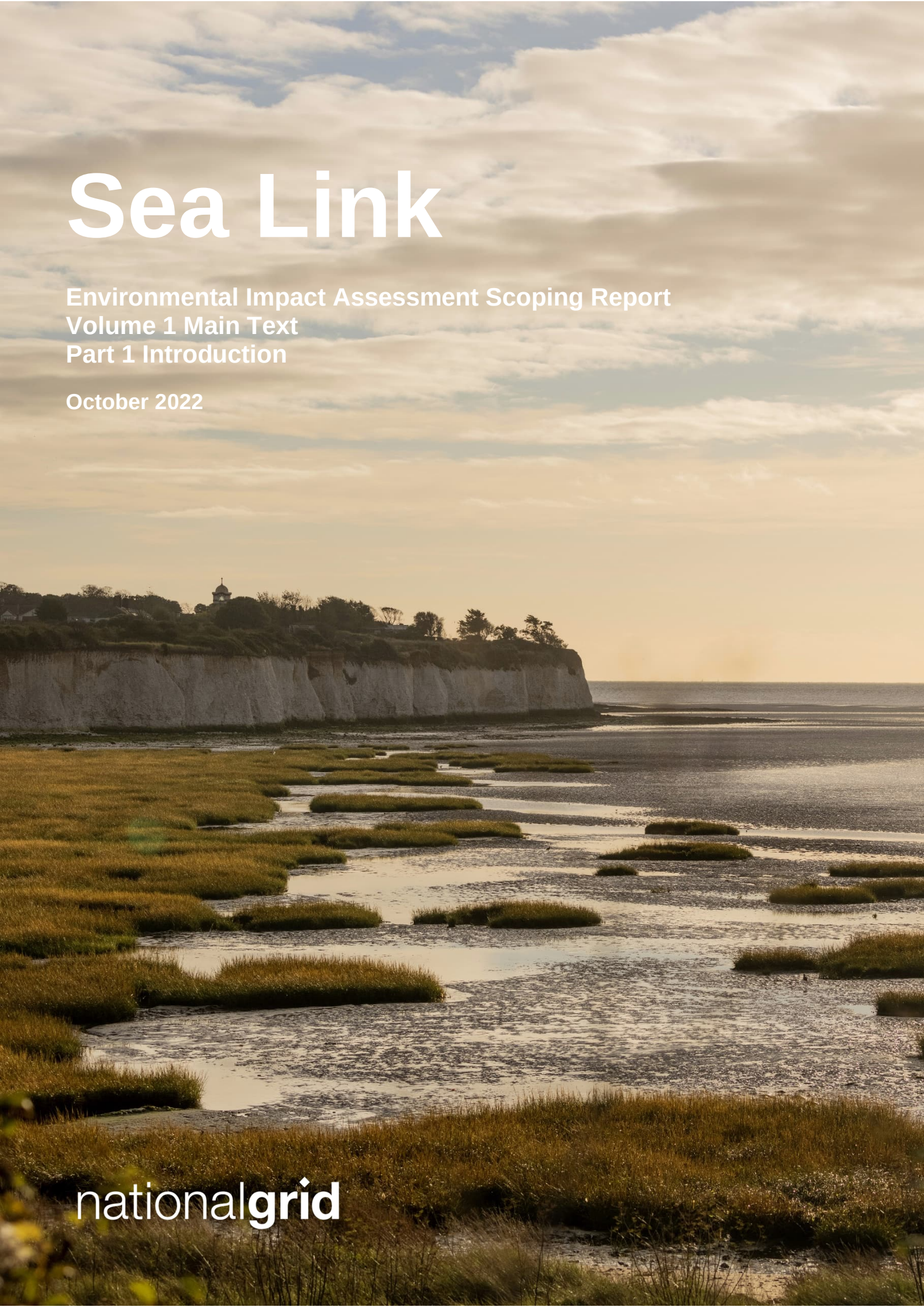

Sea Link

Environmental Impact Assessment Scoping Report
Volume 1 Main Text
Part 1 Introduction

October 2022

nationalgrid

Contents

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Images

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.
Above Ordnance Datum (AOD)	An Ordnance Datum or OD is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD. Usually mean sea level is used for the datum.
Access points	A location connecting a construction site to the public highway
Access routes	Public highway used by construction traffic to access a construction site
Accidents and safety	In the context of traffic and transport, the risk of accidents occurring where the Project is expected to produce a change in the character of traffic.
Acoustic environment	The sound with contribution from all sources, as modified by the current environment and associated conditions. This is related to the ambient sound, which is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
Acute health effect	An adverse health effect that manifests itself immediately or shortly after exposure to a causative factor (e.g. soil contamination). Associated with short-term exposures.
Additional measures	Further measures required in order to achieve the anticipated outcome. These may be implemented as part of the development consent or through inclusion in the ES. These are referred to as ‘secondary measures’ in accordance with Institute of Environmental Management and Assessment (IEMA) guidelines.
Admiralty Chart	Nautical charts issued by the United Kingdom Hydrographic Office and subject to Crown Copyright
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 MAFF Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land,1988.
Agri-environment scheme	Government programme set up to help farmers manage their land in environmentally friendly way.
Air Quality Management Areas (AQMAs)	If a local authority finds any places where the Air Quality Objectives (AQO) are not likely to be achieved, it must declare an AQMA there. This area could be just one or two streets, or it could be much bigger.

Term	Definition
	Then the local authority will put together a plan to improve the air quality - a Local Air Quality Action Plan (AQAP).
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 Standards (AQS)	The AQS Regulations report limit values at differing averaging periods for certain pollutants. There are limits provided for the protection of human health for SO2, NO2, Benzene, CO and Pb. Target values have been set for the concentration of PM2.5.
Alternating current	The electrical current changes direction in a cycle. Mains electricity is alternating current.
Anchorage area	A place where boats and ships or other water vessels can safely drop anchor.
Anchor handling vessel or Anchor Handling Tug Supply	Anchor Handling Tug Supply (AHTS) vessels are mainly built to handle anchors for oil rigs, tow them to location, and use them to secure the rigs in place
Ancient woodland	Land that has been continually wooded since at least 1600 in England. Regarded as irreplaceable habitat' in national planning guidance. Ancient woodland greater than 2ha is recorded on the National England Woodland Inventory.
Annex 1 habitat	Annex 1 Habitat refers to a habitat as defined under the EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.
Aquifer	Water-bearing rock or sediment below the soil layer.
Archaeological Interest	A heritage asset with value from the potential to hold evidence about the past that can be retrieved though specialist investigation.
Archaeological remains	The material remains of human activity from the earliest persons of human evolution to present. These may be buried traces of human activities, sites visible above ground, or moveable artifacts.
Architectural/Artistic Interest	A heritage asset with value from contemporary appreciation of a heritage asset's aesthetics.
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.
Artificial ground	Deposits that have accumulated or been placed through human activity.
Associated development	Development which is associated with a Nationally Significant Infrastructure Project (NSIP), as defined in the Planning Act 2008. It should be subordinate to, and necessary for, the construction and/or

Term	Definition
	the effective operation of the NSIP that is the subject of the Development Consent Order (DCO) application.
Auger bore	A form of trenchless crossing in which a pit is created wither side of the constraint or infrastructure being crossed and a bore is created by augering from one pit to the other.
Automatic Identification System	An AIS-equipped system on board a ship presents the bearing and distance of nearby vessels in a radar-like display format
Automatic RADAR Plotting Aid	A marine radar with automatic radar plotting aid (ARPA) capability can create tracks using radar contacts. The system can calculate the tracked object's course, speed and closest point of approach (CPA), thereby knowing if there is a danger of collision with the other ship or landmass.
Background sound/noise level	The A weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels. This represents the underlying sound level in the absence of contributions from the sound source under assessment relating to the residual sound level but characterised by LA90,T.
Baseline	The situation prevailing before the Project is commenced (the current baseline), and also to the situation that would prevail in the future without the Project (the projected future baseline).
Basis Noise Level	A reference noise level at 10m from the nearside carriageway, calculated as a function of traffic flow, percentage of Heavy Goods Vehicles, average speed, road gradient and road surface.
Bathymetry	Bathymetry is the information that describes the topography of the seabed. It is an essential component in understanding the dynamics of the marine environment, both in terms of sediment transport but also in the prediction of tides, currents and waves
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	The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
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

Term	Definition
	Grid has made a commitment to delivering a BNG target of 10% above baseline on its development projects (as agreed with Ofgem).
Biodiversity Action Plan	A strategy for conserving and enhancing wild species and wildlife habitats in the UK.
Biosecurity	Measures aimed at preventing the spread of harmful organisms (e.g. viruses and bacteria) to crops and livestock in order to reduce the risk of transmission of infectious diseases.
Birds of Conservation Concern	Quantitative criteria are used to assess the population status of bird species found in the UK, which are placed on the red, amber or green list. With those on the red list being at most risk.
Bronze Age	-2,600 to -700
Cable	An insulated conductor designed for underground installation.
Cable Lay Barge	A Cable Laying Barge (cable layer or cable ship) is a sea going vessel specially designed to lay underwater cables (telecommunications, electric power transmission, or other).
Cable Lay Vessel	A Cable Laying Vessel (cable layer or cable ship) is a sea going vessel specially designed to lay underwater cables (telecommunications, electric power transmission, or other).
Cable Sealing End Compound (CSEC)	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Chronic health effect	An adverse health effect that occurs as a result of long-term regular or continuous exposure to a causative factor (e.g. soil contamination).
Code of Construction Practice (CoCP)	Sets out the standards and procedures to which a developer or contractor must adhere in order to manage the potential environmental impacts of construction works.
Concrete mattressing	A rectangular unit made of concrete blocks joined together by polypropylene ropes. The mattress is flexible in two dimensions and is available in a range of thicknesses to suit the conditions required. Concrete matresses are used for the anchorage and protection of underwater pipelines and cables and for protecting the foundations of structures against water scouring.
Construction Environmental Management Plan (CEMP)	The purpose of the CEMP is to outline how construction of the Project will avoid, minimise or mitigate effects on the environment and surrounding area. The CEMP will detail the implementation of measures in accordance with environmental commitments outlined in the ES. It is a ‘live’ document which is to be reviewed and updated at regular intervals throughout the Project life cycle.
Conductor	The overhead wire that carries electricity from one place to another. For example, the line between two pylons.

Term	Definition
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance as defined in Section 69(1)(a) in the Planning (Listed Building and Conservation Areas) Act 1990.
Contaminated land	Land where substances are causing or could cause significant harm to people, property or protected species or could cause significant pollution of surface waters or groundwater
Corona discharge	An electrical discharge caused by the ionisation of fluid such as air surrounding a conductor carrying a high voltage. It represents a local region where the air (or other fluid) has undergone electrical breakdown and become conductive. A corona occurs at locations where the strength of the electric field (potential gradient) around a conductor exceeds the dielectric strength of the air.
Converter Station	A converter station is part of a HVDC system and converts High Voltage Direct Current to High Voltage Alternating Current and vice versa.
Corridor	A broad area, within which a new overhead line could be routed.
County Wildlife Site	Non-designated areas of land important for their wildlife and nature conservation value
Cumulative effects	There are two types of effect, in-combination effects and cumulative effects. The former occurs as a result of two or more impacts acting together (i.e. combined), to result in a new or changed effect on a single receptor. The latter arise as a result of the Project in combination with other large-scale developments or projects.
Decibel (dB)	Noise is conventionally measured in decibels (dB). The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the dB scale which extends from 0 to 140dB corresponding to the intensity of the sound pressure level.
Demographic	Relating to the structure of populations.
Development Consent Order (DCO)	Where the Secretary of State (SoS) proposes to grant consent for a NSIP, this will be through a DCO which is normally made as a statutory instrument – a form of secondary legislation. The DCO not only provides planning consent for the Project but may also incorporate other consents and include authorisation for the compulsory acquisition of land.
Dewatering	The removal of groundwater (e.g. by pumping) to keep a below-ground works area dry. This can be used during construction of the underground cable sections.
Direct effects	Direct effects are those that result directly from the Project.

Term	Definition
Disaster	A disaster is a man-made/external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.
Double tee	A connection from both circuits on either side of the same structure, creating a third and fourth circuit on another structure.
Dredging vessels	Dredging vessels are used for the removal of sediments and debris from the bottom of lakes, rivers, harbours, and other water bodies. It is a routine necessity in waterways around the world because sedimentation—the natural process of sand and silt washing downstream—gradually fills channels and harbours.
Driver delay	Traffic delays to non-development traffic.
Ducting	The installation of ducts (pipes) within which a cable can be pulled through.
Dust	Generic term used to describe larger non-respirable airborne particulates (typically those which are deposited rapidly and normally associated with soiling / marking of property, cars, vegetation etc.).
Early Medieval	410 to 1066 CE
Easement	An easement is a right benefiting a piece of land (known as the dominant land) that is enjoyed over another piece of land owned by someone else (the servient land). Usually, an easement allows the owner of the dominant land to do something on the servient land, such as use a right of way, or run services over it.
Ecological feature	Habitats, species or ecosystems.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Effects	For the purposes of the EIA and this Scoping Report, the term ‘effects’ are the consequences of changes (e.g. habitat becomes degraded by changes in drainage pattern).
Electricity System Operator (ESO)	Body required to support and guide the future development of the electricity transmission system in Britain.
Electricity transmission system	The electricity transmission system is made up largely of 400kV, 275kV and 132kV assets connecting separately owned generators and interconnectors with the demand for electricity fed directly from the transmission system, and distribution systems. The ‘transmission’ classification applies to assets at 132kV or above in Scotland or offshore. In England and Wales, it relates to assets at 275kV and above. The electricity transmission system is designed to make sure there is sufficient transmission capacity to ensure that the system can be operated in an economic and efficient way by the ESO, ensuring power can be moved from where it is generated to demand centres across Britain. This planning and development of the electricity

Term	Definition
	transmission system is governed by the Security and Quality of Supply Standard (SQSS) which ensure that the network is developed and operated securely and is resilient to any foreseeable network faults and disruption.
Electromagnetic Compatibility	The interaction of electrical equipment with its electromagnetic environment and with other equipment.
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.
Embedded measures	Modifications to the location, design or operation of the development made during the pre-application phase that are an inherent part of the Project, and do not require additional action to be taken. These are referred to as ‘primary measures’ in accordance with IEMA guidelines and will be embedded within the design of the Project.
Environmental Gain (EG)	National Grid has defined ‘Environmental Gain’ with Ofgem as being an amalgam of BNG and the status of Natural Capital (NC). This sees a simple formula being used to calculate overall EG.
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.
European Protected Species	Animals and plants listed under the Habitats Directive and protected under the Conservation of Habitats and Species Regulations 2017, as amended.
Fall pipe vessel	A fallpipe vessel (FPV) is a self-propelled vessel that is equipped with a flexible fallpipe. The vessel's design allows the fallpipe to be lowered into the water beneath the vessel allowing it to position rock with extreme accuracy down to a depth of 1,500 meters.
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.
Fisheries Liaison Officer	FLOs liaise between fishing vessels and Clients, using local knowledge and fisheries experience to encourage co-operation and help ensure operations run smoothly and efficiently

Term	Definition
Flood Risk Assessment (FRA)	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 1	Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2	Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Flood Zone 3	Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Fragmentation	Breaking up of, for example, an area of land or habitat resulting in difficulties in accessing or using some or all of that land.
Future baseline	This 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 over the identified period (for example anticipated habitat change over time, climate change projections, traffic and waste volume growth over time, etc.).
Future Energy Scenarios (FES)	Published annually by the ESO to indicate future power requirements and where future connections may occur across the network.
Geographical Information Systems	GIS is a framework for gathering, managing and analysing data. It analyses spatial location data and organises layers of information into visualisations on maps.
Good practice measures	Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements or actions that are considered to be standard practice used to manage commonly occurring environmental effects. These are referred to as 'tertiary measures' in accordance with the IEMA guidelines and would also be embedded within the design of the Project.
Graduated Swathes	Indicate the broad areas where the components of the new overhead lines forming part of the Project are likely to be located.
Ground dissolution (of limestone)	A reduction in the solid mass of rock as a result of groundwater dissolving it. This loss of mass can cause ground instability at the surface.
Ground gas	A general term to include all gases occurring and generated within the ground whether originating from Made Ground or from natural soil or rock. Typically used to mean only potentially hazardous ground gases, such as carbon dioxide, methane, hydrogen sulphide and carbon monoxide.

Term	Definition
Groundwater Dependent Terrestrial Ecosystems	The process by which plans and projects are assessed as to whether they are likely to have a significant effect on a European Site either alone or in combination with other plans or projects, under the Conservation of Habitats and Species Regulations 2017, as amended.
Guard vessel	During the construction stage of an offshore wind farm, a substation platform or a cable route, the construction site needs to be secured by a guard vessel. The vessel must constantly monitor marine traffic near the construction site visually and with radar and AIS.
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 (HRA)	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.
Habitat Suitability Index	A technique used for evaluating the suitability of habitats for great crested newt in order to assess the likelihood of their presence or absence.
Habitat Suitability Modelling	A statistical technique that predicts the distribution of a species from environmental variable data and bat occurrence records which can produce heat maps, identifying the most important flight paths and habitat connections for bats. The model identifies which of the environmental variables assessed (such as roads, the presence of woodland, or water) will most affect the distribution of a species.
Heavy Duty Vehicle (HDV)	Goods vehicles + buses >3.5 t gross vehicle weight.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).
Heritage Significance	The significance of a heritage asset is the product of the value it holds for this and future generations as a result of its historic, archaeological, architectural or artistic interests.
High Water Springs or Mean High Water Springs	Mean high water springs is the highest level that spring tides reach on the average over a period of time. The height of mean high water springs is the average throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest

Term	Definition
Historic buildings	Architectural, designed, or other structures with a significant historical value. These may include structures that have no aesthetic appeal or structures not usually thought of as buildings, such as milestones or bridges.
Historic landscape	The current landscape, whose character is the result of the action and interaction of natural and/or human factors.
Historical Interest	A heritage asset with value from its association with past events or past people; or where a heritage asset is illustrative of a particular asset type, theme, or period.
Horizontal directional drill	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Hydromorphology	The physical character and water content of water bodies.
Impacts	For the purposes of the EIA and this Scoping Report, the term 'impacts' is used to describe the changes that arise as a result of the Project (e.g. changes in drainage pattern).
Index of Multiple Deprivation (IMD)	The IMD is the official measure of relative deprivation for small areas (neighbourhoods) in England. The IMD are calculated based on the following factors: income deprivation, employment, health and disability, education, skills and training, barriers to housing and services, crime and living environment.
Indicative Alignment	The alignment of the overhead lines and underground cables that has been identified through the options appraisal process to date.
Indirect and secondary effects	Indirect and secondary effects are those which are not caused immediately by the Project but arise as a consequence of it. As such they would normally occur later in time or at locations farther away than direct effects. An example would be where water or gas pipes are damaged as a result of the Project, and the consequences of that damage is fire or flood risk to other receptors.
Infiltration	Incident rainfall that percolates into the ground, rather than evaporating or running off.
Inter-project effects	Arise as a result of the Project in combination with other large-scale developments or projects.
Intra-project effects	Effects that occur as a result of two or more impacts acting together (i.e. combined, to result in a new or changed effects on a single receptor).
Intertidal area	The extent of soft sediment beach that lies between High Water Springs and Low Water Springs at the landfall location.
Intervisibility	Intervisibility is defined as the ability to see in a direct line of sight from one position on the earth's surface to another, considering the intervening terrain.

Term	Definition
Invasive non-native species	An invasive non-native species is any non-native animal or plant that has the ability to spread, causing damage to the environment, the economy, health, and way of life.
Iron Age	-800 BCE to 43 CE
Jack-up barge	A jackup barge or a self-elevating unit is a type of mobile platform that consists of a buoyant hull fitted with a number of movable legs, capable of raising its hull over the surface of the sea. Often used as a base for servicing other structures such as offshore wind turbines, long bridges, and drilling platforms.
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.
Kilovolts (kV)	A unit of electromotive force, equal to 1,000 volts.
$L_{Aeq\ T}$	The A-weighted L_{eq} sound level measured over a specified period of time.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landform	The shape and form of the land surface resulting from combinations of geology, geomorphology, slope, elevation and physical processes.
Land use	What land is used for, based on broad categories of functional land cover such as urban and industrial use and the different types of agricultural and forestry.
Landscape	An area, as perceived by people, the character of which is the result of the action and integration of natural and/or human factors.
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Area (LCA)	Discrete geographical areas of a particular landscape type with a broadly consistent character, which might include: pattern of topography, land use, vegetation cover, geology, cultural and ecological features, pattern of evolution, visual and perceptual qualities and habitats.
Landscape Character Type (LCT)	Generic, typically homogenous types of landscape that may occur in different parts of the country. They have similar geology, topography, drainage patterns, vegetation, land use, patterns of settlement and aesthetic character.
Landscape susceptibility	The ability of the landscape (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation.

Term	Definition
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Light Goods Vehicle (LGV)	Cars and small vans <3.5 t gross vehicle weight.
Limit of Deviation	A maximum distance or measurement of variation within which the works must be constructed. These are 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 Digital, 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.
Local Geological Sites	A non-statutory designation for regionally important geological and geomorphological sites that have been identified as being of importance locally.
Local Nature Reserve	Sites dedicated by the local authority under Section 21 of the National Parks and Access to the Countryside Act 1949 for nature conservation which have wildlife or geological features that are of special interest locally.
Local planning authority	The public authority whose duty it is to carry out specific planning functions for a particular area
Local Wildlife Site (LWS)	Non-statutory nature conservation sites of local value.
Low Water or Low Water Springs	The height of mean low water springs is the average throughout a year of the heights of two successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest
Lower Layer Super Output Area (LSOA)	LSOAs are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level above which adverse effects on health and quality of life can be detected.
Macroinvertebrate	Any invertebrate organism which can be seen with the naked eye.
Macrophyte	Aquatic plants that grow in or near water.
Magnetic field	A measure of the force experienced by a moving electric charge, due to the motion of other charges.
Magnitude of change	A term that combines judgements about the size and scale off the effect, the extent of the area over which it occurs, whether it is

Term	Definition
	reversible or irreversible and whether it is short or long term in duration.
Major accident	A major accident is an event that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage. Major accidents can be caused by disasters resulting from both man-made and natural hazards
Main river	Usually larger rivers and streams that the Environment Agency maintain and improve to manage flood risk.
Marine conservation zone	Marine areas that protect a range of nationally important, rare or threatened habitats and species
Mean High water Springs or High Water Springs	Mean high water springs is the highest level that spring tides reach on the average over a period of time. The height of mean high water springs is the average throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest
Mean Low Water Springs or Low Water Springs	The height of mean low water springs is the average throughout a year of the heights of two successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest
Mechanical ploughing	A mechanical plough is a device towed along the seabed and is optimised to help deliver reductions in the cost of offshore wind installation and to minimise project risk by combining operations to reduce the time required to install subsea cables
Medieval	1066 to 1540 CE
Mesolithic	-10,000 to -4,000 BCE
Metocean	Metocean conditions refer to the combined wind, wave and climate (etc.) conditions as found on a certain location.
Micro bore	A type of trenchless crossing technique in which a pit is created wither side of the constraint or infrastructure being crossed and a micro bore is created from one pit to the other.
Mineral reserve	Mineral deposit whose extraction is economically feasible.
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
Modern	1901 to present
Mooring	Lassoing, tethering, tying, or otherwise securing your boat to a fixed object, such as a mooring buoy, rather than dropping an anchor to secure your vessel

Term	Definition
National Cycle Network (NCN)	The NCN is a UK-wide network of signed paths and routes for walking, cycling, wheeling and exploring outdoors.
National Grid Electricity Transmission (NGET) ('National Grid')	National Grid operate the national electricity transmission network across Great Britain and own and maintain 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 Nature Reserve	Sites that are dedicated by the statutory country conservation agencies, under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, for nature conservation and which have wildlife or geological features that are of special interest nationally.
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".
National Vegetation Classification	System of classifying natural habitat types in Great Britain according to their vegetation types.
Natural Capital (NC)	The total stock of natural resources and services provided by natural assets which benefit people.
Natural Superficial Deposits	Geologically recent deposits that consist of various sediments (clay, sand, gravel etc.) and sit on top of the bedrock.
Nautical Mile	A nautical mile is a unit of measurement used in air, marine, and space navigation, and for the definition of territorial waters. It is based on the circumference of the earth and is equal to one minute of latitude. It is slightly more than a statute (land measured) mile (1 nautical mile = 1.1508 statute miles). Nautical miles are used for charting and navigating.
NAVAREA warnings	NAVAREAs are the maritime geographic areas in which various governments are responsible for navigation and weather warnings.
Navigational dredging sites	Dredging sites to deepen berths and channels for the purpose of navigation. Navigational dredging will usually require a licence but there is an exemption available for low volume dredging and harbour authorities in certain circumstances.
Navigational Risk Assessment	Navigation (Marine) Risk Assessment identifies and assesses the hazards and risks affecting vessel navigation, before considering current controls to mitigate risks and further controls that could be adopted to minimise risk as low as reasonably practicable (ALARP).
Navigational Telex	NAVTEX (NAVigational TEleX), sometimes styled Navtex or NavTex,[1] is an international automated medium frequency direct-printing service for delivery of navigational and meteorological

Term	Definition
	warnings and forecasts, as well as urgent maritime safety information (MSI) to ships.
Neolithic	-4,000 to -2,200 BCE
Nitrous Dioxide (NO2)	Reddish brown gas (in high concentrations), respiratory irritant and precursor to photochemical processes which produce other pollutants, photochemical smog and contribute to global warming.
Nitrous Oxide (NOx)	Inert product of combustion, which does not contribute to local air pollution.
Noise Important Area	Determined via strategic noise maps and highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England.
Non-Road Mobile Machinery (NRMM)	A broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads.
Non-statutory designated site	A site designated at a local level for its biodiversity and/or geological value. These are not underpinned by legislation.
Notice to Mariners	A notice to mariners advises mariners of important matters affecting navigational safety, including new hydrographic information, changes in channels and aids to navigation, and other important data. Over 60 countries which produce nautical charts also produce a notice to mariners
Options appraisal	A robust and transparent process 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 outcome is to identify a Strategic Proposal for the Project.
Options Identification and Selection	Work undertaken to determine the preferred corridor and preliminary routeing and siting options for the 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 provide information on the approach to the identification and appraisal of route corridors and siting locations.
Order Limits	The presently anticipated maximum extent of land within which the proposed development may take place.
Ordinary watercourse	Watercourses that are not main rivers, and that Lead Local Flood Authorities, district councils and Internal Drainage Boards maintain.
Outage	A period of interruption to electricity supply.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.

Term	Definition
Palaeolithic	-1,000 000 to -10,000 BCE
Particulate matter (PM10 and PM2.5)	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.
Pathway (for contamination)	A route or means by which a receptor could be, or is, exposed to or affected by a contaminant.
Peak Particle Velocity	A measurement of vibration level, being the maximum rate of displacement of the vibration propagation medium (such as the ground) for a given event, such as the impact of a piling hammer, at specific locations.
Pedestrian amenity	The effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width / separation from traffic.
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.
Permanent effects	These are effects that will remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.
Phytotoxic	Displaying toxicity towards plants.
Pipe jack	A type of trenchless crossing technique in which a pit is created wither side of the constraint or infrastructure being crossed and applying force to push a pipe through from one pit to the other.
Post Lay Burial	This is the final stage of the cable laying process where the subsea cable is buried.
Post Medieval	1540 to 1901
Potential roost feature	Potential roosting features in buildings are features used as bat roosts include (but are not limited to) gaps between stone or brickwork or cracks and splits in trees.
Power control devices	Power control devices are designed to increase or decrease the apparent reactance of a line, thereby pushing power away from or pulling more power towards the circuit on which they are installed.
Pre-lay grapnel run	The Pre Lay Grapnel Run – or PLGR – occurs a few days before the installation. The ship dredges a grapnel to clear any obstacle that could obstruct the plough, such as fishing nets, ropes, lines.
Pre-sweep dredging	Before installation of a pipeline or cable, pre-sweeping of sand waves is usually required in order to level the seabed. One or more dredgers may do the pre-sweeping with pipe-laying vessels following behind.

Term	Definition
	The pre-sweeping operation prepares a smooth enough seabed upon which to lay the pipeline or cable.
Project Need Case	Sets out the reasons why the Project is required.
Protected wreck	A shipwreck designated under the Protection Wrecks Act 1973
Preliminary Environmental Information Report	Information that has been compiled by the applicant to support statutory consultation held in advance of submitting an application for development consent. The Preliminary Environmental Information Report should contain information reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development and any associated development.
Priority habitat	Habitats identified as of principal importance in England, in accordance with requirements of the NERC Act 2006. These are based on the UK Biodiversity Action Plan Priority Habitats.
Priority Hazardous Substance	Substances which are toxic and persistent in the water environment, defined by the Water Framework Directive.
Priority species	Species identified as of principal importance in England, in accordance with requirements of the NERC Act 2006. These are based on the UK Biodiversity Action Plan Priority Species
Protected Lane	Country lanes and byways of historic and landscape value that make an important contribution to rural character, which have been designated as having 'Protected Lane' status in development planning policy.
Public Rights of Way (PRoW)	These are designated routes under the CroW Act 2000, which the public can use at any time.
Pylon	Overhead line structure used to carry overhead electrical conductors, insulators and fittings.
Radon	A naturally occurring radioactive chemical element, which occurs as a gas.
Ramsar sites	Wetlands of international importance designated under the Ramsar Convention.
Rating level	The specific sound level, with the addition of character corrections to consider certain acoustic features that could potentially increase the significance of impact. If no acoustic features are present then the rating level is equal to the specific sound level.
Receptor	A component of the natural or man-made environment such as water or a building that is affected by an impact.
Reconductoring	The replacement of old conductors (wires), insulators, earthwires, etc on an existing overhead line.

Term	Definition
Registered Battlefield	Register of nationally significant military engagements maintained and designated by Historic England.
Registered Park and Garden	Register of historic parks, gardens, grounds, and planned open spaces maintained and designated by Historic England.
Riparian	Relating to or situated on the banks of a watercourse.
Road links	A linear spatial object that describes the geometry and connectivity of a road network between two points in the network.
Rochdale Envelope	The ‘Rochdale Envelope’ or ‘Design Envelope’ approach is employed where the nature of a proposed development means that some details of a project have not been confirmed (for instance, the precise dimensions of structures) when an application is submitted, and flexibility within clearly defined parameters is therefore sought to address uncertainty.
Rock placement vessel	A rock placement vessel or fallpipe vessel (FPV) is a self-propelled vessel that is equipped with a flexible fallpipe. The vessel's design allows the fallpipe to be lowered into the water beneath the vessel. Uniquely, the fallpipe vessel can position rock with extreme accuracy down to a depth of 1,500 meters.
Romano-British	43 to 410 CE
Root Protection Area (RPA)	A notional area of tree root spread (as calculated per BS5837) considered as the minimum volume necessary to ensure tree health and function.
S41 of NERC Act	Section 41 of the NERC Act 2006 lists species of principal importance in England for the purpose of conserving biodiversity
Sandbank	A raised area of sand within the sea or river which may also be visible a low tide.
Sandwave	A seabed structure formed by currents
Sandwave dredging	The process of clearing sandwaves by dredging prior to cable installation.
Schedule 1 Species	Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), for which it is an offence to intentionally or recklessly disturb birds and their young at, on or near an ‘active’ nest.
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.
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

Term	Definition
	statutory consultees and other relevant organisations on the proposed scope of the EIA are sought.
Scoping Boundary	A Scoping Red Line Boundary has been defined to represent the likely maximum extent of development.
Security and Quality of Supply Standard (SQSS)	The SQSS sets out a coordinated set of criteria and methodologies that the Transmission Licences shall use in the planning and operation of the national electricity transmission system.
Seabed plough	Subsea cable ploughs are used for the process of pre-trenching cable routes and backfilling the seabed and are designed to work in a seabed consisting mostly of sands and clays, where the seabed is well known and understood.
Sensitivity	A term applied to specific receptors, combing judgements of the susceptibility of the receptors to the specific type of change or development proposed and the value related to that receptor
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.
Severance	The separation of people from places and other people and places or impede pedestrian access to essential facilities.
Side-Scan Sonar surveys	Side-scan sonar produces a detailed picture of the seafloor or riverbed, regardless of water clarity. The system, which may be towed from a surface vessel or mounted on a ship's hull, emits fan shaped pulses down towards the seafloor across a wide angle, perpendicular to the path of the sensor through the water
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
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.
Siting Area	An area of land within which a new CSEC or substation could be sited.
Soil association	Represent a group of soil series (soil types) which are typically found occurring together in the landscape.
Soil compaction	Degradation of soil structure, which can be caused by heavy loading, resulting in a reduction in the voids within the soil.

Term	Definition
Soil stockpiles	Mounds of soil created through the storage of soil materials which have been stripped from an area of construction.
Source (of contamination)	A substance that is in, on or under the land and that has the potential to cause harm or to cause pollution of Controlled Waters.
Source Protection Zone	A defined area around a drinking water source that carries statutory protection from damaging activities.
Special Areas of Conservation (SACs)	Protected areas in the UK designated under: the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.
Special Protection Areas (SPA)	Protected areas for birds in the UK classified under the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.
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’.
Specific sound level	The equivalent continuous A-weighted sound pressure level produced by a specific sound source (i.e. the sound source under assessment in accordance with BS 4142:2014) at the assessment location over a given reference time interval, Tr.
Statutory designated site	A site which receives protection by means of legislation in recognition of its biodiversity value.
Strategic Proposal	The outcome of the strategic options appraisal; the Strategic Proposal is then taken forward to the Options Identification and Selection stage.
Strategic Road Network (SRN)	The SRN is made up of motorways and trunk roads (the most significant 'A' roads).
Substation	Electrical equipment in an electric power system through which electrical energy is passed for transmission, transformation, distribution or switching.
Subsoil	The layer of soil under the topsoil on the surface of the ground, lacking in the levels of organic matter found in topsoil.
Super Grid Transformer	Used at substations along the electricity transmission system to increase or reduce voltage.
Superficial geology	Uncemented sediments, such as alluvium, immediately beneath the soil and above the bedrock.
Suspended Particulate Matter	Suspended particulate matter (SPM) are finely divided solids or liquids that may be dispersed through the air from combustion processes, industrial activities or natural sources.

Term	Definition
Suspended sediment concentration	Is defined as the total value of both mineral and organic material carried in suspension by a river.
Temporary effects	These are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes.
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.
Topsoil	The uppermost layer of soil, usually with the highest concentration of nutrients, organic matter and microorganisms.
Traffic separation scheme	A maritime traffic management route system ruled by the International Maritime Organisation.
Tranquillity	A state of calm and quietude associated with peace, considered to be a significant asset of landscape.
Transboundary effects	Transboundary effects are those effects that would affect the environment in another state within the European Economic Area (EEA).
Transition joint bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.
Tree Preservation Order (TPO)	A statutory designation protecting trees, administered by the relevant local planning authority
Trenched	Installation of the cable using an open trench to lay the cable within before backfilling
Trenchless	Installation of a cable below a constraint or other infrastructure without using a trench
Underground Cable	An insulated conductor carrying electric current designed for underground installation.
Vessel Monitoring System	Vessel Monitoring System data tracks vessels in a similar way to an Automatic Identification System but this data has historically been restricted to government regulators or other fisheries authorities.
Vessel-side discharge methods	A method used for placing material after a subsea cable has been laid. Less precise than using a fall-pipe vessel.
Vibration	Vibration is an oscillatory motion. The magnitude of vibration can be defined in terms of displacement, i.e. how far from the equilibrium something moves, velocity (how fast something moves), or acceleration (the rate of change of velocity).
Visual effect	The change in the appearance of the townscape as a result of the development. This can be positive or negative.

Term	Definition
Visualisation	A computer simulation, photomontage or other technique illustrating the predicted appearance of a project to aid engagement with consultees.
Visual receptor	Individuals and/or defined groups of people who have the potential to be affected by a project impacting on their views.
Water jetting	High Pressure Water Jetting (also known as hydroblasting and water cutting) is an industrial tool capable of removing material and cleaning a wide variety of materials using extremely high-pressure jets of water, or a mixture of water and chemicals.
Working area	The working area refers to the area of land that is likely to form part of the construction site. This is not the same as the Scoping Boundary, as there may be parts of the Scoping Boundary that lie outside the working area.
Working width	The temporary working area required to install a cable which normally includes stock proof fencing, temporary drainage, access road, topsoil and sub soil storage and the cable trench.
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.
XC/XCP 275kV overhead line	Existing 275kV overhead line running between Monk Fryston and Poppleton.
XD/XC 275kV overhead line	Existing 275kV overhead line running between Poppleton and Knaresborough.
Zone of Influence (ZoI)	An identified geographical area around the Project where there is a potential for impacts to occur.
Zone of Theoretical Visibility (ZTV)	The likely (or theoretical) extent of visibility of a development, usually shown on a map.

List of Initialisations and Abbreviations

AAAC	All Aluminium Alloy Conductor	MAREA	Marine Aggregate Regional Environmental Assessment
AADT	Annual Average Daily Traffic	MARPOL	International Convention for the Prevention of Pollution from Ships
AC	Alternating Current	MBES	Multi- Beam Echo Sounder
AD	Anno Domini	MCA	Maritime and Coastguard Authority

ADMS	Atmospheric Dispersion Modelling Software	MCAA	Marine and Coastal Access Act
AEP	Annual Exceedance Probability	MCZ	Marine Conservation Zone
AEZ	Archaeological Exclusion Zone	MFE	Mass Flow Excavator
AGI	Above Ground Infrastructure	MHCLG	Ministry of Housing, Communities and Local Government
AIS	Automatic Identification System	MHWN	Mean High Water Neaps
ALARP	As Low as Responsibly Practicable	MHWS	Mean High Water Springs
ALC	Agricultural Land Classification	MLWN	Mean Low Water Neaps
ALDFG	Abandoned, Lost or Discarded Fishing Gear	MLWS	Mean Low Water Springs
AM	Morning	mm	Millimetres
AN17	Advice Note 17	MMO	Marine Management Organisation
AONB	Area of Outstanding Natural Beauty	MPCP	Marine Pollution Contingency Plan
AQAL	Air Quality Assessment Level	MPS	Marine Policy Statement
AQMA	Air Quality Management Area	MRA	Mineral Resource Assement
AQS	Air Quality Strategy	MSA	Mineral Safeguarding Areas
ARPA	Automatic RADAR Plotting Aid	MSL	Mean Sea Levels
As	Arsenic	MS-LOT	Marine Scotland Licensing Operations Team
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas	MTBM	Micro Tunnel Boring Machine
ASSI	Area of Special Scientific Interest	MTS	Marine Traffic Survey
ATC	Automatic Traffic Count	MU	Marine Mammal Management Units
AtoN	Aids of Navigation	MW	Megawatt
Ba	Barium	MWLP	Minerals and Waste Local Plan
BAP	Biodiversity Action Plan	MWp	Megawatt peak
BC	Before Christ	NAVAREA	Navigational Areas

BCT	Bat Conservation Trust	NAVTEX	Navigational Telex
BGS	British Geological Survey	NCA	National Character Area
BMV	Best and Most Versatile	NCERM	National Coastal Erosion Risk Mapping
BNG	Biodiversity Net Gain	NCN	National Cycle Network
BNL	Basic Noise Level	NCR	National Cycle Route
BOA	Biodiversity Opportunity Areas	NE	Natural England
BS	British Standard	NERC	Natural Environment and Rural Communities Act
BTO	British Trust for Ornithology	NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
CBC	Common Bird Census	NF_3	Nitrogen trifluoride
CBRA	Cable Burial Risk Assessment	NFI	National Forest Inventory
CBS	Cement Bound Sand	NGV	National Grid Ventures
CCA	Coastal Character Area	NHLE	National Heritage List for England
CCME	Canadian Council of Ministers of the Environment	NHS	National Health Service
CCR	Climate Change Resilience	Ni	Nickel
Cd	Cadium	NIA	Noise Impact Area
CEA	Cumulative Effects Assessment	NIPZ	Nitrate Issues Priority Zone
CBS	Cement Bound Sand	NLS	National Library of Scotland
CCA	Coastal Character Area	NM	Nautical Mile
CCME	Canadian Council of Ministers of the Environment	NMHR	National Marine Heritage Record
CCR	Climate Change Resilience	NNR	National Nature Reserve
Cd	Cadium	NO_2	Nitrogen dioxide
CEA	Cumulative Effects Assessment	N_2O	Nitrous oxide
CEFAS	Centre for Fisheries, Aquaculture Science	NOEL	No Observed Effect Level
CEMP	Construction Environmental Management Plan	NOAA	National Oceanographic and Atmospheric Organisation
CFE	Controlled Flow Excavator	NO_x	Nitrous Oxide
CFP	Common Fisheries Policy	NPF2	National Planning Framework 2

CH_4	Methane	NPPF	National Planning Policy Framework
CIEEM	Chartered Institute of Ecology and Environmental Management	NPPG	National Planning Policy Guidance
CIfA	Chartered Institute for Archaeologists	NPS	National Policy Statement
CIRIA	Construction Industry Research and Information Association	NPSE	Noise Policy Statement for England
CLB	Cable Lay Bay	NRA	Navigational Risk Assessment
CLV	Cable Lay Vessel	NRMM	Non-Road Mobile Machinery
CoCP	Code of Construction Practice	NRW	Natural Resources Wales
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea	NSIP	Nationally Significant Infrastrcute Project
COMAH	Control of Major Accident Hazard	NSR	Noise Sensitive Receptors
CPA	Coast Protection Act	NSTA	North Sea Transition Authority
Cr	Chromium	NtM	Notices to Mariners
CRoW	Countryside and Rights of Way Act	O&G	Oil and Gas
CRTN	Calculation of Road Traffic Noise	OFTO	Offshore Transmission Owner
CSEC	Cable Sealing End Compound	ONS	Office for National Statistics
CTMP	Construction Traffic Management Plan	OOS	Out-Of-Service
Cu	Copper	OS	Ordnance Survey
dB	Decibels	OSPAR	Oslo Paris
DBA	Desk Based Assessment	OWEER	Offshore Wind Environmental Evidence Register
DC	Direct Current	OWF	Offshore Wind Farm
DCO	Development Consent Order	PAD	Protocol for Archeological Discoveries
DDLCA	Dover District Council Landscape Character Assessment	PADI	Professional Association of Diving Instructors
DECC	Department for Energy and Climate Change	Pb	Lead

DEFRA	Department for Environment, Food and Rural Affairs	PBDE	Polybrominated diphenyl ethers
DENI	Department of the Environment Northern Ireland	PEIR	Preliminary Environmental Information Report
DLHC	Department for Levelling Up, Housing and Communities	PEL	Probable Effect Levels
DMRB	Design Manual for Roads and Bridges	PEXA	Practice and Exercise Area
DOC	Depth of Cover	PFC	Perfluorocarbons
DOL	Depth of Lowering	PGG	Pollution Prevention Guideline
DP	Dynamic Position	PHE	Public Health England
DTM	Digital Terrain Model	PIA	Personal Injury Accident
DWSZ	Drinking Water Safeguard Zone	PIC	Personal Injury Collision
EA	Environment Agency	PINS	Planning Inspectorate
EC	European Commission	PLB	Post Lay Burial
EcIA	Ecological Impact Assessment	PLGR	Pre-Lay Grapnel Run
ECoW	Ecological Clerk of Works	PLONOR	Pose Little or No Risk to the Environment
EEZ	Exclusive Economic Zone	PM	Particulate Matter
EIA	Environmental Impact Assessment	PM10	Particulate Matter (10 micrometres diameter)
EMF	Electromagnetic Field	PM2.5	Particulate Matter (10 micrometres diameter)
EMODnet	European Marine Observation Data Network	PPE	Personal Protective Equipment
EPS	European Protected Species	PPG	Planning Practice Guidance
ES	Environmental Statement	PPGN	Planning Practice Guidance for Noise
ESCA	European Subsea Cable Association	PRoW	Public Right of Way
ETRS89	European Terrestrial Reference System 1989	PSC	Potential Sources of Contamination
EU	European Union	PV	Photovoltaic
EUNIS	European Union Nature Identification System	RAF	Royal Air Force
FAME	Future of the Atlantic Marine Environment	RBMP	River Basin Management Plan
FEPA	Food and Environmental Protection Act	RIGS	Regionally Important Geological Sites

FLO	Fisheries Liaison Officer	RNLI	Royal National Lifeboat Institution
FPROV	Fall Pipeline Remotely Operated Vehicle	RNR	Roadside Nature Reserves
FRA	Flood Risk Assessment	ROV	Remotely Operation Vehicle
FSA	Formal Safety Agrement	RPL	Route Position List
GCN	Great Crested Newt	RSPB	Royal Society for the Preservation of Birds
GCR	Geological Conservation Review	RYA	Royal Yachting Association
GEA	Gross External Area	SAC	Special Area of Conservation
GHG	Greenhouse Gas	SACO	Supplementary Advice on Conservation Objectives
GIF	Growth and Infrastructure Framework	SARH	Search and Rescue Helicopter
GIS	Geographic Information System	SBP	Sub Bottom Profiler
GLVIA	Guidelines for Landscape and Visual Impact Assessment	SCANS	Small Cetaceans in European Atlantic waters and the North Sea
GPLC	Guiding Principles for Managing and Reducing Land Contamination	SCASNE	Seascape Character Assessment of Suffolk, South Norfolk and North Essex
GREEN	Green Energy Enablement	SCC	Suffolk County Council
GVA	Gross Value Added	SCLCA	Suffolk Coastal Landscape Character Assessment
GWDTE	Groundwater Dependant Terrestrial Ecosystems	SCLP	Suffolk Coastal Local Plan
HAT	Highest Astronomical Tide	SCOS	Special Committee on Seals
HDD	Horizontal Directional Drilling	SCT	Seascape Character Type
HDV	Heavy Duty Vehicle	SELEP	South East Local Enterprise Partnership
HER	Historical Environmental Records	SF_6	Sulphur hexafluoride
HFC	Hydrofluorocarbons	SHOM	Service Hydrographique et Océanographique de la Marine
Hg	Mercury	SLB	Simultaneous Cable Lay and Burial
HGV	Heavy Goods Vehicle	SLR	Sea Level Rise

HIA	Health Impact Assessment	SMP	Shoreline Management Plan
HLC	Historic Landscape Characterisation	SMRU	Sea Mammal Research Unit
HMSO	His Majesty's Statutory Office	SNCI	Sites of Nature Conservation Importance
HoPI	Habitats of Principal Importance	SNH	Scottish Natural Heritage
HRA	Habitat Regulation Assessment	SOAEL	Significant Observed Adverse Effect Level
HSC	Historic Seascape Characterisation	SOLAS	Safety of Life at Sea
HUDU	Healthy Urban Development Unit	SOPEP	Shipboard Oil Pollution Emergency Plan
HVAC	High Voltage Alternating Current	SoS	Secretary of State
HVDC	High Voltage Direct Current	SPA	Special Protection Area
Hz	Hertz	SPM	Suspended Particulate Matter
IAMMWG	Inter-Agency Marine Mammal Working Group	SPR	Scottish Power Renewables
IAQM	Institute of Air Quality Management	SPZ	Special Protection Zone
ICCI	In-Combination Climate Change Impact	SSC	Suspended Sediment Concentration
ICE	Inventory of Carbon and Energy	SSS	Side- Scan Sonar
ICES	International Council for the Exploration of the Sea	SSSI	Site of Special Scientific Interest
ICNIRP	International Commission on Non-Ionizing Radiation Protection	STAR	Seabird Tracking and Research
ICPC	International Cable Protection Committee	SuDS	Sustainable Drainage System
IDB	Internal Drainage Board	TA	Transport Assessment
IEMA	Institute for Environmental Management and Assessment	TBM	Tunnel Boring Machine
IFCA	Inshore Fisheries and Conservation Authority	tCO_2e	Tonnes of Carbon Dioxide Equivalent
IHBC	Institute of Historic Building Conservation	TDLCA	Thanet District Council Landscape Character Assessment

IMO	International Maritime Organisation	TEMPro	Trip End Model Presentation Program
INNS	Invasive Non-Native Species	TEZ	Temporary Exclusion Zone
IPC	Infrastructure Planning commission	TIN	Technical Information Note
ISO	International Organization for Standardization	TJB	Transition Joint Bay
ISQG	Interim Marine Sediment Quality Guidelines	TOC	Total Organic Carbon
IUCN	International Union for the Conservation of Nature	TPO	Tree Preservation Order
JFS	Joint Fisheries Statement	TSS	Traffic Separation Scheme
JNCC	Joint Nature Conservation Committee	TTLCA	Touching the Tide Landscape Character Assessment
KCC	Kent County Council	UK	United Kingdom
KIS-ORCA	Kingfisher Information Service – Offshore Renewable Cable	UK BAP	United Kingdom Biodiversity Action Plan
kW	Kilowatt	UKCP	United Kingdom Climate Projection
LAQM.TG	Local Air Quality Management Technical Guidance	UKHO	United Kingdom Hydrographic Office
LAT	Lowest Astronomical Tide	UKSIA	United Kingdom Single Issuing Authority
LCA	Landscape Character Assessment	UNCLOS	United Nations Convention on the Law of the Sea
LCRM	Land Contamination: Risk Management	UNESCO	United Nations Educational, Scientific and Cultural Organization
LCT	Landscape Character Type	UNFCCC	United Nations Framework Convention on Climate Change
LEMP	Landscape Ecological Management Plan	UTC	Universal Transverse Mercator
LEP	Local Enterprise Partnership	UXO	Unexploded Ordnance
LGS	Local Geological Site	VMS	Vessel Monitoring System
LGV	Light Goods Vehicle	WeBS	Wetland Bird Survey
LiDAR	Light Detection and Ranging	WFD	Water Framework Directive
LLFA	Lead Local Flood Authority	WHO	World Health Organisation

LNR	Local Nature Reserve	WSI	Written Scheme of Investigations
LOAEL	Lowest Observed Adverse Effect Level	WWTW	Waste Water Treatment Works
LoGS	Local Geological Sites	XLPE	Cross Linked Polyethylene
LPA	Local Planning Authority	Zn	Zinc
LTP	Local Transport Plan	ZOI	Zone of Influence
LVIA	Landscape and Visual Impact Assessment	ZTV	Zone of Theoretical Visibility
LWS	Local Wildlife Sites		
m	Metres		
MAFF	Ministry of Agriculture, Fisheries and Food		
MAIB	Marine Accident Investigation Branch		
maOD	metres above Ordnance Datum		

1.1 Introduction

1.1.1. Overview of the Project

1.1.1.1. The Sea Link Project (hereafter referred to as the 'Project') is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East of England and East Anglia. The Project is required to accommodate additional power flows generated from renewable and low carbon energy generation, as well as additional new interconnection with mainland Europe.

1.1.1.2. National Grid owns, builds and maintains the electricity transmission network in England and Wales. Under the Electricity Act 1989, National Grid holds a transmission licence under which it is required to develop and maintain an efficient, coordinated, and economic electricity transmission system.

1.1.1.3. National Grid 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;' and

Schedule 9(1)(b) '…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'.

1.1.1.4. The Project is proposed to reinforce the transmission system in the South East of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent.

1.1.1.5. The Project would comprise of the following elements:

- Underground HVAC cable between the proposed Friston substation and a new converter station in Suffolk.
- New converter station in Suffolk.
- Underground HVDC cable between a new converter station in Suffolk and a landfall on the Suffolk coast, either between Aldeburgh and Thorpeness or at Sizewell Gap.
- Marine HVDC cable between a landfall on the Suffolk coast and a landfall in Pegwell Bay in Kent.
- Underground HVDC cable between a landfall in Pegwell Bay and a new converter station in Kent.
- New converter station in Kent.

- A HVAC connection (either by overhead line or underground cables) between a new converter station in Kent and the existing Canterbury to Richborough overhead line.

1.1.1.6. None of the components of the Project fall within the definition of a 'Nationally Significant Infrastructure Project' (NSIP) defined under Part 3 of the Planning Act 2008 (PA2008). In consultation with the relevant Local Planning Authorities (LPA) in Suffolk and Kent, the Project sought direction on 4th March 2022 under Section 35 of the PA2008 from the Secretary of State (SoS) for the Project to be treated as a development for which development consent under the PA2008 is required.

1.1.1.7. On 31st March 2022 Section 35 direction was granted[1] by the SoS on the grounds that:

The proposed Project is of national significance, taking into account that it is a large-scale linear electricity transmission reinforcement project of approximately 130km in length and that it has a two Gigawatt capacity to transmit electricity.

The proposed Project will play an important role in enabling an energy system that meets the UK's commitment to reduce carbon emissions and the Government's objectives to create a secure, reliable and affordable energy supply for consumers.

By progressing the development through the Planning Act 2008 development consent process, it would provide the certainty of a single, unified consenting process and fixed timescales

1.1.1.8. Since the Section 35 Direction is now granted, National Grid intends to apply for the granting of an order for development consent under Section 37 of the PA2008 to the Planning Inspectorate (PINS). The application will provide details of the proposed development and will be accompanied by an Environmental Statement (ES).

1.1.1.9. This Scoping Report supports a request by National Grid, under Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as 'the EIA Regulations'), for a written Scoping Opinion from the SoS for Business, Energy and Industrial Strategy (BEIS), administered by the Planning Inspectorate on behalf of the SoS, to inform the Environmental Impact Assessment (EIA) for the Project.

1.1.2. The Need for the Project

1.1.2.1. The UK's target to achieve Net Zero carbon emissions by 2050 is resulting in fundamental changes to the way that electricity is going to be generated and supplied. The Government has established intermediary targets such as the development of up to 50GW of offshore wind by 2030, up from approximately 11GW today.

1.1.2.2. Offshore wind generation, Nuclear generation and Interconnectors to mainland Europe are strategically important investments to meet 2050 net-zero targets. Proximity to mainland Europe and suitability of the seabed off the coast of East Anglia region has resulted in large-scale offshore wind and interconnector connection applications in the East Anglia region. NGET as the transmission network owner in England and Wales has the responsibility to provide these

[1] Department for Business, Energy and Industrial Strategy (2022). National Grid Electricity Transmission - Sea Link electricity reinforcement project: Section 35 Direction, Planning Act 2008. [online] Available at: https://www.gov.uk/government/publications/national-grid-electricity-transmission-sea-link-electricity-interconnector-section-35-direction-planning-act-2008.

applications with a network that is compliant to the criteria contained within the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).

1.1.2.3. The future energy scenarios, established by the National Grid Electricity System Operator, highlight that additional generation between 7 and 25GW could be expected to connect in the East of England Region by 2035 and up to 14GW of interconnector and energy storage in the South of England.

1.1.2.4. Increasing levels of generation will drive substantial increases in the north - south power flows within and beyond these regions. Therefore, significant reinforcement of the transmission system is needed in the East Anglian and South East England regions, requiring the development of additional transmission circuits.

1.1.2.5. The increase in interconnector capacity between Britain and continental Europe is likely to substantially increase the duration and magnitude of power exported from Britain during periods of high wind generation and imported from continental Europe during periods of low wind generation requiring power to be supplied to and from the interconnectors located along the south and east coasts of England.

1.1.2.6. Given the substantial increase in generator-driven power flows out of East Anglia, and the region's proximity to the south coast and London, the optimum reinforcement solutions for the two regions are interactive. When generation levels are high in East Anglia, power will need to be transmitted to centres of demand in London and the South East of England. During these periods of high generation much of the 'surplus' power exported to the continent will also need to be transmitted to the south coast to supply the power requirements of the continental interconnectors, further increasing the East Anglia to South East of England power flows.

1.1.2.7. The Sea Link project therefore seeks to address these two different but interrelated transmission system constraints which trigger the need for significant reinforcement of the transmission system in both East Anglia and the South East of England. Sea Link is needed in addition to other network reinforcements identified in the region.

1.1.3. The Need for an Environmental Impact Assessment

1.1.3.1. None of the components which make up the Project are explicitly identified under Schedule 1 or 2 of the EIA Regulations. Schedule 3 of the EIA Regulations sets out the selection criteria for determining if Schedule 2 development is likely to have significant effects and is thereby 'EIA Development'. Having considered the criteria in Schedule 3, National Grid proposes to undertake an EIA having given regard to the whole of Schedule 3 but specifically:

Characteristics of development

1.- (1) The characteristics of development must be considered with particular regard to—

(a) the size and design of the whole development;

(b) cumulation with other existing development and/or approved development;

and

Location of development

2.- (1) The environmental sensitivity of geographical areas likely to affected by development, including:

(c) the absorption capacity of the natural environment, in particular:

(i) wetlands, riparian areas, river months;

(ii) coastal zone and the marine environment;

(iv) nature reserves and parks;

(v) European sites and other areas classified or protected under national legislation; and

(viii) landscapes and sites of historical, cultural or archaeological significance

1.1.3.2. This Scoping Report provides formal notification to the SoS, under Regulation 8(1)(b) of the EIA Regulations, that the Applicant (hereafter referred to as 'National Grid') proposes to provide an Environmental Statement (ES) in respect of the Project.

1.1.4. Geographical Context

1.1.4.1. The Project Scoping Boundary is illustrated on **Figure 1.1.1 Project Scoping Boundary**. All onshore parts of the Project would be located within England and offshore parts of the Project would be located within the English Territorial Waters. For ease of presentation within this Scoping Report, the Project has been split into three geographical parts, hereafter referred to as: the Suffolk Onshore Scheme; Kent Onshore Scheme; and the Offshore Scheme.

Suffolk Onshore Scheme

1.1.4.2. The Suffolk Onshore Scheme is illustrated on **Figure 1.1.2 Suffolk Onshore Scheme Scoping Boundary** and is located within the administrative boundary of Suffolk County Council (SCC) and the East Suffolk Council (ESC) local planning authority areas.

1.1.4.3. The Suffolk Onshore Scheme is in an area that is predominantly rural. The settlements of Aldeburgh, Friston, Saxmundham, Leiston, and Knodishall Common are located adjacent to the Project Scoping Boundary. The Sizewell Nuclear Site is located to the north of the Project Scoping Boundary and there are two existing 400kV overhead lines that cross the Project Scoping Boundary that connect the existing Sizewell substation to Bramford substation.

1.1.4.4. The Project Scoping Boundary includes part of the Suffolk Coasts and Heath Area of Outstanding Natural Beauty (AONB) and Sandlings Special Protection Area (SPA). Parts of the Leiston Aldeburgh and Sizewell Marshes Sites of Special Scientific Interest (SSSI) are located within the Project Scoping Boundary, as are part of North Warren RSPB reserve and two areas of Ancient Woodland.

1.1.4.5. The Hundred River is crossed by the Scoping Boundary to the south of Aldringham and the Alde or Ore River is located approximately 1km to the south of the Scoping Boundary.

Kent Onshore Scheme

1.1.4.6. The Kent Onshore Scheme is illustrated on **Figure 1.1.3 Kent Onshore Scheme Scoping Boundary** and is located within the administrative boundary of Kent County Council (KCC) and the Thanet District Council (TDC) and Dover District Council (DDC) local planning authority areas.

1.1.4.7. The Kent Onshore Scheme is in an area which is semi-rural although land use in the areas closest to the coast include golf courses and areas of nature conservation. The settlement of Cliffs End is located adjacent to the north of the Project Scoping Boundary and the settlement of Minster approximately 350m from the Project Scoping Boundary also to the north. Richborough Energy Park and a wastewater treatment works are located adjacent to the south of the Project Scoping Boundary. The existing Richborough to Canterbury 400kV overhead line crosses through the far western extent of the Project Scoping Boundary.

1.1.4.8. Parts of the Thanet Coast and Sandwich Bay Ramsar and SPA are located within the Project Scoping Boundary in addition to parts of the Sandwich Bay Special Area of Conservation (SAC), Sandwich Bay to Hacklinge Marshes SSSI and Sandwich and Pegwell Bay National Nature Reserve (NNR).

1.1.4.9. The River Stour flows through the south of the Project Scoping Boundary and several watercourses and field drains are present across the Project Scoping Boundary.

Offshore Scheme

1.1.4.10. The Offshore Scheme is illustrated on **Figure 1.1.4 Offshore Scheme Scoping Boundary** It is located wholly within English Territorial Waters, and it lies within the East Inshore[2] and South East Inshore Marine Plan Areas[3]. The Project Scoping Boundary crosses the Suffolk Coastal Waters, East Anglian Shipping Waters, Eastern English Channel Approaches and the Goodwin Sands and North Dover Strait Marine Character Areas (MCA).

1.1.4.11. The Offshore Scheme is located to the west of London Array Offshore Wind Farm and to the east of Thanet, Greater Gabbard and Galloper Offshore Wind Farms.

1.1.4.12. Parts of the Outer Thames Estuary and Thanet Coast and Sandwich Bay Ramsar and SPAs are located within the Scoping Boundary as well as parts of the Southern North Sea and the Sandwich Bay SACs. Parts of the Leiston Aldeburgh and Sandwich Bay to Hacklinge Marshes SSSI as well as Goodwin Sands Marine Conservation Zone (MCZ) are located within the Project Scoping Boundary.

1.1.5. Purpose of this Report

1.1.5.1. 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.

[2] Marine Management Organisation (2014). East Inshore and East Offshore Marine Plans. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf.

[3]Marine Management Organisation (2021). South East Inshore Marine Plan. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004493/FINAL_South_East_Marine_Plan__1_.pdf.

1.1.5.2. This Scoping Report sets out the proposed content, methodologies to be adopted and the anticipated potential significant environmental effects that are proposed to be considered in the EIA. It supports a request from National Grid for a written Scoping Opinion from PINS, on behalf of the SoS to inform the ES which will accompany the application for development consent.

1.1.5.3. This Scoping Report has been prepared in accordance with the EIA Regulations, as well as having due regard to PINS Advice Note Seven[4].

1.1.5.4. The EIA Regulations set out the requirements for an applicant who proposes to request a scoping opinion from the SoS. Regulation 10(3) of the EIA Regulations states that a request for a scoping opinion must include:

(a) a plan sufficient to 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, and

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

1.1.5.5. Table 1.1.1 identifies where the information set out in Regulation 10(3) and PINS Advice Note Seven can be found within this Scoping Report.

Table 1.1.1: Compliance with regulation 10(3) and PINS Advice Note Seven

Suggested information to be included within the Scoping Report	Location within this Scoping Report
The Proposed Development	
Referenced plans presented at an appropriate scale to cover clearly all known features associated with the proposed development	The Project Scoping Boundary is shown on **Figure 1.1.1 Project Scoping Boundary**. The boundary of the Suffolk Onshore Scheme is shown on **Figure 1.1.2 Suffolk Onshore Scheme**. The boundary of the Kent Onshore Scheme is shown on **Figure 1.1.3 Kent Onshore Scheme Scoping Boundary**. The boundary of the Offshore Scheme is shown on **Figure 1.1.4 Offshore Scheme Scoping Boundary**.
An explanation of the approach to addressing uncertainly which remains in relation to the elements of the proposed development	**Part 1, Chapter 4, Description of the Project** **Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme** **Part 3, Chapter 1, Evolution of the Kent Onshore Scheme** **Part 4, Chapter 1, Evolution of the Offshore Scheme**
EIA Approach and Topic Areas	

[4] Planning Inspectorate (2020). Advice Note Seven. EIA: Process, Preliminary Environmental Information, and Environmental Statements. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/.

Suggested information to be included within the Scoping Report	Location within this Scoping Report
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	**Part 1, Chapter 3, Main Alternatives Considered** **Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme** **Part 3, Chapter 1, Evolution of the Kent Onshore Scheme** **Part 4, Chapter 1, Evolution of the Offshore Scheme**
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 in Parts 2-5 include a summary table identifying those sources, impact and receptors proposed to be scoped in and 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 in Parts 2- 5.
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	Information on the baseline characteristics are included in each of the technical chapters in Parts 2-5.
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 in Parts 2-5. The proposed EIA approach and methods are described in **Part 1, Chapter 5, EIA Approach and Methodology** and each of the technical chapters in Parts 2 - 5 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 in Parts 2-5. An outline Code of Construction Practice (CoCP) is provided in **Appendix 1.4.A Outline Code of Construction Practice**
Information Sources	
Reference to any practice and best guidance to be relied upon	This is set out within each of the technical chapters in Parts 2-5.
Evidence or agreements reached with consultation bodies	Feedback from stakeholders is described as appropriate through Parts 1-5.
Transboundary Effects	
The Applicant may also wish to provide a completed transboundary screening matrix dealing with the potential effects of	**Appendix 1.1.A Transboundary Screening Matrix** presents this matrix which follows the suggested format for the transboundary screening matrix which is provided

Suggested information to be included within the Scoping Report	Location within this Scoping Report
the proposed development on other European Economic Area (EEA) States	in the PINS Advice Note Twelve 'Transboundary Impact Consultation'[5]

1.1.6. Structure of this Scoping Report

1.1.6.1. The structure of this Scoping Report is outlined below in Table 1.1.2 below. For ease of presentation, Volume 1 (main text) this Scoping Report is split into Parts.

1.1.6.2. Part 1 Introduction sets out an overview of the Project, an overview of the regulatory and planning context; the main alternatives considered; provides a description of the Project; sets out the proposed EIA approach and method; and the proposed approach to the Environmental Statement.

1.1.6.3. Parts 2-4 describe the evolution of the Onshore Schemes in Suffolk and Kent and the Offshore Scheme respectively and provides the technical chapters for each area.

1.1.6.4. Part 5 of the Scoping Report presents potential effects which are project wide.

1.1.6.5. Appendices are provided in Volume 2 and the Figures are provided in Volume 3.

Table 1.1.2 Structure of this Scoping Report

Chapter	Content
Volume 1 Part 1 - Introduction	
Chapter 1 Introduction	An introduction to the Project and the purpose and structure of this Scoping Report.
Chapter 2 Regulatory and Planning Context	Sets out an overview of the legislation and policy relevant to the Project.
Chapter 3 Main Alternatives Considered	An outline of the reasonable alternatives considered and the reasons for selecting the preferred option.
Chapter 4 Project Description	A description of the Project including permanent features and associated temporary works. It describes the general characteristics of the Project and outlines areas of uncertainty in relation to design parameters.
Chapter 5 EIA Approach and Method	A description of the overall EIA methodology that is proposed for the Project including temporal durations and approach to mitigation.
Chapter 6 Approach to the Environmental Statement	A description of how the ES is proposed to be structured.

[5] Planning Inspectorate (2020). Advice Note Twelve. Transboundary Impacts and Process. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/.

Chapter	Content
Volume 1 Parts 2 and 3 - Suffolk Onshore Scheme and Kent Onshore Scheme	
Chapter 1 Evolution of the Onshore Schemes in Suffolk and Kent	A description of how the Project has evolved in Suffolk and Kent.
Chapter 2 Landscape and Visual Chapter 3 Ecology and Biodiversity Chapter 4 Cultural Heritage Chapter 5 Water Environment Chapter 6 Geology ad Hydrogeology Chapter 7 Agriculture and Soils Chapter 8 Traffic and Transport Chapter 9 Air Quality Chapter 10 Noise and Vibration Chapter 11 Socio-economic Recreation and Tourism Chapter 12 Health and Wellbeing	Each chapter (2-12) provides a description of: • the regulatory and planning context specific to the topic area; • a description of the study area; • a description of the relevant baseline environment; • any embedded or good practice measures taken into consideration when proposing the scope; • potential for significant effects; • proposed assessment methodology; and • a brief conclusion summarising the proposed scope of the assessment to be included within the ES.
Chapter 13 Cumulative Effects	A description of those receptors likely to be screening into the intra-project cumulative impact assessment. A description of the other projects and developments which are proposed and known at the time of writing to be considered for the assessment of the inter-project cumulative effects.
Volume 1 Part 4 Offshore Scheme	
Chapter 1 Evolution of the Offshore Scheme	A description of how the Project has evolved in marine environment
Chapter 2 Physical Environment Chapter 3 Benthic Ecology Chapter 4 Fish and Shellfish Ecology Chapter 5 Marine Mammals Chapter 6 Ornithology Chapter 7 Marine Archaeology Chapter 8 Shipping and Navigation Chapter 9 Commercial Fisheries Chapter 10 Other Sea Users	Each chapter provides a description of: • the regulatory and planning context specific to the topic area; • a description of the study area; • a description of the relevant baseline environment; • any embedded or good practice measures taken into consideration when proposing the scope; • potential for significant effects; • proposed assessment methodology; and

Chapter	Content
	• a brief conclusion summarising the proposed scope of the assessment to be included within the ES.
Chapter 11 Cumulative Effects	A description of those receptors likely to be screening into the intra-project cumulative impact assessment. A description of the other projects and developments which are proposed and known at the time of writing to be considered for the assessment of the inter-project cumulative effects.
Volume 2 Part 5 Project Wide Effects	
Chapter 1 Climate Change Chapter 2 Major Accidents and Disasters	Each chapter provides a description of: • the regulatory and planning context specific to the topic area; • a description of the study area; • a description of the relevant baseline environment; • any embedded or good practice measures taken into consideration when proposing the scope; • potential for significant effects; • proposed assessment methodology; and • A brief conclusion summarising the proposed scope of the assessment to be included within the ES.
Chapter 4 Combined Effects of the Project	This chapter sets out how the combined effects assessment will consider the potentially significant effect on shared receptors.
Volume 2 Appendices	Provides the appendices which support Volume 1
Volume 3 Figures	Provides the Figures which support Volume 1

1.1.7. Other Assessments

1.1.7.1. In addition to the EIA, the preparation of the 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.

1.1.7.2. 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.

1.1.8. Net Gain Commitments

1.1.8.1. National Grid has committed to 10% Net Gain in Environmental value including as a minimum 10% Biodiversity Net Gain (BNG) across all its construction projects.

1.1.8.2. This commitment is underpinned by the delivery of quantifiable enhancements for biodiversity measured from a baseline using the DEFRA Biodiversity Calculator[6] with actions formalised and secured by long term management arrangements with external organisations and partners.

1.1.8.3. Wider environmental benefits such as carbon capture and storage, air quality and recreation and associated financial values are also considered and quantified using valuation tools and emerging methodologies.

1.1.8.4. These commitments ensure that National Grid can deliver long term environmental improvements as part of our works. The commitments will align and make a positive contribution to regional and national strategies and facilitate collaboration and partnerships with our communities and stakeholders.

1.1.9. Competence

1.1.9.1. Regulation 14(4) of the EIA Regulations requires that an ES is prepared by 'competent experts' and that the ES is accompanied by a statement outlining the relevant expertise or qualifications of such experts.

1.1.9.2. This Scoping Report has been prepared and coordinated by environmental consultants who are competent members, the members of the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark Scheme[7]. The Scheme allows organisations that lead the coordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

1.1.9.3. A Statement of Competence (SoC) will be included within the ES, outlining the relevant expertise or qualifications of the experts who have prepared the ES for the Project.

[6] Department for Food, Environment and Rural Affairs (2021). Biodiversity metric: calculate the biodiversity net gain of a project or development. [online] Available at: https://www.gov.uk/guidance/biodiversity-metric-calculate-the-biodiversity-net-gain-of-a-project-or-development.

[7] Institute of Environmental Management and Assessment (No Date). EIA Quality Mark Scheme. [online] Available at: https://www.iema.net/corporate-programmes/eia-quality-mark.

1.2 Regulatory and Planning Context

1.2.1. Introduction

1.2.1.1. This chapter sets out an overview of the regulatory and planning policy framework that applies to the Project, which has been taken into account across all topic chapters in the preparation of this EIA Scoping Report. Additional legislation and policy is applicable to some topics. Any such topic specific legislation is set out in the relevant topic chapters.

1.2.2. Key Legislation

The Planning Act 2008

1.2.2.1. The Planning Act 2008 ('PA 2008') provides the legislative basis for applications for a Development Consent Order (DCO). It also defines the application process under which a DCO is sought. The PA 2008 sets out that 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 their project.

1.2.2.2. Section 14 of the PA 2008 defines types of projects which are classified as NSIPs, subject to the criteria and thresholds set out in Sections 15 to 30A for different types of infrastructure. Section 16 of the PA 2008 sets this out for projects comprising 'Electricity lines'.

1.2.2.3. The Project is does not meet any of the definitions of an NSIP that are set out in Sections 14 and 16 of the PA 2008. Only electricity lines that are above ground, 132kV or greater and 2km or more in length are defined as NSIPs in their own right under Section 16 of the PA 2008. The Project, as described in **Part 1, Chapter 4, Description of the Project** will not include any above ground electricity line of 132kV or more that is 2km or more in length. The Project is therefore not an NSIP under the definitions set out in the PA 2008. However, under Section 35(1) of the PA 2008, "the Secretary of State may give a direction for development to be treated as development for which development consent is required" if certain criteria (including the type and location of the development) are met.

1.2.2.4. On 4 March 2022, the Applicant submitted a request for a direction pursuant to Section 35 of the PA 2008 to the Secretary of State (hereafter the 'SoS') for Business, Energy and Industrial Strategy (BEIS) requesting for the Project to be treated as development for which development consent is required. On 31 March 2022, the SoS issued a Direction that confirmed that the Project should be treated as a development for which a DCO under the PA 2008 is required. In the Annex to the Direction, the SoS confirmed his opinion that:

"*The proposed Project is of national significance, taking into account that it is a large-scale linear electricity transmission reinforcement project of approximately 130km in length and that it has a two Gigawatt capacity to transmit electricity*."

1.2.2.5. This Scoping Report takes account of the national significance of the project and that the SoS has directed that it is to be treated as development for which development consent is required.

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

1.2.2.6. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) govern the EIA process relevant to NSIPs. Schedule 1 of the EIA Regulations lists those projects for which an EIA is required and Schedule 2 lists projects which may be considered an EIA development, based on the selection criteria provided in Schedule 3 on characteristics of the development, its location and the types and characteristics of the potential impacts.

1.2.2.7. None of the components which make up the Project are explicitly identified under Schedule 1 or Schedule 2 of the EIA Regulations. However, National Grid proposes to undertake an EIA, having considered the criteria in Schedule 3 regarding the characteristics of the development (size of the development and cumulation with other existing and/or approved development) and its location (environmental sensitivity of geographical areas likely to be affected by the development). As such National Grid will be submitting an Environmental Statement (hereafter 'ES') with the DCO application, which will render the Project as EIA development under Regulation 6 of the EIA Regulations.

1.2.2.8. Part 5 of the EIA Regulations sets out the EIA process. Regulation 5(2) 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*".

1.2.2.9. It states that the EIA must undertake the above in relation to the following factors: population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, and landscape.

1.2.2.10. In addition, Regulation 5(4) requires the EIA to include, where relevant:

"the expected significant effects arising from the vulnerability of the Project to major accidents or disasters that are relevant to that development".

1.2.2.11. Schedule 4 of the EIA Regulations sets out the information for inclusion in the ES.

1.2.2.12. Paragraph 32(1) pf the EIA Regulations requires applicants to consider transboundary effects, meaning, those effects that could affect receptors in other countries. A screening exercise has been undertaken as part of the scoping process and is documented in **Appendix 1.1.A Transboundary Screening Matrix**. No transboundary effects in relation to the Project are expected to have an impact on the other countries, as there are no pathways for effects to occur outside the UK.

Marine and Coastal Access Act 2009

1.2.2.13. A spatial planning system for the management of the marine environment was introduced by the Marine and Coastal Access Act 2009 (MCCA 2009). This introduced a requirement to obtain Marine Licences for works at sea.

1.2.2.14. The MMO is responsible, under Part 4 of the MCAA, for administering marine licensing of activities related to construction or removal of any substance or object in UK territorial waters and also for regulating activities where they are undertaken outside of the UK territorial waters e.g. within the UK Exclusive Economic Zone (EEZ). They do so by issuing a Marine Licence.

1.2.2.15. The PA 2008 enables an applicants for a DCO to apply for 'Deemed Marine Licence' as part of the DCO process by virtue of Section 149A of the PA 2008 which was inserted by the MCAA 2009.

1.2.2.16. In addition, Section 126 of the MCAA 2009 sets out that where a public authority has the function of determining an application that is capable of affecting (other than insignificantly) the protected features of a Marine Conservation Zone (MCZ), or the processes on which those features depend, then they have a duty to consider MCZs during their decision making.

Electricity Act 1989

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

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

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

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

1.2.2.18. National Grid's Stakeholder, Community and Amenity Policy[8], published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the aforementioned legislation.

1.2.3. Related Assessments

1.2.3.1. In addition to the EIA, the Project will be assessed in accordance with the other regulatory regimes, where they apply. Information on these is included in the environmental topic chapters of this scoping report where applicable. These include the Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (hereafter 'the Habitats Regulations') and the Conservation of Offshore Marine Habitats and Species Regulations 2017.

[8] National Grid (2016). National Grid's commitments when undertaking works in the UK: Our stakeholder, community and amenity policy. [online] Available at: https://www.nationalgrid.com/sites/default/files/documents/National%20Grid_s%20commitments%20when%20undertaking%20works%20in%20the%20UK.pdf.

Habitats Regulations

1.2.3.2. The Secretary of State is required by the Habitats Regulations to consider whether a plan or project has the potential to have an adverse effect on the integrity and features of a site which is part of the National Site Network or a European Site. 'European Sites' include Special Protection Areas (SPA) and Special Areas of Conservation (SAC). The Habitats Regulations require an Appropriate Assessment if a project is likely to have a significant effect on a National Site Network site or a European Site.

1.2.4. National Planning Policy

1.2.4.1. This section sets out the current national planning policy documents that are expected to be important and relevant to the SoS' consideration of the DCO application for the Project, and contain information that may be relevant to scoping the EIA. These documents have been taken into account in preparing this Scoping Report.

National Policy Statements for Energy

1.2.4.2. The following NPSs are expected to be important and relevant to the SoS' determination of the DCO application for the Project.

- Overarching National Policy Statement for Energy (EN-1) (NPS EN-1); and,
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (NPS EN-5).

1.2.4.3. NPS EN-1 and NPS EN-5 are discussed below.

Overarching National Policy Statement for Energy (EN-1)

1.2.4.4. NPS EN-1 sets out the Government's overarching policy with regard to the development of NSIPs in the energy sector. It emphasises the need and urgency for new energy generation, transmission and distribution projects to contribute to a secure, diverse and affordable energy supply. This is to support the Government's policies on sustainable development, in particular by mitigating and adapting to climate change.

1.2.4.5. Section 3.7 in NPS EN-1 states that current scenarios show significant potential increases in generation and changes in direction of net electricity flows from Eastern England to centres of demand in the Midlands and South East England and that these kinds of flows of power cannot be accommodated by the existing network and new lines will have to be built. It also acknowledges in Paragraph 3.7.10 that:

"*in most cases, there will be more than one technological approach by which it is possible to make such a connection or reinforce the network (for example, by overhead line or underground cable) and the costs and benefits of these alternatives should be properly considered as set out in EN-5 before any overhead line proposal is consented*".

1.2.4.6. Part 5 of NPS EN-1 sets out generic impacts in respect of matters such as air quality and emissions, biodiversity, dust and odour, flood risk, historic environment, landscape, land use, noise and vibration, socio-economic, traffic and transport and

waste management. These generic impacts have been considered in the preparation of the Scoping Report.

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

1.2.4.7. NPS EN-5 relates to electricity networks and Part 2 includes specific policies relating to matters including consideration of good design, biodiversity and geological conservation, landscape and visual and noise and vibration. These policies have also been considered in the preparation of this Scoping Report.

1.2.4.8. Paragraph 2.2.6 of EN-5 reiterates the duties under Section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and, in formulating proposals for new electricity network infrastructure, to *"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or 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".*

Draft Energy National Policy Statements

1.2.4.9. The Government is currently reviewing and updating the Energy NPSs. It is doing this to reflect its policies and strategic approach for the energy system that is set out in the Energy White Paper (December 2020), and to ensure that the planning policy framework enables the delivery of the infrastructure required for the country's transition to net zero carbon emissions. As part of the Energy NPS review process, the Government published a suite of Draft Energy NPSs for consultation on 6 September 2021.

1.2.4.10. The following Draft Energy NPSs have also been considered in the scoping of this EIA:

- Draft Overarching National Policy Statement for Energy (EN-1) (Draft NPS EN-1)
- Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (Draft NPS EN-5).

1.2.4.11. Draft NPS EN-1 sets out general principles and impacts to be considered for all types of energy NSIP covered by the draft Energy NPSs. Once designated it will form the primary basis for determining if development consent should be granted and is underpinned by the principle that there will be a need for significant amounts of new large-scale energy infrastructure to meet the Government's energy objectives. It states at paragraphs 2.1.1 and 2.3.5 that the energy system needs to be transformed by "…*tackling emissions while continuing to ensure secure and reliable supply, and affordable bills for households and businesses*".

1.2.4.12. Paragraph 3.2.9 of Draft EN-1 states that in circumstances where the SoS has given a Section 35 direction: "…any application for development consent would need to be considered in accordance with [Draft EN-1]". The second bullet point sets out that this includes: "…where the application is for electricity network infrastructure not covered by sections 15-21 of the Planning Act, including underground or offshore infrastructure…".

1.2.4.13. Like its predecessor, Draft NPS EN-5 covers electricity networks and focuses on policies and considerations that are specific to this type of energy infrastructure.

National Planning Policy Framework

1.2.4.14. The revised National Planning Policy Framework (NPPF) was most recently revised in July 2021. Paragraph 5 of the NPPF sets out that it does not contain specific policies for NSIPs and states that "*These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework*)".

1.2.4.15. Since the NPPF has the potential to be considered important and relevant to the SoS' consideration of the Project, each topic chapter has considered whether there is guidance in the NPPF that differs from NPS and draft NPS policies. At this stage it is not possible to determine if such guidance will be considered relevant to, or be given weight by, the SoS, and it is therefore included for completeness to allow the SoS to make such determination.

1.2.5. Local Planning Policies

1.2.5.1. Regional and local planning policies have also been considered in the development of the Scoping Report. The main local planning policy that could be relevant to the Project comprises of the following:

- East Suffolk Council – Suffolk Coastal Local Plan (adopted 23 September 2020)[9]
- Thanet District Council – Thanet Local Plan (adopted 9 July 2020)[10]
- Dover District Council – Core Strategy (adopted 24 February 2010)[11]
- Dover District Council – Land Allocations Local Plan (adopted 28 January 2015)[12]
- Dover District Council – Saved Policies of the Dover District Local Plan 2002 (adopted 2002)[13]
- Suffolk County Council – Suffolk Minerals and Waste Local Plan (adopted 9 July 2020)[14]

[9] East Suffolk Council (2020). Suffolk Coastal Local Plan. [online] Available at: https://www.eastsuffolk.gov.uk/assets/Planning/Planning-Policy-and-Local-Plans/Suffolk-Coastal-Local-Plan/Adopted-Suffolk-Coastal-Local-Plan/East-Suffolk-Council-Suffolk-Coastal-Local-Plan.pdf.

[10] Thanet District Council (2020). Thanet Local Plan. [online] Available at: https://www.thanet.gov.uk/wp-content/uploads/2018/03/LP-adjusted.pdf.

[11] Dover District Council (2010). Local Development Framework: Core Strategy. [online] Available at: https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/PDF/Adopted-Core-Strategy.pdf.

[12] Dover District Council (2015). Land Allocations Local Plan. [online] Available at: https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/PDF/Land-Allocations-Local-Plan.pdf.

[13] Dover District Council (2002). Saved Policies of the Dover District Local Plan 2002. [online] Available at: https://www.dover.gov.uk/Planning/Planning-Policy-and-Regeneration/Adopted-Development-Plans/Saved-Policies.aspx.

[14] Suffolk County Council (2020). Suffolk Minerals and Waste Local Plan. [online] Available at: https://www.suffolk.gov.uk/planning-waste-and-environment/minerals-and-waste-policy/suffolk-minerals-and-waste-development-scheme/.

- Kent County Council - Kent Minerals and Waste Local Plan 2013-2030 (adopted September 2020)[15]
- Kent County Council – Mineral Sites Plan (adopted September 2020)[16]

1.2.5.2. A summary of national and local planning policy relevant to each technical assessment is provided for each environmental topic chapter.

1.2.6. Marine Policy Statement

1.2.6.1. The Marine Policy Statement was adopted 2011. This provides the policy framework for the preparation of marine plans and establishes how decisions affecting the marine area should be made. The Marine Policy Statement has been considered in the development of this Scoping Report in particular within the chapters relating to Part 4, the Offshore Scheme.

1.2.7. Marine Plans

1.2.7.1. The following Marine Plans have been considered in the development of this scoping report:

- East Inshore and East Offshore Marine Plan, April 2014[17]
- South East Inshore Marine Plan, June 2021[18]

1.2.7.2. A summary of marine policy that is relevant to each technical assessment is provided for each environmental topic chapter.

[15] Kent County Council (2020). Kent Minerals and Waste Local Plan 2013-2030. [online] Available at: https://www.kent.gov.uk/__data/assets/pdf_file/0004/112585/Kent-Minerals-and-Waste-Local-Plan-2013-2030.pdf.

[16] Kent County Council (2020). Mineral Sites Plan. [online] Available at: https://www.kent.gov.uk/__data/assets/pdf_file/0003/112584/Kent-Mineral-Sites-Plan.pdf.

[17] Marine Management Organisation (2014). East Inshore and East Offshore Marine Plans. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf.

[18] Marine Management Organisation (2021). South East Inshore Marine Plan. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004493/FINAL_South_East_Marine_Plan__1_.pdf.

1.3 Main Alternatives Considered

1.3.1. Introduction

1.3.1.1. The current stage of Project design is the result of an iterative process that commenced at Project inception when the initial need to reinforce the network in the South East of England was identified in 2019. Environmental, engineering and economic considerations have influenced the optioneering and design evolution process. There have also been extensive discussions with the relevant stakeholders during the Project development early stages. The iterative design process will continue up to the application for development consent in parallel with, and informed by, the EIA process.

1.3.1.2. **Part 1 Chapter 2, Regulatory and Planning Context** sets out the overarching policy relevant to the Project, comprising NPS EN-1 and NPS EN-5, which have been considered during the options appraisal process for the Project. With reference to the consideration of alternatives, paragraph 4.4.2 of EN-1 states that:

"*Applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant's choice, taking into account the environmental, social and economic effects including, where relevant, technical and commercial feasibility*."

1.3.1.3. Whilst there is no statutory requirement to include an assessment of alternatives in support of a request for a Scoping Opinion, the PINS Advice Note Seven recommends that a Scoping Report includes:

"*An outline of the reasonable alternatives considered and the reasons for selecting the preferred option*".

1.3.2. National Grid Approach to Options Appraisal

1.3.2.1. National Grid undertakes options appraisal on each new project. There are often a number of different ways that a project could be developed which could involve different locations, technologies or designs. Each project requires judgements and decisions to be made about the best way forward to achieve the required outcome. The options appraisal process provides information to help inform those judgements.

1.3.2.2. Options appraisal is a robust and transparent process that is used to compare options and to assess the positive and negative effects, those options may have across a wide range of criteria including environmental, socio-economic, technical and cost factors, as set out in National Grid's approach to options appraisal[19]. The aim is to find a balanced outcome, bearing in mind the range of National Grid's statutory duties. The assessment is documented to provide, in a transparent manner, information upon which decisions are based.

[19] National Grid (2012). Our Approach to Options Appraisal. [online] Available at: https://www.nationalgrid.com/electricity-transmission/document/96531/download.

1.3.2.3. At each stage of the options appraisal process, a clearly defined methodology has been used to inform the decision-making process. This has included technical inputs from engineers and environmental consultants to inform the decisions and design. The assessment has drawn on data and evidence collected from both, desktop studies and site visits. Decision making has also taken into account the feedback from prescribed bodies, as defined in the PA2008, and will continue to take account the feedback from the prescribed bodies alongside feedback from the local community through an extensive programme of engagement and consultation. In addition, the Project has been subject to periodic internal challenge and review process to ensure the robustness of the decision made in the light of a changing environmental baseline related to technical, physical and economic matters.

1.3.2.4. Image 1.3.1 shows where the options appraisal sits within National Grid's approach to project development and delivery, as set out in the National Grid publication 'Our Approach to Consenting'[20].

Image 1.3.1: National Grid's approach to project development and delivery

1.3.2.5. Project decisions have taken into account National Grid's statutory obligations set out in Sections 9 and 38 of the Electricity Act 1989, its licence requirements and all other relevant considerations including the relevant NPSs. The options appraisal has also considered other policy and guidance when making judgements and decisions on the Project including the Horlock Rules[21].

1.3.3. Overview

1.3.3.1. Alternatives have been considered at each stage of the Project's development, from strategic options through to routeing and siting. They will continue to be considered in the development of the proposed order limits for which an application for development consent will be made to the SoS.

1.3.3.2. The following sections provide a summary of the alternatives that have been considered at each stage.

[20] National Grid (2022). Our Approach to Consenting: National Grid, 2012, Out approach to options appraisal. [online] Available at: https://www.nationalgrid.com/electricity-transmission/document/96531/download.

[21] National Grid (2003). NGC Substations and the Environment: Guidelines on Siting and Design (updated 2006). [online] Available at: https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf.

Strategic Options

1.3.3.3. A range of strategic options that might address the network reinforcement needs were identified and appraised at a strategic level. These appraisals considered the likely environmental and socio-economic effects, technical issues, and costs that would be associated with each strategic option. The network performance of each strategic option was also modelled to determine the benefits. The appraisal and modelling results informed judgements regarding the relative merits of the options and ensured that the final Strategic Proposal would meet National Grid's statutory duties under the Electricity Act, including the requirement to bring forward proposals that are 'economic, efficient and coordinated' and that would comply with the relevant planning policies for which the consents would be granted.

Background to the Project

1.3.3.4. The strategic options considered for the Project were developed and appraised alongside the needs case to rationalise network reinforcement where possible whilst ensuring compliance with National Grid's statutory duties.

1.3.3.5. The need to reinforce the transmission system is reviewed on an annual basis 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 within the Electricity Ten Year Statement[22]. Proposals that provide those reinforcements are then assessed through the Network Options Assessment (NOA)[23] which is published annually.

1.3.3.6. The need to reinforce the network in the South East of England is driven by interconnection with mainland Europe as well as new renewable generation connecting to the network. This reinforcement was assessed in the 2018/2019 NOA and National Grid explored several strategic options that could deliver the required reinforcement. One of the strategic options that was considered was a nominal subsea HVDC link between the South East of England and East Anglia. This was included in order to appraise the performance of this strategic option, which crossed multiple system boundaries against others which just addressed the need in the South East of England. The appraisal identified that this strategic option provided the reinforcement required to the network in the South East of England as well as providing reinforcement to the network in East Anglia. The network in East Anglia was also identified in the 2018/2019 NOA as likely to need reinforcing in the future due to the volume of possible upcoming generation connecting within this region.

1.3.3.7. Strategic options were then developed that explored alternative subsea HVDC links between the South East of England and East Anglia that could provide the reinforcement required. This work identified that a connection between East Anglia and Richborough in Kent provided this reinforcement, this was then reflected in the 2019/2020 NOA.

1.3.3.8. Additional network studies in East Anglia were then undertaken to confirm which connection point provided the best value to customers whilst minimising potential environmental and socio-economic impacts. These studies identified that the HVDC

[22] National Grid ESO (2021). Electricity Ten Year Statement (ETYS). [online] Available at: https://www.nationalgrideso.com/research-publications/etys.

[23] National Grid (2022). Network Options Assessment 2021/22 Refresh. [online] Available at: https://www.nationalgrideso.com/document/262981/download.

Link needed to connect into the Sizewell area in order to maximise the system benefit.

1.3.3.9. The 2020/2021 NOA[24] also identified the reinforcements that were required to the network in East Anglia and National Grid undertook a similar exercise to investigate solutions that could provide this wider reinforcement. The Sizewell to Richborough HVDC Link (by this point named the 'Sea Link Project') was included as part of this exercise to confirm it remained the preferred solution under all scenarios.

Strategic options considered for the Project

1.3.3.10. Following the identification of the need for the HVDC reinforcement to connect into the Sizewell area in East Anglia and into the South East of England three alternative strategic options were appraised these were:

- HVDC Link between the Sizewell area and Richborough substation;
- HVDC Link between the Sizewell area and Canterbury substation; and
- HVDC Link between the Sizewell area and Sellindge substation.

1.3.3.11. The appraisal concluded a preference for a Richborough connection in Kent. This option was identified as having a significantly shorter onshore route than either Canterbury or Sellindge, resulting in lower terrestrial environment and socio-economic effects from the Project. In addition, the Richborough area was considered to provide more opportunities to sensitively site a new converter station.

1.3.3.12. A connection into Sellindge would require an overall longer route length than the other two options, without offering any additional benefits (e.g., network, cost, or programme). Whilst Canterbury was comparable to Richborough in terms of an overall length, there are several significant challenges, both within the vicinity of Canterbury substation and with the associated routeing to/from Canterbury and marine cable routeing to the north Kent, which made it less preferable due to the likely significance of environmental effects both onshore and offshore.

1.3.3.13. The strategic option appraisal therefore identified a preferred strategic option of an HVDC Link between the Sizewell area in East Anglia and existing Richborough substation in Kent.

1.3.4. Routeing and Siting

1.3.4.1. Having identified the preferred Strategic Option, National Grid undertook a Corridor and Preliminary Routeing and Siting Study (CPRSS). This process is described below.

Approach to Routeing and Siting

1.3.4.2. A staged approach was adopted to identify corridors and preliminary routeing and siting options for the Project. This approach considered the potential effects on the environment, local communities, relevant spatial planning policy and planning applications, other existing and proposed developments, and technical and engineering design considerations.

[24] National Grid ESO (2022). Network Options Assessment 2021/22 Refresh. [online] Available at: https://www.nationalgrideso.com/document/262981/download.

1.3.4.3. The aim of the approach was to identify 'on-balance' preferences for landfalls, converter station sites and potential route corridors within which preliminary alignments could be developed.

1.3.4.4. Each of the options identified for the converter site option areas and cable route corridors were appraised in accordance with National Grid's approach to options appraisal[25]. This guidance has been developed by National Grid to provide a thorough and consistent approach to the appraisal of network reinforcement options. It represents the best practice approach to inform the decision-making process. The aim of the guidance is to ensure that decisions regarding the technology options and/or location of infrastructure are based on a full understanding of the implications of each option using a wide range of criteria.

1.3.4.5. In addition to above and in the absence of guidance for specific siting of converter stations, the Horlock Rules[26] have been applied. These were developed for the siting of substations, were used when identifying and appraising converter site option areas.

1.3.4.6. The overarching principle of National Grid's approach is to follow a staged process for routeing and siting to identify preferred options. The steps undertaken for the Project in this staged approach are summarised below.

1.3.4.7. **Step 1 Identification of the Routeing and Siting Study Area:** This step sought to identify the extent of the study area within which route corridors and converter station site option areas could be developed. This was based on the study area used at the strategic option stage but widened out in places to ensure route corridors could be developed that avoided environmental and socio-economic constraints as far as possible. The routeing and siting study area is illustrated on **Figure 1.3.1 Routeing and Siting Study Area**.

1.3.4.8. **Step 2 Data Gathering:** This step sought to build on the constraints data already obtained through the strategic options process to ensure relevant baseline information from available sources was taken into consideration in the options appraisal process.

1.3.4.9. **Step 3 Identification of Landfall Areas of Search:** This step involved the identification of areas of potential landfall within the study area as this is the interface between the onshore and offshore elements of the Project and therefore form the start and end points from which corridor options could be identified. The landfall areas of search are illustrated on **Figure 1.3.2 Suffolk Landfall Areas of Search** and **Figure 1.3.3 Kent Landfall Areas of Search** and were identified based on the following criteria:

- Access to the proposed onshore grid connection point;
- Suitability of ground conditions (e.g. areas of low elevation, avoidance of estuarine habitats);
- Potential for site access;
- Avoidance of existing infrastructure; and

[25] National Grid (2012). Our Approach to Options Appraisal. [online] Available at: https://www.nationalgrid.com/electricity-transmission/document/96531/download.

[26] National Grid (2003). NGC Substations and the Environment: Guidelines on Siting and Design (updated 2006). [online] Available at: https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf.

- High level consideration of potential key environmental and socio-economic constraints such as populated areas and ecological designations. Landfall areas of search were not necessarily ruled out on the basis of these potential constraints and were taken forward in order to be subjected to an initial routeing and siting environmental and socio-economic options appraisal.

1.3.4.10. **Step 4 Identification of Route Corridors and Site Option Areas:** This step involved the identification of marine route corridors and alignments between the landfall areas of search in parallel with the identification of terrestrial route corridors and converter station site option areas including the connection to the network.

1.3.4.11. **Step 5 Appraisal of Route Corridors and Site Option Areas:** This step involved an appraisal of the marine route corridors and alignments, terrestrial corridors, converter station siting areas and network connection options.

1.3.4.12. **Step 6 Identification of the Preferred end-to-end solution:** This step used the outcomes of the environmental and socio-economic and technical appraisal of the individual elements as well, as a consideration of cost, to identify an on-balance preferred end-to end solution for the Project.

Steps 3 – 4 Identification of Landfalls, Corridors and Site Option Areas

1.3.4.13. The sections below provide a summary of the options that were considered within steps 3-4 above.

Landfall areas of search

1.3.4.14. On the East Anglian coast in Suffolk five broad landfall areas of search were identified, these are illustrated on **Figure 1.3.2 Suffolk Landfalls Areas of Search** which were: an area to the south of Aldeburgh, north of the Alde and Ore River (S1); an area between Aldeburgh and Thorpeness (S2); an area between Thorpeness and Sizewell (S3); an area at Sizewell (S4); and an area to the north of Sizewell, south of Minsmere (S5).

1.3.4.15. On the Kent coast six landfall areas of search were identified, which were split geographically across the north Kent coast, Broadstairs and Pegwell Bay, these are illustrated on **Figure 1.3.3 Kent Landfall Areas of Search**. Four areas of search were identified along the north Kent coast between the settlements of Herne Bay and Birchington (K2-K5). One area was identified at Broadstairs at North Foreland between the settlements of Margate and Broadstairs (K1a). Within Pegwell Bay one area of search was identified that stretched across the area from the settlement of Ramsgate to the settlement of Deal (K1).

Converter station site option areas

1.3.4.16. The main search parameter for the converter station site option areas was that they should be within approximately 5km of the network connection point, as a distance greater than this would trigger the need for reactive compensation equipment on the network resulting in additional land take and cost. This search parameter was however used as a guide, so as not to discount potentially suitable sites at a slightly greater distance where the benefits might outweigh the additional land take and cost.

1.3.4.17. Within Suffolk, the needs case identified that the network connection point needed to be in the Sizewell area, so all three strategic options were based on this. Three potential points of connection were identified and appraised as part of the routeing and siting appraisal. These connection points are illustrated on **Figure 1.3.4 Suffolk Network Connection Points** and were the existing Sizewell B substation or the new Sizewell C substation (part of the proposed Sizewell C Nuclear Power Station Project); the proposed Friston substation (forms part of the proposed Scottish Power Renewables (SPR) East Anglia One North and East Anglia Two Offshore Wind Farm Projects); or a new connection point directly onto the existing 400kV overhead lines close to Sizewell.

1.3.4.18. Nine converter station site option areas were identified, these are illustrated on **Figure 1.3.5 Suffolk Converter Site Option Areas.** A number of which were in the search parameters for more than one connection point. Four site option areas within the 5km search parameter for a connection to the Sizewell substations (option areas A, B, C and D), seven within the 5km search parameter for the proposed Friston substation (option areas (B, C, D, E, G and H) and six within the 5km search parameter for a new connection onto the existing 400kV overhead lines (option areas B, D, E, F, H and I).

1.3.4.19. In Kent, the preferred strategic option included Richborough substation as the connection point and this was therefore used as the 5km radius search parameter. Two converter site option areas were identified, one adjacent to Richborough substation and wider Richborough Energy Park and a second between the settlements of Minster and Birchington adjacent to some larger scale agricultural uses. These are illustrated on **Figure 1.3.6 Kent Converter Site Option Areas**.

1.3.4.20. There were few brownfield sites that could accommodate the technical parameters required for the converter station. Therefore, the identification of converter station site option areas was based on avoidance of designated sites as far as possible, landform, opportunities for natural screening and opportunities to limit visual impacts on nearby settlements.

Terrestrial route corridors

1.3.4.21. Once the landfall areas of search and converter station site option areas had been identified, terrestrial route corridors between the two were developed. Corridors were developed that could connect each of the landfall areas of search to each of the converter station site option areas.

1.3.4.22. Within Suffolk this process resulted in 15 corridors being identified, some of which could be used for multiple landfall/site permutations:

- five corridors from each of the five landfall areas of search to the four converter station site option areas that could connect into the existing and proposed Sizewell substations (see **Figure 1.3.7 Suffolk Terrestrial Route Corridors – Sizewell Connection**);
- five corridors from each of the five landfall areas of search to the seven converter site option areas that could connect into the proposed Friston substation (see **Figure 1.3.8 Suffolk Terrestrial Route Corridors – Proposed Friston Connection**); and

- five corridors from each of the five landfall areas of search to the six converter station site options that could connect into the existing 400kV overhead lines (see **Figure 1.3.9 Suffolk Terrestrial Route Corridors – New Connection**).

1.3.4.23. Within Kent seven corridors were identified; three corridors connecting three of the four landfall areas of search along the north Kent coast to the two converter site option areas, one corridor from the landfall area of search at Broadstairs to the two converter station site option areas; and three corridors from the wide landfall area of search within Pegwell Bay to the two converter station site option areas. These are illustrated on **Figure 1.3.10 Kent Terrestrial Route Corridors**.

1.3.4.24. The terrestrial corridors were not developed to a specified width but were limited by larger constraints such as:

- Avoidance of designations where possible;
- avoidance of settlements; and
- consideration of traffic and access opportunities.

1.3.4.25. This was to allow for maximum flexibility also factoring in the potential technical constraints and avoiding prematurely discounting potentially favourable/feasible alignment options.

Marine route alignments

1.3.4.26. The very large geographical marine study area and large-scale nature of many of the constraint features meant that in order to undertake a meaningful routeing appraisal, it was necessary to identify indicative marine alignments within the broader corridors to appraise the feasibility of cable burial. Therefore, alignments are illustrated on **Figure 1.3.11 Marine Alignments**.

1.3.4.27. The marine alignments were split down into sections within three broad areas. These comprised sections that connected to each of the five Suffolk landfalls, sections that connected to each of the six Kent landfalls, and central sections. Due to the number of end-to-end marine alignments associated with multiple landfall connection points and central sections, the marine alignment sections were taken through the appraisal stage but whole marine end to end solutions were considered as part of the identification of the preferred end-to end solution.

1.3.4.28. The principal driver in defining the marine corridors and alignments between the landfall areas of search was to identify areas that would ensure the long-term integrity and security of the cable whilst also avoiding key constraints. The following design criteria were taken into consideration when developing the marine corridors and marine alignments:

- Shortest route possible to minimise the cable length, which in turn reduces the manufacturing and installation cost as well as the environmental and security footprint;
- Avoidance of environmentally sensitive areas where possible;
- Avoidance of areas that have restricted movement i.e., anchorages;
- Avoidance of known wrecks and areas of archaeological importance;
- Avoidance of offshore installations (renewable, oil/gas, wells/platforms, etc.);

- Limiting the need to cross in-service cables and pipelines and, where crossings would be necessary, corridors and alignments were routed to ensure the crossing angle would be optimal and water depth would be sufficient for navigational safety;
- Routed to consider shipping density, i.e., anchorage areas, high density shipping lanes;
- Avoidance of hazardous seabed terrain (e.g., bedrock outcrop and mobile sediments) where possible, ensuring the cable would be protected by achieving an acceptable depth of burial; and
- Limiting the impact on third-party considerations including seasonal fishing activities, local tourist trade, and military practice zones.

Step 5 Appraisal of Landfalls, Route Corridors and Site Option Areas

1.3.4.29. Each of the elements described above was assessed individually. A separate assessment was not undertaken for each of the landfall areas of search as the performance of each landfall is influenced by both the marine and terrestrial corridor approach. The landfalls were therefore assessed as part of the assessment of both the terrestrial route corridors and the marine route alignments.

1.3.4.30. The sections below provide an overarching summary of the appraisal of the individual elements.

Converter station site option areas

1.3.4.31. Within Suffolk the appraisal of the three connection points was undertaken alongside that of the converter site option areas.

1.3.4.32. Of the possible connection points in the Sizewell area, only the Sizewell B substation is currently in existence; all the other proposed connection points would require the installation of a new substation, either proposed through another project in the area or installed as part of this Project. Connecting to the existing Sizewell B substation would require taking over two of the super grid transformer (SGT) circuits feeding the existing Leiston 132kV substation, by connecting into the 400kV circuits feeding the SGTs. This would require the installation of two new 400/132kV SGTs in the converter station site with new 400kV cables connecting into the existing Sizewell B substation and new 132kV cables connecting the SGTs in the converter station with the Leiston 132kV substation. The 400kV cable route to the existing Sizewell B substation would require either using the corridor allocated to the existing 132kV connection or routeing through Sizewell Marshes SSSI.

1.3.4.33. A connection into the proposed Sizewell C substation would also require using the corridor allocated to the existing 132kV connection or require routeing through Sizewell Marshes SSSI. A connection into either, the existing or the proposed Sizewell substation would also need to take into account the works to construct the proposed Sizewell C Nuclear Power Station, as the works would overlap. This interaction with the proposed Sizewell C Nuclear Power Station could have programme implications on the delivery of this Project in line with the needs case due to construction sequencing.

1.3.4.34. At the time of the routeing and siting appraisal, the DCO that would deliver Friston substation was advanced in the consenting process and it has subsequently received development consent.

1.3.4.35. A connection into the existing 400kV overhead lines would require a new substation to be built. A new substation was assessed as being co-located within the converter site option areas (B, D, E, F, H and I) and would also require, either, the existing overhead lines to be diverted in and out of the new substation, or an underground cable (where economic and efficient) from a new substation to the existing overhead lines, with a cable sealing end compound located adjacent to the overhead lines.

1.3.4.36. A summary of the appraisal outcomes of each of the converter site option areas in Suffolk is presented in **Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme**.

1.3.4.37. Within Kent only two converter site option areas were identified and appraised. The area closest to the connection point at Richborough substation was generally favoured as it minimised the connection back to the existing network and facilitated an opportunity to site a converter station close to similar existing infrastructure.

Terrestrial route corridors

1.3.4.38. Within Suffolk none of the corridors avoided designated sites. The Suffolk Coasts and Heaths AONB extends across the full extent of the routeing and siting study area and was therefore unavoidable for a11of the 15 corridors. Whilst the routeing and siting study area was drawn to provide opportunities to avoid designated sites and constraints, the AONB extends unbroken from Felixstowe and Harwich in the south to Kessingland in the north. It was not therefore possible to avoid this designation and meet the needs case without a significantly longer and indirect route that would not be in accordance with National Grid's statutory duties.

1.3.4.39. All three green corridors that connect with the southernmost of the five landfall areas of search (S1), south of Aldeburgh, would require an extensive crossing of the Alde-Ore Estuary, which is designated as a SAC and SPA. These corridors would also interact with the same designated sites around the settlements of Iken and Snape.

1.3.4.40. The three orange corridors connecting to the most northern landfall area of search (S5) to the north of Sizewell would need to cross several sites designated for their ecological conservation value (including Minsmere RSPB Reserve) and would entail significant interaction with the proposed Sizewell C Nuclear Power Station Project.

1.3.4.41. The three blue corridors that connect into the southern part of the landfall area of search (S3) between Thorpeness and Sizewell would need to cross a section of the Leiston Aldeburgh SSSI and would likely require interaction with the proposed cable routes for the Scottish Power Renewables (SPR) East Anglia One North and East Anglia Two Offshore Wind Farms.

1.3.4.42. The three purple corridors connecting into the northern part of landfall area of search S3, when considered in isolation, provided an opportunity to avoid sites designated for nature conservation but would have entailed interaction with the proposed Sizewell C Nuclear Power Station Project. Routeing was also constrained by the presence of other cables that make landfall at this location.

1.3.4.43. The three red corridors that connect to the landfall area of search between Aldeburgh and Thorpeness (S2) would also need to cross a section of the Leiston Aldeburgh SSSI as well as part of the North Warren RSPB Reserve.

1.3.4.44. Other areas considered included the three green corridors connecting into the southernmost landfall areas of search (S1), which would require the installation of cables in an extensive area of flood zones 2 and 3; these corridors would also have a longer length within the AONB compared with the other corridors

1.3.4.45. Four pinch-points were identified within the route corridors. The first pinch-point is located at a crossing of Leiston Road close to the South Warren Golf Course, which would be crossed by all three red corridors connecting to the landfall area of search between Aldeburgh and Thorpeness (S2).

1.3.4.46. The second pinch-point is located between the B1353 and Leiston Road and would require cable routes to cross the Sandlings SPA, the Leiston Aldeburgh SSSI, and a section of a golf course, as well as a narrow crossing of Leiston Road. This pinch-point would affect the three blue corridors connecting to the southern part of the Thorpeness to Sizewell landfall area of search (S3).

1.3.4.47. The third pinch-point is located to the south of Aldringham at the crossing of the Hundred River. This area is constrained by the Hundred River itself, the crossing of the B1353 and the B1122, and an area of woodland and nearby properties. In addition, the proposed cables for the SPR East Anglia One North and Two Offshore Windfarms are proposed to be routed through this same pinch-point. Depending on which converter station site option area is selected, this pinch-point would need to be routed through the three purple corridors connecting to the northern part of the Thorpeness to Sizewell landfall area of search (S3) and the three blue corridors connecting to the southern part of that same landfall.

1.3.4.48. The fourth pinch-point is located to the northwest of Leiston and is associated with the offsite works for the proposed Sizewell C Nuclear Power Station Project, including an area which has recently been established for ecological mitigation measures related to that project. Depending on which converter station site option area is selected, this this pinch-point would need to be routed through by the three purple corridors connecting to the northern part of the Thorpeness to Sizewell landfall area of search (S3) and the three blue corridors that connect to the southern part of that same landfall. Within Kent none of the landfall areas of search avoided sites designated for nature conservation, albeit the designated features vary across the landfalls. The three route corridors (green, blue and red) connecting to the landfall areas of search (K2-K4) along the north Kent coast would all require the cable to be routed through an area of Flood Zone 2 and 3. Access to the landfall areas of search was also limited by the presence of a railway line, as construction access would need to cross this feature.

1.3.4.49. The green corridor connecting to the landfall area of search (K1a) at Broadstairs would need to cross North Foreland Golf Course. There is also a pinch-point along this corridor between the settlements of Margate and Ramsgate where there is a linear belt of settlement where cables would need to be routed within the public highway. This green corridor is further constrained by a site allocated for development in the Local Plan, avoidance of which would require a longer length of cable within the public highway.

1.3.4.50. The three corridors (green, red and blue) connecting to the landfall area of search (K1) in Pegwell Bay would all cross the Thanet Coast and Sandwich Bay designated sites, albeit the extent of the designated area crossed would reduce towards the south of this area of search. Crossing of a golf course would be unavoidable across all three of these corridors. The blue southernmost of the corridor would require routeing through an extensive area of Flood Zone 2 and 3 and the southern two

corridors (blue and red) would require a crossing of the River Stour and several large waterbodies either to the north or south of Great Stonar. The northernmost of the three corridors (green) connecting to this landfall area of search would cross a greater extent of the designated site but would avoid crossing the River Stour and other waterbodies.

Marine corridors and alignments

1.3.4.51. All marine approaches to the landfall areas of search along the Suffolk Coast would need to be routed through the Outer Thames Estuary SPA and the Southern North Sea SAC. The marine alignment connecting to the landfall area of search to the north of Sizewell (S5) would result in more cable crossings than the other alignments and would have potential to interact with the proposed Sizewell C Nuclear Power Station Project's offshore works. The marine alignments connecting to the southern part of the landfall areas of search (S3), between Thorpeness and Sizewell, are significantly constrained by the presence of rocky reefs in the nearshore area, although marine alignments to the northern part of this same landfall area of search could avoid this feature. The marine alignments to the two southernmost landfall areas of search (S1 and S2), between Aldeburgh and Thorpeness and to the south of Aldeburgh, are not significantly constrained.

1.3.4.52. All marine approaches to the north Kent coast landfall areas of search (K2 – K5) would require routeing through the Margate and Long Sands SAC and would also interact with the Thanet Coast MCZ and Thanet Coast SAC. It is likely that any works required to protect the cable, where sufficient burial depth could not be achieved, could result in permanent habitat loss, affecting the interest features of Margate and Long Sands SAC. There is also an area of 'mobile sandbanks some of which may be exposed at low tide', off the north Kent coast. This area is unlikely to be avoidable for any option to a north Kent coast landfall area of search. This presents a considerable exposure and engineering risk. It is also likely that there would be some impact on key anchorage areas offshore off Margate.

1.3.4.53. The marine alignment to the landfall search area at Broadstairs (K1a) would interact with areas designated for nature conservation at the landfall but could avoid the Margate and Long Sands SAC and could also avoid routeing through the Goodwin Sands MCZ.

1.3.4.54. The marine alignments connecting to the Pegwell Bay landfall area of search (K1) could not avoid the nature conservation sites at the landfall; however, the length of the crossing would reduce for those marine alignments routed to the south of this landfall option area.

1.3.4.55. It is unlikely that marine alignments to this landfall could avoid the Goodwin Sands MCZ. This interaction is due to the routeing in this area being constrained, to the east, by the Goodwin Sandbank. Routeing over the Goodwin Sandbank would increase the risk of cable exposure during the lifetime of the cable and would subsequently likely to result in the need for additional rock protection to be put in place, potentially resulting in permanent habitat loss. Routes to the west are constrained by the Ramsgate dredged channel and an area of sandwave field. Additionally, when routeing east out from Pegwell Bay, the route must cross the Nemo Link cable and the Thanet Offshore Wind Farm export cables, requiring the placement of rock protection on the seabed at these locations and potentially resulting in permanent habitat loss, including within the Goodwin Sands MCZ. The water depths in this area are very shallow, slowly gaining depth moving to the east.

To avoid unacceptable reductions in water depths that could pose a hazard to marine vessels, the proposed cable crossings would need to be located in areas with a suitable water depth.

1.3.4.56. In the central section of the marine alignments there is a pinch-point location where the north-eastern extent of the Margate and Long Sands SAC abuts the Sunk Traffic Separation Scheme (TSS); there are also several aggregate extraction areas and deep-water shipping channels in this area. There are also three proposed projects in this area, including: the NeuConnect Interconnector, the Five Estuaries and the North Falls Offshore Wind Farms. The existing Greater Gabbard and Galloper Offshore Wind Farms also constrain marine alignments. Marine alignments through this area were considered to have suitable seabed conditions for cable installation and burial.

1.3.4.57. Due to the range of constraints in this area, engagement was undertaken with the relevant marine stakeholders. Concerns were raised by stakeholders about the need for rock placement for crossing of existing and proposed infrastructure within Margate and Long Sands SAC, both in terms of potential for permanent habitat loss and unacceptable reductions in water depth for shipping and navigation. Aggregate operators also expressed a preference for routeing to be located to the east in order to minimise impacts on their operations.

1.3.4.58. As a result an alternative route was therefore identified to the east of Margate and Long Sands SAC. This route is located close to the centre of the Sunk TSS approach channels where the shipping density is lower and the crossing would be in deeper water.

Step 6 Identification of a Preferred End-to-end Solution

1.3.4.59. Following the appraisal of the individual elements, an on-balance preferred end-to-end solution was identified, which took account of environmental, socio-economic and technical appraisals as well as cost in accordance with National Grid's statutory duties.

1.3.4.60. Within Suffolk, the significant constraints associated with a connection into either, the existing or proposed Sizewell substations meant that these options were not preferred. Connecting into a new connection point in the area, with an associated additional substation, was also not preferred. The proposed Friston substation was therefore identified as the preferred connection point for the Project.

1.3.4.61. Whilst the southernmost of the landfall areas of search (S1) was least constrained from a marine perspective, the terrestrial green corridors from this would have the greatest interaction with the AONB and require a significant crossing of the Alde and Ore Estuary, as well as interaction with the associated SAC and SPA designations. The northernmost landfall area of search (S5) was constrained both, on the marine approach from existing and proposed infrastructure, and terrestrially due to the Minsmere designated sites and potential interaction with the proposed Sizewell C Nuclear Power Station Project. The southern part of the landfall area of search (S3) between Thorpeness and Sizewell was significantly constrained on the marine approach due to the presence of an area of rocky reef. Terrestrial route corridors from this same landfall area of search could not avoid any of the pinch-points described in the sections above. The marine approach to the landfall area of search between Aldeburgh and Thorpeness (S2) has few constraints, however the Leiston Aldeburgh SSSI and North Warren RSPB reserve could not be avoided without the

use of trenchless construction techniques at the landfall. Terrestrial route corridors from this landfall area of search also include the pinch-point along Leiston Road. The northern part of the landfall area of search (S3) between Thorpeness and Sizewell could avoid the area of rocky reef however the presence of existing and proposed cables at this landfall area and in the nearshore environment constrain the marine alignments. Terrestrial route corridors connecting to this landfall could avoid the designated sites, however the terrestrial route corridors could not avoid at least one of the pinch-points described above and would result in a longer overall connection to the proposed Friston substation.

1.3.4.62. On balance, the preferred solution identified was the landfall area of search between Aldeburgh and Thorpeness (S2) connecting to a converter site option area E to the southeast of the proposed Friston substation via the red corridor. This converter site option area offered good existing screening and opportunities to develop mitigation in keeping with the existing landscape character. Whilst this option was constrained at the landfall due to presence of terrestrial nature conservation sites, it was identified that trenchless installation methods could be used to minimise or avoid potential impacts. However, as further survey work is required to confirm the feasibility of using trenchless techniques at this landfall it was considered prudent to also progress an alternative, which is to make landfall at the northern part of the landfall area of search (S3) between Thorpeness and Sizewell with the purple terrestrial route corridor connecting to the same converter site option area E.

1.3.4.63. Within Kent, the marine alignments to the landfall areas area of search along the north Kent coast (K2-K5) were highly constrained by the Margate and Long Sands SAC and an area of mobile sandbanks. Whilst the marine alignment to the landfall area of search at Broadstairs (K1a) had few constraints the terrestrial green corridor from this landfall was highly constrained by the development between the settlements of Margate and Ramsgate and several planning applications and allocations. Whilst the marine alignments to the Pegwell Bay landfall area of search (K1) could not avoid the Pegwell Bay and Sandwich designated sites, with some potential interaction with the Goodwin Sands MCZ, the appraisal identified that any potential impacts could be mitigated through careful selection and trenchless installation techniques. The preferred solution was identified as a landfall in the northernmost part of the landfall area of search K1 connecting to the converter site option area A adjacent to the existing Richborough Energy Park via the green corridor as it offered the shortest connection of the three corridors. It also avoided areas of Flood Zone 2 and 3 and crossings of the River Stour or other significant waterbodies. Whilst this option would require the longest crossing of the designated sites of the three corridors options from Pegwell Bay, trenchless installation techniques could be used to avoid the most sensitive saltmarsh habitat within this designated area.

1.3.4.64. Of the central marine alignments, the revised alignment to the centre of the Sunk TSS approach channels and outside of Margate and Long Sands SAC was identified as being preferred.

Stakeholder Engagement

1.3.4.65. Following the identification of the preferred end-to-end solution, a round of stakeholder engagement was undertaken and as a result several amendments were made which are described in the following sections.

Suffolk

1.3.4.66. During engagement with stakeholders Suffolk County Council and East Suffolk District Council emphasised the importance of looking at opportunities to co-ordinate with the interconnector projects being proposed by National Grid Ventures (NGV) in the area. These are the proposed Nautilus Interconnector which undertook non-statutory consultation in September 2021 and the proposed EuroLink Interconnector. Both projects are at the pre Environmental Impact Assessment (EIA) Scoping stage. Both interconnector projects would require its own converter station, underground HVDC cables between a landfall and the converter station and an HVAC connection between the converter station and the network connection point.

1.3.4.67. The Project has explored the concept of co-location of converter stations, shared cable corridors and consolidation of landfalls and to look at potential challenges and options for consenting a coordinated approach. The coordinating exercise has been undertaken in consultation with NGV and the Project will continue to engage with NGV to consider opportunities for coordination as the proposal for Sea Link, Nautilus and EuroLink progress.

1.3.4.68. A backcheck and review of all potential converter station sites/option areas identified independently through both the NGV Nautilus and the Project routeing and siting studies was undertaken to check the feasibility of whether those sites could accommodate up to three co-located converter stations and to identify any additional sites that should be investigated/appraised further for co-location opportunities, again up to three converter stations.

1.3.4.69. Seven sites were identified as potentially offering opportunities for coordination and an appraisal was undertaken of these sites in accordance with the National Grid options appraisal methodology described above. Two sites were identified as preferred for the development of the Project converter station, as well as offering the potential to co-locate with the other proposed projects. The conclusions on the landfall option areas and terrestrial route corridors remained unchanged and as described in the sections above; however, the northern part of the landfall option area between Thorpeness and Sizewell, and the corresponding terrestrial corridors, were identified as offering limited opportunities for coordination. Further information on the development of the Project in Suffolk, and the options that are being scoped on in this Scoping Report, is set out in **Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme**.

Kent

1.3.4.70. Following engagement with other developers who have subsequently submitted planning applications for other energy developments within Richborough Energy Park, a backcheck and review was undertaken, as the proposed developments significantly constrained the Project being able to connect into the existing network at Richborough substation. As such an alternative connection directly onto the existing Richborough to Canterbury 400kV overhead line was identified. A backcheck and review was undertaken of the routeing and siting options in Kent based on this revised connection point and following this review the conclusions on the landfall area of search (K1), Pegwell bay green corridor and converter site option area A remained unchanged. Further information of the development of the Project in Kent is set out in **Part 3, Chapter 1, Evolution of the Kent Onshore Scheme**.

1.4 Description of the Project

1.4.1. Introduction

1.4.1.1. The Project involves the reinforcement of the electricity transmission network between the proposed Friston substation in Suffolk to the existing Richborough to Canterbury 400kV overhead line in Kent. This reinforcement would be between approximately 130km – 140km long, comprising of a HVDC link.

1.4.1.2. This chapter sets out the emerging description of the Project and has been split into the following sections, which describe:

- a description of the infrastructure proposed in Suffolk, Kent and in the marine environment;
- the construction methods that are proposed for installing the infrastructure associated with the Project;
- operation and maintenance requirements; and
- how the Project is proposed to be decommissioned if required.

1.4.2. Project Description

1.4.2.1. As described in Part 1, Chapter 1, for ease of presentation the Project has been split geographically into the Suffolk Onshore Scheme, Kent Onshore Scheme and the Offshore Scheme, the following sections describe the infrastructure proposed in each of these areas.

Suffolk Onshore Scheme

1.4.2.2. The Suffolk Onshore Scheme Scoping Boundary is illustrated on **Figure 1.1.2 Suffolk Onshore Scheme Scoping Boundary**. The Suffolk Onshore Scheme comprises of:

- an extension to the proposed Friston substation;
- underground HVAC connection from the proposed Friston substation to the proposed converter station site;
- a new converter station; and
- a HVDC underground cable from the new converter station to a landfall.

1.4.2.3. Within Suffolk there are two options being considered for the proposed converter station site, as well as an alternative landfall including the associated HVDC underground cable corridors. Whilst the infrastructure described above and below would be the same regardless of the option ultimately developed, the location of the infrastructure would vary depending on which option is selected. The Project Scoping Boundary (**Figure 1.1.1 Project Scoping Boundary**) and Suffolk Onshore Scheme Scoping Boundary (**Figure 1.1.2 Suffolk Onshore Scheme Scoping**

Boundary) encompass all the options being considered. The options are described in more detail in **Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme**.

Proposed Friston substation

1.4.2.4. The works at the proposed Friston substation comprise of:

- extension to the boundary of the site and boundary fencing;
- installation of one new Air-insulated switchgear (AIS) bay; and
- additional switch gear and bus bars to be located within the substation.

1.4.2.5. Consent to construct the proposed Friston substation has been secured by SPR as part of their East Anglia One North and Two Offshore Windfarm projects. If the proposed Friston substation does not come forward under that consent , the Project needs to secure consent to build the proposed Friston substation. Under this scenario the proposed infrastructure applied for by the Project would include:

- construction of a New AIS Substation to connect to the existing 400kV overhead lines;
- replacement of three overhead line towers and installation of one additional tower;
- creation of three new Cable Sealing End Compounds (CSEC); and
- construction of a substation access road.
- the proposed scope of assessment takes account of both scenarios.

HVAC connection

1.4.2.6. The HVAC connection from the proposed converter station to the proposed Friston substation would be via HVAC underground cables.

1.4.2.7. Table 1.4.1 provides a summary of the typical characteristics of the HVAC connection.

Table 1.4.1: Typical characteristics of HVAC underground cables – Suffolk

Characteristic	Description
Working width	60m Up to 100m where coordination is included
Permanent easement	Typically 25m
No of cables	Up to 12 cables
No of trenches	Up to 4
Trench width	Typically 1.5m
Trench depth	Typically, 1.5m
Minimum depth of cover	Agricultural land – typically 0.9 m (900 mm)

Characteristic	Description
	Watercourses – typically 2.0 m (2000 mm) Roads – typically 0.75 m (750 mm) Railways – typically 5 m (5000 mm) Footpaths and non-agricultural verges – typically 0.6 m (600 mm)
Backfill material	Soil and cement bound sand (CBS) or other thermally suitable material
Cable section length	Typical cable section length: 800-1200m
Above ground infrastructure	At each cable joint there will be an above ground kiosk, which will be used to monitor and occasionally test the underground cables.

1.4.2.8. As set out in **Part 1, Chapter 3, Main Alternatives Considered** opportunities are being explored for the coordination of the Project with the proposed interconnectors in the area. Whilst each project would be consented individually, each project may seek to consent the ability to install cable ducts for the other projects to minimise disturbance along the HVAC underground cable corridors where cables can be co-located. Therefore, the proposed scope of assessment presented within this Scoping Report has included for the installation of up to 12 ducts.

Converter station

1.4.2.9. The proposed converter station would comprise of the following general components:

- AC switchyard;
- converter transformers;
- valve halls;
- DC switchyard ;
- control building;
- spare parts building;
- permanent access road; and
- landscaping / landscape planting

1.4.2.10. The proposed Project converter station would be up to 10ha in area and the valve halls could be up to 30m in height. Opportunities to coordinate the proposed Project's converter station site with the proposed interconnector projects are being explored which could result in the proposed Project converter station site being located within a larger site complex.

Underground HVDC cables

1.4.2.11. The underground HVDC cables would be made of a copper core with cross linked polyethylene (XLPE) insulation.

1.4.2.12. Table 1.4.2 provides a summary of the typical characteristics of the HVDC underground cables.

Table 1.4.2: Typical characteristics of HVDC underground cables – Suffolk

Characteristic	Description
Working width	Typically 40m Up to 80m where coordination is included
Permanent easement	Typically 15m
No of cables	Up to 4
No of trenches	Up to 2
Trench width	Typically 1.5m
Trench depth	Typically 1.5m
Minimum depth of cover	Agricultural land – typically 0.9m (900 mm) Watercourses – typically 2.0m (2000 mm) Roads – typically 0.75m (750 mm) Railways – typically 5m (5000 mm) Footpaths and non-agricultural verges – typically 0.6m (600 mm)
Backfill material	Soil and cement bound sand (CBS) or other thermally suitable material
Cable section length	Typical cable section length: 800-1200m
Above ground infrastructure	None

1.4.2.13. As set out in **Part 1, Chapter 3, Main Alternatives Considered** opportunities are being explored for the coordination of the Project with the proposed interconnectors in the area. Whilst each project would be consented individually, each project may seek to consent the ability to install cable ducts for the other projects to minimise disturbance along the HVDC underground cable corridors where cables can be co-located. Therefore, the proposed scope of assessment presented within this Scoping Report has included for the installation of up to 12 ducts.

Kent Onshore Scheme

1.4.2.14. The Kent Onshore Scheme Scoping Boundary is illustrated on **Figure 1.1.3 Kent Onshore Scheme Scoping Boundary**. The Kent Onshore Scheme comprises of:

- HVAC connection, either by overhead line or underground cable, from the existing Richborough to Canterbury 400kV overhead line to a converter station site;
- a new converter station; and
- a HVDC underground cable from the new converter station to a landfall in Pegwell Bay.

HVAC connection

1.4.2.15. The HVAC connection from the proposed converter station to the existing Richborough to Canterbury 400kV overheard line would either be made via HVAC underground cables or overhead line. Both options have been included in this Scoping Report. The type of infrastructure proposed will be refined through discussions with stakeholders and baseline surveys.

1.4.2.16. Table 1.4.3 provides a summary of the typical characteristics of the HVAC connection either by underground cables or overhead line.

Table 1.4.3: Typical characteristics of a HVAC connection – Kent

Type	Characteristic	Description
HVAC underground cable	Working width	Typically 60m
	Permanent easement	Typically 25m
	No of cables	Up to 12 cables
	No of trenches	Up to 4
	Trench width	Typically 1.5m
	Trench depth	Typically 1.5m
	Minimum depth of cover	Agricultural land – typically 0.9 m (900 mm) Watercourses – typically 2.0 m (2000 mm) Roads – typically 0.75 m (750 mm) Railways – typically 5 m (5000 mm) Footpaths and non-agricultural verges – typically 0.6 m (600 mm)
	Backfill material	Soil and cement bound sand (CBS) or other thermally suitable material
	Cable section length	Typical cable section length: 800-1200m
	Above ground infrastructure	At each cable joint there will be an above ground kiosk, which will be used to monitor and occasionally test the underground cables. A Cable Sealing End Compound (CSEC) 116m x 63m would be required at the interface with the existing Richborough to Canterbury overhead line.
Overhead line	Pylon type	Steel lattice – typical low height

Type	Characteristic	Description
	Pylon height	Typically, 46m (standard height) and 45m (low height)
	Pylon footprint	Typically 10m^2 (standard)
	Conductor type	2 x 700mm^2 Araucaria (AAAC)/ 2x 620mm^2 Matthew or Similar
	Turn in/Tee in	Double turn in - This would require the installation of approximately ten new low height towers and the removal of three existing low height towers. The existing overhead line route would be diverted, and four new towers would be installed between this point and the proposed substation site within the converter station option area. Four further towers will then connect the substation with the existing line. Double Tee - This would require the installation of approximately nine new low height towers and the removal of two existing low height towers. The works would also require the installation of a cable sealing end compound (approx.132m x 93m) adjacent to the existing overhead line. The cable sealing end compound would be constructed to the north of the existing overhead line and new towers installed either side to connect back to the existing route, this would require the removal of two towers and the installation of two new towers to the west of the proposed compound and one new tower to the east. A new Tee overhead line would then connect the compound to the proposed substation within the converter site option area via a new set of 6 towers.

Converter station

1.4.2.17. The proposed converter station would comprise of the following general components:

- AC switchyard;
- converter transformers;
- valve halls;
- DC switchyard;
- control building;
- spare parts building;
- permanent access road; and

- landscaping/landscape planting.

1.4.2.18. The proposed converter station in Kent would be up to 10ha in area and the valve halls could be up to 30m in height.

Underground HVDC cables

1.4.2.19. The underground HVDC cables would be made of a copper core with cross linked polyethylene (XLPE) insulation.

1.4.2.20. Table 1.4.4 provides a summary of the typical characteristics of the HVDC underground cables.

Table 1.4.4: Typical characteristics of HVDC underground cables – Kent

Characteristic	Description
Working width	Typically 40m
Permanent easement	Typically 15m
No of cables	Up to 4
No of trenches	Up to 2
Trench width	1.5m
Trench depth	1.5m
Minimum depth of cover	Agricultural land – typically 0.9m (900 mm) Watercourses – typically 2.0m (2000 mm) Roads – typically 0.75m (750 mm) Railways – typically 5m (5000 mm) Footpaths and non-agricultural verges – typically 0.6m (600 mm)
Backfill material	Soil and cement bound sand (CBS) or other thermally suitable material
Cable section length	Typical cable section length: 800-1200m
Above ground infrastructure	None

Offshore Scheme

1.4.2.21. The Offshore Scheme Scoping Boundary is illustrated on **Figure 1.1.4 Offshore Scheme Scoping Boundary**.

1.4.2.22. The Offshore Scheme includes three distinct components, which are summarised below:

- Suffolk Landfall: This is the area where the cable route transitions between the marine and terrestrial environment in Suffolk. This is located between Aldeburgh

and Thorpeness with an alternative landfall currently also under consideration at Sizewell gap.

- Kent Landfall: this is the area where the cable route transitions between the marine and terrestrial environment in Kent, located in the Pegwell Bay area;
- Marine Cable Route: This is the cable route from landfalls in Suffolk up to Mean High Water Springs (MHWS) to the landfall in Kent up to MHWS, between approximately 120-128 km in length and located entirely within UK territorial waters.

1.4.2.23. The detailed configuration of the cable system is still under development at this stage and will be informed by further electrical design studies and through selection of the cable supplier and installation contractor. However, up to four cables could be installed within a maximum of two trenches, these will either be installed individually, if the final design is for two cables, or as bundled pairs.

1.4.3. Construction

1.4.3.1. This section describes how the infrastructure described above would typically be constructed and installed. An outline Code of Construction Practice (CoCP) has been produced and is included at **Appendix 1.4.A Outline Code of Construction Practice**. The technical chapters within Parts 2-4 have taken account of the control and management measures which are set out in the outline CoCP when proposing their scopes.

Construction Programme

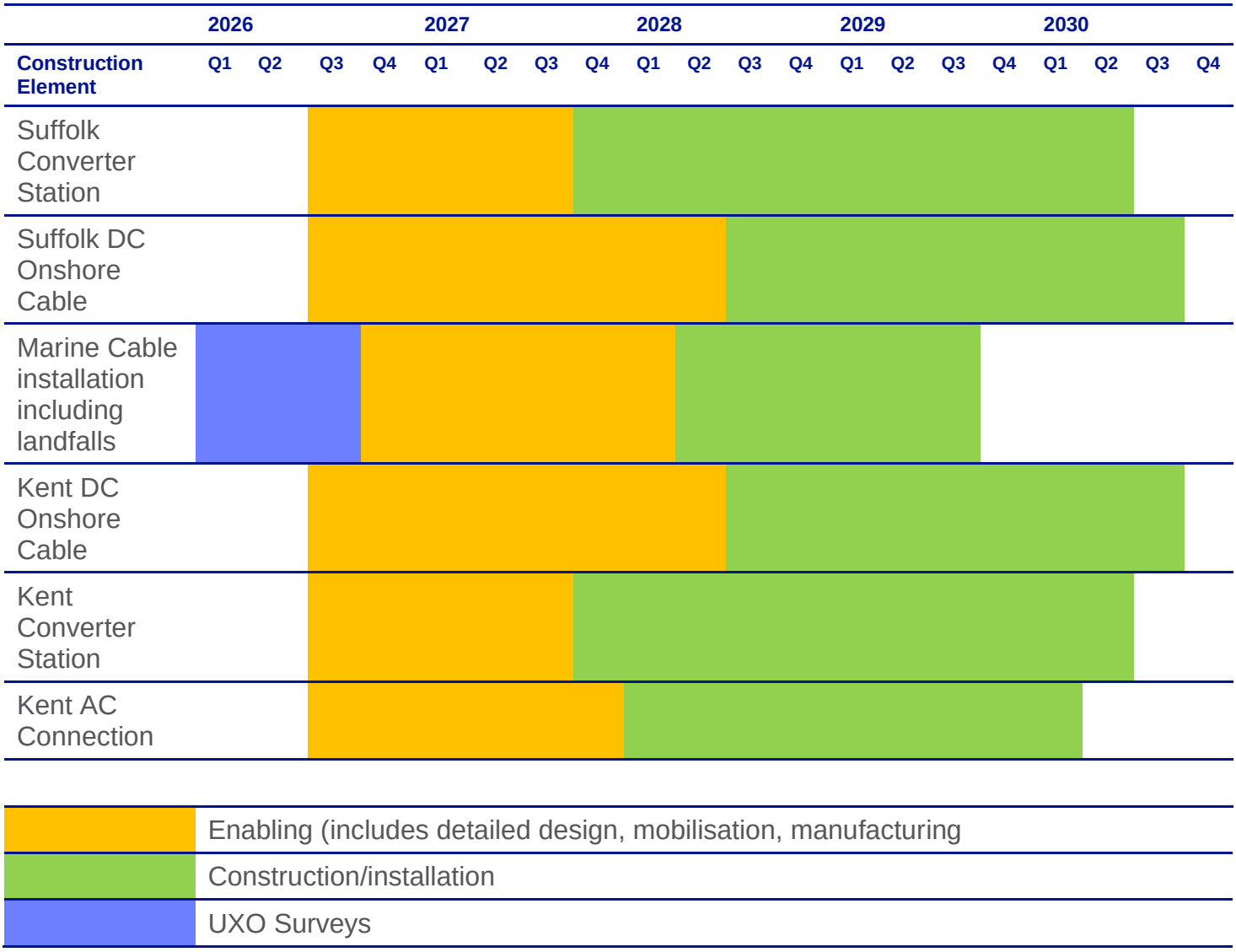
1.4.3.2. Subject to gaining development consent, construction works would be expected to start in 2026 and be completed by 2030. Certain advance works (such as archaeological trial trenching or protected species mitigation) may take place in advance of the main construction period.

1.4.3.3. The construction schedule will be developed as the Project progresses and will take account of seasonal constraints such as protected species breeding or hibernation seasons and reducing impacts associated with flood zones.

1.4.3.4. An indicative construction programme for the Project is presented in Table 1.4.5.

Table 1.4.5: Indicative construction programme

	2026				2027				2028				2029				2030			
Construction Element	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Friston substation bays																				
Suffolk AC Onshore Cable																				



Construction workforce

1.4.3.5. It is anticipated that the peak workforce would typically be within the range of 300 – 400 across the whole Project.

Enabling Works, Access and Site Preparation

1.4.3.5. In order for the elements of the Suffolk and Kent Onshore Schemes to be constructed, enabling works are required such as the establishment of temporary bellmouths and access tracks and drainage works. The enabling works are consistent across all elements of the Onshore Schemes and have therefore been described once below rather than for each individual element.

1.4.3.6. Bellmouths would be installed where new accesses or widening of existing accesses from the public highway are required. The installation of bellmouths may require realignment of existing underground services and the creation of visibility splays to create a line of sight for the safe use of the junction. 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. Typically, a bellmouth would take approximately ten days to install.

1.4.3.7. Once a new or widened access point has been created the proposed access tracks and working areas would be fenced off using approximately 1.2m high stock proof fencing or equivalent. Gates or equivalent would be incorporated into the fencing to maintain access to farmland where possible and to maintain access to Public Rights of Way (PROWs) where possible. The topsoil would be stripped from the access tracks, cable working width and pylon working areas. The topsoil would be stored carefully to one side; typically, topsoil would be stored in bunds approximately 4m wide by 1.2m high. Temporary drainage would be installed as required, with silt fences installed where required. Topsoil stripping is typically undertaken at a rate of approximately 50m to 100m per day for access tracks, 20m-40m per day for the cable working width and three days per pylon construction area depending on the excavator chosen, soil type and location.

1.4.3.8. Temporary drainage would be required during construction, to deal with rainfall and water encountered during excavation where appropriate. Construction sustainable drainage systems (SuDS) would be used if necessary and where appropriate to do so.

1.4.3.9. The access tracks would typically be 4.5m wide, and up to 9m wide at passing places. They would either be stone laid on a geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. The installation of the access tracks would typically be undertaken at a rate of approximately 50m per day and a typical or low height pylon working area would take one week to install. The stone access tracks would be constructed using primary or secondary aggregates. 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.

1.4.3.10. Culvert installations would be required for temporary access tracks to cross ditches and watercourses. The size of each culvert would vary depending on the dimensions of the crossing, and sensitivity and importance of the watercourse. To install a culvert, typically the banks are first strimmed at the proposed culvert location. Bunds would then be installed upstream and downstream to prevent water from entering the work site, water contained between the two bunds would be pumped downstream to clear the work area. To maintain the flow of the watercourse during installation of the culvert, a pump would be used to pump water from upstream to downstream, bypassing the work site. The bottom of the ditch or watercourse would be excavated to the size of the proposed foundation and, if required lined with a geotextile separation membrane overlain by bedding material. If required, a geotextile separation membrane would be placed on top of the ditch banks, prior to backfilling. The culvert would then be installed and backfilling commenced. The backfill would be laid to provide minimum cover over the culvert based on maximum loadings. A sandbag (or concrete bag) headwall and temporary fencing would subsequently be installed after which the bunds upstream and downstream would be removed and the over-pumping stopped to allow water to flow through the culvert. The installation of culverts would typically take approximately two days per culvert.

1.4.3.11. 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. Temporary bridges would need to accommodate a 250t capacity mobile crane for overhead line construction and the temporary bridge support 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 a clear span and the foundations would be placed clear of the banks of the watercourse. Once the foundations were 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. The installation of a typical short span, flat deck bridge would typically take approximately four to five days. If concrete, or piled bridge foundations were needed a further ten to 15 days per bridge would be required.

Proposed Friston Substation

1.4.3.12. A typical construction sequence for the construction of an extension would involve:

- survey and ground investigations;
- set up of site establishment and temporary facilities;
- temporary access to the substation(if required);
- earthworks;
- civil engineering works;
- building works;
- AIS extensions and bay installation(mechanical and electrical) ;
- outage works to connect to the existing substation;
- commissioning; and
- energisation

1.4.3.13. For the purposes of this Scoping Report, it has been assumed that the construction of the proposed substation extension would take between 9 and 12 months, which is typical for a substation extension.

1.4.3.14. Should the Project need to construct Friston substation, the construction sequence above would be the same up to the civil engineering works and would follow the following typical sequence thereafter:

- OHL reconfiguration works under outages including temporary towers/masts where required;
- building works;
- AIS busbars and bay installation (Mechanical and Electrical); ·
- outages to connect the new substation;
- commissioning; and
- energisation.

1.4.3.15. The construction of the proposed substation extension would take approximately 13 months or 18-24 months for the proposed substation if not already built, which is typical for a new build substation.

Converter Stations

1.4.3.16. A typical construction sequence for the construction of a converter station would include:

- survey and ground investigations;
- installation of bellmouths and creation of visibility splays (where required);
- access road construction;
- site establishment;
- earthworks;
- civil engineering works;
- building works;
- cable installation;
- provision/installation of permanent services;
- mechanical and electrical works;
- commissioning; and
- site reinstatement & landscape works.

1.4.3.17. The construction of the proposed converter stations would take between 27 months.

Overhead HVAC Connection (Kent Onshore Scheme only)

1.4.3.18. The construction of a section of overhead line would generally be sequenced as follows:

- survey and ground investigations;
- installation of bellmouths and creation of visibility splays;
- installation of stock proof fencing and gates or equivalent;
- topsoil stripping, temporary drainage installation where required;
- installation of access tracks (including culverts and bridges) and demarcated pylon working areas;
- installation of pylon foundations (pad and column, mini pile, tube pile or bespoke);
- layout of steelwork in preparation for erection;
- assembly (painting if required) and erection of steelwork;
- installation of protection prior to stringing of conductors, including scaffolding;
- installation of insulators

- establishment of machine sites for conductor stringing;
- conductor stringing;
- removal of construction equipment and reinstatement of ground and restoration of soils;
- removal of access tracks and bellmouths; and
- removal of construction compounds and reinstatement of ground.

1.4.3.19. The sections above provide a description of the enabling works and the following sections provide a description of the typical construction of an overhead line.

1.4.3.20. The foundations of the proposed pylons would either be pad and column, mini pile or tube pile (or bespoke if required). The selection of foundation type would depend upon the ground conditions encountered. The installation of pad foundations would take approximately three weeks for each pylon (four pads). Mini pile or tube pile foundations would typically take approximately four weeks for each pylon. For pylon locations where ground conditions do not easily permit the installation of pad and column, mini-pile or tube pile foundations, a bespoke foundation would be required. The design for each bespoke foundation would be subject to the ground conditions encountered.

1.4.3.21. The steel work would be brought to each pylon working area and laid out in pre-constructed sections or in numbered parts prior to assembly and erection of the pylon. Laying out of the steelwork would typically take approximately three days per pylon.

1.4.3.22. The numbered steelwork parts would be bolted together on the ground. The pylon would be assembled in sections beginning with each bottom leg section being fastened to the foundation steelwork. The pylon would be erected using a mobile crane which would lift the assembled steelwork into position. Linesmen would bolt together the pylon, climbing to each part to help guide the next section into place and fasten the bolts. The number of pylon sections required would vary according to the size of the pylon being built and the lifting capacity of the crane. To lift the topmost sections of the taller pylons a crane with a capacity of up to 250t may be required for the reach and weight of the sections to be positioned into place. A smaller capacity crane could be used to lift pylon sections up to the limit of reach of the crane considering load to be lifted. Though in this instance the larger capacity crane would still be required to complete the pylon.

1.4.3.23. Temporary scaffolding and nets would be installed during construction, where required, as a safety measure to protect assets such as roads, railways, a water treatment works and distribution network overhead lines (where not already moved underground) and could include hedgerows which would be crossed by the proposed overhead line. This is required to protect these features during conductor stringing from the accidental dropping of conductors and any of the associated equipment. The scaffolding would be transported to site using a lorry or tractor and trailer and assembled by hand at either side of the feature being protected. Typically, approximately 8m^2 of scaffolding would be installed per day.

1.4.3.24. 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. The installation of the insulators would typically take approximately two days per pylon.

1.4.3.25. The machine sites for conductor stringing (pulling positions) would be sited on interlocking panels laid directly onto the ground surface reducing disturbance to the underlying soils. The machine sites would be sited to avoid individual trees wherever possible. It would typically take approximately one day to establish the area to receive materials and equipment at each conductor stringing site.

1.4.3.26. The wires (conductors) of the overhead lines would be delivered to the machine sites for conductor stringing using lorries, or tractor and trailer. The conductors are wound onto large cable drums and, depending on the conductor type, each completed drum could weigh up to 8t, although larger and heavier drums are possible depending on the supplier and the length of conductor. 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 near the tensioning machine ('tensioner'). Light pilot wires would be laid at ground level (and over temporary scaffolding protecting assets such as roads and railway lines) along the length of the section between the pulling positions (note that it is not typically necessary to clear hedgerows specifically for this activity, though some vegetation management could be required). The pilot wires would be lifted and fed through running wheels on the cross arms of all the pylons in the section, and then fed around the 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 a linesman working from platforms on the pylons which are suspended beneath the conductors. Additional fittings such as spacers, if required, and vibration dampers, would be fitted to the conductors. To counter balance the out of balance loading at the tension pylons at the end of a conductor stringing section, it is normal to install temporary backstays or concrete blocks for safety of installation. The temporary backstays or concrete blocks are removed after conductor stringing is completed. Stringing the conductors would typically take approximately four weeks per conductor stringing section.

1.4.3.27. Once the overhead line is constructed, the access tracks and working areas at the pylon site would be removed and the ground reinstated by removing stone and trackways. Soils would be restored to their previous condition. Other surfaces would be reinstated and widened accesses would be restored to the condition they were in at the commencement of the works.

Underground HVAC and HVDC Cables

1.4.3.28. Whilst the number of cables and working width vary depending on whether the underground cable is HVAC or HVDC the sequence and method of construction and installation is the same and has therefore been described together below.

1.4.3.29. Installation of the proposed HVAC and HVDC cables will typically be undertaken within an 80m and 40m wide working width respectively. The exception to this is where environmental or engineering constraints mean additional land is required such as where the proposed cable routes cross obstacles such as roads or watercourses using a non-open cut technique. In these locations working width may be required to be larger to accommodate the larger construction equipment required to undertake installation works.

1.4.3.30. There are several cable installation methods which are summarised below:

- **Open cut methods**: These would typically be utilised in open agricultural land. This involves the excavation of a trench into which the cables could either be directly laid, or a duct could be laid through which cables will then be pulled through.
- **Trenchless methods**: These would typically be utilised where obstacles (watercourses, roads, railway lines, flood defences or other utilities) require to be crossed. This would involve the installation of ducts below the obstacle. The cables would then be pulled through the ducts.
- **Jointing methods**: These would be utilised where two adjacent sections of cable meet. This requires clean and dry conditions, so covers or cabins 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, cable pulling, jointing and reinstatement.

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

- survey and ground investigations;
- installation of bellmouths and creation of visibility splays;
- installation of stock proof fencing and gates or equivalent;
- topsoil stripping, temporary drainage installation where required;
- installation of access tracks (including culverts and bridges);
- trench 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 cement bound sand (CBS) into the cable trench;
- cables 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;·
- 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);
- warning tapes will be place 100mm above the protective tiles vertically in line with the cable poles; and
- topsoil will be reinstated to original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

1.4.3.32. To install the proposed cable routes there would be a requirement to establish temporary construction facilities and areas for dewatering, temporary and permanent land drainage and temporary access roads which are described above under enabling works. The following section provides a typical description of the works required to construct and install underground cables.

1.4.3.33. Where ducting is proposed as an alternative to direct lay, the ducts would need bedding in with the CBS and the trench backfilled. Joint bays would be excavated along the route (800m – 1200m, 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.

1.4.3.34. Cable installation does not need to be undertaken sequentially along the whole route; as a result, installation could occur in multiple sections of the length of the proposed cable route in parallel. This would limit the extent and duration of construction activity at any given location including the length of time that land remains disturbed for. The exact programme will depend on several factors including the underlying ground conditions and installation methods used.

General trenching

1.4.3.35. Soft, collapsible soils such as sand based soils would require either temporary trench boarding (direct buried) or trench boxing (ducted) to facilitate the containment construction. In firmer soils, 'battered' excavations become more acceptable for both configurations.

1.4.3.36. Lengths of 'open' trench would be around 2km for normal direct buried configuration whereas a ducted system can be backfilled on a rolling basis and therefore there is significantly less open trench at any one time (approximately 200-300m).

1.4.3.37. Construction of an open trench in good soils can progress at 100-200m+ per day, dropping to 30m per day or less in challenging areas or urban environments.

Cable installation

1.4.3.38. Cable laying durations between the main two configurations can vary significantly and use substantially different numbers of operatives to install. With an open trench, direct buried configuration, a significant amount of time is required to set up the system to install – these include flat rollers for straight runs, box rollers for corners and careful calculation of pull forces on the cable. A section can usually be installed (2 cables) in around 4 days including moving of rollers and resetting. This is achievable provided the infrastructure is in place (drum laydown and pulling points).

1.4.3.39. For a ducted system, which may not always be viable due to system constraints, provided that any moves away from the horizontal and vertical planes (bends) are within acceptable parameters, installation can be achieved much quicker – typically two days for a section (2 cables) is achievable provided the infrastructure is in place (drum laydown and pulling points).

1.4.3.40. Typically, the construction of a 1km length of cable would take approximately 4 to 9 months dependent on the complexity of the installation. This timeframe includes the pre-construction site set up as well as the reinstatement of the land following completion of installation. This assumes that the season after cable burial is completed is suitable for undertaking reinstatement. For the purposes of this Scoping Report it has been assumed that installation of the proposed cable routes would take between one and two years.

1.4.3.41. Where a constraint is required to be crossed using a trenchless method, there are a number of methods that can be employed depending on the ground conditions and detailed design. A typical description of each is provided below.

Pipe Jacking (Auger Bore)

1.4.3.42. A hydraulic ram or jack and associated boring equipment would be located in a launch pit. The size and depth of the launch pit is dependent upon the depth of the cable (deeper cable requires a deeper and larger pit). A tunnel is then created by progressively inserting clay pipes behind the drill head (driven by the hydraulic jack), with material returned to the launch site (typically via a screw-shaped shaft). One tunnel is required for each cable. The direction of the tunnel is determined by the set-up equipment in the launch pit and it is continuously surveyed. Drilling continues to the reception pit (also constructed prior to drilling, to a depth relative to the depth of cable). The launch and reception pits may require sheet piling and further works to ensure a dry and stable working environment. Following completion of the works, the launch and reception would be backfilled on completion of the crossing and the area reinstated. Topsoil will be reinstated to original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

Horizontal directional drilling

1.4.3.43. A Horizontal Directional Drilling (HDD) rig and associated equipment would be set up at the launch site. This includes electricity supply (portable generator), drill mud filter, control unit and welfare facilities. Drilling utilises a drill bit, drill head and drilling fluid. Drilling fluid (typically bentonite slurry) assists the drilling process, as well as lubricating and cooling the drill head. A pilot hole is typically drilled first, followed by a series of increasing size bores until the final drill diameter that is required is achieved. Location and direction of drilling can be monitored using the HDD locating system to ensure drilling follows the pre-planned path. Ducting is then pulled back through the drilled hole towards the HDD rig. One cable duct is required for each cable. It is likely that spare ducts will be installed to allow for ease of replacement should any faults be identified in future. Ducts can be capped to ensure no attenuation of water or sediment or prevent use by animals if left prior to cable pulling. The launch site would be reinstated on completion. Topsoil will be reinstated to original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

Micro boring (micro-tunnelling)

1.4.3.44. This method is similar to pipe jacking, however, it utilises a steerable tunnel boring machine (TBM) to tunnel between a launch pit and a reception pit. Lengths of pipe are inserted behind the TBM as it progresses, and a hydraulic jack is used to drive the pipe forward. Water or mud mix is utilised to fluidise excavated material which is pumped to the launch pit. Cable ducting is pulled through the pipe tunnel following tunnelling through to the reception pit. The launch pit and reception pit require concrete bases to ensure a clean working environment and prevent water entering the working area. The launch and reception pits also require a concrete back wall for the hydraulic jack to work against. The launch and reception pits would be backfilled on completion of the crossing and the area reinstated. Topsoil will be reinstated to original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

Landfalls

1.4.3.45. The cable landfalls form the transition between the underground HVDC cable and the marine HVDC cable. The underground HVDC cable and marine HVDC cables

are jointed together at transition joint bays (TJB) located as close to the coast as possible whilst taking account of any environmental or technical constraints at a particular landfall.

1.4.3.46. At the time of writing, a decision between a trenched or trenchless technique at all landfalls has not yet been confirmed, as the feasibility of the trenchless techniques needs to be informed by further ground investigation surveys. Consequently, this Scoping Report considers basic design principles for both options at this stage.

1.4.3.47. There are several techniques which can be used to make a cable landfall, these are described below:

Trenched

1.4.3.48. This installation method comprises the excavation of trenches across the intertidal zone perpendicular to the water line using conventional land-based excavators, whilst the tide is low and potentially supported by barge mounted excavators below MLWS. This would seek to form a trench of approximately 3m wide and between 1m and 5m deep, subject to sediment conditions. Access to the installation site would generally be gained terrestrially but could be gained from the marine side depending on local conditions. Following the formation of the trench, the cables will either be pulled directly ashore using rollers, or else ducts and messenger wires would be installed to facilitate cable pull in at a later date, subject to detailed engineering.

1.4.3.49. Up to four open cut trenches would be excavated through the intertidal zone, once the cable or ducts are installed these trenches will be backfilled.

1.4.3.50. Any potential requirement for a temporary works structure to facilitate this landfall construction technique is still to be confirmed. This is typically a cofferdam or sheet-piled structure that can be used within the marine environment to create a safe, dry working area. If a temporary works structure is required, it is expected that vibratory piling would be adopted for installation of sheet walls, with percussive piling only used where required to achieve design depth. Additional mitigation would be confirmed, and secured where required, via the appropriate regulatory controls as part of the application for relevant consents.

Trenchless – horizontal directional drill (HDD)

1.4.3.51. An HDD compound, typically 75m x 100m, would be established at the HDD launch site and an HDD rig and associated equipment set up within the compound. This includes electricity supply (portable generator), drill mud filter, control unit and welfare facilities. Drilling utilises drill bit, drill head and drilling fluid. Drilling fluid (typically bentonite slurry) assists the drilling process, as well as lubricating and cooling the drill head. A pilot hole is typically drilled first, followed by a series of increasing size bores until the final drill diameter that is required is achieved. Location and direction of drilling can be monitored using the HDD locating system to ensure drilling follows the pre-planned path. Ducting is then pulled back through the drilled hole towards the HDD rig, this is supported by a jackup rig/barge and dive spread in the marine environment. One cable duct is required for each cable. It is likely that spare ducts will be installed to allow for ease of replacement should any faults be identified in the future. Ducts can be capped to ensure no attenuation of water or sediment or prevent use by animals if left prior to cable pulling. The launch site compound would be reinstated on completion. Topsoil will be reinstated to

original soil profile and land re-seeded or released to the farmer for cultivation as it was found.

Trenchless - micro tunnel

1.4.3.52. Micro tunnelling uses a large micro tunnel boring machine (MTBM) combined with pipe sections being jacked into position as the tunnel is lengthened. It requires that the MTBM is removed from the distal end of the pipeline after installation. The diameter of the micro tunnel can be large enough for more than one cable to be installed within the tunnel. The technique is often used in areas of poor geotechnical ground conditions for construction. This would be supported by a jackup rig and dive spread to enable the recovery of the MTBM.

Trenchless - direct pipe

1.4.3.53. A combination of micro tunnel and HDD techniques where a small tunnelling machine is used to create a larger diameter bore through which a pipe is installed directly behind the machine as it bores out the tunnel. It is a single-pass technique thus reducing the need for a series of increasing size bores to reach the final drill diameter. This may allow more than one cable to be installed in a single duct. This methodology may reduce the needs for drilling fluids and is typically used in soft sediments, although it is being developed for wider application in other ground conditions.

Marine Cable

1.4.3.54. Installation of marine HVDC cable installation typically includes the following activities:

- ground preparation and cable laying activities within the intertidal zone at the landfall sites;
- pre-lay seabed preparation activities along the route below MLWS (including route clearance, pre-lay grapnel run and any pre-sweeping);
- construction of cable crossings;
- installation and burial of the subsea cables, and
- placement of external cable protection (as required).

Marine pre-installation activities

Pre-lay surveys

1.4.3.55. Multiple seabed surveys will be carried out prior to installation to reconfirm existing geotechnical and geophysical information about seabed conditions, bathymetry and other seabed features. These may include Multi-Beam Echo Sounder (MBES); Side-Scan Sonar (SSS), Sub-Bottom Profiler (SBP), Magnetometer, cable trackers etc. In addition, visual inspections may also be undertaken using a Remotely Operated Vehicle (ROV) or other visual inspection system. Pre-lay surveys may also include additional specialist studies, including geotechnical, benthic and unexploded ordnance (UXO) investigations.

Cable route clearance

1.4.3.56. Route preparation is expected to involve clearance activities to ensure the installation corridor is clear of boulders, dropped object debris and other obstacles. Removal of Out-Of-Service (OOS) cables may be required, along with boulder/debris clearance using either ploughs or ROVs and grabs. A pre-lay grapnel run (PLGR) is also expected to be completed, involving towing a heavy grapnel with a series of specially designed hooks along the centre line of the route, to confirm the installation route is clear of obstacles. Cable route clearance using the methods described here will seek to avoid areas of known sensitive habitats and/or features and will not be used near live third party assets.

Pre-sweeping (if required)

1.4.3.57. Pre-sweeping may be required if areas of large sand waves are identified within the cable corridor, during the marine surveys, which cannot be avoided. Pre-sweeping may be performed using a variety of tools including dredgers, ploughs, mass flow excavators (MFE) or controlled flow excavators (CFEs).

Unexploded ordinance

1.4.3.58. A high-level desktop study risk assessment of UXO has been undertaken to inform the geophysical and geotechnical seabed survey undertaken in Autumn 2021. The UXO risk was assessed as High and Medium risk throughout the Scoping Corridor. As part of the seabed survey, single source magnetic data was collected to provide an overview of the distribution of magnetic anomalies and to cross-check with the desk-based risk assessment, where areas of known high UXO densities have been identified.

1.4.3.59. A detailed UXO survey; including use of multiple gradiometers, ROV inspections combined with high resolution MBES, is planned to be carried out to better detect and define pUXOs and to enable rerouting away from targets throughout the route. Micro-routeing around isolated targets will be undertaken, with a closest point of approach to the target, based on the eventual installation methodology.

1.4.3.60. Whilst avoidance will be the preferred approach, if UXO clearance is necessary, the activity will be undertaken in accordance with approved industry practices for removal and disposal / waste management of ordnance. This may include detonating UXO in place or lifting and relocating to a designated storage or demolition area, for safe disposal.

Cable installation

1.4.3.61. The detailed configuration of the cable system is still under development at this stage and will be informed by further electrical design studies and through selection of the cable supplier and installation contractor. However, up to four cables could be installed within a maximum of two trenches, these will either be installed individually if final design is for two cables or as bundled pairs.

1.4.3.62. In the case that the cables are laid separately, the separation between the cables is typically around 30m, although this can be up to 60m depending on water depth. If there are two bundled pairs then higher separation distances would be required, potentially up to 200m.

1.4.3.63. Cable installation operations will be performed on a 24-hour basis in order to minimise installation time and therefore the duration of any disruption to sensitive environmental receptors, as well as navigation and other sea users. 24-hour operations will also maximise available weather opportunities, as well as vessel and equipment availability.

1.4.3.64. Cable installation will require a Cable Lay Vessel (CLV) and various support vessels, including survey vessels, trenching support vessels, guard vessels and potentially anchor handling vessels. Dredging vessels and/or other specialist vessels may also be required for limited periods, in response to localised conditions along the cable corridor. A Cable Lay Barge (CLB) and Jack-Up platform may also be required for shallow water operations.

1.4.3.65. The preferred method of protection for marine cables is by burial. The burial conditions for the cables will be assessed within the Cable Burial Risk Assessment (CBRA) to optimise burial along the route between the landfalls, typically up to a depth of 1-2m or deeper in areas of greater risk. The route will be optimised to maximise the distance over which the required cable burial depth can be achieved, to limit the need for external protection. This is achieved by varying the depth of burial of the cables, selecting appropriate burial tools, and remedial trenching where unexpected soil conditions are encountered. It is not known at this stage what type of equipment will be required to install the cables as it will depend on the seabed conditions present within the cable corridor.

1.4.3.66. There are two main cable installation techniques, cable lay and post lay burial (PLB) or simultaneous cable lay and burial (SLB) these are described below followed by the different methods of burial:

Cable lay and post lay burial

1.4.3.67. In cable lay and PLB the cable is laid on the surface of the seabed before subsequently being buried. The subsequent burial is almost always carried out by a second vessel following on from the CLV. This enables a wide variety of burial techniques to be used.

1.4.3.68. The standard post lay burial methods are listed below, followed by an outline description. This is not an exhaustive list and more specialised techniques may be required, such as a barge mounted excavator in the nearshore areas.

- ploughs;
- jet trenching;
- mechanical trenching (rock wheel or chain cutters);
- Mass Flow Excavator (MFE); or
- Controlled Flow Excavator (CFE)

Ploughs

1.4.3.69. Ploughs are large machines towed behind a vessel that create a trench into which the cable is laid. This trench is then normally left to backfill naturally, but can sometimes be backfilled manually. Ploughs may be used for simultaneous lay and burial or for pre-lay trenching. Ploughs are best suited for relatively soft sediments.

Jet trenching

1.4.3.70. Jet trenchers use high pressure water jets to fluidise the seabed and bury the cable, they are most effective in soft sediments, non-cohesive and normally consolidated sediments.

Mechanical trenching (rock wheel or chain cutters)

1.4.3.71. Mechanical trenchers use force to cut a trench in the seabed which the cable is then laid in. This technique is generally used in harder sediments. The trench then backfills through natural processes or backfill can be directed into the trench by mechanical adaptors on the rear of the trencher body.

MFE and CFE

1.4.3.72. MFE and CFE use relatively low pressure but high volumes of seawater to excavate relatively large volumes of seabed (compared to jet trenching). Some models allow both burial and backfill of a cable nearly simultaneously. They are best suited for soft and loose sediments but have significantly less control on sediment spoil dispersion than the other PLB methods.

Simultaneous cable lay and burial

1.4.3.73. Simultaneous lay and burial (SLB) is where the cable is plough buried at the same time as it is laid.

External cable protection

1.4.3.74. Where burial cannot be achieved, external cable protection may be required where the soil or rock conditions are too hard to achieve effective burial, or third-party assets cross the route. Other locations may require additional protection to mitigate the effects of mobile sediments, such as at HDD exit points and to mitigate potential coastal erosion.

1.4.3.75. Options for external cable protection include:

- Rock Placement (planned berms) – installation of a pre-designed berm over the installed cables, Planned berms may comprise different grades of rock to provide a stable structure. Rock Placement (remedial berms) – installation of discontinuous single-grade rock berm in order to enhance the external protection due to insufficient achieved burial depth. Targeted placement will be undertaken using Fall Pipe ROV (FPROV) rock emplacement vessel, where water depths allow. Where water depths do not allow the use of an FPROV vessel, other methods may be used which are selected to minimise environmental disturbance, such as side dumping or open hopper dumping.
- Concrete Mattresses – frequently used to protect cables where external risks are lower, and as part of crossing constructions. The flexibility of the mattresses allows them to follow the contours of the seabed or any exposed subsea asset. Several types of mattress are available for deployment in different environments, and appropriate types will be used for the local conditions.
- Rock / gravel / sand / grout bags – a range of pre-filled bags of different sediment grades, or grout, which can be used to provide local protection, or structural support, in areas where access is restricted for conventional protection systems.

- Protection Sleeves / Cast-Iron Shells – additional, flexible, protection systems for the cable, which are installed around the cable during installation and/or post installation. Protective sleeves usually comprise of polyurethane with steel banding.

1.4.3.76. The requirement for external cable protection will be clarified following the CBRA works and as more survey data is received. In addition, the design development will further progress as an iterative process both pre- and post-consent, including during the detailed engineering, by the installation Contractor.

1.4.3.77. Where external protection is or may be required, details of the type, quantity and nature of each protection measure will be provided to inform the detailed environmental assessment, including estimated locations, volumes/numbers, tonnages and likely grades of rock or other materials to be used. This will include both planned and potential remedial requirements and will be provided to characterise the nature and extent of cable protection which may be installed within UK territorial waters.

Cable and pipeline crossings

1.4.3.78. The Offshore Scheme would enter into crossing agreements and/or proximity agreements with the third-party asset owners of any subsea infrastructure installed and/or planned along the corridor. Power, telecom and fibre optic cables will be crossed by the HVDC cables; these cables will be both In-Service (IS) and OOS. Crossings of IS cables will be undertaken using agreed crossing designs in accordance with the crossing agreements with the third-party owners and will ensure separation between the assets and protection over the installed HVDC cables. The separation and protection structures may comprise concrete mattresses, protective sleeves on the HVDC cables and/or pre- and post-lay rock placement.

1.4.3.79. OOS cables may be cleared prior to installation of the cables, thus removing the need for a crossing structure.

1.4.3.80. No pipelines currently cross the Offshore Scheme Scoping Boundary. However, the same principal would be applied to any future pipelines that may cross the HVDC cables, where the pipeline owner will be responsible for crossing installation.

Vessel activities

1.4.3.81. A range of different vessels are expected to be used during cable installation. These are expected to include:

- Cable Lay Vessel (CLV): The CLV will be a specialist ship designed to carry and handle long lengths of heavy power cables, the CLV will be equipped with Dynamic Position (DP) system. The shallowest depth in which the cable ship can operate will depend on the vessel used, however at this stage it has been assumed that larger vessels such as a CLV would not be expected inshore of the 10 m depth contour;
- Cable Burial Vessel: a dynamically positioned ship carrying post-lay burial equipment, this might include jet or mechanical trenchers or possibly MFE equipment. This is typically supported by an ROV to monitor the cable during the protection work.

- Guard vessel(s): Guard vessels may be required to accompany the CLV, particularly in areas of high-density other users/shipping and potentially other specialist vessels required to install required cable protection systems (other than rock placement);
- Support vessel(s): These may include survey vessels, for pre- during- and post-installation surveys, anchor handler/offshore support vessels, dredgers etc. as required;
- Rock placement vessel: A rock placement vessel features a large hopper to transport rock and a mechanism for deployment of the rock at the placement location where target burial depth cannot be achieved. For the purposes of this Scoping Report it has been assumed that a flexible fall pipe mechanism for rock placement will be used; and
- Cable Lay Barge (CLB): A CLB may be required at landfall, in the event that vessel operation is required in water depths less than 10 m. A CLB may be anticipated to require a four to six-point anchor mooring system covering an area of between 500 m and 1,000 m radius from the vessel to allow the barge to hold station whilst the installation work is undertaken.

Post installation survey and reporting

1.4.3.82. Following the various phases of route preparation and cable installation, there will be an as-built survey of the route. This will be combined with the installation contractors' records to produce an as built report. The report will include all data relating to the protection status of the installed cables, between the TJBs, at each landfall and the marine corridor: i.e. as-built drawings, engineering alignment sheets, imagery and video data, which together will provide a record of the safe installation of the cable. In effect this will be the baseline (reference) report for future OMR (Operations, Maintenance and Repair) activities, as well as input into the eventual decommissioning operations.

1.4.3.83. Central to the report will be the as-trenched and as-installed geophysical reports from the post-burial surveys, rock emplacement campaigns and as-built trenchless solution construction drawings at the landfalls. Together, the reports will provide the Depth of Lowering (depth the cable is found below the mean seabed level) and Depth of Cover (DOC) (depth of material above the buried cable – may be less than Depth of Lowering (DOL)) achieved immediately after installation, as well as the location of the cables.

1.4.3.84. Subsequent routine inspection surveys will be compared to the baseline report to assess any changes to the DOL and DOC of the cables and inform the engineering of any remediation or repair activities during the lifetime of the cables.

1.4.3.85. The 'as-built' Route Position List (RPL) data will be supplied to relevant stakeholders, third-party asset owners and the United Kingdom Hydrographic Office (UKHO), for inclusion in the relevant Charts. Other national hydrographic agencies may also be supplied with the data, as per best practice (such as NOOA in the US, or SHOM in France).

1.4.4. Operation

Proposed Friston Substation

1.4.4.1. Once the Project is operational the proposed Friston substation would be operated in the same way that National Grid operates all other substations on the network.

Converter Stations

1.4.4.2. Following a period of commissioning and testing the proposed converter stations would operate continuously throughout the year. Whether each end is (converting DC to AC) or (converting AC to DC) would depend on supply and demand on the transmission system.

1.4.4.3. The proposed converter station would be operated by a small team based on site. In general, a minimum of two operators would be present at all times. During normal operation there would be approximately six personnel on site, divided between three shifts over a 24-hour period.

Overhead HVAC Connection (Kent Onshore Scheme only)

1.4.4.4. During operation the overhead line would transmit electricity from the proposed Kent converter station onto the existing network in the South East of England.

Underground HVAC and HVDC Cables

1.4.4.5. During operation the HVDC link would transmit electricity from the proposed Friston substation to the existing network in Kent and vice versa depending on the supply and demand at the time.

Marine Cable

1.4.4.6. During operation the HVDC link would transmit electricity from the proposed Friston substation to the existing network in Kent and vice versa depending on the supply and demand at the time.

1.4.5. Maintenance

Proposed Friston Substation

1.4.5.1. Maintenance would be undertaken on an ongoing basis with individual equipment subject to a three-year maintenance cycle. Visual checks would be undertaken on a monthly inspection visit to the site.

1.4.5.2. If the substation required refurbishment or replacement works, vehicles would be used to carry workers in and out of site and suitable vehicles would be used to bring new materials and equipment to site and remove old equipment.

Converter Stations

1.4.5.3. During maintenance (planned and unplanned) the number of personnel present on site would increase with the number of staff proportionate to the nature of the maintenance works being undertaken.

1.4.5.4. If the converter stations required refurbishment or replacement works, vehicles would be used to carry workers in and out of site and suitable vehicles would be used to bring new materials and equipment to site and remove old equipment.

Overhead HVAC Connection (Kent Onshore Scheme only)

1.4.5.5. The overhead line would be subject to an annual inspection from the ground or by helicopter. The inspection would identify if there are any visible faults or signs of wear and would also indicate if changes in plant or tree growth or development had occurred that could risk infringing safety clearances. Inspections would provide input as to when refurbishment was required.

1.4.5.6. 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.

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

1.4.5.8. The overhead line would be made up of a variety of materials, including concrete and steel for the foundations, steelwork for the pylon and aluminium for the conductors. 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.

1.4.5.9. 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 track mat panels.

1.4.5.10. Refurbishment work would be undertaken typically on one side of the pylon at a time, so that the other side could be kept ‘live’ or in use.

1.4.5.11. 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 and
- conductor fittings;
- painting or replacement of the pylon steelwork and

- replacement of telecommunication equipment (by separate companies).

1.4.5.12. During refurbishment there would be activity along the overhead line, especially at tension pylons when a new conductor is installed and an old conductor taken down.

1.4.5.13. Vans would be used to carry workers in and out of the site and trucks would be used to bring new materials and equipment to site and remove old equipment. Temporary works including access tracks and scaffolding to protect roads may be required as for construction.

Underground HVAC and HVDC Cables

1.4.5.14. Maintenance activity along the proposed cable routes 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 installation albeit over a much smaller area and scale.

Marine Cable

1.4.5.15. Maintenance activity along the marine cable route would generally be limited to non-intrusive inspections and cable repairs.

1.4.5.16. Periodic surveys would be undertaken to assess the protection levels afforded the cable, particularly important in areas of mobile seabed. The survey results would be used to inform the necessity of any remedial works to maintain depth of cover to the cables. A schedule of surveys would be prepared to monitor the stability of the seabed after installation and identify any critical areas where the seabed does not stabilise, necessitating additional monitoring and a maintenance/mitigation plan.

1.4.5.17. Cable repair 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 installation albeit over a much smaller area and scale.

1.4.5.18. In areas of mobile seabed periodic surveys may identify areas where the cable has become exposed or is in free span, in these areas remedial burial may be needed using similar techniques to those described above for installation, particularly jetting and rock placement, albeit over a much smaller section.

1.4.6. Decommissioning

Proposed Friston Substation

1.4.6.1. The lifespan of substation equipment is approximately 40 years. If the elements of the proposed Friston substation, that form part the Project were no longer required, the equipment would be safely disconnected from the transmission system and carefully dismantled. Much of the material would be taken for recycling. Similar methods and equipment would be required for dismantling as for construction.

Converter Stations

1.4.6.2. The anticipated operational life of the proposed converter station is approximately 40 years. It is likely that during this period refurbishment and plant replacement would extend the life of the converter station rather than decommissioning. In the event that the Project ceases operation the proposed converter stations would be decommissioned. The main components would be dismantled and removed for recycling wherever possible. Where this is not possible disposal would be undertaken in accordance with the relevant waste disposal regulations at the time of decommissioning. It is anticipated that the permanent access road would be left in-situ.

Overhead HVAC Connection (Kent Onshore Scheme Only)

1.4.6.3. If the Project is required to be decommissioned the section of overhead line between the proposed converter station site and the existing Richborough to Canterbury 400kV overhead line would be removed. Fittings such as dampers and spacers would be removed from the conductors. The conductors would be cut into manageable lengths or would be winched onto drums in a reverse process to that described for construction. the fittings would be removed from the pylons and lowered to the ground.

1.4.6.4. Each pylon would most likely be dismantled by crane, with sections cut and lowered to the ground for further dismantling and removal from site. Depending on the access and space available, it may be possible to cut the pylon legs and then pull the pylon to the ground using a tractor. The pylon could be cut into sections on the ground. Unless there was a compelling need for removal of all the foundations, these would be removed to approximately 1.5m deep, sufficient for safe agricultural use of the land and subsoil and topsoil reinstated.

Underground HVAC and HVDC Cables

1.4.6.5. If the Project is required to be decommissioned, the proposed underground cables would be decommissioned. Dependent on specific requirements the redundant cables could either be left in-situ, or all or parts of the cable could be removed for recycling. Where this is not possible, removed cables would be disposed of in accordance with the relevant waste disposal regulations at the time of decommissioning.

Marine Cable

1.4.6.6. If the Project is required to be decommissioned, the proposed marine cables would be decommissioned. Dependent on the specific requirements, the redundant cables would either be left in-situ, or all or parts of the cables could be removed. An initial decommissioning plan would be written once the final route and installation methodology is chosen. This would be in accordance with all applicable legislation and best practice guidance at the time of compilation, however as decommissioning of the cable would be many decades into the future, regulatory requirements and industry best practice will change. The decommissioning plan would be updated throughout the life of the project in preparation for decommissioning occurring.

1.5 EIA Approach and Methodology

1.5.1. Introduction

1.5.1.1. EIA is the process of compiling, evaluating and presenting information about the likely significant environmental effects, both adverse and beneficial, of a proposed project. The assessment is designed to help produce an environmentally sympathetic project and to provide decision makers and statutory consultees with the environmental information they require during 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 likely significant adverse 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 undertaker, the EIA team and the designers.

1.5.1.2. Three main EIA documents are produced as part of the DCO pre-application process:

- **EIA Scoping Report**: The Scoping Report sets out the likely significant effects from a project (scope). It also presents the data collected and the proposed assessment methodology and approach that would be used during the EIA. The Scoping Report is issued by PINS to consultees for comment on the scope and methodology proposed informing the scoping opinion.
- **Preliminary Environmental Information Report (PEIR):** The PEI Report 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' (Planning Inspectorate, 2020). The PEIR is used by consultees to inform their consultation responses during the Statutory Consultation and it is issued at the same time the Statutory Consultation launches; and
- **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 mitigation proposed 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.

1.5.2. General Approach

1.5.2.1. This chapter describes the methodology which will be used to assess the potential effects on the natural, human and built environment because of the project. In accordance with the EIA Regulations 2017, 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.

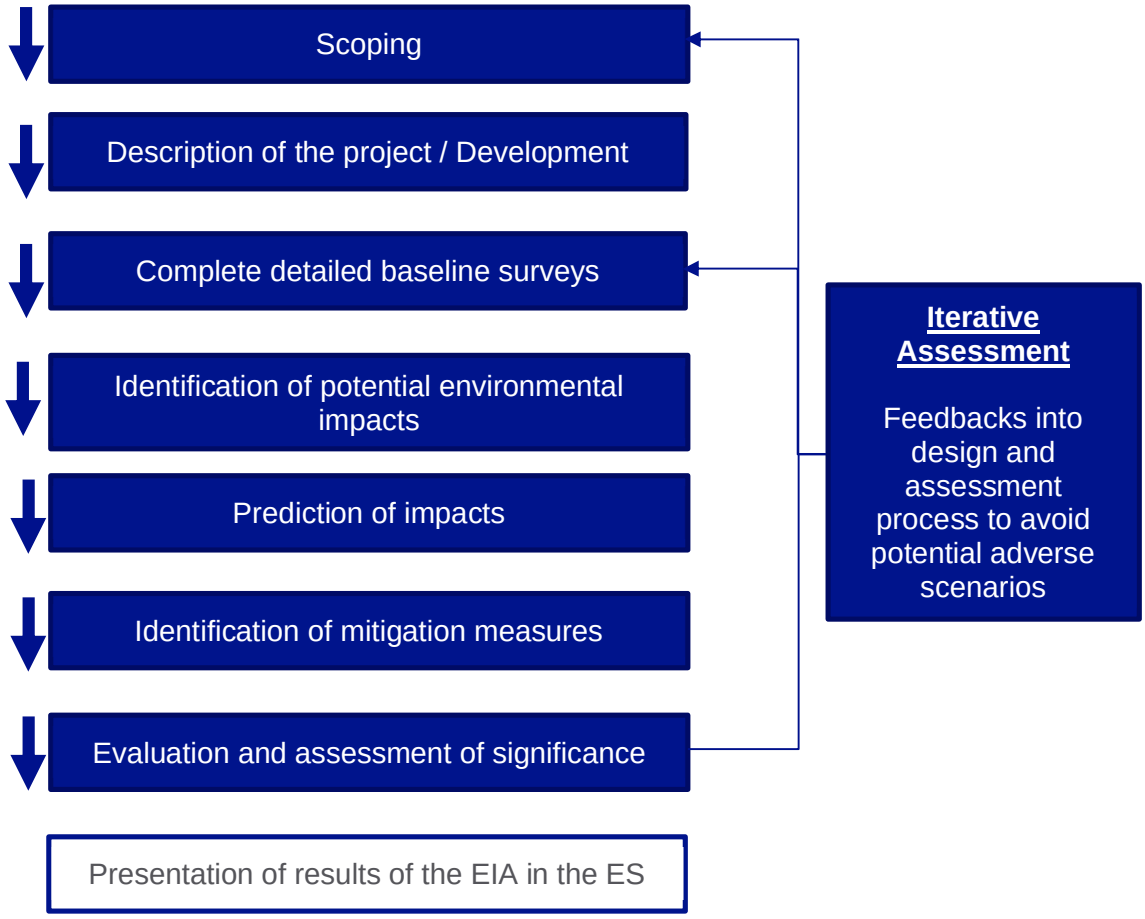
1.5.2.2. The Project would follow best practice by integrating the environmental considerations into the design process at all stages. This has already begun

through the strategic options and routeing and siting processes as described in Part 1, Chapter 3.

1.5.2.3. 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.

1.5.2.4. The EIA Process involves the main steps illustrated on Image 1.5.1 below.

Image 1.5.1: EIA Process



The 'Rochdale Envelope' Approach

1.5.2.5. Major infrastructure projects such as linear infrastructure projects for underground cables, overhead lines and above ground installations, such as converter stations, 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 or poor ground conditions on cable routes and to allow for detailed design of the converter station by a specialist manufacturer post consent. To mitigate such issues a flexible approach to design parameters is used within the EIA process, and this is typically referred to as the 'Rochdale Envelope'; and it allows for a realistic worst-case assessment to be undertaken.

1.5.2.6. 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 and while still retaining the level of design flexibility needed as the Project moves into detailed design and construction.

1.5.2.7. 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.

1.5.3. Approach to Scoping

1.5.3.1. Scoping sets the proposed scope for the EIA process and, when done right, it makes the subsequent phases more straightforward. A robust scope, focussed on the potential for likely significant environmental effects is required in order to ensure the EIA is focused and proportionate. The process of scoping helps to ensure that the topics covered, the baseline information used, and the methods of assessment, are appropriate, and have considered the views of decision makers, and consultees where appropriate.

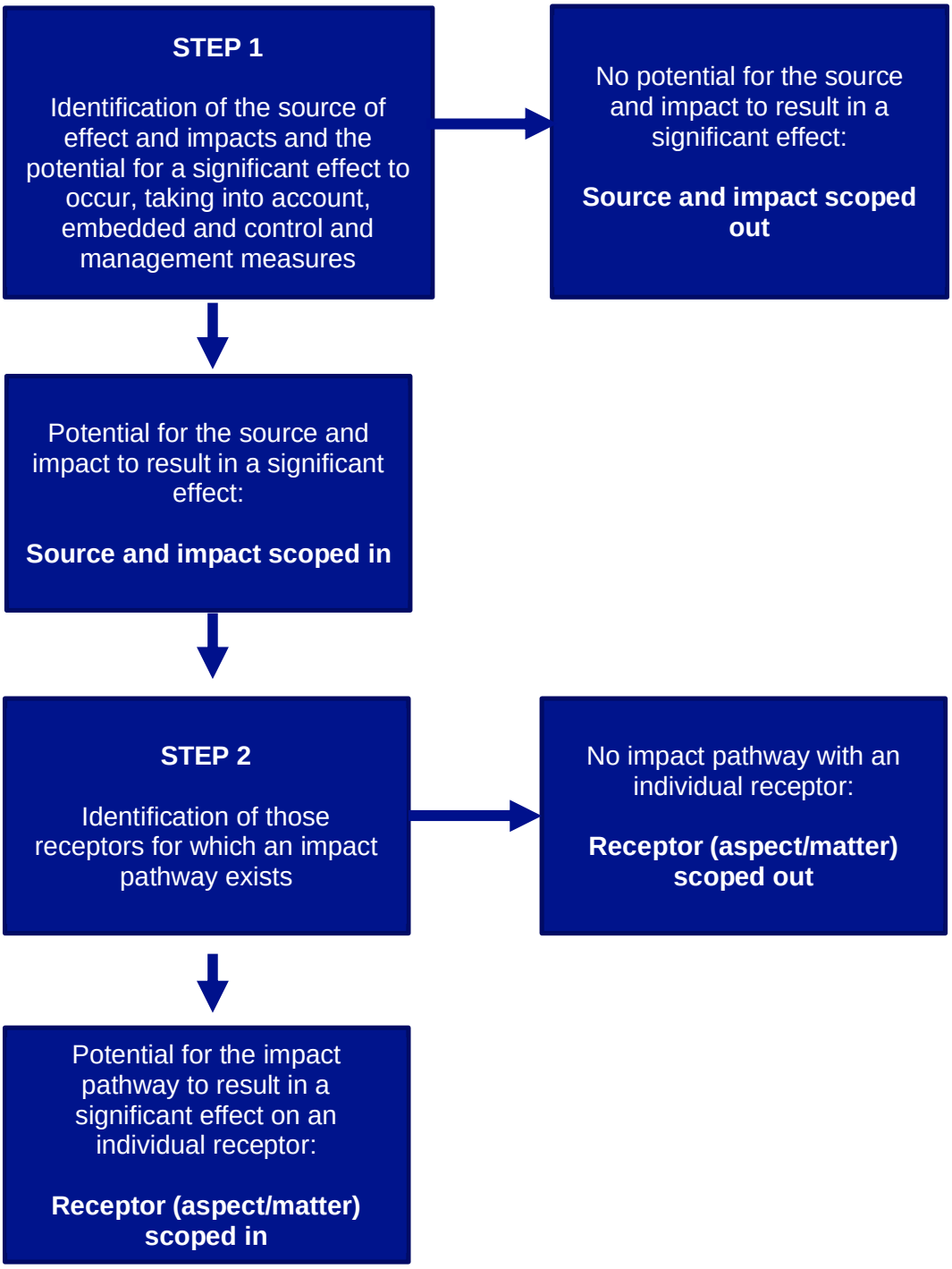
1.5.3.2. The approach taken in preparation of this Scoping Report has also been informed by the Planning Inspectorate's Advice Note Seven[27] and reflects that the EIA Regulations 2017 which require an ES to focus on aspects of the environment likely to be subject to significant effects. In line with 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 as promoted by the IEMA (2017) Delivering Proportionate EIA guidance document[28].

1.5.3.3. The approach taken to identifying the proposed scope of the EIA has used a staged approach that considers the likelihood of significant impacts 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 Image 1.5.2 below.

[27] Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/.

[28] Institute for Environmental Management and Assessment (2017). Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice. [online] Available at: https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia.

Image 1.5.2: Approach to the identification of the proposed scope of assessment



Technical Scope

1.5.3.4. The technical scope of assessment for each environmental aspect is detailed in the technical chapters of Parts 2-4 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.

Spatial Scope

1.5.3.5. The spatial scope for each environmental aspect is the area over which changes to the environment are predicted to occur because of the Project. This will depend on the nature of the potential effects and the location of receptors that could be affected. It takes account of:

- The physical area of the Project;
- The nature of the baseline environment; and
- The manner and extent to which environmental effects may occur.

1.5.3.6. Each of the technical chapters in Parts 2-4 describes the study area to be considered, providing a clear explanation as to why that particular 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, refinement of the Project or further assessment work.

Temporal Scope

1.5.3.7. The temporal scope considers the time period over which changes to the environment and the resultant effects are predicted to occur, and are typically defined as either being temporary or permanent:

- Permanent - these are effects that will remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.
- Temporary – these are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes.

1.5.3.8. The assessment will have regard to the project programme and will evaluate the environmental effects of the Project during construction, operation, maintenance and decommissioning. These effects will be compared to the situation prevailing before the Project is commenced (the current baseline), and to the situation that would prevail in the future without the Project (the projected future baseline).

1.5.3.9. 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.).

1.5.3.10. 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 the technical chapters of Parts 2-4 of this Scoping Report. Where relevant, aspect

chapters provide further information on the time elements within the project programme that will be considered for their assessment.

1.5.4. Assessment of Effects and Determination of Significance

1.5.4.1. The Institute of Environmental Management and Assessment (IEMA) guidelines (2004, p11/2)[29] state that:

"*The assessment stage of the EIA should follow a clear progression; from the characterisation of 'impact' to the assessment of the significance of the effects taking into account the evaluation of the sensitivity and value of the receptors.*"

1.5.4.2. The prediction of potential impacts will be undertaken to determine what could happen to each environmental receptor because of the Project and its associated activities. There is expected to be a diverse range of potential impacts to consider within the assessment process and it will likely be appropriate to use a range of prediction methods including quantitative, semi-qualitative and qualitative.

Identification of Potential Effects

1.5.4.3. 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).

Approach to Mitigation

1.5.4.4. After the identification of the potential effects, consideration will be given to how those potential effects could be avoided, reduced or offset. This is referred to as mitigation. Each topic chapter of the ES will identify proposed mitigation measures that may be required to avoid or reduce the potential significant adverse effects of the project. Mitigation will be categorised as follows:

- Embedded Measures: are those that are intrinsic to and built into the design. They include the avoidance of designated sites through sensitive routeing, siting and design.
- Control and Management Measures: These are Good practice measures that are included within the Code of Construction Practice (CoCP) and other control and management plans such as the use of road sweepers and the implementation of measures to control silt-laden runoff during construction.
- Mitigation Measures: These are measures over and above design mitigation, for example anything that has been added to the design purely to mitigate an effect such as landscape planting.

[29] Institute of Environmental Management and Assessment (2004). Guidelines for Environmental Impact Assessment.

Assessing Effects and Determining Residual Significance

1.5.4.5. There is no statutory definition of what constitutes a 'significant' effect within the EIA Regulations and whilst the determination of the significance of effects is important to informing the decision-making process, defining what is significant is not a simple task. The process typically involves consideration of two aspects of a potential effect, namely the sensitivity and/or value of the receptor or resource, and the magnitude of the impact on the receptor/resource.

1.5.4.6. The significance of the residual effects will be determined by reference to criteria for each assessment topic. Specific significance criteria for each technical discipline, include giving due regard to the following:

- scale of the impact;
- impact duration, and whether effects are temporary, revisable, or permanent;
- effect nature (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; and
- compatibility with environmental policies.

1.5.4.7. 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.

Magnitude of impact

1.5.4.8. General criteria for defining the magnitude of an impact, or change, are set out in Table 1.5.1. Key factors that influence this 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; and
- 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 1.5.1: 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

Magnitude	General criteria
	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

Sensitivity and value of the receptor

1.5.4.9. 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 1.5.2. Characterisation of the receptor is achieved by balancing out of these three considerations to determine the receptor's 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; and
- 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 1.5.2: Sensitivity criteria

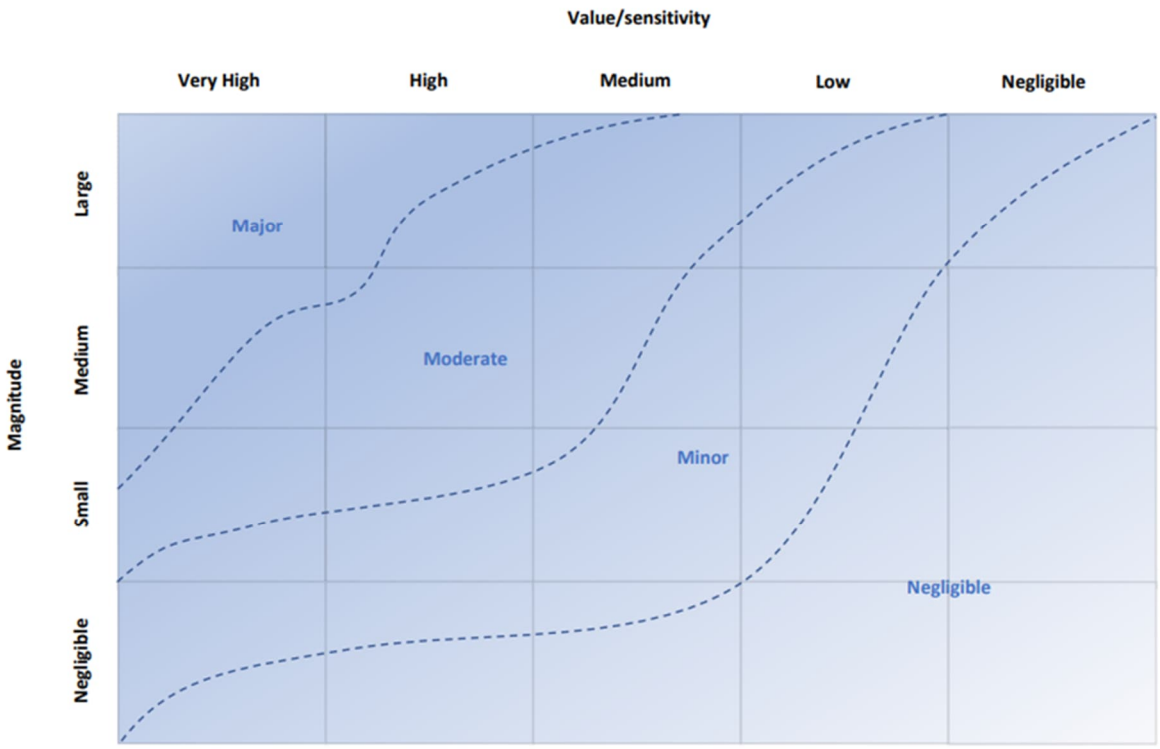
Value/Sensitivity	General Criteria
Very High	Very high importance and rarity, valued at an international level and limited potential for recovery or substitution

Value/Sensitivity	General Criteria
High	High importance and rarity, valued at a national level and limited potential for recovery or substitution
Medium	Medium importance and rarity, valued at a regional level, some potential for recovery or substitution
Low	Low or medium importance and rarity, valued at a local level, good potential for recovery or substitution
Negligible	Very low importance and rarity, valued at a local level, easy to replace.

Evaluating the significance of effects

1.5.4.10. 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 in Image 1.5.3 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 significance effect, and a low sensitivity receptor subject to a small magnitude of change would experience a minor or negligible significance effect.

Image 1.5.3: Basis of assigning significance



1.5.4.11. Each of the specialist disciplines will apply magnitude and sensitivity criteria that best suit the topic area, and for some topics these may be defined in industry guidelines.

1.5.4.12. Following the classification of an effect using this methodology, a clear statement will then me 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 1.5.3.

Table 1.5.3: Generic significance description

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 conditions being replaced by new legal compliance or a major contribution being made to national targets.	**Yes**

Significance	General criteria	Significant effect
	These effects may represent key factors in the decision-making process. Potentially associated with sites and features of 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.	
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 (e.g. UK BAP targets) are contributed to.	**Yes (typically)**
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**

1.5.5. Cumulative Effects

1.5.5.1. 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.

Intra-project effects

1.5.5.2. Intra-project cumulative effects (sometimes referred to as combined or interactive effects) occur where a single receptor is affected 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 affected 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.

1.5.5.3. A useful summary of the principle of cumulative intra-project effects is provided by the Planning Inspectorate in Advice Note Nine[30].

"*The ES should not be a series of separate unrelated topic reports. The inter-relationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how inter-relationships 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*."

1.5.5.4. Schedule 4 of the EIA Regulations states that an ES should include:

Paragraph 19:

"A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter relationship between the above factors."

Paragraph 20:

"A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:

(a) The existence of the development;

(b) The use of natural resources;

(c) The emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant of the forecasting methods used to assess the effects on the environment."

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

1.5.5.6. The Overarching NPS EN-1 states the following in relation to requirements for the assessment of cumulative effects:

'*The Infrastructure Planning Commissions (IPC) [now the Planning Inspectorate (PINS)] should consider how the accumulation of, and interrelationship between,*

[30] Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/.

effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.'

1.5.5.7. There is no established EIA methodology for assessing and quantifying the effects intra-project effects.

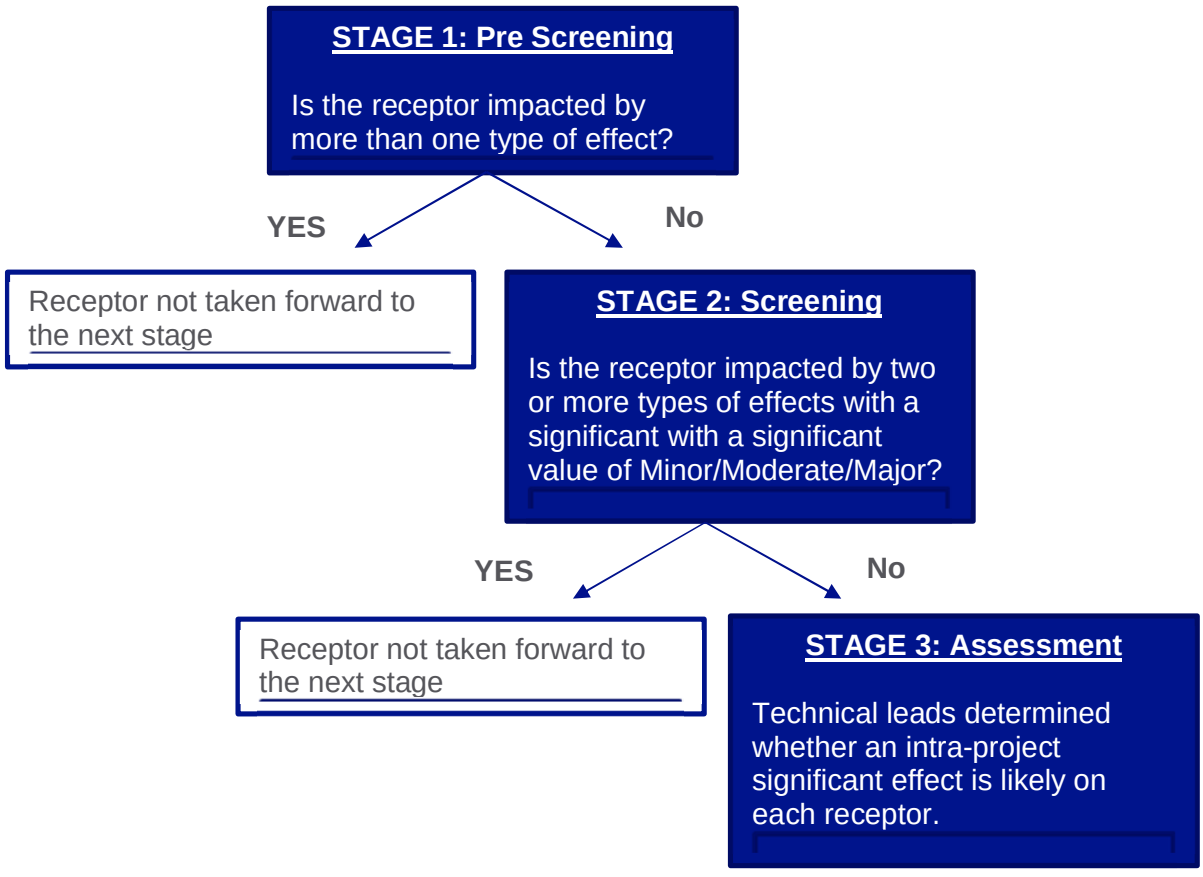
1.5.5.8. Some environmental topics consider receptors that are not considered by any other topics and so intra-project cumulative assessment is unlikely to be necessary. Examples include buried archaeology and protected species.

1.5.5.9. 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.

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

1.5.5.11. This three-stage approach is described in more detail in the following section and the approach is illustrated in Image 1.5.4 below.

Image 1.5.4: Methodological approach to identifying intra-project cumulative effects



Inter-project effects

1.5.5.12. Inter-project cumulative effects occur where a receptor is affected 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.

1.5.5.13. In addition to paragraph 20 for the EIA Regulations described above, NPS EN-1 states the following in relation to requirements for the assessment of cumulative effects:

'*When considering cumulative effects, the Environmental Statement (ES) should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other developments (including projects for which consent has been sought or granted, as well as those already in existence).*'

1.5.5.14. The Planning Inspectorate Advice Note 17 (AN17)[31] 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.

1.5.5.15. The approach outlined in AN17[29] is split into four stages, as outlined below:

- Stage 1 – the two main tasks in this stage are to establish what the 'zone of influence (ZOI)' is for each topic and to then identify a 'long list' of other developments, by reviewing planning applications, development plans.
- Stage 2 – criteria are set for the inclusion or exclusion of developments on the long list. 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 (CEA) is undertaken in relation to the shortlisted developments and the findings are reported in a 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 1.5.4.

Table 1.5.4 'Other Development' for inclusion in the Inter-project cumulative effects assessment

Tier	Development
Tier 1	Under Construction
	Permitted permission(s) not yet implemented
	Submitted application(s) not yet determined
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted

[31] Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/.

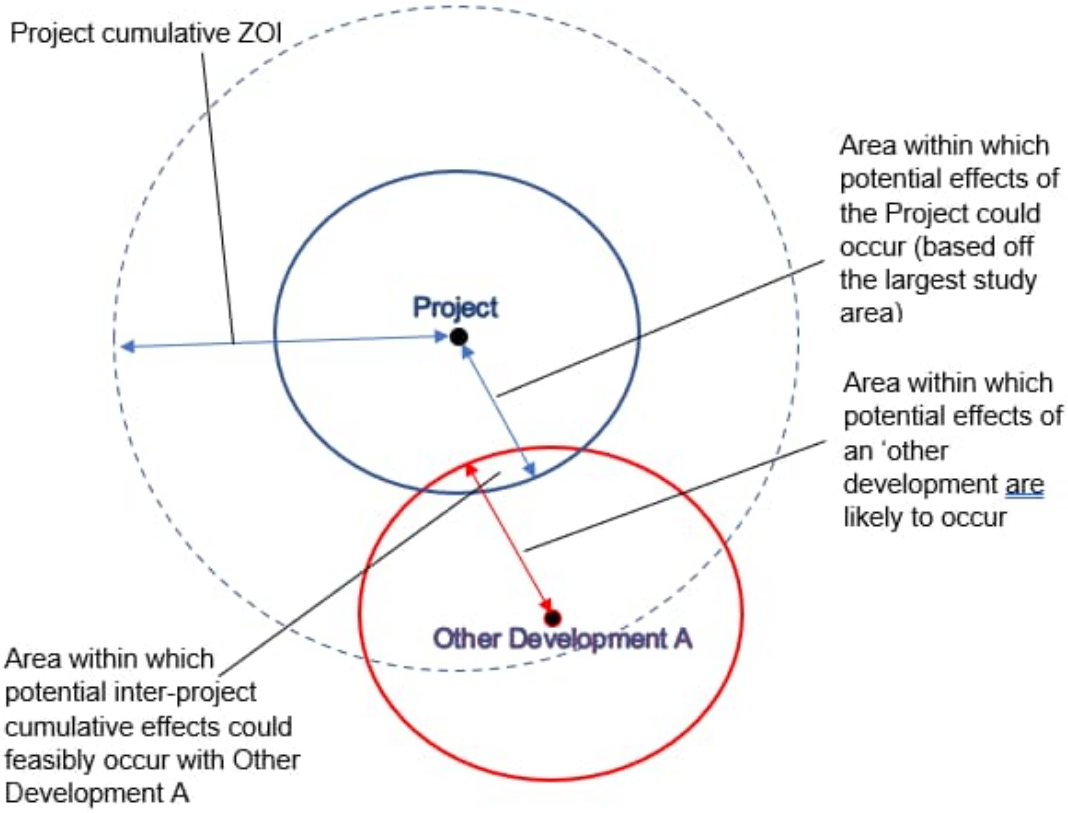
Tier	Development
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted
	Identified in the relevant Development Plan
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward

Stage 1

1.5.5.16. The first step of Stage 1 is to identify a ZOI within which the long list of projects can be identified.

1.5.5.17. The ZOI has been based off the largest study area of the environmental topic chapters, as the maximum area within which potential effects of the Project could occur. This has then been doubled to take account of potential study areas of 'other developments'. It is considered that doubling the maximum study area is sufficient to identify the 'long list' of 'other developments' whose study areas may overlap with the area within which the Project could result in a potential effect, therefore the area within which inter-project cumulative effects could feasibly occur. This is illustrated on Image 1.5.5. Professional judgement was also applied so as to not use this as hard cut off when identifying the 'long list'.

Image 1.5.5: Defining the ZOI



1.5.5.18. The second step is to identify a long list of projects within the ZOI. This initial long list is provided in **Appendix 1.5.A Inter Project Effects Long List** and will be continually reviewed and updated as required.

1.5.5.19. Those projects which are proposed to be progressed through to Stage 2 are presented within each of the cumulative effects chapters in Parts 2-4 and the outputs of the inter-project cumulative effects assessment will be reported in the ES.

1.5.6. Monitoring

1.5.6.1. Schedule 4, Paragraph 7 of the EIA Regulations 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.

1.6 Approach to the Environmental Statement

1.6.1. Introduction

1.6.1.1. The PINS Advice Note Seven[32] 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.

1.6.1.2. An indicative outline structure of the ES is set out in Table 1.7.1.

Table 1.7.1: Indicative structure of the ES

ES volume	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 2 – Main Document	Part 1 Introduction	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.
		Regulatory and Planning Context – this section will set out the legislative, national and local planning context, other relevant guidance and policies and any applicable consents and permits.
		Main Alternatives Considered – this section will set out the main alternatives considered and the reasons for the selection of the preferred options.
		Description of the Proposed Development – this section will provide a description of the Proposed Development and how the Proposed Development would be constructed, operated maintained and decommissioned.

[32] Planning Inspectorate (2020). Advice Note Seven. EIA: Process, Preliminary Environmental Information, and Environmental Statements. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/.

ES volume	Likely content	
		EIA Methodology and Basis of Assessment – this section will set out the overarching approach to the ES and the methodology used including the basis of assessment.
	Part 2 Suffolk Onshore Scheme	This will include a chapter describing the evolution of the Suffolk Onshore Scheme and the technical assessment chapters for the Suffolk Onshore Scheme. This part is proposed to comprise of the following: • Evolution of the Suffolk Onshore Scheme • Landscape and Visual • Ecology and Biodiversity • Cultural Heritage • Water Environment • Geology and Hydrogeology • Agriculture and Soils • Traffic and Transport • Air Quality • Noise and Vibration • Socio-economics recreation and tourism • Health and Wellbeing • Intra-project Cumulative Effects • Inter-project Cumulative Effects It is proposed that each of the technical chapters will be structured as follows: • Introduction • Legislation and Planning Context • Scope of Assessment and Consultation • Methodology • Basis of Assessment • Study Area

ES volume	Likely content	
		• Baseline Conditions • Potential Effects • Mitigation and Residual Effects • Cumulative Effects • Summary
	Part 3 Kent Onshore Scheme	This will include a chapter describing the evolution of the Kent Onshore Scheme and the technical assessment chapters for the Kent Onshore Scheme. This part is proposed to comprise of: • Evolution of the Suffolk Onshore Scheme • Landscape and Visual • Ecology and Biodiversity • Cultural Heritage • Water Environment • Geology and Hydrogeology • Agriculture and Soils • Traffic and Transport • Air Quality • Noise and Vibration • Socio-economics recreation and tourism • Health and Wellbeing • Intra-project Cumulative Effects • Inter-project Cumulative Effects It is proposed that each of the technical chapters will be structured as follows: • Introduction • Legislation and Planning Context • Scope of Assessment and Consultation • Methodology

ES volume	Likely content	
		• Basis of Assessment • Study Area • Baseline Conditions • Potential Effects • Mitigation and Residual Effects • Cumulative Effects • Summary
	Part 4 Offshore Scheme	This will include a chapter describing the evolution of the Offshore Scheme and the technical assessment chapters for the Offshore Scheme. This part is proposed to comprise of: • Evolution of the Offshore Scheme • Physical Environment • Benthic Ecology • Fish and Shellfish Ecology • Marine Mammals • Marine Ornithology • Marine Archaeology • Shipping and Navigation • Commercial Fisheries • Other Sea Users • Intra-project Cumulative Effects • Inter-project Cumulative Effects It is proposed that each of the technical chapters will be structured as follows: • Introduction • Legislation and Planning Context • Scope of Assessment and Consultation • Methodology • Basis of Assessment • Study Area

ES volume	Likely content	
		• Baseline Conditions • Potential Effects • Mitigation and Residual Effects • Cumulative Effects • Summary
	Part 5 Project Wide Effects	Climate Change – this section will provide an assessment of climate change and greenhouse gas emissions as a result of the Proposed Development
		Combined Effects of the Project – this will provide an assessment as required of any project wide effects over and above those assessed within the individual chapters where there is a pathway for a combined effects between the offshore and onshore schemes.
Volume 2 Appendices	This will set out the appendices for the chapters listed above where required	
Volume 3 Figures	This will provide the Figures for the chapters listed above where required.	