demolition of facility); or • Introduce (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. Business, recreational and tourism asset: • Where the extent of impacts on receptors is large in scale (for example loss of business, recreational or tourism asset); or • Loss of resource and/or introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision; or • Where the recreational route will be fully stopped up with no access provision.
Medium	Local economy and employment: • Number of employment opportunities is moderate in scale when compared to the combined local planning authorities' (i.e. those within the Wider Study Area) total number of employees within the sector (for example the construction employment opportunities to be generated by the Project will represent half of the combined local planning authorities' total number of employees in the construction sector). Community facility: • Potential loss of/damage to key characteristics, features or elements (for example partial removal or substantial amendment to access or acquisition of facility); or • Partial loss of resource and/or introduction (adverse) or removal (beneficial) of complete severance with limited / moderate accessibility provision; or • Introduction (adverse) or removal (beneficial) of severance with limited/moderate accessibility provision. Business, recreational and tourism asset:

Magnitude of impact	Description
	• Where the extent of impacts on receptors may be moderate (for example substantial amendment or partial closure to business, recreational or tourism asset). • Where access to the recreational route will be fully affected with diversion in place.
Low	Local economy and employment: • Number of employment opportunities is small in scale when compared to the combined local planning authorities' (i.e. those within the Wider Study Area) total number of employees within the sector (for example the construction employment opportunities to be generated by the Project will represent less than half of the combined local planning authorities' total number of employees in the construction sector). Community facility: • A discernible change in attributes, quality or vulnerability; or • Minor loss of, or alteration to one (maybe more) key characteristics, features or elements (for example amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of the community facility; or • A discernible change in resource and/or introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision; or • Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. Business, recreational and tourism asset: • Where the extent of impacts on receptors is considered to be small (for example minor amendment to business, recreational or tourism asset that do not compromise overall operation; or very minor reduction in annual visitor numbers but this is considered to be within the parameters of normal annual variability). • Where access to the recreational route will be partially affected with diversion in place.
Very Low	Local economy and employment: • Number of employment opportunities is very small in scale when compared to the combined local planning authorities' (i.e. those within the Wider Study Area) total number of employees within the sector (for example the construction employment opportunities to be generated by the Project will represent an

Magnitude of impact	Description
	insignificant number of the combined local planning authorities' total number of employees in the construction sector). Community facility: • Very minor loss or alteration to one or more characteristics, features or elements (for example acquisition of non-operational land or buildings not directly affecting the viability of the community facility; or • Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. Business, recreational and tourism asset: • Where there is no credible scenario whereby the proposal could affect the viability of the business, recreational or tourism asset, visitor numbers, tourism opportunities or benefits beyond a handful of individuals; or • A discernible change in resource and/or introduction (adverse) or removal (beneficial) of complete severance with adequate accessibility provision; or • Where there is no credible change to access to the recreational route.

Significance

15.8.7 Significance will be derived using the matrix set out in **Chapter 5: EIA Approach and Methodology**. This may be informed by professional judgement which, where used, will be explained to give the rationale behind the values assigned. Significant effects in the context of the EIA Regulations 2017 will be effects of moderate or greater significance.

15.8.8 Overall significance will also be concluded for each topic covered by the socio-economics, recreation and tourism assessment.

15.8.9 Duration of impact will also be considered, with more weight given to reversible long-term or permanent changes than to temporary ones. Temporary effects are considered to be those associated with the construction and maintenance works. Long-term reversible effects/permanent effects are generally those associated with the operational development.

Assumptions and Limitations

15.8.10 The following limitations and assumptions have been identified:

- The assessment relies, in part, on third party data (e.g. OS Mapping, ONS, Nomis, Visit England) which are the most up-to-date, available at the time of the assessment. No significant changes or limitations in these datasets have been identified that will affect the robustness of the assessment for EIA purpose.

- There is limited information on landowners and business land parcels at this stage. These will be further assessed in the ES to identify potential effects on businesses (where visual impact is likely to be an economic consideration).

15.9 Proposed Scope of the ES

15.9.1 The matters that are proposed to be scoped in and out of further assessment for socio-economics, recreation and tourism are outlined in **Table 15.13**.

Table 15.13 – Proposed Scope of the ES for Socio-economics, Recreation and Tourism

Matter	Phase	Scoped In/Out	Justification
Local economy and employment	Construction	**Scoped In**	There are likely to be significant beneficial direct, indirect and induced employment generation and economic activity from the Project during construction.
	Operation (including maintenance)	**Scoped Out**	Given the nature of the Project, there is not likely to be significant economic activity or employment (whether direct, indirect or induced) generated during operation and maintenance phases of the Project.
Community facilities	Construction	**Scoped In**	The Project has attempted to avoid community facilities where practicable. However, there is the potential for temporary and/or permanent disruption to community facilities during. These effects may include temporary land take, access disruption impacts.
	Operation (including maintenance)	**Scoped In**	The Project has attempted to avoid community facilities where practicable. However, there is the potential for permanent disruption to community facilities during operation. These effects may include permanent land take, access disruption impacts.
Business, recreation and tourism assets	Construction	**Scoped In**	The Project has attempted to avoid business, recreation and tourism assets, where practicable. However, there is the potential for temporary and/or permanent disruption to businesses (e.g. quarry and farm), recreation assets, PRoWs, recreational routes, tourist attractions, and tourist accommodations during construction in certain locations. These effects may include temporary land take, disruption to access and/or amenity impacts.
	Operation (including maintenance)	**Scoped In**	The Project has attempted to avoid businesses, recreation and tourism assets, where practicable. However, there is the potential for permanent disruption to businesses (e.g. quarry and farm), recreation assets, PRoWs, recreational routes,

Matter	Phase	Scoped In/Out	Justification
			tourist attractions during operation in certain locations. These effects may include permanent land take, disruption to access and/or amenity impacts.
Recreation and tourism: pressures on local visitor accommodation from influx of construction workers	Construction	**Scoped In**	Whilst there is likely to be some existing bedspace capacity within tourist accommodation provision in the wider study area, workers are likely to be accommodated by the spare capacity. However, this matter will be kept under review as more information becomes available and the assessment progresses and is therefore proposed to be scoped into the ES.
	Operation (including maintenance)	**Scoped Out**	During operation there would not be construction workers. Given the nature of the Project, the scale of maintenance work and number of workers required is likely to be limited and not likely to adversely impact on visitor accommodation.

15.10 References

Ref 15.1: HMSO (2000). Countryside and Rights of Way (CROW) Act. Accessed May 2024. Available at: https://www.legislation.gov.uk/ukpga/2000/37/contents

Ref 15.2: HMSO (2024). Equality Act 2010 (as amended). Accessed May 2024. Available at: https://www.legislation.gov.uk/ukpga/2010/15/contents

Ref 15.3: HMSO (2011). Localism Act 2011. Accessed May 2024. Available at: https://www.legislation.gov.uk/ukpga/2011/20/contents

Ref 15.4: HMSO (2021). Environment Act 2021. Accessed Sep 2024. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents

Ref 15.5: Department for Energy Security & Net Zero (2023a). Overarching National Policy Statement for Energy (EN-1). Accessed February 2024. Available at: https://assets.publishing.service.gov.uk/media/64252f3b60a35e00120cb158/NPS_EN-1.pdf

Ref 15.6: Department for Energy Security & Net Zero (2023b). National Policy Statement for Electricity Networks Infrastructure (EN-5). Accessed February 2024. Available at: https://assets.publishing.service.gov.uk/media/64252f852fa848000cec0f53/NPS_EN-5.pdf

Ref 15.7: Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Accessed February 2024. Available at: https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.pdf

Ref 15.8: Ministry of Housing, Community and Local Government and Department for Levelling Up, Housing and Communities (2014). Planning Practice Guidance – Open space, sports and recreation facilities, public rights of way and local green space.

Ref 15.9: HMSO (2022). The HM Treasury Green Book.

Ref 15.10: Homes & Communities Agency (HCA) (2014). Additionality Guide Fourth Edition.

Ref 15.11: National Highways (2020). Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring.

Ref 15.12: National Highways (2020). DMRB LA 112 Population and Human Health.

Ref 15.13: Office of National Statistics (ONS) (2024). Home. Accessed February 2024. Available at: https://www.ons.gov.uk/

Ref 15.14: Nomis (2021). 2021 Census.

Ref 15.15: UK Government (2019). English Indices of Deprivation 2019.

Ref 15.16: Visit England (2016). Accommodation stock audit. Accessed February 2024. Available at: https://www.visitbritain.org/research-insights/england-accommodation-stock-audit

Ref 15.17: Visit England (2024). Accommodation occupancy. Accessed February 2024. Available at: https://www.visitbritain.org/research-insights/england-hotel-occupancy-latest

16. Health and Wellbeing

nationalgrid

Contents

16. Health and Wellbeing

16.1 Introduction

16.1.1 This chapter presents how the health and wellbeing assessment will consider the potentially significant effects on health and wellbeing receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4: Description of the Project**).

16.1.2 As detailed in **Chapter 4: Description of the Project**, there are no specific plans to decommission the Project as a whole and therefore this aspect has been scoped out of the environmental assessment.

16.1.3 The Project Scoping Boundary is presented on **Figure 1.1: Location / Context** in **Volume 3**.

16.2 Approach to Scoping

16.2.1 The approach to scoping has drawn from previous experience of similar Projects and professional judgement. Determining the scope of the health and wellbeing assessment has included the following stages:

- Setting the regulatory and planning policy context.
- Defining the study area.
- Stating sources of data collected.
- Outlining baseline conditions.
- Highlighting further data to be gathered.
- Outlining environmental measures.
- Predicting likely significant effects.
- Drafting the proposed assessment methodology.
- Stating the proposed scope of the Environmental Statement (ES).

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

- **Chapter 6: Landscape and Visual.**
- **Chapter 9: Hydrology and Land Drainage.**
- **Chapter 10: Geology and Hydrogeology.**
- **Chapter 12: Traffic and Transport.**
- **Chapter 13: Air Quality.**
- **Chapter 14: Noise and Vibration.**
- Chapter 15: Socio-economics, Recreation and Tourism.

16.2.3 This chapter is supported by the following figures in **Volume 3**:

- **Figure 16.1: Health and Wellbeing Study Area**.

16.3 Key Regulatory, Planning Policy Context and Technical Guidance

Key Legislation

16.3.1 A summary of the key legislation considered in scoping the health and wellbeing assessment is outlined below:

- Equality Act 2010 (Ref 16.1).
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 16.2).
- Control of Electromagnetic Fields at Work Regulations (Ref 16.3)
- Environment Act 2021 (Ref 16.4).

National Planning Policy

National Policy Statements

16.3.2 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project including the Overarching National Policy Statement (NPS) for Energy EN-1 (Ref 16.5) and NPS for Electricity Networks Infrastructure EN-5 (Ref 16.6). **Table 16.1** sets out the requirements of both NPSs relevant to health and wellbeing and how these have been considered within this chapter.

Table 16.1 – National Planning Policy Relevant to Health and Wellbeing

Policy Reference	Policy Context	How it will be considered
Overarching National Policy Statement for Energy (EN-1) 2024		
Paragraph 4.3.4 and Paragraph 4.3.5	Paragraph 4.3.4 of EN-1 states that 'As described in the relevant sections of this NPS and in the technology specific NPSs, 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.' Paragraph 4.3.5 of EN-1 states that '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.'	Section 16.7 of this Scoping Report chapter has considered how the potential for likely significant health and wellbeing effects from the construction, maintenance and operation of the Project will be considered in the ES. A cumulative effects assessment will be undertaken and presented within the ES.
Paragraph 5.12.17	Paragraph 5.12.17 of EN-1 states that 'The Secretary of State should not grant development consent unless they are satisfied that the proposals will meet the following aims…: Avoid significant adverse impacts on health and quality of life from noise. Mitigate and minimise other adverse impacts on health and quality of life from noise. Where possible, contribute to improvements to health and quality of life through the effective management and control of noise'.	
National Policy Statement for Electricity Networks Infrastructure (EN-5) 2024		
Paragraph 2.10.11	Paragraph 2.10.11 of EN-5 states that 'The applicant should consider the following factors: Height, position, insulation and protection (electrical or mechanical as appropriate) measures subject to ensuring compliance with the Electricity Safety, Quality and Continuity Regulations 2002. That optimal phasing of high voltage overhead power lines is introduced wherever possible and practicable in accordance with the Code of Practice to minimise [Electric and Magnetic Fields] EMFs. Any new advice emerging from the Department of Health and Social Care relating to government policy for EMF exposure guidelines.'	Section 16.7 of this Scoping Report chapter has considered how the potential for impacts from high voltage power lines on receptors will be considered in the ES.

Other National Policy

16.3.3 A summary of other relevant national policy considered in scoping the health and wellbeing assessment includes:

- National Planning Policy Framework (NPPF) (Ref 16.7).

Regional and Local Planning Policy

16.3.4 **Chapter 2: Legislation, Regulatory and Planning Policy Context** sets out relevant regional and local policy considered by this Project.

16.3.5 All local policy specific to health and wellbeing will be reviewed and assessments undertaken with regard to relevant policies as part of the ES.

Guidance

16.3.6 Relevant guidance, specific to health and wellbeing, that has informed this Scoping Report comprises:

- Government White Paper: Healthy Lives, Healthy People (Ref 16.8).
- Mental Well-being Impact Assessment (Ref 16.9).
- A Green Future: Our 25 Year Plan to Improve the Environment (Ref 16.10).
- Putting Health into Place (Ref 16.11).
- Health Impact Assessment in spatial planning (Ref 16.12).
- Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning (NSIP) Regime (Ref 16.13).
- Public Health England Strategy 2020 to 2025 (Ref 16.14).
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines – For limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz) (Ref 16.15).
- Planning Practice Guidance – Healthy and safe communities (Ref 16.16).
- Fair Society, Healthy Lives (Ref 16.17).
- Marmot Review 10 Years On (Ref 16.18).
- Build Back Fairer: The COVID-19 Marmot Review (Ref 16.19).
- Health in Environmental Impact Assessment: A Primer for a Proportionate Approach (Ref 16.20).
- Effective Scoping of Human Heath in Environmental Impact Assessment (Ref 16.21).
- Determining Significance for Human Health in Environmental Impact Assessment (Ref 16.22).
- The Control of Electromagnetic Fields at Work Regulations 2016 (Ref 16.23).

16.3.7 It is recognised that a range of other guidance is available which relates to the assessment of health impacts; for example, that produced by the Healthy Urban Development Unit (HUDU), National Highways (Design Management for Roads and Bridges (DMRB) LA112 Population and Human Health) or the Welsh Health Impact Assessment Unit (WHIASU). However, these guidance documents typically relate to

other types of development or infrastructure (for example residential development or roads) and are less suited to assessing the impacts associated with linear energy infrastructure of the type proposed. As such, IEMA guidance is considered the most appropriate to inform the methodology in this Scoping Report chapter.

16.4 Study Area

16.4.1 The scoping study area for health and wellbeing comprises the potential for effects within the two study areas as detailed in **Table 16.2**. The study areas are shown in **Figure 16.1: Health and Wellbeing Study Area** in **Volume 3**.

Table 16.2 – Study Areas and Associated Topics

Study area	Description	Topic
200 m study area	Previous studies and calculations (Ref 16.24) have shown that equipment operating at the proposed voltage and rating do not produce EMFs greater than typical background levels at distances of more than 200 m. Therefore, a 200 m study area from the Scoping Boundary has been defined for the EMF assessment.	EMFs
Wider study area	The study area for health and wellbeing has been defined using professional judgement and experience of similar linear projects and comprises the boundary of the Local Planning Authorities through which the Scoping Boundary passes. These include: North East Derbyshire District Council, Bolsover District Council, Amber Valley Borough Council, Erewash Borough Council, South Derbyshire District Council and Derby City Council.	Health and Wellbeing

16.5 Baseline Conditions (inc. Future Baseline)

Data Collection

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

- Local Authority Health Profiles (Ref 16.25).
- 2021 Census (Ref 16.26).
- Ordnance Survey (OS) mapping and aerial imagery.

16.5.2 The desk study has also been informed by Chapter 6: Landscape and Visual, Chapter 9: Hydrology and Land Drainage, Chapter 10: Geology and Hydrogeology, Chapter 12: Traffic and Transport, Chapter 13: Air Quality, Chapter 14: Noise and Vibration, and Chapter 15: Socio-economics, Recreation and Tourism.

Engagement with Stakeholders

16.5.3 The Environmental Impact Assessment (EIA) will be informed by consultation and engagement with stakeholders, including local planning authorities, National Health Service Integrated Care Systems, relevant emergency service authorities, Health and Safety Executive (HSE), UKHSA, OHID, Natural England and the Environment Agency. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

16.5.4 At the time of writing this chapter, the HSE confirmed it does not have any comments related to human health at the non-statutory stage of the Project.

16.5.5 Following receipt of the Scoping Opinion, engagement with relevant stakeholders will be on-going up to the submission of the Development Consent Order (DCO) with the aim to agree the outcomes of the assessment, as well as key design parameters and mitigation measures.

Existing Baseline Conditions

Health Related Environmental Change

16.5.6 The Scoping Boundary is located, as far as practicable, to avoid large residential and urban areas and sensitive receptors such as residential properties, schools, medical facilities, residential care homes and other environmental receptors.

16.5.7 Visual receptors baseline information is set out in **Chapter 6: Landscape and Visual**.

16.5.8 Flood zone baseline information is set out in **Chapter 9: Hydrology and Land Drainage**.

16.5.9 Groundwater vulnerability, Source Protection Zone and contaminated land baseline information is set out in **Chapter 10: Geology and Hydrogeology**.

16.5.10 Existing road network, walking, cycling and horse-riding routes are set out in **Chapter 12: Traffic and Transport**.

16.5.11 Air Quality Management Areas baseline information is set out in **Chapter 13: Air Quality**.

16.5.12 Noise receptors are set out in **Chapter 14: Noise and Vibration**.

16.5.13 Demographic data (for example age profiles), deprivation data, employment information, community facilities and recreational receptors baseline information are described in **Chapter 15: Socio-economics, Recreation and Tourism**.

Local Health

16.5.14 Health profiles and indicators across the wider study area are detailed in **Table 16.3**. Overall, Bolsover has the highest proportion of the population with self-assessed bad or very bad health, adults who are overweight (the figure for Bolsover also considerably surpasses the England average), and have disabilities (i.e. physical or mental health conditions or illnesses) categorised under the Equality Act. Bolsover District also has the lowest life expectancy at birth for both males and females. Conversely, South Derbyshire District has the best health profile out of the six local

authorities, as well as when compared to East Midlands and England as a whole, with the exception of adult obesity. Indeed, much of the study area experiences a higher proportion of adults who are overweight when compared to England as a whole. This indicates that there may be challenges to opportunities for exercise, active travel, outdoor recreation and accessing healthy food within the study area.

Table 16.3 – Health Profile

	General health – "Bad" and "Very bad" health (2021)	Life expectancy at birth (male) (2020-22)	Life expectancy at birth (female) (2020-22)	Year 6 prevalence of obesity (2022/23)	Overweight adults (18+) (2021/22)	Disability (under Equality Act) (2021)
North East Derbyshire	6.5%	79.1	82.5	20.6%	67.8%	21.3%
Bolsover	7.8%	76.9	80.4	25.7%	72.1%	22.9%
Amber Valley	5.6%	78.8	82.5	21.0%	65.5%	19.9%
Erewash	5.6%	77.9	81.7	22.1%	66.4%	19.6%
South Derbyshire	4.6%	79.2	83.3	18.3%	68.5%	17.2%
Derby	5.8%	77.0	81.4	26.6%	64.7%	18.8%
East Midlands	5.4%	78.6	82.4	22.6%	67.0%	18.3%
England	5.2%	78.9	82.8	22.7%	63.8%	17.3%

Source: Office for Health Improvement & Disparities (2024, Ref 16.25) and Nomis (2021, Ref 16.26)

Electric and Magnetic Fields

16.5.15 All equipment that generates, distributes or uses electricity produces EMFs, and these also occur naturally. The UK power frequency is 50 hertz (Hz) which is the principal frequency of the EMFs produced (Ref 16.27).

16.5.16 All overhead lines produce EMFs, and these are highest directly under an overhead line and decrease to the sides at increasing distance (Ref 16.6). Underground cables produce no external electric fields, and the magnetic field falls more rapidly, falling to the levels typically found in UK homes within around 20 m compared to around 150 m for an overhead line.

16.5.17 Substations and Cable Sealing End compounds do not produce significant EMFs outside their boundaries. The sources of EMFs from these are the overhead lines and underground cables entering and exiting. As EMFs are only generated when electricity is flowing through the equipment, no discernible EMF generation is anticipated during the construction of grid connection development. Only when power is being transmitted has the potential to generate EMFs.

16.5.18 There is existing electricity transmission and distribution equipment within the 200 m study area including 132 kV, 275 kV and 400 kV overhead lines within the six local authority boundaries, a 275 kV substation in North East Derbyshire and a 400 kV substation in South Derbyshire. The existing electricity infrastructure produces EMFs as it transmits, distributes or uses electricity. All existing overhead lines are compliant with the exposure limits detailed in NPS-EN5. When demonstrating compliance with the exposure limits, calculations are performed using worst case conditions as set out in the Governments Code of Practice, ‘Power Lines: Demonstrating compliance with EMF public exposure guidelines – a voluntary Code of Practice’ (Ref 16.28). Typically, the overhead line will carry less current and have higher clearances than these worst case assumptions. The typical electric and magnetic fields from overhead lines of the type located within the 200 m study areas are demonstrated in **Plate 16.1** and **Plate 16.2**.

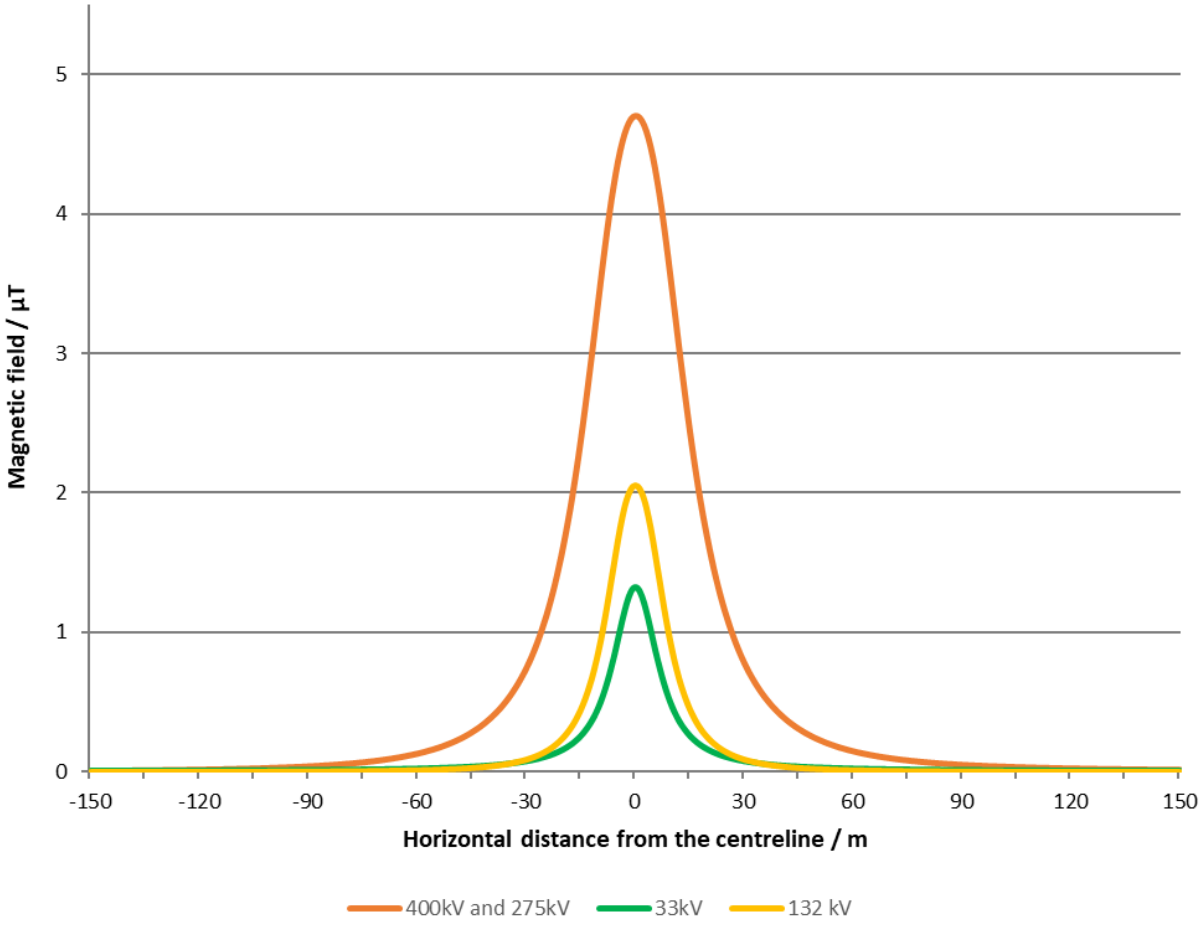

Plate 16.1 – Typical Magnetic Fields from Existing Overhead Lines

Source: https://www.emfs.info/ (2024)

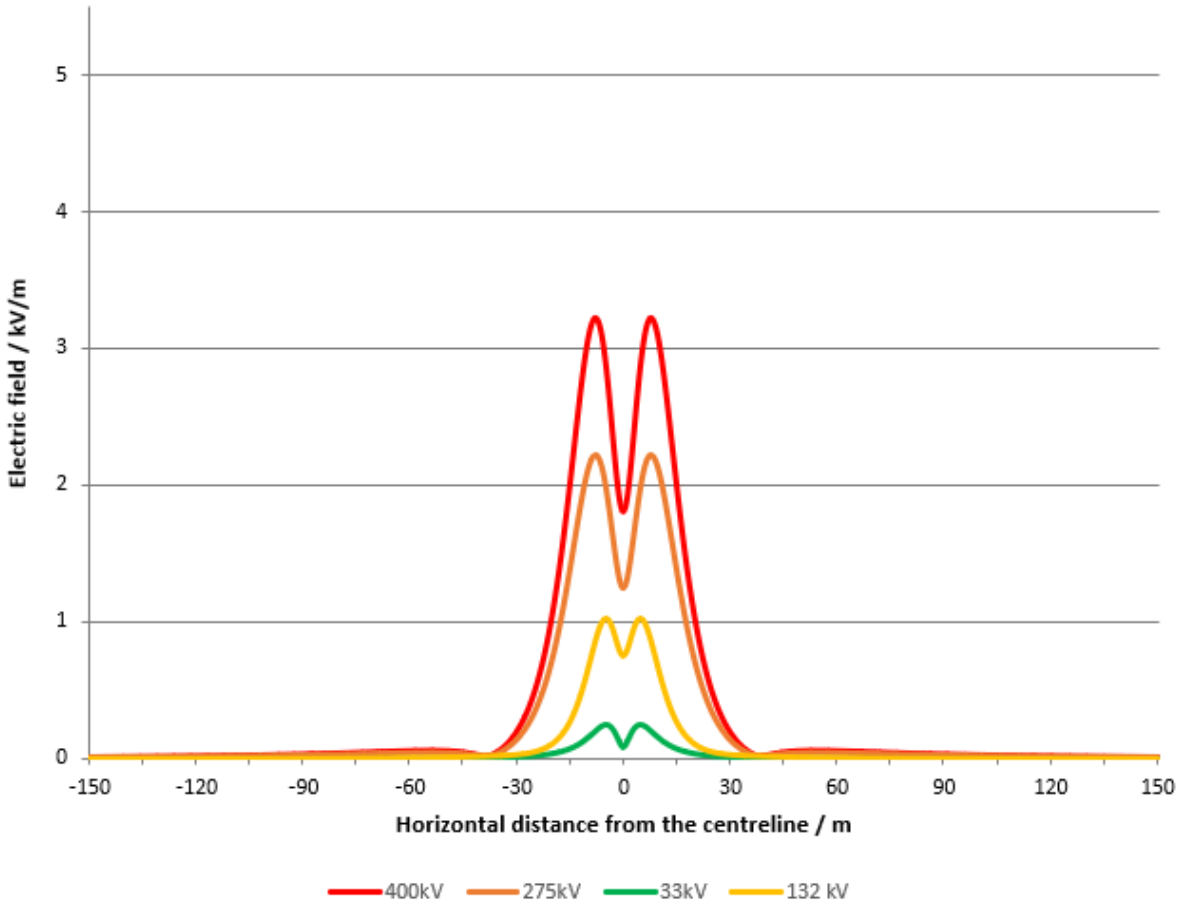

Plate 16.2 – Typical Electric Fields from Existing Overhead Lines

Source: https://www.emfs.info/ (2024)

Future Baseline Conditions

16.5.19 The future baseline relates to known or anticipated changes to the current baseline which should be considered as part of the baseline that the Project is assessed against in the ES.

16.5.20 The population within the wider study area is expected to increase by 4.3% in 2034 as detailed in **Chapter 15: Socio-economics, Recreation and Tourism**, The projected population growth is expected to increase demand for social infrastructure. The projected increase in the older age population (i.e., aged 65 and above) would also increase the demand for health services. However, it is expected that planning policy will be reviewed and updated to ensure there is sufficient investment for the necessary services and infrastructure to accommodate the projected demand, hence, the future baseline is not expected to materially change in the reasonably foreseeable future. It is worth noting that the forecasts may be subject to change due to demographic growth and behavioural shifts as a result of the COVID-19 pandemic. At the time of writing, these impacts are unknown and therefore cannot be quantified.

16.5.21 This section should be read in conjunction with future baseline information set out in **Chapter 6: Landscape and Visual, Chapter 9: Hydrology and Land Drainage, Chapter 10: Geology and Hydrogeology, Chapter 12: Traffic and Transport,**

Chapter 13: Air Quality, Chapter 14: Noise and Vibration, and **Chapter 15: Socio-economics, Recreation and Tourism**.

16.6 Mitigation Measures Adopted as Part of the Project

16.6.1 A number of mitigation measures would be adopted through the Project to avoid or reduce the likely significant effects that would be experienced during the implementation of the Project, which fall into one of three categories: embedded mitigation measures, good practice mitigation measures, and additional mitigation measures. A definition of the each of the mitigation measures is provided in **Chapter 5: EIA Approach and Methodology.**

Embedded Mitigation Measures

16.6.2 An optioneering study (the CPRSS, as described in **Chapter 3: Main Alternatives**) has been undertaken to identify the preferred routeing and siting of the proposed infrastructure to ensure that, where reasonably practicable, environmental effects may be avoided or reduced. This includes avoiding settlements where possible, and allowing for a wide enough corridor to avoid or reduce potential human receptors as the Project design develops. Disruption to PRoW and other recreational routes during construction would be avoided as far as possible. Where necessary, suitable diversions would be agreed upon with the relevant local authority access officers prior to the commencement of construction work.

16.6.3 As part of the Project design process, a number of embedded environmental measures will be proposed to reduce the potential for impacts on health and wellbeing receptors. These measures will evolve as the EIA progresses, and in response to consultation, and will be fed iteratively into the assessment process. Embedded measures that will be explored include the potential for sections of underground cables. The design of the Project will be developed to be compliant with existing legal requirements and standards for EMFs, including:

- Technical Specification 1 – Ratings and General requirements for plant, equipment and apparatus for the National Grid system (Ref 16.29).
- National Grid SHES Standard- Non-ionising radiational standard – UK/T1/8.7.4/S (Ref 16.30).
- Policy Statement (Transmission) 103 – EMF Policy applied to overhead line designs (Ref 16.31).

16.6.4 These technical specifications and policies ensure that the proposed design will be compliant with the requirements of NPS EN-5.

16.6.5 National Grid Electricity Transmission (NGET) are aware that there may be concern regarding the potential effects of EMFs, despite the measures in place to protect against these. To address any concerns or anxiety, National Grid offer open communication on the issue, providing information on the science, research and measures that will be applied to protect against EMF effects. These measures include:

- Open and transparent information is provided about EMFs on the NGET website www.emfs.info which is linked to all project websites for members of the public to access.

- NGET operate a helpline on EMFs to answer any questions on this subject. This and the website are aimed at providing information on EMFs to help reduce anxiety or concern around EMFs.
- EMF experts are present at public consultation events to address any questions or concerns on EMFs.
- The Project offers '*ask the expert'* sessions to address any questions or concerns on EMFs.

Good Practice Mitigation Measures

16.6.6 A range of standard good practice mitigation measures for the Project would be adopted throughout the duration of the construction phase. These are generally measures that would normally be implemented on a well-run construction site and that have typically been employed by National Grid projects. General good practice construction management and construction site set up mitigation measures are set out in **Table 2.1** of **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2.**

16.6.7 Good practice mitigation measures relevant to health and wellbeing resulting from environmental change are set out in **Chapter 6: Landscape and Visual, Chapter 9: Hydrology and Land Drainage, Chapter 10: Geology and Hydrogeology, Chapter 12: Traffic and Transport, Chapter 13: Air Quality, Chapter 14: Noise and Vibration, and Chapter 15: Socio-economics, Recreation and Tourism** and in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**.

Additional Mitigation Measures

16.6.8 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for health and wellbeing. Additional mitigation measures will be developed as the Project design evolves. The EIA process is iterative, to enable the development of further mitigation and refinement of the Project to avoid or reduce potential significant effects.

16.7 Likely Significant Effects

16.7.1 This section sets out the likely significant effects on health and wellbeing arising from the construction, operations and maintenance of the Project. A description of each of these stages is set out in **Chapter 4: Description of the Project**.

16.7.2 The review of likely significant effects assumes that the embedded, good practice and additional mitigation measures described in Section 16.6 and outlined within the **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2**, are in place before assessing the effects. This is in accordance with guidance from the IEMA as part of preparing a proportionate assessment.

Health and Wellbeing

Construction

16.7.3 There is potential for temporary adverse and positive health and wellbeing effects to arise from construction activities including:

- **Potential temporary generation of noise and dust; visual impacts; soil, contaminated land and water disruption**: There is the potential for significant health related effects on the quality of life of local residents, workers and visitors arising from construction activities (e.g. noise, dust, visual amenity, soil quality, water quality and flood risk) leading to potential worsened health outcomes.
- Potential temporary severance of access to community facilities, recreational assets, PRoW and recreational routes resulting from temporary closures or diversions: There is the potential for significant health related effects on local residents, workers and visitors in accessing community facilities, recreational assets, PRoW and other recreational routes, potentially leading to worsened health outcomes.
- **Potential for new employment:** There is the potential for significant positive health related effects on local residents resulting from new employment and associated income opportunities for the construction workforce, potentially leading to improved health outcomes.

16.7.4 Therefore, the assessment on physical health and wellbeing during construction is proposed to be **Scoped In**.

16.7.5 Construction best practice mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** and would be implemented during the construction phase. Considering the nature of the construction activities and the implementation of these best practice mitigation measures, it is not considered likely that there would be the potential for significant mental health effects to occur during the construction phase and, on this basis, an assessment on mental health during the construction phase is proposed to be **Scoped Out** of the ES.

Operation (inc. Maintenance)

16.7.6 There is the potential for permanent adverse and positive health and wellbeing effects to arise from operational activities including:

- **Potential permanent changes in noise, visual amenity, flood and contaminated land risk**: There is the potential for significant health related effects on the quality of life of local residents, workers and visitors arising from operational activities (e.g. noise, visual amenity, flood risk and contaminated land risk), potentially leading to worsened health outcomes during operation.
- Potential permanent severance of access to community facilities, recreational assets and PRoW resulting from permanent closures or diversions: There is the potential for significant health related effects on local residents, workers and visitors in accessing community facilities, recreational assets (for example areas of open space) and PRoW, potentially leading to worsened health outcomes during operation.
- **Potential for new employment**: There is the potential for positive health related effects on local residents resulting from new employment and associated income opportunities for the operational workforce, potentially leading to improved health

outcomes. However, given the nature of the Project as a grid infrastructure (i.e. substation, pylons and overhead lines), the scale of operation and maintenance employment is not likely to generate a significant number of additional jobs as detailed in **Chapter 15: Socio-economics, Recreation and Tourism** of this Scoping Report. Negligible health and wellbeing effects relating to employment generation are therefore anticipated to arise from the operation and maintenance of the Project, and this matter is **Scoped Out**.

16.7.7 Therefore, the assessment of health and wellbeing during operation is proposed to be **Scoped In**, with the exception of health effects arising from employment during the operational and maintenance phase.

EMF

Construction

16.7.8 EMFs are associated with power distribution. Given that no distribution would be taking place during construction, no EMFs would be generated. Potential health and wellbeing effects of EMFs during construction are therefore **Scoped Out**.

Operation (inc. maintenance)

16.7.9 As set out in Section 16.6, the Project will be designed in accordance with National Grid design standards and will be compliant with the guidelines and policies related to EMFs stated in NPS EN-5 (Ref 16.6), including the ICNIRP guidelines (Ref 16.15) National Policy to ensure that all equipment complies with public EMF exposure limits. Potential physical health effects of EMFs during operation are therefore **Scoped Out**.

16.7.10 As set out in Section 16.6, the Project will be designed in accordance with National Grid design standards and will be compliant with the guidelines and precautionary policies related to EMFs stated in NPS EN-5 (Ref 16.6), including the ICNIRP guidelines (Ref 16.15) to ensure that all equipment complies with public EMF exposure limits. In addition, to help address concerns or anxieties of members of the public around effects of EMF there is open and transparent information is provided about EMFs on the NGET website www.emfs.info which is linked to all project websites for members of the public to access. NGET also operate a helpline on EMFs to answer any questions on this subject. This and the website are aimed at providing information on EMFs to help reduce anxiety or concern around EMFs.

16.7.11 Based on the measures outlined above, the perceived potential health and wellbeing effects of EMFs during operation will be **Scoped Out** of the ES.

16.8 Proposed Assessment Method

Further Data to be Gathered / Processed in the ES

16.8.1 Further data will be gathered by other relevant topic assessments outlined in this Scoping Report that consider potential effects on health and wellbeing. These include the results of relevant site surveys undertaken, for example, usage surveys for PRoW as part of the wider traffic and transport assessment.

Proposed Assessment Method

16.8.2 This section sets out the proposed methodology for the health and wellbeing assessment of the ES. The health and wellbeing assessment approach is derived from the IEMA guidance and may differ from that which is outlined in **Chapter 5: EIA Approach and Methodology**. The criterial adapted from the IEMA guidance (Ref 16.22) are intentionally broadly phrased to provide flexibility in covering a wide range of determinants of health, population groups, project activity types and contexts. Professional judgement will be used where applicable with appropriate justifications set out in the ES.

Sensitivity

16.8.3 The sensitivity of health and wellbeing receptors is driven by a number of factors which are based on guidance set out by IEMA (Table 7.1 of the IEMA guidance (Ref 16.22)) and professional judgement. This is detailed in **Table 16.4**.

Table 16.4 – Sensitivity Criteria

Level of Sensitivity	Indicative Description
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project) resources services and facilities potentially affected by 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; high proportions of dependants; people with very poor health status; and/or people with a very low capacity to adapt to change.
Medium	Moderate levels of deprivation; few alternatives to shared resources services and facilities potentially affected by the project; 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 as a result of health status; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt to change.
Low	Low levels of deprivation; many alternatives to shared resources services and facilities potentially affected by the project; 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 as a result of health status; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt to change.
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 as a result of health status; high proportion of people who are independent (not a carer or dependant);

Level of Sensitivity	Indicative Description
	people with good or very good health status; and/or people with a very high capacity to adapt to change.

Source: IEMA, Ref 16.22

Magnitude

16.8.4 Magnitude of impact is driven by a number of factors which are set out in **Table 16.5**. This is based on Table 7.2 in the IEMA guidance.

Table 16.5 – Criteria for Determining Magnitude of Impact

Level of Magnitude of Impact	Indicative Description
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for 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 major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	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 scale; very short-term duration; one-of frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Source: IEMA, Ref 16.22

Significance

16.8.5 Significance will be identified using the matrix set out in **Table 16.6,** which is derived from Table 7.3 in the IEMA guidance. Significant effects in the context of the EIA Regulations 2017 would be effects of moderate or greater significance.

Table 16.6 – Significance Matrix

		Sensitivity			
		High	**Medium**	**Low**	**Very Low**
Magnitude	**High**	Major	Major / Moderate	Moderate / Minor	Minor / Negligible
	Medium	Major / Moderate	Moderate	Minor	Minor / Negligible
	Low	Moderate / Minor	Minor	Minor	Negligible
	Negligible	Minor / Negligible	Minor / Negligible	Negligible	Negligible

Source: IEMA, Ref 16.22

Assumptions and Limitations

16.8.6 The following limitations and assumptions have been identified:

- The assessment relies, in part, on third party data (e.g. OS Mapping, OHID and Nomis) which are the most up-to-date and available at the time of the assessment. No significant changes or limitations in these datasets have been identified that will affect the robustness of the assessment for EIA purpose.
- Baseline data is also subject to a time lag between collection and publication. As with any dataset, these conditions may be subject to change over time which may influence the findings of the assessment.

16.9 Proposed Scope of the ES

16.9.1 The matters that are proposed to be scoped in and out of the health and wellbeing assessment are outlined in **Table 16.7.**

16.9.2 Where there are intra-project health and wellbeing effects, these will be considered in the intra-project cumulative effects assessment.

Table 16.7 – Proposed Scope of the ES for Health and Wellbeing

Matter	Phase	Scoped In / Out	Justification
Quality of life	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects arising from potential environmental changes relating to construction and operational activities. These are expected to include: air quality, noise, visual amenity, geology and hydrogeology, and water environment effects (during construction); and noise, visual amenity, flood and contaminated land risk (during operations).
	Operation and maintenance	**Scoped In**	
Access to community facilities, recreational assets, PRoWs and recreational routes	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects from potential access disruptions relating to construction and operational activities. The development of the Project has to date sought to avoid community facilities, recreational assets, PRoWs and recreation routes, where practicable. However, there is the potential for temporary and/or permanent disruption to such assets during construction, operation and maintenance in certain locations. These potential impacts may include temporary or permanent land take, access disruption and/or amenity impacts.
	Operation and maintenance	**Scoped In**	
Potential employment generation	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects from new employment generation and associated income opportunities for the construction workforce. These employment opportunities could potentially lead to improved health outcomes.
	Operation and maintenance	**Scoped Out**	There is the potential for limited new employment generation and associated income opportunities during operation and maintenance due to the nature of the

Matter	Phase	Scoped In / Out	Justification
			Project as grid infrastructure. Hence, health and wellbeing effects relating to employment generation during operation and maintenance are not anticipated to be significant.
Mental health due to construction works	Construction	**Scoped Out**	Construction best practice mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** and would be implemented during the construction phase. Considering the nature of the construction activities and the implementation of these best practice mitigation measures, it is not considered likely that there would be the potential for significant mental health effects to occur during the construction phase.
Generation of EMFs associated with the Project	Construction	**Scoped Out**	Given that no distribution would be taking place during construction, no EMFs would be generated. Hence, no health and wellbeing effect relating to EMFs is anticipated during construction.
	Operation and maintenance	**Scoped Out**	Whilst the Applicant acknowledges that whilst there is some potential for EMF exposure, the Project will be designed in accordance with National Grid design standards and will be compliant with the guidelines and policies related to EMFs stated in NPS EN-5 (Ref 16.6), including the ICNIRP guidelines (Ref 16.15) National Policy to ensure that all equipment complies with public EMF exposure limits. Hence, physical health effects from EMFs during operation and maintenance are not anticipated to be significant.
	Operation and maintenance	**Scoped Out**	the Project will be designed in accordance with National Grid design standards and will be compliant with the guidelines and precautionary policies related to EMFs stated in NPS EN-5 (Ref 16.6), including the ICNIRP guidelines (Ref 16.15) to ensure that all

Matter	Phase	Scoped In / Out	Justification
			equipment complies with public EMF exposure limits. In addition, to help address concerns or anxieties of members of the public around effects of EMF there is open and transparent information is provided about EMFs on the NGET website www.emfs.info which is linked to all project websites for members of the public to access. NGET also operate a helpline on EMFs to answer any questions on this subject. This and the website are aimed at providing information on EMFs to help reduce anxiety or concern around EMFs.

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17. Summary and Proposed Scope of the Environmental Statement

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Contents

17. Summary and Proposed Scope of the Environmental Statement

17.1 Introduction

17.1.1 This chapter summarises the aspects and matters that are proposed to be scoped into and out of the Environmental Impact Assessment, and the proposed content of the Environmental Statement (ES).

17.2 Topics Proposed to be Scoped In and Out

17.2.1 **Table 17.1** sets out the matters National Grid proposes to scope into and out of the assessment within the ES. This is based on the baseline data (receptors) gathered to date, and a prediction of whether the Project is likely to result in significant effects on those identified receptors. **Table 17.1** also provides signposts to where effects would be reported, including those predicted to be 'not significant' (and therefore sit outside of the ES) together with links to other key supporting documents. Further details and the justification for this scope is set out within environmental topic Chapters 6 – 16 of this Scoping Report.

Table 17.1 – Proposed Scope of the Environmental Statement

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
Landscape and Visual	Derwent Valley Mills World Heritage Site	Construction	**Scoped Out**	As this designation is considered to be more heritage-related than landscape-related, effects upon its outstanding universal value attributes will be addressed in **Chapter 8: Historic Environmental** rather than the Landscape and Visual Impact Assessment (LVIA). Consideration of the presence of the World Heritage Site when making judgements upon the sensitivity of the Study Area's landscape character and visual amenity will, however, be made within the LVIA.
		Operation (including maintenance)	**Scoped Out**	
	Peak District National Park	Construction	**Scoped In**	The Peak District National Park is located at its closest point less than 8 km from the Scoping Boundary. In addition, its elevation makes it likely for there to be some intervisibility from it to the Project. The LVIA will therefore provisionally include consideration of the indirect effects upon the designation's natural beauty and special qualities in terms of the possible impacts arising from changes within its setting.
		Operation (including maintenance)	**Scoped In**	
	Amber Valley Special Landscape Area	Construction	**Scoped Out**	The Scoping Boundary does not cross into any part of the Amber Valley Special Landscape Area. For this reason, and as no landscape 'setting' to the designation (outside of its boundary) has been defined within the Amber Valley Local Plan or its associated evidence base documentation, this is scoped out.
		Operation (including maintenance)	**Scoped Out**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	West Yorkshire and Nottingham and Derby Green Belt	Construction	**Scoped Out**	The Project will be located outside of the West Yorkshire Green Belt. The Nottingham and Derby Green Belt covers the stretch of the Scoping Boundary between Pentrich and Aston-on-Trent. Accordingly, consideration of the extent to which the Project may conflict with the purposes of this part of the Green Belt would be considered within the Planning Statement.
		Operation (including maintenance)	**Scoped Out**	As outlined in Guidelines for Landscape and Visual Impact (GLVIA3) paragraph 5.4, where 'openness' (being one of the essential characteristics of Green Belt stated in paragraph 142 of the National Planning Policy Framework (NPPF)) is an aesthetic and perceptual aspect of any section's landscape character and visual amenity, it would be considered as part of the LVIA.
	Landscape Character	Construction	**Scoped In**	There is the potential for direct effects on the overall character and/or key characteristics of the identified local landscape character areas that intersect with the Project, and indirect effects on those local landscape character areas within the LVIA Study Area from which there is potential intervisibility with the Project. National Character Areas (NCAs) and regional-level landscape character areas will not be considered as landscape receptors. This is to avoid duplication in the assessment.
		Operation (including maintenance)	**Scoped In**	Landscape elements (i.e. tree cover, field boundaries, landform, watercourses) will not be appraised as receptors in their own right but will be considered as part of the baseline in terms of contribution to landscape sensitivity. Likely impacts in terms of potential tree and hedgerow loss will be described in relation to each character area and cross references will be made to other chapters such as that covering Biodiversity and Arboriculture.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Receptors that lie outside the Zone of Theoretical Visibility (ZTV) of the Project	Construction	**Scoped Out**	Significant effects on receptors outside the ZTV of the Project are considered unlikely.
		Operation (including maintenance)	**Scoped Out**	
	Residential Communities within 5km of the Scoping Boundary	Construction	**Scoped In**	The Project may form a noticeable and/or distinct component within the views experienced by people within 5 km of the Project, and so potentially lead to significant visual effects.
		Operation (including maintenance)	**Scoped In**	
	Receptors beyond 5km of the Scoping Boundary (with the exception of any very high sensitivity receptors up to 7.5km from the Scoping Boundary that are identified during the LVIA)	Construction	**Scoped Out**	At such distances and taking into account intervening landform, vegetation, built-form, significant effects on visual receptors, that are not highly sensitive, are considered unlikely beyond 5 km.
		Operation (including maintenance)	**Scoped Out**	
	Recreational visual receptors within 5km of the Scoping Boundary	Construction	**Scoped In**	The Project may form a noticeable and/or distinct component within the views experienced by people within 5 km of the Project, and so potentially lead to significant visual effects.
		Operation (including maintenance)	**Scoped In**	
	Road users	Construction	**Scoped Out**	Significant visual effects on people travelling by motorised vehicle are not anticipated due to the speed of travel, and the

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
		Operation (including maintenance)	**Scoped Out**	fact that there are no known promoted driving routes through the LVIA Study Area.
	Rail users	Construction	**Scoped Out**	Significant visual effects on people travelling by train network are not anticipated due to the speed of travel, and the fact that the only railway line within the LVIA Study Area that is promoted as a scenic route, i.e. the Derwent Valley Line between Derby and Matlock, lies predominantly at the base of the river valley with no anticipated intervisibility with the Project (approximately 1.5-11.0 km away).
		Operation (including maintenance)	**Scoped Out**	
	Landscape and visual effect at night	Construction	**Scoped Out**	Project may not involve any permanent lighting during its operation, and that lighting used during the construction and maintenance would be temporary, directional only and minimised where possible.
		Operation (including maintenance)	**Scoped Out**	
	Cumulative landscape and visual effects	Construction	**Scoped In**	The potential for significant cumulative landscape and/or visual effects with other operational, consented and proposed development of a similar type and scale will be considered. A list of developments to be considered in the cumulative LVIA will be agreed with consultees through the EIA process.
		Operation (including maintenance)	**Scoped In**	
Ecology and Biodiversity	Peak District Moors (South Pennine Moors Phase 1) Special Protection Area (SPA)	Construction	**Scoped In**	Although this site sits outside the Scoping Boundary, it has been scoped in for potential impacts during construction, resulting from general construction activities. Likely significant effects on the SPA cannot be ruled out in the absence of a dedicated assessment and it is therefore scoped in. A Habitats Regulation Assessment (HRA) screening will be undertaken, which will include an assessment of any land that is

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				'Functionally Linked' to the SPA. Where required, progression to subsequent stages of the Habitat Regulations Assessment (HRA) process may occur.
		Operation (including maintenance)	**Scoped In**	There is the potential to impact birds associated with the site during the operation (and maintenance) phase. The addition of new overhead lines poses a potential collision risk to birds which will be fully assessed through bird survey work, which will inform the ES and HRA for the scheme.
	River Mease Special Area of Conservation (SAC)	Construction	**Scoped In**	Although this site sits outside the Scoping Boundary, it has been scoped in for potential indirect impacts during construction due to the potential hydrological connection between the SAC and the Scoping Boundary. A HRA screening will be undertaken to determine any significant effects, and this will include an assessment of any land that is 'Functionally Linked' to the site.
		Operation (including maintenance)	**Scoped Out**	No likely significant effects are anticipated as there are no perceivable pathways to impact this statutory designated site.
	SACs: South Pennine Moors SAC, Gang Mine SAC, Bees Nest & Green Clay Pits SAC and Birklands & Bilhaugh SAC	Construction	**Scoped Out**	Designated for their habitats (and for Great Crested Newts (GCN) in the case of Bees Nest & Green Clay Pits SAC) which are mainly impacted by air pollution and/or changes in hydrological conditions. It is considered unlikely that the Project would cause these impacts to these SACs, which are at least 7.5 km away at the nearest point and not hydrologically connected (where relevant), as they are outside of the Zone of Influence (ZoI). There are no perceivable pathways to impact this statutory designated site and no likely significant effects are anticipated during the construction and operational phase.
		Operation (including maintenance)	**Scoped Out**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Peak District Dales SAC	Construction	**Scoped Out**	This site is located 8 km away from the Scoping Boundary. When considering the qualifying habitats and aquatic fauna of the SAC, impacts at this distance from works are not anticipated.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact this statutory designated site and no likely significant effects are anticipated during the construction and operational phase.
	Ogston Reservoir SSSI	Construction	**Scoped In**	Although this designated site sits outside the Scoping Boundary, it has been scoped in for potential indirect impacts (e.g. pollution events) and potential noise and disturbance of qualifying breeding birds during construction due to being adjacent to the Scoping Boundary and with potential hydrological links to the Scoping Boundary. It also has a relevant IRZ (Impact Risk Zone) within the Scoping Boundary.
		Operation (including maintenance)	**Scoped In**	Although the risk is considered to be low, the pathways to impact breeding birds associated with Ogston Reservoir SSSI during the operational phase include potential collision risk, electrocution and the increased risk of perching spots for raptors which may reduce breeding activity.
	Morley Brick Pits Site of Special Scientific Interest (SSSI)	Construction	**Scoped In**	This designated site is located within the Scoping Boundary. Although careful consideration will be made to avoid the site as far as practically possible at the design phase, likely significant effects cannot be ruled out. Therefore, this site is scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact this statutory designated site during operation. Therefore, no likely significant effects are anticipated.
		Construction	**Scoped In**	Although all of these designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	National sites designated for biodiversity (14 SSSIs and one NNR)			impacts (e.g. pollution events) during construction due to being located within 5 km or with potential hydrological links to the Scoping Boundary. In addition, Donington Park SSSI has relevant Impact Risk Zones (IRZs) within the Scoping Boundary. These sites are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these statutory designated sites during operation.
	Aston Brickyard Plantation Local Nature Reserve (LNR), Williamthorpe LNR and Oakerthorpe LNR	Construction	**Scoped In**	These locally designated sites are located (or partially located) within the Scoping Boundary. Although careful consideration will be made to avoid the sites as far as practically possible at the design phase, there is a risk of direct impacts to the LNRs. Therefore, these sites are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these statutory designated sites during operation.
	Other Local sites designated for biodiversity (LNRs)	Construction	**Scoped In**	Although all of these locally designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect impacts (e.g. pollution events) during construction due to being located within 2 km or with potential hydrological links to the Scoping Boundary. These sites are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.
	60 Local Wildlife Sites (LWSs), 21 proposed Local Wildlife Sites	Construction	**Scoped In**	These locally designated sites are located (or partially located) within the Scoping Boundary. Although careful consideration will be made to avoid the sites as far as practically possible at the design phase, there is a risk of direct impacts to the LWSs,

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	(pLWSs) and 3 Derbyshire Wildlife Trust (DWT) reserves within the Scoping Boundary			pLWSs and DWT reserves. Therefore, these sites are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.
	194 LWSs, 74 pLWSs and 9 DWT reserves outside the Scoping Boundary	Construction	**Scoped In**	Although all of these locally designated sites sit outside the Scoping Boundary, they have been scoped in for potential indirect impacts (e.g. pollution events) during construction due to being located within 2 km or with potential hydrological links to the Scoping Boundary. These sites are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any of these sites during operation.
	Ancient woodland	Construction	**Scoped In**	Although careful consideration will be made to avoid ancient woodland as far as practically possible at the design phase, there is the potential for habitat damage/ modification through deterioration in local air quality arising from construction traffic. Fifteen blocks of ancient woodland are located within the Scoping Boundary and a further nine within 200 m. Given the air quality impacts are unknown, impacts to ancient woodland are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact ancient woodland during operation.
		Construction	**Scoped In**	The Project may pass through and in close proximity to HPIs. The potential therefore exists for direct impacts during construction (e.g. direct loss of habitat) and indirect impacts

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Habitats of Principal Importance (HPI)			(e.g. pollution events) during construction. Therefore, HPIs are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact any HPIs during operation.
	Hedgerows	Construction	**Scoped In**	Sections of hedgerow may require removal to facilitate construction (e.g. an open cut method of cable installation). It is currently unknown if any hedgerows within the Scoping Boundary meet the criteria to be classified as 'Important' under the Hedgerows Regulations. The potential therefore exists for direct physical impacts during construction (e.g. direct loss of habitat) and indirect impacts during construction. Therefore, hedgerows are scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact hedgerows during operation.
	Trees	Construction	**Scoped In**	Individual Trees and Tree Groups including irreplaceable Ancient and Veteran features have the potential to be directly or indirectly impacted by construction, either by requiring removal or pruning works to facilitate construction or through construction impacts to Root Protection Areas. Impacts to Trees, Tree Groups and Woodlands will be assessed as per **Appendix 7A: Arboricultural Strategy** in **Volume 2**.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact trees during operation.
		Construction	**Scoped In**	Given the extent of the Scoping Boundary and numerous watercourses it contains, there is potential for terrestrial and aquatic protected/ notable vascular and non-vascular plants,

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Vascular, non-vascular plants and fungi			fungi and Invasive and Non-native Species (INNS) to be present. Further survey work is required to inform potential impacts. In the absence of appropriate mitigation, the Project has the potential for adverse effects and these receptors are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped Out**	There are no perceivable pathways to impact these receptors during operation.
	Bats	Construction	**Scoped In**	Woodland parcels, lone trees and buildings within or adjacent to the Scoping Boundary are likely to provide opportunities for roosting bats. Woodland edges/rides, networks of hedgerows, and other linear features, such as railway lines, rivers and canals within the Scoping Boundary are likely to provide opportunities for commuting and foraging bats. Bats are therefore at risk of direct impacts during construction (e.g., impacts to roosts, habitat loss/ fragmentation). However, negative impacts to foraging/commuting bats from habitat removal or artificial lighting to facilitate construction are not expected to be significant due to embedded working methods.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on bats, therefore these receptors are scoped in for further assessment.
	Water vole	Construction	**Scoped In**	Water vole are present within the Scoping Boundary. American mink (a predator of water vole) are also widespread (McGuire & Morse, 2020). The Scoping Boundary contains networks of watercourses and ditches which would be suitable for both species. There is a risk of direct impacts during construction as a result of, for example, loss/ damage to burrows during construction (culverts, minor trenching works) while indirect disturbance due

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Water vole are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on water vole, therefore this receptor is scoped in for further assessment.
	Otter	Construction	**Scoped In**	Three rivers, as well as canals and ditch networks, and adjacent parcels of woodland are present within the Scoping Boundary. These habitats may be suitable for otter holt creation, commuting and foraging and otter have been recorded within the River Trent. There is a risk of direct impacts during construction as a result of, for example, loss/ damage to holts/ couches during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Otter are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on otter, therefore this receptor is scoped in for further assessment.
	Badger	Construction	**Scoped In**	The Scoping Boundary comprises an extensive network of rural habitats demarcated by hedgerows and small woodland parcels; therefore it is anticipated that badger will be widespread. Badgers may be impacted during construction through, for example, habitat loss/fragmentation and loss of / damage to / disturbance of setts which would constitute a breach of legislation. Badgers are therefore scoped in for further assessment.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on badger, therefore this receptor is scoped in for further assessment.
	Hazel dormouse	Construction	**Scoped In**	No granted licences returned from Natural England within 2 km of the Scoping Boundary, however, there have been reintroduction programs in the local area, including Calke Abbey in 2023 (4.6 km south of the Scoping Boundary) as well as in the Derwent Valley in 2003 and 2005. Therefore, it is possible that hazel dormouse are present within the Scoping Boundary. Suitable habitats, such as well-connected woodlands with diverse understory and opportunities for nesting, will be scoped in to minimise impacts (and thus prevent breach of legislation) on hazel dormouse nest sites and foraging habitats.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on hazel dormouse, therefore this receptor is scoped in for further assessment.
	Pine marten	Construction	**Scoped Out**	One record of this species was returned from eight years ago during the desk study. A handful of individual records have been found in the local area within the past 20 years. The species is considered to be largely absent from the Scoping Boundary, and, if any populations are present, they are likely to be small and isolated. A dedicated survey for this species is likely to be unviable and is not considered to be proportionate. It is considered there are no perceivable pathways to impact pine marten during both construction and operational phases and pine marten are therefore scoped out.
		Operation (including maintenance)	**Scoped Out**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Other notable mammals including Species of Principle Importance (SPI) species: brown hare, hedgehog, and harvest mouse	Construction	**Scoped Out**	Given the rural location of the Project and wider landscape connectivity, terrestrial mammals such as hedgehog and brown hare are anticipated to be present within the Scoping Boundary. Harvest mouse are also present, though not common within Derbyshire, with presence reported in Ogston Reservoir SSSI. Negative impacts to these species could occur during construction as a result of habitat removal/ fragmentation. In addition, nocturnal species may also be impacted by operational lighting and any temporary lighting required during construction. These impacts are anticipated to be largely temporary and as habitats would be reinstated to equal or better condition, with embedded mitigation measures during works, impacts are not anticipated to be significant. As a result, other notable mammals are scoped out of further assessment for the construction and operational phases.
		Operation (including maintenance)	**Scoped Out**	
	Barn owl	Construction	**Scoped In**	The Scoping Boundary comprises an extensive network of rural habitats with associated farm buildings, demarcated by hedgerows and small woodland parcels, therefore it is anticipated that Barn owl will be present.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on barn owl, therefore this receptor is scoped in for further assessment.
	Kingfisher	Construction	**Scoped In**	Three rivers (River Amber, River Derwent and River Trent), as well as canals and ditch networks are present within the Scoping Boundary. These habitats may be suitable for breeding kingfisher and may be impacted during construction works on or adjacent to watercourses.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on kingfisher, therefore this receptor is scoped in for further assessment.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Other breeding birds	Construction	**Scoped In**	There will likely be some direct loss of suitable breeding bird habitat during the construction phase, including trees, hedgerows and arable fields. Surveys may be required to determine areas where breeding birds may be significantly impacted across the Scoping Boundary.
		Operation (including maintenance)	**Scoped In**	Although the risk is considered to be low, the pathways to impact breeding birds during the operational phase include potential collision risk, electrocution and the increased risk of perching spots for raptors which may reduce breeding activity. Lighting at the proposed new Chesterfield Substation could also cause impacts.
	Wintering/passage birds	Construction	**Scoped In**	Ogston Reservoir SSSI is designated for wintering and passage birds and is located within 100m of the Scoping Boundary. In addition, there are several locally designated sites which support wintering and passage birds located within 2 km (Arcadis, 2024). Functionally linked land for wintering birds at Peak District Moors (South Pennine Moors Phase 1) SPA is not considered to be present within the Scoping Boundary (as determined by the Wintering Bird Technical Note; Arcadis, 2024). Surveys are required to target wintering and passage birds to determine locations of functionally linked land and likely passage routes across the Scoping Boundary. Other key waterways crossing the scheme have been included within the scope. This is for the purposes of determining if/where there are areas where wetland species may be impacted during construction. The Wintering Bird Technical Note (Arcadis, 2024) outlines survey locations which, along with the survey approach, have been agreed with Natural England.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
		Operation (including maintenance)	**Scoped In**	There is the potential to impact wintering and migratory birds during the operation (and maintenance) phase. The addition of new overhead lines poses a potential collision risk to wintering and migratory birds. Wintering and passage/migratory birds are therefore Scoped In during Operation.
	Reptiles	Construction	**Scoped In**	It is considered unlikely that widespread presence, and/or large populations, of reptiles will be found due to the majority of habitats within the Scoping Boundary being agricultural land. However, common and widespread species of reptile are anticipated to be present within suitable habitat (where present) and are therefore at risk of direct impacts during construction (e.g., habitat loss/ fragmentation). In the absence of appropriate mitigation, reptiles are also at risk of killing / injury during construction. This would constitute a breach of legislation. Reptiles are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on reptiles, therefore these receptors are scoped in for further assessment.
	Amphibians	Construction	**Scoped In**	Amphibians, such as common toad, may be negatively affected by direct impacts during construction (e.g., habitat loss/ fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction. Amphibians are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on amphibians, therefore these receptors are scoped in for further assessment.
	Fish	Construction	**Scoped In**	Spined loach and Bullhead are located within River Mease SAC which is hydrologically connected to the site via River Trent.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				There is a risk of direct impacts during construction as a result of, for example, dewatering during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. Fish, including migratory species, are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on fish, therefore these receptors are scoped in for further assessment.
	White-clawed crayfish	Construction	**Scoped In**	White-clawed crayfish are located within River Mease SAC, which is hydrologically connected to the site via River Trent. Data from Environment Agency (via National Biodiversity Network) also show presence of white-clawed crayfish in the local area. Watercourses may be impacted by construction works, either directly or indirectly. There is a risk of direct impacts during construction as a result of, for example, dewatering during construction (culverts, minor trenching works) while indirect disturbance due to increased noise and vibration and/ or pollution events may be experienced at trenchless crossings during construction. White-clawed crayfish are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on white-clawed crayfish, therefore this receptor is scoped in for further assessment.
	Terrestrial invertebrates	Construction	**Scoped In**	The UKHab classification survey and desk study records will identify habitats, such as species-rich grassland and open mosaic habitats, which are able to support a range of terrestrial invertebrates.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				The Project extends through a largely agricultural landscape which has limited suitability for large invertebrate populations, protected species or notable assemblages. Any high value areas/habitats for invertebrates will be identified during the preliminary assessment, including the UKHab classification survey and desk study. There is potential for direct impacts during construction (e.g. habitat loss/ fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction. Terrestrial invertebrates are therefore scoped in for further assessment.
		Operation (including maintenance)	**Scoped In**	Lighting at the proposed new Chesterfield Substation (were this to be brought into scope) could cause impacts on terrestrial invertebrates, therefore these receptors are scoped in for further assessment.
Historic Environment	Physical impacts on designated archaeological remains	Construction	**Scoped Out**	The Project to date has been developed and would continue to be developed, to avoid designated archaeological remains such as scheduled monuments, therefore there is unlikely to be direct and indirect physical impacts on the designated assets within the Scoping Boundary.
		Operation (including maintenance)	**Scoped Out**	No physical impacts on archaeological remains are likely to occur as a result of operational and maintenance activities. Where inspections of the Project assets indicate the requirement for repairs and modifications of sub-surface features, such as pylon foundations and underground cables, these would be localised in nature and likely limited to areas of ground previously disturbed by the Project.
	Physical impacts on non-designated	Construction	**Scoped In**	Likely significant effects due to the direct physical damage and truncation of non-designated archaeological remains cannot be ruled out. There is also the potential for indirect physical

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	archaeological remains			impacts due to changes to groundwater regimes. Further assessment will be undertaken in the ES.
		Operation (including maintenance)	**Scoped Out**	No physical impacts on archaeological remains are likely to occur as a result of operational and maintenance activities. Where inspections of the Project assets indicate the requirement for repairs and modifications of sub-surface features, such as pylon foundations and underground cables, these would be localised in nature and likely limited to areas of ground previously disturbed by the Project.
	Impacts on the setting of designated and non-designated archaeological remains	Construction	**Scoped In**	Factors such as an increase in noise, dust and visual intrusion have the potential to impact the value of designated and non-designated archaeological remains.
		Operation (including maintenance)	**Scoped In**	The presence of the new infrastructure during the operational phase of the Project has the potential to adversely impact the setting of archaeological remains.
	Physical impacts to designated historic buildings	Construction	**Scoped Out**	Direct and indirect physical impacts on designated historic buildings are not anticipated during the construction phase.
		Operation (including maintenance)	**Scoped Out**	Direct and indirect physical impacts to designated historic buildings are not anticipated. Maintenance activities would be localised in scale and nature.
	Physical impacts to non-designated historic buildings	Construction	**Scoped In**	Ongoing review of the presence of non-designated historic buildings would be carried out during the design development to, where reasonably practicable, ensure the routing of the Project avoids the potential for direct physical impacts, however, likely significant effects on non-designated historic buildings cannot be fully ruled out at this early design stage.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
		Operation (including maintenance)	**Scoped Out**	Direct and indirect physical impacts to non-designated are not anticipated. Maintenance activities would be localised in scale and nature.
	Physical impacts to Conservation Areas	Construction	**Scoped In**	A total of 10 Conservation Areas within the Scoping Boundary. The development of the preferred route alignment the Project would seek to avoid direct and indirect physical impacts to Conservation Areas, this cannot be ruled out during the construction phase at this stage.
		Operation (including maintenance)	**Scoped Out**	Direct and indirect physical impacts to Conservation Areas are not anticipated. Maintenance activities would be localised in scale and nature.
	Impacts to the setting of historic buildings and Conservation Areas	Construction	**Scoped In**	There is potential for likely significant effects to the setting of designated and non-designated historic buildings during the construction phase.
		Operation (including maintenance)	**Scoped In**	There is potential for likely significant effects to the setting of designated and non-designated historic buildings during operation and maintenance.
	Physical impacts to designated historic landscapes including Derwent Valley Mills World Heritage Site and Registered Parks and Gardens	Construction	**Scoped Out**	There is little potential for physical impacts on designated historic landscapes to occur during construction as none lie within the Scoping Boundary.
		Operation (including maintenance)	**Scoped Out**	There is not anticipated to be any direct or indirect physical impacts to designated historic landscapes arising from the operational phase and maintenance activities.
	Physical impacts to non-designated	Construction	**Scoped In**	There is potential for physical impacts to non-designated historic landscapes to arise during the construction phase

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	historic landscapes			including landscape features. Therefore, further assessment is required in the ES.
		Operation (including maintenance)	**Scoped Out**	There is not anticipated to be any direct or indirect physical impacts to non-designated historic landscapes arising from the operational phase and maintenance activities.
	Impacts to the setting of Derwent Valley Mills World Heritage Site	Construction	**Scoped Out**	The Scoping Boundary lies on average between 2-7 km away from the 'core area' of the World Heritage Site. Given the distance and the fact that the designation predominantly covers the base and lower slopes of the valley of the River Derwent past the Scoping Boundary, intervening landform, 20th Century housing and vegetation are likely to combine to prevent intervisibility between the designated site and the Project.
		Operation (including maintenance)	**Scoped Out**	
	Impacts to the setting of Registered Parks and Gardens and non-designated historic landscapes	Construction	**Scoped In**	There is the potential for impacts to the setting of Registered Parks and Gardens and non-designated historic landscapes during the construction and operation (including maintenance) phases of the Project.
		Operation (including maintenance)	**Scoped In**	
Hydrology and Land Drainage	Effects on surface water quality	Construction	**Scoped In**	Project wide but particularly at temporary watercourse crossings by haul routes and local to areas of topsoil stripping and excavations including for the laying of cable sections.
		Operation (including maintenance)	**Scoped Out**	No likely significant effects as no operational discharges would be generated and surface water drainage from operational infrastructure would be managed using suitable Sustainable Urban Drainage Systems (SuDS).
		Construction	**Scoped Out**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Existing water interests (abstractions and discharges)	Operation (including maintenance)	**Scoped Out**	No likely significant effects on flow availability in watercourses supporting existing water interests.
	Hydromorphology of watercourses	Construction	**Scoped In**	Project wide but particularly at temporary watercourse crossings by haul routes or through methods of laying the cables and where there are temporary works within floodplains.
		Operation (including maintenance)	**Scoped Out**	No likely significant effects as once the Project is installed and land temporarily affected is re-instated, there would be no disturbance to the beds, banks, flow regimes or riparian corridors of watercourses.
	Flood risk from rivers	Construction	**Scoped In**	There are working areas in fluvial Flood Zone 3. Works have the potential to temporarily disrupt river flow and floodplain flow regimes.
		Operation (including maintenance)	**Scoped In**	Most land required for construction would be returned to its pre-construction land use and so impacts on rivers and their floodplains across the Project are likely to be limited. However, there is potential for permanent above ground infrastructure in Flood Zone 3, so this aspect is proposed to be scoped in at this early stage, subject to further detailed assessment.
	Flood risk from surface water and effects on the land drainage regime	Construction	**Scoped In**	The Project has potential to cause temporary and permanent changes to impermeable land cover and potential for temporary disruption to existing land drainage routes during construction.
		Operation (including maintenance)	**Scoped In**	
		Construction	**Scoped In**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Flood risk from groundwater	Operation (including maintenance)	**Scoped In**	Piling for pylons may be required and so this aspect is proposed to be scoped in at this early stage. Due to the expected depth of the cable route and the minimal displacement of soils it is not expected that flood risk will increase from the cable route. However, this matter has been scoped in for completeness with the pylons.
	Flood risk from other sources (the sea, sewers, artificial waterbodies)	Construction	**Scoped Out**	Given the nature of the Project (overhead line and buried cable), it is of low vulnerability to flooding from other sources and has limited potential to impact on flood risk from these sources.
		Operation (including maintenance)	**Scoped Out**	
Geology and Hydrogeology	Geology and minerals – Geohazards and land instability	Construction	**Scoped Out**	The Project, and design of structures, will include (in accordance with best practice and industry guidance) suitable consideration of site-specific ground conditions, potential ground instability and geohazard risks. As such, it is considered that the construction of the Project and the operation and maintenance of the new infrastructure would not be adversely affected and would not generate any significant effects.
		Operation (including maintenance)	**Scoped Out**	
	Geology and minerals – Degradation of geological resources and sites of geological importance	Construction	**Scoped Out**	No SSSIs designated for their geological interest identified within the geology study area. No sites of regional or local geological importance have been identified within the geology study area using the publicly available information. Further consultation will be undertaken with the relevant bodies to identify any sites. Where practicable, the Project would be routed to avoid any physical impacts on sites of geological importance.
		Operation (including maintenance)	**Scoped Out**	
		Construction	**Scoped In**	

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Geology and minerals – Sterilisation of minerals within the Scoping Boundary	Operation (including maintenance)	**Scoped In**	The Scoping Boundary crosses areas designated as safeguarded within the Derbyshire and Derby Minerals Local Plan.
	Hydrogeology – Changes to groundwater flows and levels	Construction	**Scoped In**	The Project construction activities have the potential to change groundwater flows and levels, which support sensitive receptors identified within the baseline.
		Operation (including maintenance)	**Scoped In**	Likely significant effects are not expected to groundwater levels and flows during operation and maintenance, however these cannot be ruled out at this stage.
	Hydrogeology – Changes to groundwater quality	Construction	**Scoped In**	The Project construction activities may lead to the creation of new pollutant pathways and the reduction of groundwater quality supporting sensitive receptors.
		Operation (including maintenance)	**Scoped Out**	Works carried out during the operational phase, including maintenance, are not anticipated to result in any changes to groundwater quality through new flow paths.
	Contaminated land – Introduction of new contamination	Construction	**Scoped Out**	Good practice controls would be set out within the Outline Code of Construction Practice (CoCP) to manage the storage and handling of construction materials, excavated soils and wastes whilst protocols would be established to manage accidental spillages and emergencies.
		Operation (including maintenance)	**Scoped Out**	
	Contaminated land – Disturbance and mobilisation of	Construction	**Scoped In**	Appropriate controls in line with industry best practice would be put in place to manage risks associated with existing land contamination. Further review is required and therefore likely significant effects cannot be ruled out.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	existing contamination	Operation (including maintenance)	**Scoped Out**	In the event contamination, which has the potential to impact sensitive receptors, is identified on land required to construct the Project, this would be appropriately managed as part of the construction phase of the Project ensuring land is suitable for the proposed end use.
	Contaminated land – Discovery and disturbance of unforeseen contamination	Construction	**Scoped Out**	A watching brief protocol would be specified for earthwork activities to observe for any unforeseen contamination, reducing the risk of disturbance and mobilisation. Suspected contaminated material would be handled and stored separately from other materials in line with the measures set out in the Outline CoCP submitted in support of the Development Consent Order (DCO) application. Likely significant effects are not anticipated.
Agriculture and Soils	Temporary loss of agricultural land (including BMV land)	Construction	**Scoped In**	Soil and Agricultural Land Classification (ALC) surveys would be undertaken in relation to areas of significant permanent infrastructure, sections of the haul route through particularly sensitive soils (such as heavy soils prone to compaction) and soil stripping for cable installation. The assessment would detail, as standard mitigation, the requirements for soil handling and reinstatement. Land required temporarily would be fully reinstated to its pre-construction condition (or a condition agreed with the landowner).
	Permanent loss of agricultural land (including Best and Most Versatile (BMV) land)	Operation (including maintenance)	**Scoped In**	The permanent loss of BMV land would be assessed as part of the ES based on detailed surveys.
	Soil quality associated with	Construction	**Scoped In**	Stripping and stockpiling soils would have a temporary effect on the soil ecosystem services provided. Successful reinstatement would be critical in ensuring these functions are restored.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	ecosystem services	Operation (including maintenance)	**Scoped Out**	The majority of the land required for construction would be returned to its pre- construction land use (as agreed with the landowner) and so impacts on soil ecosystem functions are likely to be limited.
	Land use / agricultural landholdings	Construction	**Scoped In**	The Project has the potential to impact agricultural operations due to disturbance, fragmentation, access restrictions or disruption to water supplies or land drainage. A proportionate approach would be taken, focusing on the most sensitive land uses.
		Operation (including maintenance)	**Scoped Out**	The majority of land required for construction would be returned to its pre-construction land use during operation, therefore, impacts on agricultural landholdings across the Project are likely to be limited and not significant.
Traffic and Transport	Assessment of traffic and transport impacts	Construction	**Scoped In**	To assess the potential increase in traffic flows against the Rule 1 and Rule 2 of the Environmental Assessment of Traffic and Movement ('IEMA Guidelines') (Institute of Environmental Management and Assessment (IEMA), 2023). A separate Transport Assessment (TA) and Outline Construction Traffic Management Plan (CTMP) would also be prepared for the Project to include measures that control traffic.
		Operation (including maintenance)	**Scoped Out**	The overhead lines, pylons and new substation are uncrewed, therefore operational traffic would be associated with infrequent repair and routine maintenance works. The impact of operational phase traffic from the Project would be expected to be significantly lower than the construction phase and is classed as negligible, as it is expected to be below 10% increase in future baseline flows. For this reason, operational traffic movements are not anticipated to have a material effect on the transport network and receptors. Scoping out an

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				assessment of operational phase traffic and transport impacts is consistent with other National Grid projects.
	Assessment of potential PRoW, long distance paths and cycle route diversions and closures	Construction	**Scoped In**	Where practical and feasible continued access to and use of the PRoW will be facilitated in order to minimise the number of diversions and temporary closures required and the impact on users. Where this is not feasible, the PRoW will either be temporarily diverted, or if the route cannot be diverted, temporarily closed. The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and Outline CTMP (including Public Right of Way Management Plan (PRoWMP) and Construction Worker Travel Plan (CWTP)) would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders.
		Operation (including maintenance)	**Scoped In**	Any potential permanent closure or diversions on existing PRoW routes may affect journey times. Potential effects on users of PRoWs (walkers, cyclists and horse-riders) will be assessed. The significance of effects will be dependent upon the increase in journey length and period of time changes are in place. A separate TA and Outline CTMP would also be prepared for the Project to include measures that control movements by walkers, cyclists and horse-riders.
	Assessment of impacts on the rail network	Construction	**Scoped Out**	Most construction routes would use existing crossings that would not exceed existing weight/height restrictions, and this would be confirmed with Network Rail. However, remedial or upgrade works may be required to railway bridges to accommodate temporary access works such as haul roads or side access on existing over-bridges to reach severed areas of land. There may be a requirement for service interruptions to facilitate netting of scaffolding protection over railways for overhead line crossings to facilitate overhead line stringing and

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				vegetation clearance adjacent to the railway line. Agreement would need to be sought with Network Rail for daytime or nighttime line blockages or possessions. Subject to discussions with Network Rail, where possible planned closures would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. Durations of closures would be limited as far as practicable. National Grid would liaise with Network Rail to agree any additional measures that may be required as part of the works. With these measures in place it is expected that potential effects would not be significant.
		Operation (including maintenance)	**Scoped Out**	The design life of the overhead line seeks to minimise the impact on railway assets. Operation and maintenance traffic would not affect the railway service. The overhead line would be designed to avoid interaction with any operational rail infrastructure and accesses to pylons for maintenance would be either side of operational railways avoiding the need for crossings where practicable. There may be a requirement for service interruptions to facilitate netting of scaffolding protection over railways for overhead line maintenance and vegetation clearance. Agreement would need to be sought with Network Rail for daytime or nighttime line blockages. Subject to discussions with Network Rail, where possible planned closures would be carried out during an off-peak period, either over night or at a weekend to reduce impacts on passengers. Durations of closures would be limited as far as practicable. National Grid would liaise with Network Rail to agree any additional measures that may be required as part of the works. With these measures in place it is expected that potential effects would not be significant.
	Assessment of impacts on the	Construction	**Scoped Out**	Overhead line crossing methods will be employed to minimise any likely significant effects on the operation of the

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	watercourse network			watercourse. Relevant stakeholders would be engaged prior to works being undertaken. It is anticipated that construction material and any surplus material removed will be transported via the road network. As the Project progresses, if the use of the existing watercourses within the Scoping Boundary to transport construction material or removal of spoil is explored, the Environment Agency and Local Authorities will be consulted and the scope of the assessment will be reviewed.
		Operation (including maintenance)	**Scoped Out**	Similar to the approach taken to the crossing of other live transport networks, any requirements for crossings of existing watercourses during the operational and maintenance phase would be coordinated with the asset owner. Operation and maintenance traffic would be unlikely to use or affect the existing watercourse network.
Air Quality	Construction dust	Construction	**Scoped In**	During the construction phase there is potential for dust deposition and health impacts from elevated particulate matter (PM) concentrations caused by construction activities. The DCO application will be supported by a construction dust risk assessment. This will document the Project's compliance in accordance with the Institute of Air Quality Management (IAQM) guidance and identify any further measures applicable to the Project to be included within the Outline CoCP (submitted with the DCO).
	Construction generators emissions	Construction	**Scoped In**	The use of generators would be localised, temporary and short-lived when considered on an annual basis. Good practice measures such as limiting their use and locating generators away from sensitive receptors would reduce the potential for likely significant effects. However, information on the type of generators will be reviewed during the ES.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	Construction traffic emissions	Construction	**Scoped In** (if the screening criteria are met or exceeded)	Potential for deterioration in local air quality (nitrogen dioxide (NO_2), nitrogen oxides (NO_x), PM10 and PM2.5) at local human and ecological receptors. This will be scoped out if criteria are not met. Diverted traffic is scoped out as there are no likely significant effects due to low expected changes in traffic flows.
	Operational traffic emissions	Operation (including maintenance)	**Scoped Out**	No likely significant effects expected due to the low numbers of vehicle movements.
Noise and Vibration	Construction noise effects from construction activities Static construction sites and compounds	Construction	**Scoped In**	Much of the construction activities supporting the overhead line, cable sealing end compounds, undergrounding are likely to be transient in nature, short term and controlled through good practice noise mitigation. Likely significant effects from static construction sites such as compounds and substations (where such works to be incorporated into the Project scope) cannot be ruled out at this stage as separation distances to noise sensitive receptors (NSRs) have yet to be defined.
	Noise effects from construction traffic	Construction	**Scoped In**	There is the potential for likely significant effects at NSR located within 50 m of roads identified as construction traffic routes.
	Vibration effects from construction activities – human health receptors	Construction	**Scoped In**	Construction vibration from activities such as piling and ground stabilisation could result in perceptible vibration at NSR. Although likely significant effects to human NSR are unlikely to occur, it is not possible to fully rule out at this stage and will be considered further in the ES.
	Vibration effects from construction Traffic – human health receptors	Construction	**Scoped Out**	Vibration from traffic is caused by the road surface. Assuming the road surfaces used by construction traffic are well maintained and remain free from irregularities, such as potholes significant effects would not be expected, even at relatively short distances

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				Management of this would be set out in the Outline CoCP within the DCO.
	Noise effects from the operation of overhead lines (Conductor System Noise)	Operation (including maintenance)	**Scoped In**	Likely significant effects at NSR cannot be ruled out at this stage.
	Noise effects from proposed new substation (where this is brought into the scope of the Project) (e.g. transformers), associated cooling plant, and proposed cable sealing end compounds	Operation (including maintenance)	**Scoped In**	Embedded noise mitigation measures would be designed into the new proposed substation at Chesterfield to minimise likely significant effects at NSR. However, these cannot be ruled out at this stage. The existing Willington substation would be maintained therefore noise effects from the Willington substation are scoped out from the ES.
	Noise effects from the operation of underground cables	Operation (including maintenance)	**Scoped Out**	Undergrounding of cables is considered to significantly mitigate operational noise from cable surfaces. Likely significant effects would not be expected to occur where the Project is proposing to underground existing overhead lines.
	Vibration effects from the operation of new infrastructure including overhead lines, new substation equipment (where	Operation (including maintenance)	**Scoped Out**	No likely significant effects from vibration would occur as plant with moving parts, including cooling equipment and transformers, would include vibration isolation measures within the design as embedded mitigation such as the use of suitable anti-vibration mounts.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
	brought into the Project scope), cable sealing end compounds and underground cables			
	Noise and vibration effects from the maintenance of operational infrastructure including overhead lines, substations, cable sealing end compounds and underground cables	Operation (including maintenance)	**Scoped Out**	No likely significant effects form noise and vibration would occur in relation to maintenance activities.
Socio-economics, Recreation and Tourism	Local economy and employment	Construction	**Scoped In**	There are likely to be significant beneficial direct, indirect and induced employment generation and economic activity from the Project during construction.
		Operation (including maintenance)	**Scoped Out**	Given the nature of the Project, there is not likely to be significant economic activity or employment (whether direct, indirect or induced) generated during operation and maintenance phases of the Project.
	Community facilities	Construction	**Scoped In**	The Project has attempted to avoid community facilities where practicable. However, there is the potential for temporary and/or permanent disruption to community facilities during. These effects may include temporary land take, access disruption impacts.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
		Operation (including maintenance)	**Scoped In**	The Project has attempted to avoid community facilities where practicable. However, there is the potential for permanent disruption to community facilities during operation. These effects may include permanent land take, access disruption impacts.
	Business, recreation and tourism assets	Construction	**Scoped In**	The Project has attempted to avoid business, recreation and tourism assets, where practicable. However, there is the potential for temporary and/or permanent disruption to businesses (e.g. quarry and farm), recreation assets, PRoWs, recreational routes, tourist attractions, and tourist accommodations during construction in certain locations. These effects may include temporary land take, disruption to access and/or amenity impacts.
		Operation (including maintenance)	**Scoped In**	The Project has attempted to avoid businesses, recreation and tourism assets, where practicable. However, there is the potential for permanent disruption to businesses (e.g. quarry and farm), recreation assets, PRoWs, recreational routes, tourist attractions during operation in certain locations. These effects may include permanent land take, disruption to access and/or amenity impacts.
	Recreation and tourism: pressures on local visitor accommodation from influx of construction workers	Construction	**Scoped In**	Whilst there is likely to be some existing bedspace capacity within tourist accommodation provision in the wider study area, workers are likely to be accommodated by the spare capacity. However, this matter will be kept under review as more information becomes available and the assessment progresses and is therefore proposed to be scoped into the ES.
		Operation (including maintenance)	**Scoped Out**	During operation there would not be construction workers. Given the nature of the Project, the scale of maintenance work and number of workers required is likely to be limited and not likely to adversely impact on visitor accommodation.

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
Health and Wellbeing	Quality of life	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects arising from potential environmental changes. These are expected to include air quality, noise, visual amenity, geology and hydrogeology, and water environment effects during construction; and noise, visual amenity, flood and contaminated land risk during operation.
		Operation (including maintenance)	**Scoped In**	
	Access to community facilities, recreational assets, PRoWs and recreational routes	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects from potential access disruptions. The Project has attempted to avoid community facilities, recreational assets, PRoWs and recreation routes, where practicable. However, there is the potential for temporary and/or permanent disruption to such assets during construction, operation and maintenance in certain locations. These potential impacts may include temporary or permanent land take, access disruption and/or amenity impacts.
		Operation (including maintenance)	**Scoped In**	
	Potential employment generation	Construction	**Scoped In**	There are likely to be significant health and wellbeing effects from new employment generation and associated income opportunities for the construction workforce. These employment opportunities could potentially lead to improved health outcomes.
		Operation (including maintenance)	**Scoped Out**	There is the potential for limited employment generation during operation and maintenance due to the nature of the Project as a grid infrastructure. Hence, health and wellbeing effects from employment generation during operation and maintenance are not anticipated to be significant.
	Mental health due to construction works	Construction	**Scoped out**	Construction best practice mitigation measures are set out in **Appendix 4A: Initial Outline Code of Construction Practice** in **Volume 2** and would be implemented during the construction phase. Considering the nature of the construction activities and the implementation of these best practice mitigation measures,

Topic	Matter	Phase	Scoped In / Out	Potential Significant Effects
				it is not considered likely that there would be the potential for significant mental health effects to occur during the construction phase.
	Generation of electromagnetic fields (EMFs) associated with the Project	Construction	**Scoped Out**	Given that no distribution would be taking place during construction, no EMFs would be generated. Hence, no health and wellbeing effect is anticipated during construction.
		Operation (including maintenance)	**Scoped Out**	As set out in Section 16.6, the Project will be designed in accordance with National Grid design standards and will be compliant with the guidelines and policies related to EMFs stated in NPS EN-5 (Ref 16.6), including the ICNIRP guidelines (Ref 16.15) to ensure that all equipment complies with public EMF exposure limits. In addition, to help address concerns or anxieties of members of the public around effects of EMF there is open and transparent information is provided about EMFs on the NGET website www.emfs.info which is linked to all project websites for members of the public to access. NGET also operate a helpline on EMFs to answer any questions on this subject. This and the website are aimed at providing information on EMFs to help reduce anxiety or concern around EMFs.

17.2.2 Separate chapters within the ES are not proposed for major accidents and disasters, material assets (and waste) or climate. Full details of the proposed approaches to these topics and matters are outlined in **Chapter 5: EIA Approach and Methodology**.

17.3 Proposed Content of the ES

17.3.1 The ES would be produced in a number of volumes. The volumes are expected to comprise:

- **Non-Technical Summary**: A concise and standalone document which will provide a description of the Project, EIA process and its findings, in a manner that is easily understood by the general public.
- **Main Document**: This would detail the findings of the EIA. It would include the chapters listed in **Table 17.2**.
- **Technical Appendices**: This would contain accompanying reports or documents to support the Main Document.
- **Figures**: This would contain the figures which support the Main Document.

17.3.2 The proposed structure of the ES is set out in **Table 17.2**; however, this may be revised following receipt of the Scoping Opinion.

Table 17.2 - Proposed Contents of the ES

Chapter	Title
1	Introduction
2	Main Alternatives Considered
3	Proposed Description
4	EIA Approach and Methodology
5	Landscape and Visual
6	Ecology and Biodiversity
7	Historic Environment
8	Hydrology and Land Drainage
9	Geology and Hydrogeology
10	Agriculture and Soils
11	Traffic and Transport
12	Air Quality
13	Noise and Vibration
14	Socio-economics
15	Health and Wellbeing
16	Cumulative Effects
17	Summary

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