Preliminary Environmental Information Report Volume 1

Chapter 9 Geology and Contamination

LLK1-ARU-REP-ENV-000009
Version 0.0
January 2026

Contents

Glossary of Project Terminology

This Glossary has been provided to define terms used across a number of the LionLink Proposed Scheme documents.

Terms and Abbreviations contained herein are provided at the end of the document in the **Topic Glossary and Abbreviations**

Term	Description
Amendment to Kiln Lane Substation Scenario	The scenario where the Proposed Scheme will comprise the amendments to Kiln Lane Substation that would be required if Kiln Lane Substation was built out pursuant to the EA1N/EA2 DCOs.
Applicant, the	National Grid Lion Link Limited (NGLLL)
Bellmouth	A flared vehicular access/egress point connecting permanent route to the public highway.
Converter Station	A converter station changes electricity between High Voltage Alternating Current (HVAC), which power our homes, and High Voltage Direct Current (HVDC) which is more efficient for transporting electricity over long distances and vice versa. The proposed Converter Station is located to the east of Saxmundham.
Converter Station Site	The Converter Station Site as a whole, allowing for the co-location of the Converter Station with the Converter Station being separately consented as part of the Sea Link project.
Co-ordination	The process of people or entities working together.
Co-location	Where different elements of a project, or various projects, are located in one place.
Construction Compound	Temporary compounds installed during the construction phase of the Proposed Scheme. Each compound is likely to contain storage areas such as laydown areas, soils storage, and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Development Consent Order (DCO)	An order made by the Secretary of State pursuant to the Planning Act 2008 (as amended) granting development consent for a Nationally Significant Infrastructure Project. It grants consent to develop the approved project and may include (among other things) powers to compulsorily acquire land and rights where required and deemed marine licences for any offshore works.
Draft Order Limits	The area of land identified as being subject to the DCO application. The Draft Order Limits are made up of the land required both temporarily and permanently to allow for the construction, operation and maintenance, and decommissioning of the Proposed Scheme. All onshore parts of the Proposed Onshore Scheme are located within England and offshore parts of the Proposed Offshore Scheme are located within English territorial waters to 12 Nautical

Term	Description
	Miles and then up to the United Kingdom (UK) Exclusive Economic Zone (EEZ) boundary at sea.
Dutch Offshore Components	Is the term used when referring to the offshore elements of the Project within Dutch waters.
Eastern Route Option	As part of the Underground HVDC cable corridor, the Eastern Route Option would facilitate a degree of co-location with the Sizewell Link Road (SLR) scheme.
Environmental Impact Assessment (EIA)	The EIA is a systematic regulatory process that assesses the potential likely significant effects of a proposed project or development on the environment.
EIA Scoping Report	An EIA scoping report defines the proposed scope and methodology of the EIA process for a particular project or development. The EIA Scoping Report for the Proposed Scheme was submitted to the Planning Inspectorate with a request for the Secretary of State to adopt a scoping opinion in relation to the Proposed Scheme on 6 March 2024.
Environmental Statement (ES)	The ES is a document that sets out the likely significant effects of the project on the environment. The ES is the main output from the EIA process. The ES is published as part of the DCO application.
Exclusive Economic Zone (EEZ)	The zone in which the coastal state exercises the rights under Part V of the United Nations Convention on the Law of the Sea. These rights relate principally to the water column and may extend to 200 nautical miles from baselines. This is distinct from territorial waters, which for the UK extend 12 nautical miles from the coast.
Full Build Out of Kiln Lane Substation Scenario	The scenario if the Proposed Scheme was brought forward first, then it would be responsible for developing Kiln Lane Substation for the Proposed Scheme, with sufficient additional capacity for other projects.
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.
Kiln Lane Substation	The proposed connection point for the Project to the British National Electricity Transmission System, located to the north of Friston. Formerly known as Friston Substation. The new name has recently been adopted by NGET. The substation is of the same footprint and in the same location. Friston Substation will, hereafter, be referred to as Kiln Lane Substation.
Landfall	The proposed Landfall is where the proposed offshore HVDC Submarine Cables are brought ashore and meets with the onshore proposed Underground HVDC Cables. This includes the Transition Joint Bay (TJB). The proposed Landfall will be located at Walberswick, and there will be no permanent above ground infrastructure at the proposed Landfall.
Landfall Site	The area where the Landfall may be located.

Term	Description
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).
Link Box Chamber	Link boxes are used at joint bays to facilitate grounding connections to ensure safety and enable maintenance. Link boxes can either be installed below ground, in a link box chamber, or in an above ground link pillar
Multi-purpose interconnector (MPI)	A project where GB interconnection is combined with transmission of offshore generation within GB (and optionally within a connecting state).
National Grid Electricity Distribution (NGED)	The local distribution network operator for the Midlands, the southwest of England and south Wales.
National Grid Electricity Transmission (NGET)	Operators of 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 Grid Lion Link Limited (NGLLL)	The Applicant, a joint venture between National Grid Ventures and TenneT. NGLLL is a business within the wider National Grid Ventures portfolio.
National Grid Strategic Infrastructure (NGSI)	Part of NGET and responsible for delivering major strategic UK electricity transmission projects, focussed on connecting more clean, low-carbon power to England and Wales.
National Grid Ventures (NGV)	Operates and invests in energy projects, technologies and partnerships to accelerate the development of a clean energy future. This includes interconnectors (such as the LionLink Project), allowing trade between energy markets and the efficient use of renewable energy resources.
Nationally Significant Infrastructure Projects (NSIP)	Major infrastructure developments in England and Wales for which development consent is required, as defined within Section 14 of the Planning Act 2008 (as amended). This includes any development which is subject to a direction by the relevant Secretary of State pursuant to Section 35 of the Planning Act 2008.
Non-standard interconnector (NSI)	A project where GB interconnection is combined with transmission of offshore generation outside of GB.
Northern Route Option	A northern cable corridor option that would allow Underground HVAC Cable delivery for Proposed Scheme only.
Offshore Hybrid Asset (OHA)	A project that combines cross-border interconnection with the transmission of offshore generation, this is an overarching term which covers both multi-purpose interconnectors (MPI) and non-standard interconnectors (NSI).
Order Limits	The maximum extent of land within which the Proposed Scheme may take place, as consented.

Term	Description
Outline Offshore Construction Environmental Management Plan (Outline Offshore CEMP)	Describes the control measures and standards proposed to be implemented to provide a consistent approach to the environmental management of the construction activities of the Proposed Offshore Scheme.
Outline Onshore Code of Construction Practice (Outline Onshore CoCP)	Describes the control measures and standards proposed to be implemented to provide a consistent approach to the environmental management of the construction activities of the Proposed Onshore Scheme.
Overhead Lines (OHL)	Conductors (wires) carrying electric current, strung from Tower to Tower.
Planning Act 2008	The Planning Act 2008 being the relevant primary legislation for national infrastructure planning.
Planning Inspectorate (PINS)	The Planning inspectorate review DCO applications and make a recommendation to the Secretary of State, who will then decide whether to approve the DCO.
Preliminary Environmental Information Report (PEIR)	The PEIR is a document, compiled by the Applicant, which presents preliminary environmental information, as part of the statutory consultation process. This is defined by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as containing information which "is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)" (Section 12 2. (b)). This PEIR describes the Proposed Scheme, sets out preliminary findings of the EIA undertaken to date, and the mitigation measures proposed to reduce effects. The PEIR is published at Statutory Consultation stage for information and feedback.
Project (the)	The LionLink Project (hereafter referred to as the 'Project') is a proposal by National Grid Lion Link Limited (NGLLL) and TenneT. The Project is a proposed electricity link between Great Britain (GB) and the Netherlands with a capacity of up to 2.0 gigawatts (GW) of electricity and will connect to Dutch offshore wind via an offshore platform in Dutch waters. The Project is the collective term used to refer to the proposal for all aspects (onshore and offshore) of the proposed interconnector between GB and the Netherlands.
Proposed Offshore Scheme	The term used when referring to the offshore elements of the Proposed Scheme, seaward of the mean high-water springs to the EEZ boundary at sea.
Proposed Onshore Scheme	The term used when referring to the onshore elements of the Proposed Scheme, landward of the mean low water springs. Proposed Onshore Scheme components include:

Term	Description
	a) Kiln Lane Substation. b) Underground High Voltage Alternating Current (HVAC) Cables; c) Converter Station. d) Underground High Voltage Direct Current (HVDC) Cables; and e) Landfall.
Proposed Scheme	Used when referring to the GB scheme components of the Project, not including Dutch components. This includes both the onshore and offshore scheme components which are within UK territorial waters and up to the UK EEZ boundary at sea.
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 are not available in advance of, or at the time of submitting the DCO application. The Rochdale Envelope approach defines a design envelope and parameters within which the final design will sit and ensures a robust and reliable EIA can be undertaken.
Scoping Opinion	A scoping opinion is requested from the Planning Inspectorate on behalf of the Secretary of State, to inform the requirements of EIA process and ultimately the ES which will be submitted as part of the application for development consent. Through the scoping process, the views of the statutory consultees and other relevant organisations on the proposed scope of the EIA are sought. A Scoping Opinion for the Proposed Scheme was issued by the Planning Inspectorate (on behalf of the Secretary of State) on 16 April 2024. The Applicant received a separate EIA Scoping Opinion from the Marine Management Organisation (MMO) (Reference DCO/2024/00005, dated 04 September 2024) as the MMO were unable to provide opinion to the Planning Inspectorate in time for the April 2024 deadline.
Scottish Power Renewables (SPR) East Anglia One North (EA1N) and East Anglia 2 (EA2) Consents (SPR EA1N and EA2 Consents)	The Orders made following the Scottish Power Renewables applications for development consent for the following projects: a) The East Anglia ONE North Offshore Wind Farm Order 2022; and b) East Anglia TWO Offshore Wind Farm Order 2022
Southern Route Option	A southern cable corridor option that would allow: a) Underground HVAC Cable delivery for Proposed Scheme only, or b) Underground HVAC Cable delivery for Proposed Scheme and ducting for Sea Links Underground HVAC and HVDC cables in that section.
Statutory Consultation	Consultation undertaken with the community and stakeholders in advance of the application for development consent being submitted

Term	Description
	to the Planning Inspectorate, on behalf of the Secretary of state, in accordance with the PA 2008.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
TenneT	Operator of the electricity transmission network across the Netherlands.
Tower	A structure used to carry overhead electrical conductors, insulators, and fittings. Often described as a pylon.
Transition Joint Bay (TJB)	An underground structure at the Landfall Site that house the joints between the offshore cables and the onshore cables.
Underground Cable Corridors	Collective term for the corridors within which HVAC and HVDC cables are planned.
Underground High Voltage Alternating Current (HVAC) Cable Corridor	A corridor in which the underground HVAC cables are planned to be installed.
Underground High Voltage Alternating Current (HVAC) Cables	Transmission cables which connect between the Converter Station and Substation. HVAC cables are designed to manage fluctuating flow of current.
Underground High Voltage Direct Current (HVDC) Cable Corridor	A corridor in which the underground HVDC cables are planned to be installed.
Underground High Voltage Direct Current (HVDC) Cables	Transmission cables which connect the Converter Station to the Landfall Site and then offshore. HVDC cables are designed to manage current flowing in one direction.
Visibility Splay	An area of land at a road junction that ensures drivers have an unobstructed view of oncoming traffic allowing them to safely join or cross the road.
Western Route Option	As part of the Underground HVDC cable corridor, the Western Route Option would deliver the Scheme within its own corridor with no co-location with the Sizewell Link Road (SLR) scheme.

9 Geology and Contamination

9.1 Introduction

9.1.1 This chapter provides a preliminary assessment of the potential likely significant effects in relation to the geology and contamination from the construction, operation and maintenance, and decommissioning of LionLink (hereafter referred to as 'the Proposed Scheme').

9.1.2 This chapter outlines legislation, policy and guidance that is relevant to Geology and Contamination, summarises the engagement undertaken to date with relevant key stakeholders, sets out the scope and methodology of the assessment, and describes the baseline environment. Following this, the likely significant effects of the Proposed Onshore Scheme on geology and contamination are assessed taking account of mitigation measures within the design and control measures. The need for any additional mitigation is then considered along with proposals for monitoring and/or enhancement. The chapter concludes with a summary of the residual effects.

9.1.3 Geology and contamination aspects considered within this chapter for the Proposed Onshore Scheme are:

a. Effects on sites designated for their geological importance (the term 'geodiversity' is used in this chapter);
b. Potential exacerbation of existing coastal erosion; and
c. Risks to human health, surface water and groundwater quality arising from the Proposed Scheme's interaction with land contamination

9.1.4 This chapter should be read in conjunction with **Chapter 2 Description of the Proposed Scheme** of this Preliminary Environmental Information Report (PEIR), which describes the development parameters against which the effects considered in this chapter have been assessed and **Chapter 5 Approach and Methodology** which describes the approach to the preliminary Environmental Impact Assessment (EIA) including the approach to the assessment scenarios considered.

9.1.5 In addition, there may be interrelationships related to the potential effects on Geology and Contamination and other disciplines. Therefore, this chapter should be read alongside relevant parts of other chapters; namely:

a. **Chapter 6 Agriculture** of this PEIR – which covers the temporary and permanent loss of soils and soil functions;
b. **Chapter 10 Health and Wellbeing** of this PEIR – which covers disturbance or release or contamination in soil and groundwater as a result of construction activities and the potential to affect health;
c. **Chapter 12 Hydrology, Hydrogeology and Drainage** of this PEIR – which covers how contamination may impact on water, sources, pathways and receptors;

d. **Chapter 14 Material Assets and Waste** of this PEIR – which covers how contaminated materials and surplus soils will need to be managed, if they are classified as waste; and
e. **Chapter 18 Marine Physical Environment** of this PEIR – which covers risks associated with coastal erosion.

9.1.6 This chapter is supported by the following appendices and figures:

a. **Figure 9.1 Study Area;**
b. **Figure 9.2 Superficial Geology;**
c. **Figure 9.3 Solid Geology and Ground Investigation Locations;**
d. **Figure 9.4 Environmental Receptors;**
e. **Figure 9.5 Potentially Contaminated Land;**
f. **Appendix 9.1 Preliminary Contamination Risk Assessment; and**
g. **Appendix 9.2 Ground Investigation Reports.**

9.2 Legislation, and policy framework

9.2.1 This section identifies the legislation, policy and guidance that has informed the assessment of the likely significant effects on Geology and Contamination.

9.2.2 **Table 9.1** lists the legislation relevant to the assessment of the likely significant effects on Geology and Contamination.

Table 9.1: List of relevant legislation for Geology and Contamination

Legislation	Relevance to assessment
Environmental Protection Act 1990 (Part 2A): Contaminated Land (Ref 1)	The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the statutory definition of contaminated land: *"Contaminated Land is any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reasons of substances in, on or under land that:* • *Significant harm is being caused or there is a significant possibility of such harm being caused; or* • *Significant pollution of controlled waters is being or is likely to be caused".* The Act also provides the regulatory basis for the identification, designation and remediation of contaminated land. The Proposed Onshore Scheme could be located on land potentially affected by contamination. This requires assessment to ensure that the land is suitable for use following the construction of the Proposed Scheme and that the land cannot be determined as Contaminated Land under Part 2A of the Act.
Control of Pollution (Applications, Appeals and Registers) Regulations 1996 (Ref 2)	The Control of Pollution (Applications, Appeals and Registers) Regulations 1996 outline the procedures for managing applications, appeals, and registers related to pollution control in England and

Legislation	Relevance to assessment
	Wales. These regulations are part of the broader framework established by the Water Resources Act 1991. The Proposed Scheme may require consent to discharge water (potentially a pollutant) during construction. It is a requirement to apply for consent to discharge and adhere to consent requirements prior to discharge.
Environment Act 2021 (Ref 3)	The UK's Environment Act 2021 provide a new framework for environmental protection setting out targets on air quality, biodiversity, water, and waste reduction, and establishing the Office for Environmental Protection. The Act introduces a duty for policymakers to consider environmental principles when developing new policies. This includes the Polluter Pays Principle, the prevention principle, and the rectification at source principle. The Proposed Onshore Scheme could be located on land potentially affected by contamination. This requires assessment to ensure that the Proposed Onshore Scheme does not negatively impact the natural environment. In the unlikely event of a pollution incident during construction, operation and maintenance or decommissioning of the scheme, there is a legal obligation to cover the costs of remediation.
The Contaminated Land (England) Regulations 2006 (Ref 4)	The Contaminated Land (England) Regulations 2006 provide a framework for the designation and remediation of contaminated land. It provides the regulatory basis for identifying categories of "special sites", including land which is contaminated land by radioactive substances in, on or under that land. The Regulations also provide for the content and notification of remediation notices. The Proposed Onshore Scheme could be located on land potentially affected by contamination. It is a requirement to identify if the site is classified as a 'special site' and to adhere to the relevant guidance for the appropriate site category.
The Control of Asbestos Regulations 2012 (Ref 5)	The Control of Asbestos Regulation provides a framework for managing and working with asbestos. These regulations set out a duty to protect individuals from being exposed to asbestos at work. The regulation states that: *"An employer must not undertake work in demolition, maintenance or any other work which exposes or is liable to expose employees of that employer to asbestos in respect of any premises unless either—* *(a) that employer has carried out a suitable and sufficient assessment as to whether asbestos, what type of asbestos, contained in what material and in what condition is present or is liable to be present in those premises; or* *(b) if there is doubt as to whether asbestos is present in those premises, that employer—*

Legislation	Relevance to assessment
	(i) assumes that asbestos is present, and that it is not chrysotile alone, and *(ii) observes the applicable provisions of these Regulations"* The Proposed Onshore Scheme could be located on land affected by asbestos. This requires assessment to ensure protection of workers during GI and construction of the Proposed Onshore Scheme.
Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 6)	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, transpose into English and Welsh law the Water Framework Directive 2000/60/EC and contain provisions to protect rivers, lakes, estuaries, coastal waters and groundwater. These regulations provide for protection of types of water bodies and include environmental objectives and compliance parameters to be assessed. These requirements underpin the impact assessment for the water environment. The Draft Order Limits for the Proposed Onshore Scheme may include, or be located near to, protected waterbodies. This requires assessment to ensure that the Proposed Onshore Scheme does not negatively impact protected water bodies.
The Health and Safety at Work Act 1974 (Ref 7)	The Health and Safety at Work etc Act 1974 is the primary piece of legislation covering occupational health and safety in the United Kingdom. Some working environments present significant risks to employee health and safety (e.g. contact with hazardous substances). In such environments, there is a duty on the employer to provide their workers with personal protective equipment (PPE) to reduce the potential risk of harm when it cannot be reduced or mitigated by other means. The Proposed Onshore Scheme could be located on land potentially affected by contamination which presents a risk to workers during ground investigation (GI) and construction. Assessment is required to evaluate if workers are at risk to land contamination. Where it has been assessed that PPE is required, the provision of PPE must be suitable and appropriate to the associated risk.
The Construction (Design and Management) Regulations 2015 (Ref 8)	The Construction (Design and Management) Regulations 2015 aims to ensure that health and safety are considered throughout the entire construction process, from planning and design to completion and maintenance. The Regulations require hazards to be identified, assessed and controlled to ensure worker safety and comply with environmental regulations. Hazards relevant to Geology and Contamination would include contaminated land, ground stability and UXO risk.
The Environmental Permitting (England and	The Environmental Permitting (England and Wales) Regulations 2016 seeks to streamline the legislative framework for industrial and waste installations into a single permitting structure for those

Legislation	Relevance to assessment
Wales) Regulations 2016 (Ref 9)	activities which have the potential to cause harm to human health or the environment. Operating without a permit, failing to comply with permit conditions, or causing pollution incidents can result in enforcement actions, including fines and notices. The regulation states that a permit is required if a stand-alone groundwater activity that involves releasing polluting liquids directly or indirectly to water underground is carried out. The Proposed Onshore Scheme may require an environmental permit to discharge water during construction. It is a requirement to apply for environmental permit and adhere to permit requirements prior to discharge.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 10)	The Environmental Damage Regulations 2015 apply to the prevention of damage to sites of special scientific interest (SSSI), surface water, groundwater, marine waters and land. The scope of the regulations includes increases in the concentrations of pollutants in water and land which would result in a change to the status of the waterbody or a significant risk of adverse effects on human health. The Proposed Onshore Scheme could be located on land potentially affected by contamination which could be released to land or water during construction. Assessment is required to evaluate whether there are potential risks present and identify appropriate mitigation.
The Environmental Damage (Prevention and Remediation) (England and Wales) Regulations 2009 (Ref 11)	The Environmental Damage Regulations 2009 apply to the prevention and remediation of environmental damage. They aim to ensure that operators whose activities cause environmental harm are held financially responsible for preventing and remedying that damage. The scope of the regulations includes preventing environmental damage, remediation and administration and enforcement. The Proposed Onshore Scheme could be located on land potentially affected by contamination. Assessment is required to evaluate whether there are potential risks present and identify appropriate mitigation.

National policy

National Policy Statements for Energy

9.2.3 The primary policy consideration for the Secretary of State when deciding whether to grant a Development Consent Order (DCO) for the Proposed Scheme will be the National Policy Statements (NPSs) for Energy. Of specific relevance to the Proposed Scheme are the Overarching National Policy Statement for Energy (NPS EN-1) (Ref 12), the NPS for Electricity Networks Infrastructure (NPS-EN-5) (Ref 13) and National Planning Policy Framework (Ref 14). These set out a policy

framework to guide how DCO applications for energy infrastructure should be decided and how the effects of such infrastructure are considered.

9.2.4 **Table 9.2** lists the paragraphs from the NPSs and other national policy that are relevant to the Geology and Contamination assessment. It also sets out where these policy requirements are addressed within this chapter.

Table 9.2: List of relevant national policy for Geology and Contamination

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
Overarching National Policy Statement for Energy (NPS EN-1) (Ref 12)		
NPS EN-1 Section 5.4 Biodiversity and Geological Conservation (Ref 12)	Development on land within or outside a SSSI, and which is likely to have an adverse impact on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits (including need) of the development in the location proposed clearly outweigh both its likely effect on the features of the site that make it of special scientific interest, and potential broader effects on the national network of SSSIs. (NPS EN-1 Paragraph 5.4.8). The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests (NPS EN-1 Paragraph 5.4.8).	The baseline conditions are presented in **Section 9.6** of this chapter and do not identify designated geological SSSI or other geological designations within the study area. Effects on biodiversity are considered within **Chapter 8 Ecology and Biodiversity**.
NPS EN-1 Section 5.6 Coastal Change (Ref 12)	The impact of the Proposed Scheme on coastal processes and geomorphology, including potential impacts from climate change should be assessed. If the development will have an impact on coastal processes the applicant must demonstrate how the impacts will be managed to minimise adverse impacts on other parts of the coast (NPS EN-1, Paragraph 5.6.11.	Coastal processes are assessed and included in **Chapter 18 – Marine Physical Environment**.
NPS EN-1 Section 5.11 Land Use, Including Open	Where pre-existing land contamination is being considered within a development, the objective is to ensure that the site is suitable for its	**Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary land contamination risk

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
Space, Green Infrastructure, and Green Belt (Ref 12)	intended use. Risks would require consideration in accordance with the contaminated land statutory guidance as a minimum (NPS EN-1 Paragraph 5.11.5) The ES should identify existing and proposed land uses near the project. For developments on previously developed land, the applicant should ensure that they have considered the risk posed by land contamination and how it is proposed to address this (NPS EN-1 Paragraph 5.11.8) Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination. (NPS EN-1 Paragraph 5.11.14) Applicants should ensure that a site is suitable for its proposed use, taking account of ground conditions and risks arising from contamination (NPS EN-1 Paragraph 5.11.17) For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination, and where contamination is present, applicants should consider opportunities for remediation where possible. It is important to do this as early as possible as part of engagement with the relevant bodies before the official pre-application stage (NPS EN-1 Paragraph 5.11.18)	assessment to support the baseline information presented in **Section 9.6** of this chapter and informs the assessment presented in **Section 9.8**. The risk posed by land contamination has been considered in **Appendix 9.1 Preliminary Contamination Risk Assessment**. The risk assessment includes a review of historical and current land uses which have the potential to cause land contamination (see **Figure 9.5**). The methodology used to assess land contamination is presented in **Section 9.4**. Soil and materials management is considered in **Chapter 6 Agricultural Land and Soils** and **Chapter 14 Material Assets and Waste**. Suitability for the proposed use, taking into account risks arising from contamination, is considered in the assessment presented in **Appendix 9.1 Preliminary Contamination Risk Assessment**. Geotechnical suitability (land stability) will be considered as part of the detailed geotechnical design of the Proposed Onshore Scheme.
Section NPS EN-1	Where the project is likely to have effects on the water environment, the applicant should undertake an	The assessment presented in **Section 9.8** of this chapter includes an assessment of controlled waters,

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
5.16 Water Quality and Resources (Ref 12)	assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment, and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment, as part of the ES or equivalent. (NPS EN-1 Paragraph 5.16.3) Where possible, applicants are encouraged to manage surface water during construction by treating surface water runoff from exposed topsoil prior to discharging and to limit the discharge of suspended solids e.g. from car parks or other areas of hard standing, during operation (NPS EN-1 Paragraph 5.16.5) Applicants are encouraged to consider protective measures to control the risk of pollution to groundwater (NPS EN-1 Paragraph 5.16.6) The ES should in particular describe: • The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality. • Any impacts of the proposed project on water bodies or protected areas under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and Source Protection Zones (SPZs) around potable groundwater abstractions. (NPS EN-1 Paragraph 5.16.7) The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice. For	including SPZs and water abstractions within the study area. Mitigation measures to manage the risk to controlled waters during construction are presented in **Section 9.7**. Risk to groundwater and surface water is assessed in further detail within **Chapter 12 Hydrology, Hydrogeology and Drainage**.

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
	example, designated areas for storage and unloading, with appropriate drainage facilities, should be clearly marked (NPS EN-1 Paragraph 5.16.9)	
National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref 13)		
NPS EN-5 2.9 Applicant Assessment – Biodiversity and Geological Conservation (Ref 13)	NPS EN-5 Section 2.9 Applicant Assessment (Biodiversity and Geological Conservation) addresses the impacts of electricity networks on biodiversity and does not include requirements for geological conservation.	The baseline conditions presented in **Section 9.6** do not identify designated geological sites within the study area. Effects on biodiversity are considered within **Chapter 8 Ecology and Biodiversity**.
NPS EN-5 2.9 Applicant Assessment – Landscape and Visual Impact (Ref 13)	The Horlock Rules state that applicants should: • Consider environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum. • Seek to avoid altogether internationally and nationally designated areas of scientific value. • Protect as far as reasonably practicable surface and ground water sources. • Keep environmental effects to a reasonably practicable minimum. (NPS EN-5 Paragraph 2.9.19)	The baseline condition is presented in **Section 9.6** of this chapter and does not identify designated geological SSSI within the study area. Other internationally and nationally dedicated sites (e.g., wildlife sites, nature reserves, areas of outstanding natural beauty) are considered within **Chapter 8 Ecology and Biodiversity and Chapter 13 Landscape and Visual.** Effects on biodiversity are considered within **Chapter 8 Ecology and Biodiversity**. The assessment presented in **Section 9.8** of this chapter includes an assessment of controlled waters, including SPZs and water abstractions. Risk to groundwater and surface water is assessed in further detail within **Chapter 12 Hydrology, Hydrogeology and Drainage**. Mitigation measures to manage the risk to identified receptors are presented in **Section 9.7**.
Section NPS EN-5 Section 2.9 Applicant	...to consider: The potentially very disruptive effects of undergrounding on local	**Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary contamination risk assessment to inform the baseline

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
Assessment – Undergrounding and subsea cables (Ref 13)	environments, soil (including peat soils), hydrology, geology, and, for a substantial time after construction, landscape and visual amenity. Undergrounding an overhead line will mean digging a trench along the length of the route, and so such works will often be disruptive – albeit temporarily – to the receptors listed above than would an overhead line of equivalent rating. (NPS EN-5 Paragraph 2.9.25)	information presented in **Section 9.6** of this chapter and informs the assessment presented in **Section 9.8**. The assessment presented in **Section 9.8** of this chapter includes an assessment of how trenching may disturb contamination and potentially impact geology, soils (including peat soils).
NPS EN-5 2.10 Mitigation – Biodiversity and Geological Conservation (Ref 13)	NPS EN-5 Section 2.10 Mitigation (Biodiversity and Geological Conservation) states that the applicant should consider and address routing and avoidance/minimisation of impacts to biodiversity and does not include requirements for geological conservation (NPS EN-5 Paragraph 2.10.2 to 2.10.4)	The baseline conditions presented in **Section 9.6** do not identify designated geological sites within the study area. Effects on biodiversity are considered within **Chapter 8 Ecology and Biodiversity**.
National Planning Policy Framework 2024 (Ref 14)		
Chapter 15 Paragraph 187 (Ref 14)	Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued sites of geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil or water pollution. Development should, wherever possible, help to improve local environmental conditions such water quality. f) remediating and mitigating despoiled, degraded, derelict, contaminated land, where appropriate.	The baseline conditions presented in **Section 9.6** do not identify designated geological sites within the study area. Effects on biodiversity are considered within **Chapter 8 Ecology and Biodiversity**. **Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary contamination risk assessment. Mitigation measures to manage the risk to identified receptors, including remediation of contaminated land, are presented in **Section 9.7**.

Relevant paragraph reference	Summary of policy requirement	Where addressed in PEIR
Chapter 15 Paragraph 196 (Ref 14)	Planning policies and decisions should ensure that: a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and c) adequate site investigation information, prepared by a competent person, is available to inform these assessments (Paragraph 196)	**Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary contamination risk assessment to support the baseline information presented in **Section 9.7** of this chapter and informs the assessment presented in **Section 9.8**. The Proposed Onshore Scheme is not within an area at risk of ground instability due to coal mining. Other ground instability risks are considered in the Geotechnical Design of the Proposed Scheme. Site specific GI data is presented within **Appendix 9.2 Ground Investigation Reports**.
Paragraph 197 (Ref 14)	Where a site is affected by contamination, responsibility for securing a safe development rests with the developer and/or landowner.	**Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary contamination risk assessment to support the baseline information presented in **Section 9.7** of this chapter and informs the assessment presented in **Section 9.8**

9.2.5 In April 2025, the Department for Energy Security and Net Zero (DESNZ) published the consultation on the revised energy NPS's, with draft updates made to NPS EN-1, NPS EN-3 and NPS EN-5. The Applicant recognises the clarifications that are proposed in the draft NPS's, including specific reference to Offshore Hybrid Asset's directed into the NSIP regime under Section 35 of the Planning Act 2008 (draft NPS EN-1 paragraph 4.2.18 and draft NPS EN-3 paragraph 1.6.3).

9.2.6 The Applicant acknowledges that the draft policy is subject to change and therefore all potentially relevant references that apply to the Proposed Scheme are not recorded within this PEIR.

9.2.7 The Applicant will continue to monitor the progress of the designation of the draft NPS's and their applicability to the Proposed Scheme, as it progresses through Statutory Consultation and towards the submission of the application for development consent.

Local policy

9.2.8 The local policies listed in **Table 9.3** are considered relevant to the Geology and Contamination assessment of the Proposed Onshore Scheme.

Table 9.3: List of relevant local policy for Geology and Contamination

Local planning authority	Relevant local policy	Relevance to assessment
East Suffolk Council - Suffolk Coastal Local Plan (2020) (Ref 15)	**Section 10 – Natural Environment: Biodiversity and Geodiversity** Any increase or improvement to areas of geodiversity should be accurately evidenced at an early stage in the planning process. Development proposals should be accompanied by sufficient information to assess the effects of development on geology, together with proposed prevention, mitigation or compensation measures. **Policy SCLP10.1: Biodiversity and Geodiversity** Proposals that will have a direct or indirect adverse impact (alone or in-combination with other plans or projects) on locally designated sites of biodiversity or geodiversity importance will not be supported unless it can be demonstrated with comprehensive evidence that the benefits of the proposal, in its particular location, outweighs the biodiversity loss. Any proposal that adversely affects a European site, or causes significant harm to a SSSI, will not normally be granted permission. **Policy SCLP10.3: Environmental Quality** Development proposals will be expected to protect the quality of the environment and to minimise and, where possible, reduce all forms of pollution and contamination. Development proposals will be considered in relation to impacts on land contamination and its effects on sensitive land uses and water quality and the achievement of Water Framework	The baseline conditions presented in **Section 9.6** of this chapter do not identify any designated geological sites within the study area. Information on biodiversity is presented in **Chapter 8 Ecology and Biodiversity**. **Appendix 9.1 Preliminary Contamination Risk Assessment** presents a preliminary contamination risk assessment which identifies potential sources of contamination to support the baseline information presented in **Section 9.6**. Mitigation measures to manage the risk to identified receptors are presented in **Section 9.7**.

Local planning authority	Relevant local policy	Relevance to assessment
	Directive) (England and Wales) Regulations 2017 objectives.	
East Suffolk Council - Waveney Local Plan (2019) (Ref 16)	**Policy WLP8.34 – Biodiversity and Geodiversity** Proposals that will have a direct or indirect adverse impact on locally recognised sites of geodiversity importance will not be supported unless it can be demonstrated that new opportunities to enhance the green infrastructure network will be provided as part of the development that will mitigate or compensate for this loss.	The baseline conditions presented in **Section 9.6** do not identify any designated geological sites within the study area. Information on biodiversity is presented in **Chapter 8 Ecology and Biodiversity**.

9.3 Consultation and engagement

9.3.1 This section describes the outcome of, and response to, the Environmental Impact Assessment (EIA) Scoping Opinion (Ref 17) in relation to the Geology and Contamination assessment.

9.3.2 It also provides details of the ongoing technical engagement that has been undertaken with key stakeholders and provides a brief overview of the non-statutory public consultation undertaken to date.

9.3.3 Feedback from engagement and consultation are used to define the assessment approach and to ensure that appropriate baseline information is used.

9.3.4 It should be noted that feedback is also used to drive the design of the Proposed Scheme to avoid, prevent and reduce likely significant environmental effects where possible. **Chapter 3 Alternatives and Design Evolution** reports how the Proposed Scheme design has evolved in response to feedback. Details of proposed embedded design (Primary) mitigation and standard good practice (Tertiary) mitigation measures relevant to the Geology and Contamination assessment are provided in **Section 9.7** of this chapter.

Consultation

Non-Statutory Consultation

9.3.5 Feedback received from stakeholders following the close of Non-Statutory Consultations in both 2022 and 2023 is outlined within the **Interim Non-Statutory Consultation Feedback Summary Report 2023** (Ref 18) and **Supplementary Non-Statutory Consultation Summary Report 2024** (Ref 19).

9.3.6 **Table 9.4** below includes a summary of key non-statutory consultation feedback received to date and how this has been addressed within the PEIR or will be within the ES.

Table 9.4: Key non-statutory consultation feedback for Geology and Contamination

Stakeholder	Comment	Applicant response
Aldeburgh Town Council	"*In the main consultation, or the summary documents there is no mention of the environmental constraints. SSSIs represent the country's best wildlife and geological sites, supporting plants and animals that are rarely found elsewhere. We are not sure what weight is given to the appraisal of potential negative effects between the nature of the constraint or receptor and who sets the value or sensitivity and how it could be affected in the future. Or how robust the Developer's data can be considering they acknowledge that to date research has been desk-study only.*"	The baseline conditions presented in **Section 9.6** of this chapter identify that there are no designated geological sites within the study area. There is a geological SSSI (Pakefield to Easton Bavents) within Suffolk, but this is located 3.9km from the proposed Landfall Site. The Southwold Landfall Site was removed from the Proposed Scheme during option development, partially due to its proximity to the Pakefield to Easton Bavents SSSI (see **Chapter 3 Alternatives and Design Evolution**). Receptor value and sensitivity used in this assessment has been based on the LA109 Guidance (Ref 20). A discussion of potential ecological impacts on SSSI is presented in **Chapter 8 Ecology and Biodiversity**
Environment Agency	"*As this consultation is at high level we have few comments at this stage. If the cable route selection is refined we would wish to see that land contamination issues are considered through, as a minimum, a preliminary risk assessment. The results of the preliminary risk assessment conversely may constrain or alter the proposed cable route selection to minimise the risk to receptors.*"	Land contamination is considered in **Appendix 9.1 Preliminary Contamination Risk Assessment** which has been undertaken in line with the Environment Agency Land Contamination Risk Management (LC:RM) guidance. This risk assessment informs the assessment presented in **Section 9.8.** Routing for the proposed Underground Cable Corridors has been informed by the baseline information collated and design mitigation measures described in **Section 9.9**. The assessment presented **Section 9.8** considers the potential effects arising from contamination, assuming that mitigation measures outlined in **Section 9.7** are followed.
Suffolk Energy Action Solutions	"*Subsea cables coming into Landfall on the fragile coastline of Suffolk Coastal during*	The baseline presented in **Section 9.6** identified that the Coralline Crag formation outcrops on the sea bed

Stakeholder	Comment	Applicant response
	construction or over their lifespan will have a devastating effect on Suffolk's unique Coralline Crag. It is believed that there is no other such geological formation of marine deposits in the world. The Suffolk Coast is dependent on the Coralline Crag as a sea defence, and with climate change sea rises and tidal surges, National Grid Venture (NGV) must investigate the likely damage to the coastline and coastal communities."	approximately 11.6km to the south of the proposed Landfall Site and 6.5km to the east of Kiln Lane Substation. The proposed Offshore Underground Cable Corridor will not be laid within the Coralline Crag outcrop. For these reasons, no impact to the Coralline Crag is anticipated, and therefore it has not been assessed further.
East Suffolk Council (ESC)	"*Nationally designated SSSI and National Nature Reserves and locally designated (Local Nature Reserves and County Wildlife Sites (CWS)) sites are not identified and therefore it is unclear whether they have been considered as part of this process. Given the importance of such sites it is essential that impacts on them are considered as part of the project.* *Contaminated land - There is an expectation that land within the development area will be subject to assessment for land contamination in line with relevant guidance and legislation (including BS10175:2011+A2:2017 and the Land Contamination Risk Management LC:RM to ensure that contamination is identified and dealt with appropriately in respect of the development and sensitive receptors both onsite and offsite. The developer should also develop a robust watching brief in order to cover the eventuality that unexpected contamination is encountered and appropriately addressed.* *Southwold landfall - This landfall is also located partly within Easton Marshes CWS and is*	The baseline conditions presented in **Section 9.6** of this chapter identified that there are no designated geological sites within the study area. The closest geological SSSI is located 3.9km to the north of the proposed Landfall Site at Walberswick (Pakefield to Easton Bavents SSSI) and will not be disturbed as a result of the Proposed Scheme. The Southwold Landfall Site was removed from the Proposed Scheme during option development, partially due to its proximity to the Pakefield to Easton Bavents SSSI (see **Chapter 3 Alternatives and Design Evolution**). A preliminary contaminated land assessment is presented in **Appendix 9.1 Preliminary Contamination Risk Assessment**. The assessment of potentially contaminated land has been carried out in accordance with LC:RM guidance. Intrusive GI completed in line with BS10175:2011+A2:2017, was ongoing at the time of preparing this PEIR. The available GI data is presented in **Appendix 9.2 Ground Investigation Reports**. Where significant contamination is identified, either through the Preliminary Risk Assessment or intrusive investigation, mitigation measures will be

Stakeholder	Comment	Applicant response
	immediately to the south of part of Pakefield to Easton Bavents SSSI *Walberswick - The site also lies within East Suffolk Council's (ESC) Coastal Change Management Area which should be carefully considered. A map of the area can be found within the Suffolk Coastal/Waveney Local Plan. The impacts on coastal processes and nearshore change in the proposed landfall areas must be considered in detail."*	developed to ensure that it does not pose a risk to the identified receptors. No requirements for additional mitigation measures beyond those detailed within **Section 9.7** are required (see **Section 9.9)**. The assessment presented in **Section 9.8** considers the effects arising from potential contamination, assuming that mitigation measures outlined in **Section 9.7** are followed. Impacts on coastal processes and nearshore change are considered in **Chapter 18 Marine Physical Environment**.
Suffolk Wildlife Trust	*"The route corridor abuts Pakefield to Easton Bavents SSSI"*	The Southwold Landfall Site was removed from the Proposed Scheme during option development, partially due to its proximity to the Pakefield to Easton Bavents SSSI. The proposed Landfall Site at Walberswick is located 3.9km from this SSSI (see **Chapter 3 Alternatives and Design Evolution**).
Mining Remediation Authority (formerly The Coal Authority)	*"I have checked the site location plan against the information held by the Coal Authority and can confirm that the proposed development site is located outside of the defined coalfield. On this basis, the Planning team at the Coal Authority have no comments to make."*	The Proposed Onshore Scheme is not within an area at risk of coal mining instability, or future coal mining interest. The Mining Remediation Authority requested not to be included in future engagement for the Proposed Onshore Scheme.
Chairman of the Alde and Ore Association	*"It's concerns include any actions or interference with coastal sedimentary flows which could affect the sea defences at Aldeburgh and the eastern shingle bank of the Alde and Ore Estuary.* *Please be aware of the Shoreline Management Plan, the centuries old coastal transport of sedimentation, plus increases in rising sea level, more violent storms with climate change and a receding shoreline."*	Impacts on coastal processes and nearshore change are discussed in **Chapter 18 Marine Physical Environment**.

Stakeholder	Comment	Applicant response
ESC	*"Southwold Town Council has expressed concerns to ESC regarding the apparent lack of information available supporting coastal erosion calculations resulting from landfall and cabling activities. On coastal erosion – have been told the lifetime of a hub at, e.g. Easton Bavents is 50 years, many of us feel that the area will be significantly different in 10-20 years."*	The Southwold Landfall Site was removed from the Proposed Scheme during option development, partially due to its proximity to the Pakefield to Easton Bavents SSSI. The proposed Landfall Site at Walberswick is located 3.9km from this SSSI (see **Chapter 3 Alternatives and Design Evolution**).
Reydon Parish Council	*"Although we have been told the connection point will be behind the concrete seawall north of Southwold Pier, the cliffs to the north of this wall (at Easton Bavents in Reydon) continue to erode as fast as any other area of the Suffolk and Norfolk coast. This will reach a point where inundation occurs behind the current sea wall putting an onshore connection point at severe risk."*	The Southwold Landfall Site has been removed from the Proposed Scheme during the proposed Underground Cable Corridor optioneering process (see **Chapter 3 Alternatives and Design Evolution**). Impacts on coastal processes and nearshore change are discussed in **Chapter 18 Marine Physical Environment**.

9.3.7 All feedback has been considered as part of the ongoing EIA.

EIA Scoping Opinion

9.3.8 An EIA Scoping Opinion was adopted by the Planning Inspectorate on behalf of the Secretary of State on 16 April 2024.Comments received from the Planning Inspectorate in relation to Geology and Contamination are provided in **Table 9.5**.

Table 9.5: Preliminary response to Planning Inspectorate Scoping Opinion comments on Geology and Contamination

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
3.4.1 Paragraph 9.4.2 and Table 9-2	The Scoping Report states that a significant effect is unlikely as there are no geodiversity sites within the scoping boundary. The Inspectorate notes that the Pakefield to East Bavents SSSI, designated for its geological interest, is located adjacent to the scoping boundary in the vicinity of the proposed Southwold landfall site and cable	The Southwold Landfall Site is not being taken forward, therefore this Landfall Site will not be assessed in the PEIR or ES. An alternative proposed Landfall Site has been selected as part of the Proposed Scheme design at Walberswick (see **Chapter 3**

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
	corridor. Paragraph 9.4.2 identifies potential impact pathways to the SSSI, including restricted access through footpath closures and changes in ground stability. In addition, it is considered that there could be coastal process impacts arising from the Proposed Development that could result in damage or impairment of the SSSI. The Inspectorate does not have sufficient justification on which to conclude, that significant effects are not likely and this matter should be scoped into the ES. Cross reference to the assessment of effects in the Marine Physical Processes ES Chapter can be used to avoid duplication of information.	**Alternatives and Design Evolution**), which is located 3.9km from this SSSI as shown in **Figure 9.4 Environmental Receptors**. The impacts on the Pakefield and Easton Bavents SSSI have been considered in this context. An assessment of coastal process impacts is made within the **Chapter 18 Marine Physical Environment** and cross-referenced in this chapter.
3.4.2 Table 9-2	The Scoping Report states that GI and assessment of known contamination sources should ensure that remediation is completed during the construction phase. The Inspectorate notes that effects on human health arising from disturbance/release of contamination during construction would be assessed as part of the ES. The Inspectorate considers that further significant effects from the disturbance/release of existing contamination during the operational phase are unlikely and agrees that this matter can be scoped out.	Operational effects relating to the release/disturbance of contamination and effects on human health will be scoped out of assessment. The scope of assessment is detailed within **Table 9.6**. A preliminary contaminated land assessment is presented in **Appendix 9.1 Preliminary Contamination Risk Assessment**.
3.4.3 Table 9-2	The Scoping Report states that significant effects are not likely as storage of chemicals will be undertaken in accordance with best practice, e.g. bunded tanks. The Inspectorate agrees that, with the implementation of measures to limit any accidental release of pollution, any potential impacts are unlikely to result in significant effects and therefore further assessment is not required. The proposed best practice measures should be described in the ES and demonstrably secured in the DCO.	Contamination associated with storage of chemicals during construction will be scoped out of assessment. The scope of assessment is detailed within **Table 9.6**. Mitigation and control measures, including the details of measures to be used to prevent pollution arising from the storage of chemicals during construction or operation, are outlined in **Section 9.7** and in **Appendix 2.1 Outline Onshore Code of Construction Practice**.

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
3.4.4 Table 9-2	The Scoping Report states that significant effects are not likely as contamination would be identified and remediated during construction of open-cut trenches. The Inspectorate notes that effects arising from disturbance/release of contamination during construction would be assessed as part of the ES. Please refer to the Inspectorate's comments at ID 3.4.10 of this Opinion regarding measures to remediate contamination. On that basis, the Inspectorate considers that further significant effects from the creation of new contamination pathways during the operational phase are unlikely and agrees that this matter can be scoped out.	Effects to groundwater from the creation of new pathways along pipeline trenches during operation and maintenance will be scoped out of assessment. The scope of assessment is detailed within **Table 9.6**. A preliminary contaminated land assessment is presented in **Appendix 9.1 Preliminary Contamination Risk Assessment.** The assessment of potentially contaminated land has been carried out in accordance with LC:RM guidance. The Preliminary Risk Assessment (PRA) has been used to inform the assessment presented **Section 9.8**.
3.4.5 Table 9-2	The Scoping Report states that significant effects are not likely as contamination at the surface would be identified and remediated during construction of the proposed Converter Station or other structures. The Inspectorate notes that effects arising from disturbance/release of contamination during construction would be assessed as part of the ES. Please refer to the Inspectorate's comments at ID 3.4.10 of this Opinion regarding measures to remediate contamination. On that basis, the Inspectorate considers that further significant effects from the creation of new contamination pathways during the operational phase are unlikely and agrees that this matter can be scoped out.	Operational effects on the quality of deep groundwater aquifers from the creation of pathways through piled foundations will be scoped out of assessment. The scope of assessment is detailed within **Table 9.6**. A preliminary contaminated land assessment is presented in **Appendix 9.1 Preliminary Contamination Risk Assessment.** The assessment of potentially contaminated land has been carried out in accordance with LC:RM guidance. The PRA has been used to inform the assessment presented **Section 9.8**.
3.4.6 Paragraphs 9.3.1 to 9.3.5	The Scoping Report describes the proposed study areas, comprising 250m and 500m buffers around the scoping boundary for Geology and Contamination and sensitive groundwater receptors respectively. It is stated that the proposed study areas are based on professional judgment, consistent with other major linear infrastructure schemes and published industry guidance, used to determine a zone of influence.	The final study area(s) will be confirmed in the ES. Justification for the study area selection at PEIR is detailed within **Section 9.4**. The 250m and 500m buffers used to establish the study area are considered a reasonable worst-case scenario for the migration of contamination, informed by the baseline data collection and an

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
	The final study area(s) should be based on an understanding of the likely contamination/impact pathways that exist, informed by the baseline data collection. The ES should confirm the guidance that has been used to support identification of the zone of influence.	understanding of the likely contamination pathways.
3.4.7 Paragraphs 9.5.4 to 9.5.5	The Scoping Report indicates that the assessment would primarily be based on desk-based sources, which would be validated using the results of intrusive GI. It is stated that investigation is currently being designed for the proposed landfall and converter station sites, with a further phase planned for the underground cable corridor but that further detailed investigation would *"...be undertaken at later stages to inform detailed design."* No reference is made to the proposed Kiln Lane substation site, although paragraph 9.3.11 of the Scoping Report indicates that the use is currently and historically as farmland. Paragraph 9.5.5 suggests that investigation would not be undertaken on sites proposed for construction compounds until after grant of any DCO. The Applicant should seek to agree the approach to establishing baseline conditions with relevant consultation bodies, undertaking intrusive GI where it is deemed necessary to inform a robust assessment of likely significant effects and identification of mitigation required to address such effects in the ES. The scope, method and location of GI should be clearly described in the ES.	The proposed approach to establishing baseline conditions and ground investigation (GI) has been discussed with the Environment Agency and relevant local authorities at scoping stage as described in **Paragraph 9.3.9** and no concerns were raised at that time, although the details of the GI locations were not known. Since those initial consultations, further details of the GI have been made available, and these details will be shared during future consultation with the Environment Agency and the relevant local authorities to agree the approach to establishing baseline conditions for the ES. GI locations are shown on **Figure 9.3 Solid Geology and Ground Investigation Locations**. The GI factual reports are presented within **Appendix 9.2 Ground Investigation Reports**. The GI reports included in **Appendix 9.2** has been used to inform baseline conditions (**Section 9.6**) and the Geology and Contamination assessment (**Section 9.8**). The GI data reviewed for the PEIR provides good coverage of the Draft Order Limits for the Proposed Scheme to allow informed understanding of baseline conditions.
3.4.8 Paragraph 9.6.2	The Scoping Report states that coastal stability and/or erosion will not be assessed as part of the Geology and Contamination ES chapter but would be addressed in the Marine Physical Processes ES chapter and in	Works for the Proposed Onshore Scheme in the area of the coast are limited to trenchless techniques, for example horizontal directional drilling (HDD) as detailed in **Chapter**

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
	a separate technical report on coastal stability. The Inspectorate advises that coastal stability and/or erosion should also form part of the geology assessment, noting that the proposed landfall sites are both in locations subject to coastal erosion. The Inspectorate's comments at ID 2.1.6 of this Opinion are also of relevance to this matter. Cross reference can be made to the Marine Physical Processes ES chapter to avoid duplication.	**2 Description of the Proposed Scheme**. By utilising trenchless techniques, the coastal environment remains intact, allowing the drilling process to avoid interference with natural erosion or accretion rates at the shoreline. An assessment of coastal process impacts is made within the **Chapter 18 Marine Physical Environment** and cross-referenced in this chapter.
3.4.9 Table 9-2	In addition to the receptors identified in **Table 9-2**, the Inspectorate advises that secondary aquifers should also be considered as a receptor in the assessment.	Secondary aquifers have been included as receptors in **Appendix 9.1 Preliminary Contamination Risk Assessment**. The preliminary contamination risk assessment (PRA) has been used to inform the assessment of effects presented in **Section 9.8**.
3.4.10	The assessment of construction phase effects should include consideration of potential for existing contamination to be mobilised and released to new contamination pathways to groundwater receptors, including along pipeline trenches and piled foundations. Any measures required to remediate existing contamination and mitigate likely significant effects arising should be identified in the ES and demonstrably secured in the DCO. In addition to the proposed Converter Station site, an assessment of other locations where piled foundations are proposed should be provided, where significant effects are likely to occur.	The creation of preferential pathways for existing contamination during construction have been assessed in **Appendix 9.1 Preliminary Contamination Risk Assessment**. This includes piled foundations. The PRA has been used to inform the assessment of effects presented in **Section 9.8**. Mitigation and control measures, required to mitigate likely significant effects during construction, operation and decommissioning are outlined in **Section 9.7** and in **Appendix 2.1 Outline Onshore Code of Construction Practice**.
3.4.11	The Scoping Report identifies areas of high unexploded ordnance (UXO) risk within the onshore scoping boundary but does not reference this as an impact pathway to be assessed in **Table 9-2**. Any likely significant effects to Geology and Contamination arising from the presence of UXO should be assessed and described in the ES.	More detailed information on UXO risk was not available at scoping but has since been provided for some areas of the scheme to inform the GI. As GI is ongoing at the time of preparing this PEIR, further UXO assessment is to be completed. This information has been reviewed to

Scoping Opinion ID	Scoping Opinion Comment	How this is addressed
		inform the baseline conditions (see **Section 9.6**).

Engagement

9.3.9 This section provides details of the ongoing technical engagement that has been undertaken with stakeholders in relation to Geology and Contamination and is outlined below.

Key stakeholders

9.3.10 Key stakeholders with views and concerns regarding Geology and Contamination have been identified as:

a. Environment Agency;
b. Suffolk County Council (SCC);
c. East Suffolk Council (ESC);
d. Mining Remediation Authority (formerly the Coal Authority) confirmed the scheme is not within a coal mining area and they do not wish to be a key stakeholder; and
e. GeoSuffolk.

Environment Agency consultation

9.3.11 On the 27 July 2023, a meeting between the Environment Agency and the Applicant was held. An overview of the EIA Scoping Report and the Geology and Contamination chapter therein was provided. The presentation covered the extent of the study area, potential sources of contamination, potential impacts of contamination and potential design/control measures (for example undertaking an intrusive GI).

9.3.12 The Environment Agency did not raise objections to the information presented. The Scoping Report identifies five historical landfill sites in the study area. The Environment Agency noted that they do not have records on the listed sites as pre-1997, as details are normally held by the local authority. The Environment Agency recommended that landfill sites are avoided where possible in the design for the Proposed Onshore Scheme. Details of where interaction with landfill has been avoided are provided in the Design Mitigation **Section 9.7**.

Suffolk County Council and East Suffolk Council consultation

9.3.13 On the 23 August 2023, a meeting between SCC, ESC and the Applicant was held, which was the first meeting dedicated to the topic of Geology and Contamination. The Proposed Scheme Introduction and EIA Scoping Report Methodology was omitted as the participants from ESC and SCC had attended numerous previous engagement meetings.

9.3.14 The focus of the EIA Scoping Report section for Geology and Contamination was outlined. The presentation covered the extents of the study area, potential sources of contamination, potential impacts of contamination and potential design/control measures. Proposed GI (pre-construction/pre-consent surveys) was also presented.

9.3.15 The Applicant also shared that an initial engagement meeting with the Environment Agency had already been undertaken (see **Paragraph 9.3.11**).

9.3.16 The Applicant requested information on potential future sites of geological value to help inform the future baseline. SCC identified a brick works at South Cove which may have potential for former workings to be future geological designations. South Cove is located outside the study area described in **Section 9.6**. Due to the distance from the Proposed Onshore Scheme (approximately 6km), South Cove is not anticipated to affected and was therefore not considered further in this assessment.

9.3.17 The Applicant noted several potential sources of contamination within the study area (described in **Section 9.6**). SSC provided some further information on former defensive sites and RAF Leiston in the meeting and stated that account should be taken in the Proposed Onshore Scheme of historical pits in farmland as a potential source of contamination. This information has been used within the **Appendix 9.1 Preliminary Risk Assessment**.

9.3.18 ESC raised that for other projects, consultation with Natural England had been requested prior to undertaking GI despite these activities being covered by Permitted Development (PD) rights. This is because PD rights do not apply should works have the potential to adversely impact European Designated Sites. The GI completed to date is presented in **Appendix 9.2 Ground Investigation Reports**. Planning consent for GI was obtained where required.

GeoSuffolk

9.3.19 Input has been sought from GeoSuffolk during the preparation of this PEIR and will continue to be sought to inform the assessment.

9.4 Assessment methodology

9.4.1 This section outlines the methodology followed to assess the potential likely significant effects of the Proposed Onshore Scheme in relation to Geology and Contamination including:

a. scope of the assessment;
b. study area;
c. methodology; and
d. assessment of cumulative effects;

9.4.2 This section presents a description of how receptor sensitivity, magnitude of impact and significance of effects are described and assigned to the assessment.

9.4.3 The project-wide approach to the assessment methodology is set out in **Chapter 5 EIA Approach and Methodology** of this PEIR.

Scope of the assessment

9.4.4 Potential likely significant effects requiring assessment may be temporary or permanent and may occur during construction, operation and maintenance and/or decommissioning. Potential likely significant effects on Geology and Contamination receptors within the scope of the assessment are summarised in **Table 9.6**. The scope of the assessment has responded to feedback received as detailed in **Section 9.3**.

Table 9.6: Summary of the PEIR scope for Geology and Contamination assessment

Receptor	Construction	Operation	Decommissioning
Human Health	**Scoped in**	**Scoped out**	**Scoped in**
Surface water	**Scoped out**	**Scoped out**	**Scoped out**
Groundwater (pollution of groundwater bodies as result of temporary alteration of groundwater flows, and new contamination pathways to groundwater receptors)	**Scoped in**	**Scoped out**	**Scoped in**
Groundwater (accidental spillage)	**Scoped out**	**Scoped out**	**Scoped out**
Coastal Erosion	**Scoped in**	**Scoped in**	**Scoped in**
Geodiversity	**Scoped in**	**Scoped in**	**Scoped in**

Study area

9.4.5 This section describes the spatial scope (the area which may be impacted) for the assessment as it applies to Geology and Contamination.

9.4.6 The study area for Geology and Contamination includes land within the Proposed Onshore Scheme plus a 250m buffer, as shown on **Figure 9.1**.

9.4.7 This study area is based upon professional judgement and is considered a reasonable worst-case scenario informed by the baseline data collection and an understanding of the likely contamination pathways. It is in line with assessments for other major linear infrastructure schemes (such as railways, highways and cable routes), takes into account the requirements of LA 109 (Ref 20) and has been agreed with statutory consultees.

9.4.8 For sensitive groundwater receptors the study area also includes land beyond the Proposed Onshore Scheme within a buffer of 500m either side, as shown on **Figure 9.1**. This buffer distance for groundwater allows for the capture of sensitive groundwater receptors and the assessment of potential impacts on groundwater quality from significant contamination sources, such as large

historical landfill sites. It is informed by published industry guidance LA 109 (Ref 20) and professional judgement to determine an appropriate Zone of Influence and is consistent with the study area adopted for the **Chapter 12 Hydrology, Hydrogeology and Drainage** assessment which also considers groundwater impacts.

Assessment scenarios

9.4.9 **Chapter 5 EIA Approach and Methodology** of this PEIR provides an overview of the Applicant's approach to the temporal scope (the timescales over which impacts may occur) of the EIA. This section sets out the reasonable worst-case scenarios and options which have been assessed for the purposes of this Geology and Contamination chapter.

9.4.10 The Full Build out of Kiln Lane Substation Scenario as described in **Chapter 5 EIA Approach and Methodology** has been assessed in this chapter, as it represents a worst case scenario due to the greater size of the study area when compared with the Amendment to the Substation Scenario.

9.4.11 Both options (Northern Route Option and Southern Route Option) with regards to the proposed Underground High Voltage Alternating Current (HVAC) Cable Corridor as described in **Chapter 5 EIA Approach and Methodology** have been assessed. For the HVAC Cable Southern Route Option, the HVAC Cable Route LionLink Infrastructure and ducting for Sea Link Scenario has been assessed as the worst case.

9.4.12 The location of these routes is shown in **Figure 2.2**. In undertaking the assessment for the proposed Underground HVAC Cable Corridor, this chapter has assumed that trenching or ground disturbance may occur anywhere within the Draft Order Limits.

9.4.13 The proposed Underground HVDC Cable Corridor generally follows a single route, except for a small section where it splits into two alternative options as described in **Chapter 2 Description of the Proposed Scheme**.

9.4.14 Both options with regards to the proposed Underground High Voltage Direct Current (HVDC) Cable Corridor as described in **Chapter 5 EIA Approach and Methodology** have been considered in this chapter topic assessment.

9.4.15 In undertaking the assessment of the proposed Underground HVDC Cable Corridor, this **Chapter 9 Geology and Contamination** has assumed that trenching may occur anywhere within the Draft Order Limits.

Baseline methodology

Data collection

9.4.16 Baseline data collection has been undertaken to obtain information over the study area. The study area has been split into four geographical areas (A to D)

for simplicity, as shown in **Figure 2.1**. This section provides the approach to collecting baseline data.

9.4.17 The following sources of data have been utilised to inform the baseline with respect to Geology and Contamination (**Table 9.7**). In addition to these data sources, the Geology and Contamination assessment draws on environmental baseline data collated for other topics, specifically, baseline data presented in **Chapter 12 Hydrology, Hydrogeology and Drainage** and **Chapter 18 Marine Physical Environment** of this PEIR.

Table 9.7: Data sources used to inform the Geology and Contamination assessment

Source of data	Baseline data
Natural England Peat Map (Ref 21)	Interactive peat map showing the extent and thickness of peaty soil (accessed June 2025)
Groundsure Map Insight GIS data package (Ref 22)	Historical Ordnance Survey maps in digital form (obtained February 2025)
Groundsure Enviro+Geo Insight GIS data package (Ref 23)	Key datasets (obtained February 2025): • past land use; • waste and landfill sites; • current and recent industrial activity; • hydrogeology/hydrology; • flood risk data sets; • designations (environmental, visual, cultural, agricultural and habitats); • geology; • Water Framework Directive water quality data; • waste exemptions; • recent and historical aerial imagery; and • pollution inventory data.
British Geological Survey (BGS) (Ref 24)	Published geology (1:50,000 scale digital geology map) (accessed February 2025)
Environment Agency (Ref 25)	Historical landfill data including location and licence details (accessed February 2025)
Environment Agency (Ref 26)	Authorised landfill and permitted waste site data including location and licence details (accessed November 2024)
BGS (Ref 27)	Historical borehole records (accessed March 2025)
BGS (Ref 27)	Lexicon of Named Rock Units (accessed March 2025)
BGS Memoir (Ref 28)	Geology of the country around Lowestoft and Saxmundham: Memoir for 1:50 000 Geological Sheets 176 and 191 (England and Wales) (accessed February 2025)
Public Health England (Ref 29)	Radon mapping (accessed March 2025)
Zetica (Ref 30)	Site-specific UXO desk studies/risk assessments (accessed March 2025)

Source of data	Baseline data
ESC (Ref 31)	Information on sites designated under Part IIA of the Environment Act 1995 (accessed March 2025)
Mining Remediation Authority Interactive Map Viewer (Ref 32)	Coal mine workings (accessed March 2025)
ESC (Ref 33)	GeoSuffolk geologically designed sites (obtained January 2023)
Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref 34)	Geological SSSI (accessed March 2025)
Geotechnics (Ref 35, Ref 36, Ref 37, Ref 38)	GI data (proposed Underground Cable Corridor and proposed Landfall Site data obtained between January and March 2025. Convertor Station data received October 2024)
Geotechnical desk studies (Ref 39, Ref 40, Ref 41, Ref 43)	Geotechnical desk studies (obtained May 2024)
National Library of Scotland	Georeferenced historical maps (obtained March 2025)

9.4.18 Baseline data collection for the Geology and Contamination assessment has been predominantly desk based. Intrusive ground investigation was ongoing at the time of preparing this PEIR. The available data has been used to inform the assessments in this PEIR.

Site surveys

9.4.19 As mentioned above, site-specific GI data was being obtained at the time of writing this PEIR, to provide information for detailed design of the Proposed Onshore Scheme. The available GI data used for this PEIR is presented in **Appendix 9.2 Ground Investigation Reports**.

9.4.20 Interpretive GI reports, which will include quantitative contaminated land risk assessments, were not available at the time of writing.

Geology and hydrogeology

9.4.21 The geology and ground conditions present across the study area (defined in **Section 9.4**) are important in setting the context for the assessment and identifying the potential pathways by which contamination could migrate.

9.4.22 The nature and distribution of superficial and bedrock geology across the study area and surrounding area has been determined with reference to British Geological Survey (BGS) mapping and GI data, as well as historical mapping to determine the extent and location of past mineral extraction. The indicated bedrock and superficial geology are summarised in **Figures 9.3** and **Figure 9.2** respectively.

9.4.23 As described in the Site Survey section of this report, Proposed Scheme specific GI was ongoing at the time of writing this PEIR. GI data received after 23/03/2025 will continue to inform the assessment as further data becomes available.

Geodiversity

9.4.24 Geodiversity impacts could occur as a result of direct loss of, or damage to, important sites through construction of the Proposed Onshore Scheme. Some geodiversity sites can also be impacted through changes to the local hydrogeology, as reported in **Chapter 12 Hydrology, Hydrogeology and Drainage**. Geologically-designated sites on the coast can also be impacted through changes to the rates of coastal erosion.

9.4.25 The locations of sites such as SSSI and County Geodiversity Sites have been established through publicly-available data sets. The indicated geodiversity sites based upon the above are summarised in **Figure 9.4**, which shows that there are none within the study area. Therefore, the assessment of effects for geodiversity is not considered further in this PEIR.

Potential contaminant sources

9.4.26 The history of the study area and surrounding land has been summarised based on historical mapping and satellite imagery. Areas of potentially contaminative land have been identified based on the study areas former and current land uses (e.g. old quarries, tips and industrial or commercial sites). Desk-based information from public data sets and engagement with ESC, SCC and the Environment Agency have also been reviewed in order to identify potential sources of contamination. Further stakeholder engagement will be carried out to inform the assessment where it has not been possible to obtain information to date.

9.4.27 Potential contaminant sources identified based upon the above are summarised in **Figure 9.5**.

9.4.28 Each potential contamination source identified has been given its own unique identifier (e.g. CL-01, where CL refers to ‘contaminated land’ and 01 refers to a unique potential contaminant source). Professional judgement has been applied where a potential contamination source has had multiple uses, for example:

a. a historical industrial building that had high potential for contamination but has since been converted into a residence and is therefore considered likely to now have a low contamination potential; or
b. a former quarry which had low contamination potential was later used as a landfill site and is now likely to have a high contamination potential.

9.4.29 Information on the potential for encountering UXO has been taken from Geotechnical Desk Study reports (Ref 39, Ref 40, Ref 41, Ref 43).

Receptors

9.4.30 The assessment has identified receptors that could be exposed to contamination, including the health of people living in, working in or otherwise using the study area ('human health') and the quality of groundwater. Impacts to human health and groundwater quality are assessed further assessed within **Chapter 10 Health and Wellbeing** and **Chapter 12 Hydrology, Hydrogeology and Drainage** respectively.

Assessment methodology

Contamination assessment

9.4.31 The approach to assessment is set out in **Chapter 5 EIA Approach and Methodology** of this PEIR. This has informed the approach used in this Geology and Contamination assessment.

9.4.32 The methodology for the assessment of Geology and Contamination for the PEIR follows the requirements of LA 109 (Ref 20) and considers potential impacts on human health and groundwater arising from the project's interaction with contamination.

9.4.33 Prior to undertaking the assessment for ground conditions, the baseline conditions pertaining to the ground conditions (including geology, land use, contaminated land and hydrogeology) have been obtained. The study area has been split into four geographical areas (Sections A to D, see **Figure 2.1**) for simplicity and the baseline for each section is described separately.

Coastal erosion assessment

9.4.34 The methodology for the assessment of coastal erosion is presented in **Chapter 18 Marine Physical Environment**.

Determining receptor value/sensitivity, magnitude and significance of effect

9.4.35 **Chapter 5 EIA Approach and Method** sets out the standard EIA methodology and matrices to be used for the assessment. The methodology is based on the principle that the environmental effects will be determined by identifying potential receptors, assigning receptor value, assessing the magnitude of change on the receptor and then identifying the significance of the effect.

9.4.36 **Table 9.8** below describes the receptor value and sensitivity to be used in the assessment, in line with the definitions in **Chapter 5 EIA Approach and Methodology**, which have been adapted from existing guidance for linear infrastructure as set out in Highways England LA109: Geology and Soils. The magnitude of impact on receptors is described in **Table 9.9**, adapted from existing guidance in LA109: Geology and Soils. The significance of effect is based on the standard matrix in **Chapter 5 EIA Approach and Methodology**. Construction and maintenance workers are not included as receptors within the

assessment as risks will be managed under the Health and Safety at Work Act (Ref 7).

Table 9.8: Receptor value and sensitivity

Receptor value and sensitivity	Geological receptors	Human receptors	Controlled waters receptors
Very high	UNESCO Global GeoParks Geological Conservation Review sites (international) Sites of international importance	Residential dwellings Allotment gardens Schools, nurseries	**Surface water:** Watercourse with Q95 >1.0 m^3/s **Groundwater:** Principal aquifer providing regionally important resource and/or supporting a site designated under legislation Source Protection Zone 1
High	Geological SSSI, Geological Conservation Review sites (national) Sites of national importance	Public open space areas e.g. parks, playing fields	**Surface water:** Watercourse with Q95 <1m3/sec **Groundwater:** Principal aquifer providing locally important resource or supporting a river Source Protection Zone 2
Medium	Regionally important geological sites (RIGS)	Commercial or industrial land uses	**Surface water**: Watercourses not having a Water Framework Directive classification, Q95 >0.001m3/sec **Groundwater**: Aquifer providing water for agricultural or industrial use with limited connection to surface water (Secondary aquifer) Source Protection Zone 3
Low	Locally important geological sites e.g. former quarries or mining sites	Highways, railway land	**Surface water**: Watercourses not having a Water Framework Directive classification shown in a River Basin Management Plan and Q95 <0.001m3/sec **Groundwater**: Unproductive strata (low yield)

Receptor value and sensitivity	Geological receptors	Human receptors	Controlled waters receptors
Negligible	No geological exposures	Undeveloped land Land with no sensitive uses proposed	**Surface water**: Watercourses with negligible/no flow during construction **Groundwater**: Unproductive strata (very low or no yield)

Table 9.9: Magnitude of impact on receptors

Magnitude	Definition
High	**Geology** Loss of geological feature/designation of international importance, severe damage to key characteristics, features or elements. **Contamination** Human health: Significant contamination, significantly exceeding background levels and relevant screening criteria. Potential for significant harm to human health. Groundwater: Pollution of a principal aquifer within a Source Protection Zone or potable supply, characterised by a breach of drinking water standards. Surface water: Pollution of a surface watercourse characterised by a breach of an Environmental Quality Standard at a statutory monitoring location or resulting in a change in General Quality Assessment grade.
	Geology Creation of a new feature of international importance e.g. a new permanently accessible exposure. **Contamination** Human health: A considerable reduction in contamination risk to health e.g. remediation of significant contamination to levels below relevant screening criteria. Groundwater/surface water: Considerable local-scale/moderate to significant wide-scale improvement to the quality of groundwater or surface water.
Medium	**Geology** Partial loss of nationally important feature/designation, damage to key characteristics, features or elements. **Contamination**

Magnitude	Definition
	Human health: Contaminant concentrations exceed background levels and are in line with the limits of relevant screening criteria. Land requires remediation in order to make it suitable for development.
	Geology Creation of a new nationally important exposure/feature, or new geological understanding e.g. through GI. **Contamination** Human health: A reduction in contamination risk e.g. through remediation to make land suitable for development. Groundwater/surface water: Local-scale, or moderate wide-scale improvement to the quality of groundwater or surface water resources.
Low	**Geology** Minor, measurable change in geological feature of local importance, or minor loss of key characteristics, features or elements. **Contamination** Human health: Contaminant concentrations are below relevant screening criteria. Significant contamination is unlikely with a low risk to health. Groundwater: Low levels of pollution of a principal aquifer outside a Source Protection Zone or an industrial abstraction, or pollution of a Secondary A or B aquifer. Surface water: Low levels of pollution insufficient to result in a change in the WFD classification.
	Geology Creation of a new feature/resource of local importance or a new short-term accessible geological exposure. **Contamination** Human health: A slight reduction in contamination risk e.g. land that has a low contamination risk in the baseline becomes very low risk through the use of best practice measures to minimise risks to human health.
Negligible	**Geology** Very minor loss or detrimental impact on geological feature of local importance. **Contamination** Human health: Contaminant concentrations significantly less than relevant screening criteria. No requirement for remediation. Groundwater and Surface Water: No appreciable pollution, or pollution of a low sensitivity receptor such as a secondary (undifferentiated) aquifer or surface watercourse without a quality classification.
	Geology Very minor improvement to geological feature of local importance.

Magnitude	Definition
	Contamination Human health: Minor reduction in contaminant concentrations or exposure pathways. Groundwater and Surface Water: Very minor improvement in water quality of a low sensitivity receptor such as a secondary (undifferentiated) aquifer or surface watercourse without a quality classification.

9.4.37 Based on the sensitivity and magnitude, the significance of effect will be predicted. The standard matrix is to be used for the assessment, which is provided in **Table 5.4** in **Chapter 5 EIA Approach and Methodology** of this PEIR.

Cumulative assessment

9.4.38 **Chapter 28 Cumulative Effects** of this PEIR defines the methodology for the assessment of cumulative effects. The Geology and Contamination assessment of intra- and inter-project cumulative effects will be carried out and reported within the ES to be submitted with the application for development consent.

9.4.39 The Zone of Influence for the inter-project cumulative effects assessment of Geology and Contamination comprises land beyond the Proposed Onshore Scheme within a buffer of 500m either side, as shown on **Figure 9.1** and described in **Section 9.4**.

Guidance

9.4.40 The Geology and Contamination assessment has been undertaken in accordance with relevant guidance and has been compiled in accordance with professional standards. The guidance and standards which relate to this assessment are:

a. Environment Agency, LC:RM (Ref 44);
b. Environment Agency (2009) Updated technical background to the Contaminated Land Exposure Assessment (CLEA) model. Science Report SC050021 (Ref 45);
c. Environment Agency (2014) Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (Ref 46);
d. Health and Safety Executive (2012) The Control of Asbestos Regulations (Ref 47);
e. Construction Industry Research and Information Associating (CIRIA) (2014) Asbestos in soil and made ground: a guide to understanding and managing risks. Publication C733. (Ref 48);
f. CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings, C665. (Ref 49);
g. British Standards Institute (2019) BS8485:2015+A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (+A1:2019). (Ref 50);

h. Building Research Establishment (2005) Special Digest 1: Concrete in aggressive ground, third edition. (Ref 51);
i. Building Research Establishment (2004) Report 465: Cover systems for land regeneration: thickness of cover systems for contaminated land. Note that this guidance has been withdrawn but provides useful background information (Ref 52); and
j. Building Research Establishment (2003) Report 456: Control of dust from construction and demolition activities. (Ref 53).

9.5 Assessment assumptions and limitations

9.5.1 This section provides a description of the assumptions and limitations to the Geology and Contamination assessment.

9.5.2 The extent of the study area used for the Geology and Contamination assessment is considered appropriate, based on professional judgement taking account of the anticipated ground conditions, the Proposed Scheme and receptor types. The information presented in this PEIR provides suitable coverage to enable the potential risks to be appropriately considered.

9.5.3 This PEIR has been collated based on a range of published information, data purchased from specialist providers and information provided by local authorities and the Environment Agency, together with some development-specific GI data. It is assumed that the data collated is accurate.

9.5.4 It was difficult to distinguish between the outwash sands and gravels of the Lowestoft Formation and the Crag Group using the available GI data as both units are similar in colour and composition. To adopt a reasonable worst-case approach, the Lowestoft Formation was conservatively defined as comprising only the diamicton (clay) deposits. This assumption results in the shallowest interpreted depth to the Principal Aquifer.

9.5.5 Groundsure historical mapping information was not obtained for a small section of the Proposed Kiln Lane Substation Draft Order Limits along Snape Road and Aldeburgh Road. The PEIR assessment for the study area along Snape Road and Aldeburgh Road is reliant on historical maps from published and readily available sources (Ref 39 and Ref 41).

9.5.6 Contaminant types included within the risk assessments presented in this chapter are based on the 'Industry Profiles' series of documents (Ref 57) where available, and professional judgement. In the absence of contamination data, a precautionary approach has been used where required to inform the assessment. It is assumed that identified potential sources of contamination contain mobile contaminants. This assumption will be reviewed as part of the ES when further contamination data from the GIs is available for review.

9.5.7 The assessment set out in this chapter assumes that piling is required at tower locations, the proposed Converter Station and Kiln Lane Substation (as a

reasonable worst case). This assumption is in line with those made in the Sea Link ES (Ref 54).

9.5.8 It is assumed that dewatering is unlikely to be required for the construction of the Proposed Onshore Scheme. However, if dewatering is required, it would be undertaken by pumping out of seepages of water, rather than active lowering of the groundwater table.

9.5.9 It is assumed that discharges from dewatering of open cut trenches to remove rainwater and minor groundwater seepages would be made to ground. At deeper excavations, it is assumed that, if required, discharges would be subject to treatment to settle sediments prior to discharge to surface watercourses. It is assumed that discharges will be subject to their own relevant environmental permit applications.

9.5.10 It is assumed that trenchless crossing will be employed at the proposed Landfall Site, using trenchless techniques, for example horizontal directional drilling. It is assumed that the water used to facilitate the drilling technique will be brought in tankers. If contaminated water is recovered at surface, this will be disposed of in line with relevant environmental legislation.

9.5.11 It is assumed that contamination present within the study area will have been identified as a result of GI carried out prior to construction (as set out in **Appendix 2.1 Outline Onshore Code of Construction Practice**) and remediated either prior to or during construction. Therefore, impacts from contaminated land during operation and maintenance and decommissioning are assumed to have been dealt with. The construction, operation and maintenance and decommissioning assessments assume that the operation of the Proposed Onshore Scheme is in accordance with environmental legislation.

9.5.12 The risk assessments presented in this PEIR are qualitative in nature. Intrusive GI data is anticipated to be available for the ES, which will take into account the findings of generic quantitative contamination risk assessments undertaken as part of the intrusive GI.

9.5.13 There is the potential that further localised sources of contamination could be present over and above those identified as part of the assessment. These could, for example, be associated with localised fill materials, spillages or waste deposition. Whilst the assessment cannot take into account such unknown sources, mitigation to manage the potential impacts of such contamination are set out in **Section 9.7**.

9.5.14 As described in **Section 2.7** of **Chapter 2** of this PEIR, it is assumed that the infrastructure for the proposed Underground Cables will be left in situ during decommissioning and that buildings will be demolished to ground level only, meaning that ground disturbance during decommissioning will be minimised.

9.6 Baseline conditions

9.6.1 To provide an assessment of the likely significance of the Proposed Onshore Scheme, it is necessary to identify and understand the baseline conditions in the study area. This provides a reference point against which potential changes in Geology and Contamination can be assessed.

Current baseline

9.6.2 For ease of descriptions, the study area has been split into Subsections 1 to 4 on **Figure 9.1 to Figure 9.5**. In addition, a summary of baseline conditions for the whole study area is presented. The baseline describes the worst case scenario (Full Build Out of Kiln Lane Substation).

Overview of study area

Coastal erosion

9.6.3 The study area includes a section of coastline at Walberswick. The coastline of Suffolk is characterised by soft cliffs which makes it more susceptible to erosion from wave action of the southern North Sea. According to the Landfall Erosion Study undertaken by Intertek (Ref 58), natural dunes at the shoreline experience a continuing cycle of accretion and erosion and at present there is a 0.5m per year accretion rate at Walberswick. Further information on the coastal erosion baseline is presented in **Chapter 18 Marine Physical Environment** of this PEIR.

Soils

9.6.4 Topsoil and subsoil will be present within the study area associated with agricultural land. Made ground is mapped in isolated pockets across the study area but is also expected to be found in areas associated with previous development (e.g. existing development sites or infilled pits).

Natural superficial deposits

9.6.5 Natural superficial deposits including peat, alluvium (clay, silt, sand and gravel) and head deposits (poorly sorted and poorly stratified clay, silt, sand and gravel) are mapped associated with watercourses and overlie the Lowestoft Formation. A review of Natural England's Peat Map (Ref 21) indicates peat deposits associated with the Minsmere River within the study area, but these are sporadic.

9.6.6 BGS maps and the Natural England Peat Map indicate that peat is not widespread within the study area, suggesting a low likelihood of encountering peat during excavation works. This assessment is supported by the findings of GI conducted to date, which have not identified any peat deposits.

9.6.7 The Lowestoft Formation comprises an extensive sheet of chalky pebbly sandy clay (Diamicton) with outwash sands and gravels at the base of the formation. Outwash sand and gravels comprise predominantly angular to rounded patinated

flints in a sandy matrix. Locally the gravels have incorporated material from the underlying bedrock Crag Group.

9.6.8 Adjacent to the coastline, tidal flat deposits (mud) overlie marine beach deposits (sand and gravel).

Solid geology

9.6.9 The solid geology across the study area is of the Crag Group in which undifferentiated Crag and the Westleton Beds overlie the Red Crag formation. The Crag Group predominantly comprises fine to coarse micaceous sands but also contains gravels, silts and clays. Gravels include flint and quartzite and are typically encountered near the top of the unit. The sands are locally shelly and are interbedded with clays containing thin silt and sand laminae.

9.6.10 The Crag Group sands are characteristically dark green from glauconite below the water table but weather to a yellowish to reddish brown or buff brown colour above the water table, yielding a light sandy soil. The Crag Group sands are easily excavatable, and previous excavation has shown the group to contain haematite 'iron pans'.

9.6.11 It is difficult to distinguish between the outwash sands and gravels of the Lowestoft Formation and the Crag Group as both are similar in colour and composition. For the purposes of this assessment, the Lowestoft formation is taken to be the diamicton only. Sands and gravels encountered beneath the diamicton have been interpreted to be the Crag Group.

9.6.12 The Crag Group lies unconformably above the Coralline Crag which comprises hard shelly calcarenite. The onshore outcrop of the Coralline Crag is restricted to southeast Suffolk near Aldeburgh and does not occur within the study area. Similarly, the offshore outcrop of the Coralline Crag occurs near the shoreline to the east of Altringham and will not be encountered as a result of the Proposed Onshore Scheme as it is not located within the study area.

9.6.13 Bedrock beneath the study area dips gently towards the east. No faults or other linear features cross through the study area.

Groundwater

9.6.14 Bedrock beneath the study area is classified as Principal aquifer (Crag Group) and the superficial deposits are a Secondary A (Lowestoft - sand and gravel), Secondary undifferentiated (Lowestoft - diamicton), Unproductive aquifer (peat) and Secondary B aquifer (Lowestoft silt). The whole study area, excluding the western and southwestern corner of the study area, is located a within a SPZ 3.

9.6.15 There are 12 groundwater abstraction licences within 500m of the study area. Six of these abstraction licences are private and six are abstractions registered with the Environment Agency. No information is available to determine the purpose of the private abstraction licences. Consequently, it has been assumed that private abstraction licences are utilised as a domestic (potable) water supply.

9.6.16 Deregulated groundwater abstraction licences have not been considered within the Geology and Contamination chapter of this PEIR due to insufficient information on abstraction status (historical or active) and the purpose of abstraction (potable or non-potable). These may be considered in the ES if further information becomes available.

Potential contamination sources

9.6.17 Information on sites designated under Part IIA of the Environment Act 1995 (Ref 31) was reviewed. There are currently two entries in the public register of contaminated land, both of which are located over 20km from the study area.

9.6.18 Following an initial data review, a number of potential contaminated land sites have been identified which could be impacted by the project. Potential sources of contamination identified from historical mapping include railways, old quarries and pits, infilled ponds, Theberton airfield, a rifle range, a smithy, several tanks and graveyards.

9.6.19 Two historical landfill sites are located within the study area, according to data provided by the Environment Agency. These are: Haw Wood Lane and Hinton Lodge Pit. In addition, data provided by Groundsure indicates that two historical waste sites (refuse heaps) were located within the study area. These historical landfills and waste sites are considered potential sources of contamination.

9.6.20 Within the study area there are two records for licenced waste sites. Both licences are associated with Breakers Yard metal recycling located on Moat Road, Theberton, Suffolk. The metal recycling site is considered a potential source of contamination.

9.6.21 Radon is not considered a source of contamination as the entire study area is located within the lowest band of radon potential whereby less than 1% of homes are at or above the Action Level.

9.6.22 According to Zetica online risk maps, there is a low risk of UXO being present within the study area. However, it is considered that there is a higher risk of encountering UXO within and around the former Theberton (RAF Leiston) airfield in Subsection 2, as it was used during WWII and may have stored UXO or been the target of aerial bombing. Localised increases in UXO risk may also be associated with former rifle ranges.

Identified receptors

9.6.23 A number of potential contamination receptors have been identified within the study area. Potential human receptors include commercial and residential properties and a recreational area (picnic site). Potential environmental receptors include groundwater abstractions, a Principal aquifer and Secondary A aquifer.

Subsection 1: Proposed Underground HVAC Cable Corridor, Full Build of Kiln Lane Substation Scenario, proposed Converter Station

Geology and hydrogeology

9.6.24 Natural superficial deposits including alluvium (clay, silt, sand and gravel) and head deposits (poorly sorted and poorly stratified clay, silt, sand and gravel) are mapped associated with watercourses and overlie the Lowestoft Formation (as shown on **Figure 9.2**). Lowestoft Formation comprising diamicton is mapped across the majority of the subsection compared to the sand and gravels which form four narrow linear bands across the subsection. Within these linear bands, there are sections where no superficial deposits are mapped.

9.6.25 Excluding a small outcrop of made ground to north of The Street (B1121), made ground is not mapped within the subsection. However, it is anticipated that made ground may be present in areas associated with previous development.

9.6.26 Superficial deposits are underlain everywhere by bedrock of the Crag Group (as shown on **Figure 9.3**). Where superficial deposits are absent, bedrock is expected to be present directly beneath the surface soil. No faults or other linear features cross the subsection.

9.6.27 A total of six BGS historical boreholes are located within the subsection however, majority of these records were incomplete. A summary of ground conditions using BGS boreholes and GI data undertaken within this area is provided in **Table 9.10**. It should be noted that at the time of writing this PEIR, only GI within the footprint of the proposed Converter Station was available for review. It is anticipated that ground conditions encountered within the proposed Converter Station will be representative of the wider subsection, excluding areas where superficial deposits align with river tributaries.

Table 9.10: Summary of ground conditions in Subsection 1 of the study area

Strata	Description	Distribution
Superficial deposits		
Topsoil	Soft brown slightly sandy slightly gravelly clay with occasional plant fragments. Gravel is subangular to subrounded fine to coarse quartzite and flint. Rare anthropogenic brick, ceramic and tile encountered within topsoil. The topsoil has a proven thickness range of between 0.3m and 0.5m.	Topsoil is present across the entire subsection.
Peat, alluvium and head deposits	No GI was undertaken within the mapped area of peat, alluvium and head deposits.	Deposits align with tributaries of the River Fromus and Hundred River.

Strata	Description	Distribution
Lowestoft Formation - diamicton	Brown/grey/orangish brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse chalk and flint. Borehole data shows that the unit has a proven thickness range of between 1.7m and 14m.	Lowestoft diamicton is present across majority of the subsection, excluding along tributaries of the River Fromus and Hundred River.
Bedrock		
Crag Formation	Dense light brown to orangish brown fine to medium sand.	Crag Group forms the bedrock across the entire subsection.

9.6.28 There are numerous small ponds and drainage ditches within the subsection in addition to two lakes (Friston Hall and an unnamed lake), the River Fromus and the Hundred River.

9.6.29 Bedrock beneath the subsection is classified as Principal aquifer (Crag Group) and the superficial deposits are a Secondary A (Lowestoft - sand and gravel), Secondary undifferentiated (Lowestoft - diamicton) and Unproductive aquifer (peat). The majority of the subsection is located a within a SPZ 3.

9.6.30 There are three groundwater abstraction licence records within 500m of this subsection. One groundwater abstraction licence is a private licence registered to a single domestic dwelling and is located at Saxmundham Road, Friston. It is assumed that private groundwater abstractions may be used as a potable water supply. The other two groundwater abstraction licences are registered to the Environment Agency and are utilized for spray irrigation only.

Geodiversity

9.6.31 No geological SSSI or County GeoSites have been identified within the subsection.

Potential contamination sources

9.6.32 Following an initial data review, a number of potential sources of contamination have been identified which could be impacted by the Proposed Onshore Scheme. Potential sources of contamination include a graveyard, historical sand pits and a clay pit, several unspecified pits, numerous infilled ponds, a rifle range and garage.

9.6.33 There are no waste licence records within the subsection but there are several records of waste exemptions. Waste exemptions relate to the storage of sludge, spreading of waste for agriculture purposes, burning of waste and depositing dredged waste from inland waters. The exemptions listed above are not considered potential sources of contamination.

UXO

9.6.34 According to Zetica online risk maps, the subsection is of low UXO risk – an area indicated as having 15 bombs per 1000 acre or less. A PDSA was prepared by

Zetica for the proposed Converter Station, which recommended that a detailed desk study, whilst always prudent, is not considered essential.

9.6.35 There may be an increased risk of encountering UXO in the area historically occupied by a rifle range. Rifle ranges typically used small arms ammunition, which poses less risk than artillery or bombing ranges, but can still present a UXO hazard. It is not known if live ammunition was used at the rifle range or if the site was used for military training over an extended period. In addition, the majority of land previously occupied by the rifle range has not been redeveloped since its use as a range therefore unfired, misfired, or buried ammunition could still be in the ground.

9.6.36 It is anticipated that detailed UXO risk assessment will be undertaken prior to construction where the risk requires it. This is detailed in **Appendix 2.1 Outline Onshore Code of Construction Practice**.

Identified receptors

9.6.37 Several potential contamination receptors have been identified in the subsection. The identified receptors include commercial and residential properties, Principal aquifer, Secondary A aquifer, groundwater abstractions and surface waters.

9.6.38 No geodiversity receptors of low sensitivity or above have been identified within the subsection.

Subsection 2: The proposed Underground HVDC Cable Corridor extending from the proposed Converter Station to Middleton

Geology and hydrogeology

9.6.39 No made ground deposits are mapped within this subsection, but it is anticipated that made ground may be present in areas associated with previous development (e.g. historical development within Theberton airfield). The superficial geology within the subsection predominantly comprises Lowestoft Formation which are mapped either as diamicton or sands and gravels, with the addition of peat, alluvium, head deposits which are associated with the course of rivers (as shown on **Figure 9.2**).

9.6.40 Superficial peat, alluvium, head deposits and the sand and gravels of the Lowestoft Formation are restricted to the northern section of the subsection on the geological map. Lowestoft diamicton is mapped across the central and southern parts of the subsection. Although not shown on the 1:50,000 geological map, Lowestoft sands and gravels may underlie the Lowestoft diamicton.

9.6.41 Superficial deposits are underlain everywhere by bedrock of the Crag Group (as shown on **Figure 9.3**). Both undifferentiated Crag Group and the Westleton Beds (locally shelly sands with gravel flint) are mapped within the subsection. No faults or other linear features cross the subsection.

9.6.42 A total of six BGS historical borehole records were identified within this subsection. A summary of ground conditions using BGS boreholes and GI data collected for the Proposed Onshore Scheme within this subsection is provided in **Table 9.11**.

Table 9.11: Summary of ground conditions in Subsection 2 of the study area.

Strata	Description	Distribution
Superficial deposits		
Topsoil	Very stiff dark brown slightly sandy slightly gravelly clay with occasional rootlets. Gravel is angular to subrounded coarse flint, chalk and quartzite. The topsoil has a proven thickness range of between 0.3m and 0.8m.	Topsoil is expected to be present across the entire subsection, associated with agricultural land.
Peat, alluvium and head deposits	No peat was encountered within exploratory holes. Very limited investigation has been completed within the mapped area of alluvium and head deposits and therefore it is not possible to provide a detailed description. According to BGS 1:50,000 maps alluvium predominantly comprises mud and sand and head deposits predominantly comprise stony sandy clays and clayey sands.	Deposits align with tributaries of the Minsmere River (both Minsmere Old River and Minsmere New Cut) in an east-west orientation.
Lowestoft Formation - diamicton	Firm to stiff orangish brown/greenish grey/grey slightly gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse chalk, flint, quartzite, mudstone and sandstone. The clay contains occasional pockets of silt and rare shell fragments. Locally the formation comprises brown clayey sand with flint and chalk gravels. Within BHB15, a 1.2m thick layer of chalk within the diamicton was recovered as a white sandy gravelly silt. The thickness of the diamicton is variable across the subsection with a proven thickness range of between 0.05m and 15m. The thickness of the formation is therefore expected to be variable across the subsection. The unit was absent within TPB29, TPB30, BHB23 and BHB24 confirming	Lowestoft diamicton is present across majority of the subsection, except along tributaries of the Minsmere River.

Strata	Description	Distribution
	that the diamicton is absent along the tributaries of the Minsmere River.	
Bedrock		
Crag Formation	Typically an orange brown or brown fine to medium sand which comprises layers of slightly gravelly sand. Gravel is typically subangular to subrounded flint and quartzite. Rare pockets of very sandy clay and occasional shell fragments were encountered. A distinct layer of very stiff/dense brown sandy silt was encountered within three boreholes only (BHB02, BHB08 and BHB12). In these locations the silt has a variable proven thickness range of between 1m and 7m. The base of the Crag Group was not encountered during GI but has been proven up to be up to 15m thick.	Crag Group forms the bedrock across the entire subsection.

9.6.43 Bedrock beneath this subsection is classified as Principal aquifer (Crag Group) and the superficial deposits are a Secondary A (Lowestoft - sand and gravel), Secondary undifferentiated (Lowestoft - diamicton) and Unproductive aquifer (peat). The southern part of the subsection is located within a SPZ 3. The northern part of the subsection is not located within a SPZ.

9.6.44 There are five active groundwater abstraction licences located within the subsection. Three of the groundwater abstractions are private licences registered to single domestic dwellings in the following locations:

a. Moat Road, Theberton;
b. Fordley Road, Middleton; and
c. Pretty Road, Theberton.

9.6.45 It is assumed that private groundwater abstractions may be used as a potable water supply. The other two groundwater abstraction licences are utilised for spray irrigation.

Potential contamination sources

9.6.46 Following an initial data review, a number of potentially contaminated land sites have been identified which could be impacted. Potential sources of contamination include old mineral extraction pits (primarily for sand and clay), several infilled ponds, a smithy and Theberton Airfield, also referred to as RAF Leiston.

9.6.47 There are two records for licenced waste sites within the subsection. Both licences are associated with Breakers Yard metal recycling located on Moat

Road, Theberton. The metal recycling site is considered as a potential source of contamination.

UXO

9.6.48 According to Zetica online risk maps, the subsection is of low UXO risk – an area indicated as having 15 bombs per 1000 acre or less. However, it is considered that there is a higher risk of encountering UXO within and around the former airfield, as it was used during WWII and may have stored UXO or been the target of aerial bombing.

9.6.49 It is anticipated that detailed UXO risk assessment will be undertaken prior to construction where the risk requires it. This is detailed in **Appendix 2.1 Outline Onshore Code of Construction Practice.**

Identified receptors

9.6.50 Several potential contamination receptors have been identified in the subsection. The identified receptors include commercial and residential properties, groundwater abstractions, a Principal aquifer, Secondary A aquifer.

Subsection 3: The proposed Underground HVDC Cable Corridor extending from Middleton to Blythburgh

Geology and hydrogeology

9.6.51 Made ground deposits are mapped as isolated pockets to the north of Subsection 3, in the vicinity of Toby's Walks Picnic area and near Dunwich Road. Made ground is also anticipated to be present in association with previous development (e.g. construction of roads and within landfills).

9.6.52 The superficial geology within the subsection predominantly comprises Lowestoft Formation which are mapped either as diamicton or sand and gravel (as shown on **Figure 9.2**), with the addition of peat and head deposits which are associated with the course of rivers. No superficial deposits are mapped along the eastern margin of the subsection between Dunwich Road and Lymballs Lane.

9.6.53 Superficial deposits are underlain everywhere by bedrock of the Crag Group (as shown on **Figure 9.3**). Both undifferentiated Crag Group and the Westleton Beds (locally shelly sands with gravel flint) are mapped within the subsection. No faults or other linear features cross the subsection.

9.6.54 A summary of the ground conditions within the subsection based on BGS boreholes and GI completed within the subsection is provided in **Table 9.12**. It should be noted that only four historical boreholes are located within the subsection and these contained very limited information on ground conditions. At the time of writing the PEIR, GI data had not been completed. GI data will be assessed and reported in the ES.

Table 9.12: Summary of ground conditions in Subsection 3 of the study area.

Strata	Description	Distribution
Superficial deposits		
Topsoil	Soft to stiff brown slightly gravelly sandy clay with rootlets. Gravel is angular to subrounded fine to coarse flint, chalk and quartzite. Topsoil has a proven thickness range of between 0.2m and 0.5m.	Topsoil expected to be present across majority of the subsection associated with agricultural land.
Peat	No peat was encountered.	Deposits align with Minsmere River in an east-west orientation.
Head deposits	Head deposits not thought to have been encountered.	Deposits align with the Dunwich River and Minsmere River in an east-west orientation.
Lowestoft Formation	Bluish grey mottled brown and orangish brown slightly sandy clay which contains rare pockets of calcareous silt. Gravel is subangular to subrounded fine to coarse chalk, flint and quartzite. In BHC07, a 0.9m thick layer of chalk at the base of the diamicton was recovered as a white sandy gravelly silt. Where encountered, the formation has a proven thickness range of between 0.3m and 7.5m. The formation was absent within BHC02 indicating that the clay does not form a continuous layer across the subsection. The thickness of the formation is therefore expected to be variable across the subsection.	Lowestoft Formation distributed across the majority of the subsection as diamicton. Lowestoft sand and gravels are largely constrained to the north of the subsection.
Bedrock		
Crag Formation	Orangish brown and yellowish brown slightly silty sand which locally contains clay pockets and shell fragments. Gravel is angular to subangular flint, chalk and quartzite. In BHC01, the uppermost section of the Crag grades from a silt into a sand. The base of the Crag Group was not encountered during GI however the unit was proven up to 14.3m thickness.	Present everywhere across the subsection.

9.6.55 Hydrological features within the subsection include numerous small ponds and drainage ditches, in addition to two watercourses: the Dunwich River and Minsmere River.

9.6.56 Bedrock beneath the subsection is classified as a Principal aquifer (Crag Group) and the superficial deposits are a Secondary A (Lowestoft - sand and gravel), Secondary undifferentiated (Lowestoft - diamicton) and Unproductive aquifer (peat). This subsection is not located within a SPZ.

9.6.57 There are four active groundwater abstraction licences located within the subsection. Two of the licences are private which are registered to single domestic dwellings located at:

a. Fenstreet Road, Westleton; and
b. Butchers Road, Hinton.

9.6.58 It is assumed that private groundwater abstractions may be used as a potable water supply. The other two groundwater abstraction licences are for spray irrigation only.

Geodiversity

9.6.59 No geological SSSI or County GeoSites have been identified within the subsection.

Potential contamination sources

9.6.60 Following an initial data review, a number of potentially contaminative land uses have been identified which could be impacted by the project. These include old unspecified pits, an old sand pit, two historical landfills, an historical waste site (refuse heap), unspecified tanks and numerous infilled ponds. Details of historical landfills and waste sites are outlined below:

a. Hinton Lodge pit (reference 907/01/16/24 and FSSC1) is an historical landfill located approximately 525m east of The Granary, Hinton Lodge, Hinton near Blythborough. Records indicate the landfill accepted inert, industrial and commercial waste. The dates during which the landfill was operational are not available.
b. Haw Wood Lane (reference OFSSC3) is an historical landfill located along Hinton Road, Darsham near Saxmundham. No records are available for the dates in which the landfill was operational nor the type of waste the landfill accepted.
c. Data provided by Groundsure indicates that a refuse heap was located along Hinton Corner, in an area formerly utilised as a gravel pit.

9.6.61 There are no records of licenced waste sites within the subsection but there are several waste exemption records. These exemptions primarily relate to the storage and spreading of material for agricultural purposes and are not considered a source of contamination.

UXO

9.6.62 According to Zetica online risk maps, there is a low risk of UXO being present within the subsection. The subsection is indicated as having 15 bombs per 1000 acre or less.

9.6.63 It is anticipated that detailed UXO risk assessment will be undertaken prior to construction where the risk requires it. This is detailed in **Appendix 2.1 Outline Onshore Code of Construction Practice**.

Receptors

9.6.64 The potential receptors within this subsection include commercial and residential properties, a recreational area (Toby's Walks Picnic), groundwater abstractions, Principal aquifer, Secondary A aquifer and surface waters (notably the Dunwich River and Minsmere River).

Subsection 4: Blythburgh to Walberswick

Geology and hydrogeology

9.6.65 The subsection includes coastline at Walberswick where tidal flat deposits and marine beach deposits are present, but these deposits are restricted to the coastline. No superficial deposits are mapped in the area of the proposed Landfall Site.

9.6.66 The subsection is indicated to be underlain by superficial deposits of Lowestoft Formation which are mapped either as diamicton or sand and gravel (as shown on **Figure 9.2**). Diamicton is mapped within the western section of the subsection only and overlies Lowestoft sand and gravels which are mapped across majority of the subsection.

9.6.67 Isolated areas of made ground are mapped within the western section of the subsection but are also expected to be present in areas associated with previous development.

9.6.68 Superficial deposits are underlain everywhere by bedrock of the Crag Group (as shown on **Figure 9.3**). In the area of the proposed Landfall Site, undifferentiated Crag Group is mapped at the surface. No faults or other linear features cross the subsection.

9.6.69 No BGS historical borehole logs are available for review within the subsection. A summary of ground conditions based on the GI for the Proposed Onshore Scheme which has been completed within the subsection is provided in **Table 9.13** below. It was not possible to confidently distinguish the Lowestoft sand and gravels from the uppermost section of the Crag Group and therefore sand and gravel beneath the Lowestoft diamicton has been included within the Crag Group.

Table 9.13: Summary of ground conditions for Subsection 4 of the study area.

Strata	Description	Distribution
Superficial deposits		
Topsoil	Dark brown slightly gravelly slightly clayey sand with occasional rootlets. Gravel is typically angular to rounded coarse flint, quartzite and quartz. Topsoil has a proven thickness of range 0.3m and 1.0m across the subsection but is typically 0.4m thick.	Topsoil is likely to be present across the entire subsection associated with agricultural land.
Lowestoft formation – diamicton	Firm brown slightly gravelly slightly sandy clay. Gravel is typically angular to subrounded fine to coarse chalk, flint, quartzite and quartz. In two locations (TPD08 and TPD03), the uppermost layer of the formation comprised a clayey sand which transitioned into a clay with depth. Where encountered, the formation had a proven thickness range of 0.9m to 2.7m thick.	The formation is largely constrained to the west of the subsection, excluding a small outcrop in the centre of the subsection (near BHD05)
Bedrock		
Crag Formation	Yellowish brown silty sand with occasional pockets of orangish brown clay. The first 0.5m of the unit is typically described as a gravelly sand in which gravel is subangular to subrounded quartzite and flint. At approximately 20mgbl, the sands become shelly. The sand transitioned to a greenish grey silty sand with many shell fragments at 31.5mbgl in BH03 and 28.5mbgl in BH4.	Present throughout the subsection.

9.6.70 The Dunwich River is located within the eastern section of the subsection. The river is tidal and flows into the North Sea. Several smaller watercourses are also present within the subsection, along with ponds and ditches.

9.6.71 The proposed Underground HVDC Cable Corridor within the subsection intersects with the Dunwich River and several smaller surface water features.

9.6.72 Groundwater designations are Secondary A (sand and gravel of the Lowestoft Formation) or Secondary (undifferentiated) associated with diamicton of the Lowestoft Formation and Head deposits. The Crag Group is classified as a Principal aquifer. This subsection is not located within a SPZ.

9.6.73 There are no active groundwater abstraction licences within the subsection.

Potential contamination sources

9.6.74 Following an initial data review, a number of potentially contaminative land uses have been identified which could be impacted by the project. These include railway lines, an historical clay pit, several unspecified pits/ground workings, a graveyard and infilled ponds.

9.6.75 There are no recorded active or historic landfill sites or records of licenced waste sites within the subsection but there are three waste exemption records. These waste exemption records relate to the storage and spreading of material for

agricultural purposes and use of waste in construction and are not considered to be a potential source of contamination.

UXO

9.6.76 Zetica online risk maps have classified the risk of UXO as low. However, a UXO PDSA was also presented within the proposed Landfall Geotechnical Desk Study (Ref 56), which recommended that a detailed desk study was commissioned to assess, and potentially zone, the UXO hazard level within the subsection.

9.6.77 A detailed desk study for the proposed Landfall Site was obtained and is available for review in Appendix D of Geotechnical Desk Study: Walberswick Landfall (Ref 56). The key findings and recommendations of the detailed desk study are summarised below:

a. No significant sources of Unexploded Ordnance (UXO) hazard have been identified.
b. The site's UXO risk was determined to be low.
c. UXO awareness briefing is recommended for all staff involved in excavations.

9.6.78 It is anticipated that detailed UXO risk assessment will be undertaken prior to construction where the risk requires it. This is detailed in **Appendix 2.1 Outline Onshore Code of Construction Practice**.

Identified receptors

9.6.79 Several potential contamination receptors have been identified in the subsection. These include the residential and commercial properties associated with Walberswick town, surface waters (notably Dunwich River), the North Sea, Secondary A aquifer and a Principal aquifer.

9.6.80 No geodiversity receptors of low sensitivity or above have been identified within the subsection.

Stage 1 contamination screening assessment

9.6.81 **Figure 9.5** shows the location of the potential sources of contamination which have been identified within the study area. The Preliminary Risk Assessment of potential contamination sources is presented in **Appendix 9.1 Preliminary Contamination Risk Assessment**. Following stage 1 of screening, the number of potential sources of contamination which were progressed onto stage 2 of screening was reduced to 14 as shown in **Table 9.14**.

Table 9.14: Potential contamination sources being taken through to stage 2 screening

Source
CL-05 (Historical infilled gravel pit)
CL-65 (Historical infilled unspecified pit)

Source
CL-77 (Historical infilled clay pit)
CL-80 (Railway line)
CL-123 (Historical infilled sand pit)
CL-130 (Historical infilled clay pit)
CL-152 (Historical infilled unspecified pit)
CL-156 (Historical infilled unspecified pit)
CL-157 (Historical infilled unspecified pit)
CL-180 (Historical infilled unspecified pit)
CL-235 (Historical airfield)
CL-237 (Hinton Lodge Pit – Historical landfill)
CL-239 (Historical waste site)
CL-250 (Historical infilled clay pit)

Stage 2 assessment - conceptual model

9.6.82 The potential impacts that disturbance or mobilisation of contamination could have at baseline has been assessed using the source-pathway-receptor principle and is presented in the form of a conceptual model. The conceptual models for baseline are presented in **Appendix 9.1 Preliminary Contamination Risk Assessment**. The risks arising from the identified pollutant linkages are assessed qualitatively.

Future baseline

Proposed Underground HVDC Cable Corridor

9.6.83 The Sizewell Link Road is a committed development associated with the delivery of Sizewell C which has been identified and included in the future baseline as a new receptor to the Proposed Onshore Scheme within the proposed Underground HVDC Cable Corridor (further detail provided in **Chapter 5 EIA Approach and Methodology** of this PEIR). The presence of Sizewell Link Road is unlikely to cause significant changes to geology and land contamination either

prior to, or during the construction, operation and maintenance or decommissioning phases of the Proposed Onshore Scheme.

9.6.84 The proposed Landfall Site at Walberswick is located in an area of the Suffolk coastline is susceptible to erosion from wave action and climate change. Predictions for the UK indicate a trend of increased storm intensity and higher sea levels, which could have an impact on the rates of coastal erosion. The Proposed Scheme has been designed to take account of future coastal erosion and is not anticipated to affect the present erosion and accretion patterns at the shoreline. The position of the entry pit, drill trajectory and location of permanent infrastructure will be informed by the prediction of future coastal erosion rates on the Suffolk coastline. Coastal erosion effects are considered in **Chapter 18 Marine Physical Environment.**

9.6.85 Climate change is also expected to result in wetter winters, drier summers, higher average temperatures and higher intensity rainfall events. These could affect soil erosion, groundwater levels, and indirectly (through groundwater level changes) – the potential for mobilisation of contamination. In the context of soil erosion and groundwater levels, it is not considered these would have a noticeable impact on the significance of effects given the nature of the Proposed Onshore Scheme, where ground disturbance will be limited to the construction phase. In relation to contamination, as areas that may have a significant impact would be remediated or mitigated during design and construction of the Proposed Onshore Scheme, it is not considered that climate change would have a noticeable impact on the significance of effects for contamination.

9.6.86 The future baseline assumes that no other schemes have come forward in the same locale. No changes are anticipated to the geology and land contamination baseline prior to the construction phase of the Proposed Onshore Scheme.

9.7 Embedded design mitigation and control measures

Design and embedded mitigation measures

9.7.1 As described in **Chapter 2 Description of the Proposed Scheme** of this PEIR, a range of measures have been embedded into the Proposed Scheme design to avoid or reduce environmental effects. These primary mitigation measures form part of the design that has been assessed, which for Geology and Contamination are listed in **Table 9.15**.

Control measures

9.7.2 Preliminary control measures are set out in **Appendix 2.1 Outline Onshore Code of Construction Practice** which will manage the effects of construction. The measures of particular relevance to Geology and Contamination are listed in **Table 9.15**.

Table 9.15: Design and embedded mitigation and control measures relevant to Geology and Contamination

Measure reference	Design and embedded mitigation and control measures	Compliance mechanism
GC:1	Future GI will be in accordance with BS10175: Code of Practice for Contaminated Land (Ref 60) and the assessment and remediation of contamination will be in accordance with LC:RM guidance (Ref 44)	Outline Onshore CoCP
GC:2	Use of appropriate occupational health and safety measures on site e.g. PPE, and statutory health and safety to minimise the risks associated with anticipated and/or unexpected contamination. This will be based on risk assessment informed by site specific information.	Outline Onshore CoCP
GC:3	Protocols will be in place for identifying and dealing with unexpected contamination encountered during construction.	Outline Onshore CoCP
GC:4	Workers on site will be trained on the risks, handling and use of potentially hazardous substances.	Outline Onshore CoCP
GC:5	All use and storage of chemicals to be undertaken in accordance with Environment Agency Guidance for Pollution Prevention (GPP) documents and controlled and monitored under the CoCP and general construction site good environmental and waste management procedures.	Outline Onshore CoCP
GC:6	A Pollution Incident Control Plan will be developed and implemented.	Outline Onshore CoCP
GC:7	The control of earthworks or materials movement (including re-use of materials) is to be carried out under appropriate Environmental Permits, exemptions to the Environmental Permitting system or by use of the CL:AIRE 'The definition of Waste: The development industry Code of Practice' (Ref 59).	Environmental Permitting Regulations 2016 CL:AIRE Code of Practice
GC:8	Trenchless installation techniques shall use lubricants which do not pose a risk to groundwater or surface water quality. The aim of this mitigation measure is to ensure the construction phase does not introduce contamination.	Outline Onshore CoCP
GC:9	Preliminary assessment indicates the risk of encountering UXO and informs if a Detailed UXO Risk Assessment is required. These assessments will be prepared prior to construction commencement. This approach is set out in the CoCP and will be secured as part of the DCO.	Outline Onshore CoCP, Health and Safety at Work Act
GC:10	Re-routing of the proposed Underground HVDC Cable Corridor to avoid direct disturbance of Hinton Lodge Pit (CL-237), a recorded historical landfill site.	Embedded mitigation by design

9.7.3 The following mitigation measures are specific to **Chapter 12 Hydrology, Hydrogeology and Drainage** of this PEIR but are relevant to the Geology and Contamination chapter:

a. A breakout management plan will be developed to manage impacts from the use of trenchless construction methods. This mitigation measure is required as drilling fluids may pose a risk to groundwater and/or surface water quality.

Guidance

9.7.4 Further intrusive GI and assessment will be undertaken post-consent, prior to construction activities in order to inform appropriate geotechnical design. GI and risk assessments will be in accordance with:

a. The requirements of the NPPF;
b. British Standard (BS) 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice (Ref 60);
c. BS 5930:2015+A1:2020 Code of practice for site investigations (Ref 61);
d. BS 8576:2013 Guidance on investigations for ground gas – Permanent gases and volatile organic compounds (VOCs) (Ref 62);
e. Association of Geotechnical and Geoenvironmental Specialists, Guidance on dealing with contamination during an intrusive investigation 2012 (Ref 63);
f. Relevant Environment Agency and Defra guidance, including LC:RM (Ref 44), and
g. Relevant new/replacement guidance or legislation published prior to construction.

9.8 Assessment of effects

9.8.1 This section presents the preliminary assessment of likely significant effects on Geology and Contamination resulting from the construction, operation and maintenance and decommissioning of the Proposed Onshore Scheme. The likely significant effects of the Proposed Onshore Scheme are identified taking into account the embedded design mitigation and control measures.

9.8.2 Following assessment further mitigation is proposed as required which is presented in **Section 9.9**.

Construction

Impacts to human health as a result of ground disturbance of potentially contaminated land

9.8.3 An assessment of human health effects were scoped in at the EIA scoping stage as there was insufficient data at this time in the Proposed Scheme design.

9.8.4 Where a source of potential contamination is identified, there is the potential for exposure of human health receptors if potential contamination is disturbed (e.g. by excavations). Human receptors within the study area range in sensitivity from negligible (undeveloped land, which includes agricultural land and workers on the land) to very high (residential receptors).

9.8.5 A baseline conditions and PRA has been undertaken in accordance with LC:RM guidance (Ref 44) and is presented within **Appendix 9.1 Preliminary**

Contamination Risk Assessment. This PRA has identified that potential existing contamination within the study area presents a very low to low risk to receptors. Exceptions include the historical airfield and a historical waste site, both of which were identified as having moderate/low risk at baseline due to proximity of sensitive receptors (residential developments).

9.8.6 Assuming good practice measures and mitigation procedures are implemented in accordance with **Appendix 2.1 Outline Onshore Code of Construction Practice**, it is unlikely that there will be adverse consequences resulting from construction. The PRA indicates that the risk to receptors posed by existing contamination would not increase above baseline level during construction of the Proposed Onshore Scheme and therefore the magnitude of temporary construction impacts from existing contamination would be negligible. Human receptors of a negligible to very high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

9.8.7 It is not anticipated that additional GI data beyond that reviewed for PEIR would change the outcome of the PRA or the assessment of effects presented here, assuming that the identified mitigation and control measures in **Section 9.7** are implemented. It is therefore proposed that assessment of effects on human health as a result of ground disturbance of potentially contaminated land is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to production of the ES.

Impacts to groundwater due to temporary alteration of groundwater flows as a result of dewatering/construction activity

9.8.8 Impacts to groundwater due to the temporary alteration of groundwater flow as a result of dewatering were scoped in for construction due to insufficient data at scoping. The sensitivity of groundwater receptors within the study area ranges from medium to high.

9.8.9 It has been assumed that dewatering would not be required for the construction of the Proposed Onshore Scheme. Based on this assumption, there is a very low risk of mobilising existing contamination in groundwater or soil during construction activities.

9.8.10 A baseline conditions and PRA has been undertaken in accordance with LC:RM guidance (Ref 44) and is presented within **Appendix 9.1 Preliminary Contamination Risk Assessment**. This PRA indicates that risk to groundwater quality posed by the temporary alteration of groundwater levels during construction would not increase above baseline level.

9.8.11 With respect to Geology and Contamination, significant effects are deemed to occur when the risk of contamination, as defined within **Table 2.3** of **Appendix 9.1 Preliminary Contamination Risk Assessment**, has increased by two or more levels. The PRA has not identified sources of contamination whereby the

temporary alteration of groundwater would increase the risk by two or more levels. The magnitude of impacts to groundwater as a result of temporary alterations to groundwater flow during construction are negligible. Groundwater receptors of a medium to high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

9.8.12 It is not anticipated that additional GI data beyond that reviewed for PEIR would change the outcome of the PRA or the assessment of effects presented here, assuming that the identified mitigation and control measures in **Section 9.7** are implemented. It is therefore proposed that assessment of effects for groundwater from dewatering is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to production of the ES.

Impacts to groundwater due to mobilisation and release of contamination along new pathways (including cable trenches and piled foundations)

9.8.13 Impacts to groundwater due to mobilisation and release of contamination along new pathways (open cut trenches, trenches created using trenchless techniques and piled foundations) were scoped in due to insufficient data at scoping. Groundwater receptors of a medium to high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

9.8.14 A baseline conditions and PRA has been undertaken in accordance with LC:RM guidance (Ref 44) and is presented within **Appendix 9.1 Preliminary Contamination Risk Assessment**.

Proposed Underground Cables trenches – open-cut

9.8.15 It has been assumed that groundwater will not be encountered within the depth of the proposed opencut trench section. Consequently, there is a very low risk of mobilising existing contamination in groundwater or soil along the proposed Underground Cables trenches where opencut methods are utilized.

9.8.16 The PRA indicates that risk to groundwater due to mobilisation and release of contamination along the proposed Underground Cables where open-cut trenches are used would not increase above baseline level during construction of the Proposed Onshore Scheme. Groundwater receptors of a medium to high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

Trenchless techniques

9.8.17 Trenchless installation techniques utilized for trenchless crossings may allow movement of existing contamination or mixing of aquifers. Impacts to groundwater due to mobilisation and release of contamination along trenchless

pipelines possible but is considered unlikely as shallow groundwater is not anticipated within the study area.

9.8.18 The PRA indicates that impacts to groundwater due to mobilisation and release of contamination along pipeline trenches created using trenchless installation techniques generally increased the risk to the bedrock Principal aquifer beneath the study area. Where the risk to Principal aquifers increased above baseline level, this increase was only marginal, with risk levels increasing from low risk to moderate/low risk. It is assumed that new pathways for contamination created by trenchless techniques would be temporary as the pits created by will be backfilled.

The risk to superficial Secondary aquifers and surface waters due to mobilisation and release of contamination along pipeline trenches created using techniques did not increase above baseline level. Groundwater receptors of a medium to high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

Piled foundations

9.8.19 As a reasonable worst-case scenario, it has been assumed that piling is required at tower locations, the proposed Converter Station and Kiln Lane Substation.

9.8.20 None of the sources taken through to the Stage 2 Assessment are located in footprint of proposed towers, proposed Converter Station or Kiln Lane Substation. Consequently, the PRA indicates that the temporary risk to groundwater due to mobilisation and release of contamination along piled foundations would not increase above baseline level. Groundwater receptors of a medium to high sensitivity will experience negligible magnitude of change, leading to a negligible to minor effect which is considered to be **not significant**.

Overall conclusions

9.8.21 The PRA indicated that temporary risk to groundwater due to mobilisation and release of contamination along new pathways would only increase above baseline level in areas where trenchless installation techniques s are to be utilised to lay the proposed Underground Cables. The increase in risk is temporary as pits created by trenchless installation techniques will be backfilled following construction.

9.8.22 With respect to Geology and Contamination, significant effects are deemed to occur when the risk of contamination, as defined within **Table 2.3** of **Appendix 9.1 Preliminary Contamination Risk Assessment**, has increased by two or more levels. The PRA has not identified sources of contamination whereby the creation of new pathways during construction of the scheme would increase the risk by two or more levels (negligible). The effects to groundwater due to mobilisation and release of contamination along new pathways during construction would be negligible to minor and **not significant**.

9.8.23 It is therefore proposed that assessment of effects for groundwater from the proposed Underground Cable trenches, trenchless crossings and piled foundations is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to production of the ES.

Coastal erosion

9.8.24 Trenchless installation techniques i.e. HDD are to be used to install the cable at the proposed Landfall Site. By utilising trenchless techniques such as HDD, the coastal environment remains intact, allowing the drilling process to avoid interference with natural erosion or accretion rates at the shoreline.

9.8.25 The assessment of coastal erosion risk is presented in **Chapter 18 Marine Physical Environment**, which concludes that the effect of HDD on coastal erosion rates due to the construction of the Proposed Onshore Scheme would be **not significant**.

9.8.26 It is therefore proposed that assessment of effects for coastal erosion is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to the ES.

Operation

9.8.27 During operation, effects on Geology and Contamination are anticipated to be minimal.

9.8.28 Minimal ground disturbance is anticipated during the operation phase. The ground disturbance which may occur during operation will be limited to repairs and maintenance of the cables and associated infrastructure, which would be **very unlikely to have significant effects**, because contamination sources within the footprint of the Proposed Onshore Scheme are assumed to have been remediated during construction.

9.8.29 Maintenance and repair activities would be expected to take place in accordance with UK environmental legislation, good practice control and management measures and the relevant environmental permitting regime (if appropriate) current at the time.

Coastal erosion

9.8.30 Scoping opinion received from the Planning Inspectorate requested that the exacerbation of coastal erosion is scoped in as the proposed Landfall Site is in a location already subject to coastal erosion.

9.8.31 The position of the entry pits (TJB) and the drill trajectory for HDD will be informed by the prediction of coastal erosion rates on the Suffolk coastline. The TJB will be positioned sufficiently inland that should the coastline erode over the Proposed Scheme lifecycle the TJB remains above MHWS. The trajectory of the drill also takes the erosion rates into consideration again ensuring that the drill is

a sufficient depth below the eroding coastline to ensure that at no time in the lifetime of the cable will the HDPE ducts become exposed, but will remain buried.

9.8.32 The assessment of coastal erosion risk is presented in **Chapter 18 Marine Physical Environment**, which concludes that the effects on coastal erosion rates due to the operation of the Proposed Onshore Scheme would be neutral and **not significant**.

9.8.33 It is therefore proposed that the assessment of effects to coastal erosion is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to the ES.

Decommissioning

Coastal erosion

9.8.34 The potential for significant effect is unlikely during decommissioning as it is anticipated that the proposed Underground Cables will be left in situ, causing minimal ground disturbance which could exacerbate coastal erosion.

9.8.35 The assessment of coastal erosion risk is presented in **Chapter 18 Marine Physical Environment**, which concludes that the effect on coastal erosion rates due to the operation of the Proposed Onshore Scheme would be neutral and **not significant**.

9.8.36 It is therefore proposed that the assessment of effects to coastal erosion as a result of decommissioning is **scoped out** of the EIA process and no further assessment of effects required in the ES. This position will be agreed formally with statutory stakeholders prior to the ES.

9.9 Mitigation, monitoring and enhancement

9.9.1 Mitigation measures are defined in **Chapter 5 EIA Approach and Methodology** of this PEIR, with embedded control measures for Geology and Contamination being presented in **Section 9.7** of this chapter.

Additional mitigation and enhancement

9.9.2 The assessment has concluded that there are no likely significant effects in relation to Geology and Contamination therefore no additional mitigation measures are required.

Monitoring

9.9.3 There are no likely significant adverse effects related to the Geology and Contamination assessment identified either during construction, operation or decommissioning stages of the Proposed Onshore Scheme that require monitoring.

9.10 Summary of residual effects

9.10.1 The Geology and Contamination assessment has considered the potential impacts that construction, operation and maintenance and decommissioning of the Proposed Onshore Scheme may have on geodiversity, controlled water and human health receptors.

9.10.2 The assessment presented in **Section 9.8** has concluded that residual significant effects are not likely in relation to geodiversity, controlled water or human health receptors across the Proposed Onshore Scheme phases. A summary of assessment of likely significant effects for the construction, operational and decommissioning phase of the Project is provided in **Table 9.16**, **Table 9.17** and **Table 9.18** respectively. These tables consider significant effects after the inclusion of embedded mitigation and control measures, before summarising if further mitigation is considered required as per the assessment within the chapter.

9.10.3 Effects to geodiversity sites, human health and controlled waters have largely been mitigated through design, by avoiding, where practicable, known sources of significant potential contamination (e.g. Hinton Lodge Pit Landfill) and high sensitivity receptors (e.g. residential areas and watercourses).

Table 9.16: Summary of assessment of likely significant effects during construction

Receptor	Pathway	Environmental effect without further mitigation	Additional Mitigation	Residual effect
Human health	Ground disturbance resulting in release of contamination from soil or groundwater	Negligible to minor (**not significant**)	Not required	Negligible to minor, **not significant**
Groundwater	Temporary alteration of groundwater flows	Negligible to minor (**not significant**)	Not required	Negligible to minor, **not significant**
Groundwater	Mobilisation and release of contamination along new pathways e.g. piled foundations	Negligible to minor (**not significant**)	Not required	Negligible to minor, **not significant**

Table 9.17: Summary of assessment of likely significant effects during operation

Receptor	Pathway	Environmental effect without further mitigation	Additional Mitigation	Residual effect
	None identified			

Table 9.18: Summary of assessment of likely significant effects during decommissioning

Receptor	Pathway	Environmental effect without further mitigation	Additional Mitigation	Residual effect
	None identified			

9.10.4 No significant effects have been identified. It is therefore proposed that further assessment of effects for Geology and Contamination is **scoped out** of the ES.

9.11 Monitoring

9.11.1 No additional monitoring is proposed for Geology and Contamination as no significant residual effects have been identified.

Topic Glossary and Abbreviations

Term	Definition
Principal aquifer	provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands
Secondary A aquifer	permeable layers that can support local water supplies, and may form an important source of base flow to rivers
Secondary B aquifer	mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers
Secondary undifferentiated	where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value
Unproductive	largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them
Source Protection Zone	Source Protection Zones are defined around large and public potable groundwater abstraction sites. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water
Ground Investigation	A ground investigation involves the collection and analysis of information about the physical and chemical properties of the ground (soil, rock, and groundwater) at a specific site. It helps determine whether the ground is suitable for a proposed development and identifies any potential environmental or geotechnical risks.
APHA	Animal and Plant Health Agency
bgl	Below Ground Level (metres)
BGS	British Geological Survey
BS	British Standard
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
CoCP	Code of Construction Plan
CWS	County Wildlife Sites
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DOL	Draft Order Limits
EIA	Environmental Impact Assessment
ES	Environmental Statement

Term	Definition
ESC	East Suffolk Council
GI	Ground Investigation
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LC:RM	Land Contamination Risk Management
m	Metres
MAGIC	Multi-Agency Geographic Information for the Countryside
NGV	National Grid Venture
NPS	National Policy Statement
NPSE	National Policy Statement for Energy
PD	Permitted Development
PEIR	Preliminary Environmental Information Report
PPE	Personal Protective Equipment
PDSA	Pre-Desk Study Assessment
PRA	Preliminary Risk Assessment
Q	Quarter (of the year)
RAF	Royal Air Force
RFI	Request for Information
RIGS	Regionally Important Geological Sites
SCC	Suffolk County Council
SPR EA1N/EA2	Scottish Power Renewables East Anglia one north/East Anglia two
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
UNESCO	United Nations Educational, Scientific and Cultural Organization
UXO	Unexploded Ordnance
WFD	Water Directive Framework

References

Ref 1 Environmental Protection Act 1990 (Part 2A), c. 43. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents (Accessed 10 June 2025)

Ref 2 Control of Pollution (Applications, Appeals and Registers) Regulations 1996, No. 2971. Available at: https://www.legislation.gov.uk/uksi/1996/2971/contents/made (Accessed 10 June 2025)

Ref 3 Environment Act 2021, c. 30. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents (Accessed 10 June 2025).

Ref 4 The Contaminated Land (England) Regulations 2006, No. 1380. Available at: https://www.legislation.gov.uk/uksi/2006/1380/contents (Accessed 10 June 2025)

Ref 5 The Control of Asbestos Regulations 2012, No. 632. Available at: https://www.legislation.gov.uk/uksi/2012/632/contents (Accessed 10 June 2025).

Ref 6 Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, No. 407. Available at: https://www.legislation.gov.uk/uksi/2017/407/contents (Accessed 10 June 2025).

Ref 7 The Health and Safety at Work Act 1974, c. 37. Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents (Accessed 10 June 2025).

Ref 8 The Construction (Design and Management) Regulations 2015, No. 51. Available at: https://www.legislation.gov.uk/uksi/2015/51/contents (Accessed 10 June 2025).

Ref 9 The Environmental Permitting (England and Wales) Regulations, No. 1154. Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed 10 June 2025).

Ref 10 The Environmental Damage (Prevention and Remediation) (England) Regulations 2015, No. 810. Available at: https://www.legislation.gov.uk/uksi/2015/810/contents (Accessed 10 June 2025).

Ref 11 The Environmental Damage (Prevention and Remediation) (England and Wales) Regulations 2009, No. 13. Available at: https://www.legislation.gov.uk/uksi/2009/153/contents/made

Ref 12 Department for Energy Security and Net Zero (2024). Overarching National Policy Statement for Energy (EN-1). Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 (Accessed 10 June 2025).

Ref 13 Department for Energy Security and Net Zero (2025). National Policy Statement for electricity networks infrastructure (EN-5), Available at:

https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5 (Accessed 10 June 2025).

Ref 14 Ministry of Housing, Communities and Local Government (2024). National Planning Policy Framework. Available at: https://www.gov.uk/guidance/national-planning-policy-framework (Accessed 10 June 2025)

Ref 15 East Suffolk Council. 2020. Suffolk Coastal Local Plan. Available at: https://www.eastsuffolk.gov.uk/planning/planning-policy-and-local-plans/local-plans/ (Accessed 10 June 2025)

Ref 16 East Suffolk Council (2019). Waveney Local Plan. Available at: https://www.eastsuffolk.gov.uk/planning/planning-policy-and-local-plans/local-plans/ (Accessed 10 June 2025).

Ref 17 National Grid (2024) LionLink Environmental Impact Assessment Scoping Report Volume 1 Main Text . Available at: https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020033/documents (Accessed 10 June 2025).

Ref 18 LionLink Multi-Purpose Interconnector (August 2023) Interim Non-Statutory Consultation Feedback Summary Report. Available at: https://www.nationalgrid.com/national-grid-ventures/lionlink/library#230548828-3684997351 (Accessed 10 June 2025)

Ref 19 LionLink (March 2024) Supplementary Non-Statutory Consultation Summary Report. Available at: https://www.nationalgrid.com/national-grid-ventures/lionlink/library#230548828-3684997351 (Accessed 10 June 2025)

Ref 20 Highways England (2019). LA 109 Geology and soils. Available at: https://www.standardsforhighways.co.uk/tses/attachments/adca4c7d-4037-4907-b633-76eaed30b9c0?inline=true (Accessed 10 June 2025).

Ref 21 Natural England Peat Map. Available at: https://experience.arcgis.com/experience/2de81f5bd54f48e99771549e0b4746d0/ (Accessed 10 June 2025)

Ref 22 Groundsure Map Insight GIS data package.

Ref 23 Groundsure Enviro+Geo GIS data package.

Ref 24 British Geological Survey (no date). BGS Geology 50K Web Map Sever. Available at: https://www.bgs.ac.uk/technologies/web-map-services-wms/web-map-services-geology-50k/ (Accessed 10 June 2025).

Ref 25 Environment Agency (2025). Historical Landfill Sites data. Available at: https://www.data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites1 (Accessed 10 June 2025).

Ref 26 Environment Agency (2024). Authorised Landfill Site Boundaries data. Available at: https://www.data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-

99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries1 (Accessed 10 June 2025).

Ref 27 British Geological Survey (no date). Geoindex (onshore). Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Accessed 10 June 2025).

Ref 28 Moorlock, B S P, Hamblin, R J O, Booth, S J, and Morigi, A N. Geology of the country around Lowestoft and Saxmundham (2000). Memoir of the British Geological Survey, Sheets 176 and 191 (England and Wales). Available at: https://webapps.bgs.ac.uk/memoirs/docs/B01612.html (Accessed 10 June 2025).

Ref 29 UK Health Security Agency (2022). UK maps of radon data. Available at: https://www.ukradon.org/information/ukmaps (Accessed 10 June 2025)

Ref 30 Zetica UXO (no date). UXO risk maps. Available at: https://zeticauxo.com/guidance/risk-maps/ (Accessed 10 June 2025).

Ref 31 East Suffolk Council (2025). Contaminated land: Public register of contaminated land, 2025. Available at: https://www.eastsuffolk.gov.uk/environment/environmental-protection/contaminated-land/ (Accessed 10 June 2025).

Ref 32 Mining Remediation Authority (no date). Interactive map viewer. Available at: https://datamine-cauk.hub.arcgis.com/ (Accessed 10 June 2025).

Ref 33 East Suffolk Council (no date). GeoSuffolk. Available at: https://GeoSuffolk.co.uk/ (Accessed 10 June 2025)

Ref 34 DEFRA (no date). Multi-Agency Geographic Information for the Countryside (MAGIC) Map. Available at: https://magic.defra.gov.uk/MagicMap.html. (Accessed 10 June 2025).

Ref 35 Geotechnics (2025). GI at Lionlink – Cable Route Section D (Factual Report).

Ref 36 Geotechnics (2025). GI at Lionlink – Cable Route Section B & C (Factual Report).

Ref 37 Geotechnics (2024). GI at Lionlink NG Onshore HVDC – Converter Station Site 3 – V2 (factual report).

Ref 38 Geotechnics (2025). Geotechnics. GI at Lionlink – Walberswick Landfall.

Ref 39 BakerHicks (2023). Geotechnical Desk Study: Section A Cable Route, Reference: 30002884-BHK-01-AC-RP-C-0001.

Ref 40 BakerHicks (2023). Geotechnical Desk Study: Section B Cable Route, Reference: 30002884-BHK-01-DC-RP-C-0001.

Ref 41 BakerHicks (2024). Geotechnical Desk Study: Cable Section C, Reference: 30002884-BHK-01-DC-RP-C-0002.

Ref 42 National Library of Scotland (no date). Georeferenced Maps. Available at: https://maps.nls.uk/.

Ref 43 BakerHicks (2024). Geotechnical Desk Study: Cable Section D, Reference: 30002884-BHK-01-DC-RP-C-0003.

Ref 44 Environment Agency (2023). Land Contamination: Risk Management (LC:RM). Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm (Accessed 10 June 2025).

Ref 45 Environment Agency (2009). Updated technical background to the CLEA model. Science Report SC050021/SR3. Available at: https://www.gov.uk/government/publications/updated-technical-background-to-the-clea-model (Accessed 10 June 2025).

Ref 46 Environment Agency (2014). Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination. Available at: https://www.gov.uk/government/publications/remedial-targets-worksheet-v22a-user-manual (Accessed 10 June 2025)

Ref 47 Health and Safety Executive (2012). The Control of Asbestos Regulations, No. 632. Available at: https://www.legislation.gov.uk/uksi/2012/632/contents (Accessed 10 June 2025).

Ref 48 CIRIA (2014). Asbestos in soil and made ground: a guide to understanding and managing risks C733. London: CIRIA.

Ref 49 CIRIA (2007). Assessing risks posed by hazardous ground gases to buildings C665. London: CIRA.

Ref 50 British Standard Institution (2019). BS8485:2015+A1:2019. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (+A1:2019). London: BSI.

Ref 51 Building Research Establishment (2005). Special Digest 1: Concrete in aggressive ground, third edition. Watford: BRE.

Ref 52 Building Research Establishment (2004). Report 465: Cover systems for land regeneration: thickness of cover systems for contaminated land.

Ref 53 Building Research Establishment (2003). Report 456: Control of dust from construction and demolition activities.

Ref 54 National Grid (2025). Sea Link Volume 6: Environmental Statement – Part 2, Suffolk, Chapter 5, Geology and Hydrogeology. Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN020026-000237-6.2.2.5%20Part%202%20Suffolk%20Chapter%205%20Geology%20and%20Hydrogeology.pdf (Accessed 10 June 2025).

Ref 55 BakerHicks (2023). Geotechnical Desk Study: Converter Station Site 3

Ref 56 BakerHicks (2023). Geotechnical Desk Study: Walberswick Landfall

Ref 57 Department of Environment (1995). DoE Industry Profiles. Available at: https://claire.co.uk/useful-government-legislation-and-guidance-by-country/76-key-documents/198-doe-industry-profiles (Accessed 10 June 2025).

Ref 58 Intertek (2024). Landfall Erosion Study.

Ref 59 CL:AIRE (2011). The definition of Waste: The development industry Code of Practice. Available at: https://claire.co.uk/projects-and-initiatives/dow-cop https://www.bing.com/search?q=The+definition+of+Waste+The+development+industry+Code+of+Practice+2011+.&FORM=AWRE(Accessed 10 June 2025).

Ref 60 British Standard Institution (2017). BS 10175:2011+A2:2017. Investigation of potentially contaminated sites. London: BSI.

Ref 61 British Standard Institution (2020). BS 5930:2015+A1:2020. Code of practice for site investigations. London: BSI.

Ref 62 British Standard Institutions (2013). BS 8576:2013. Guidance on investigations for ground gas – Permanent gases and volatile organic compounds (VOCs). London: BSI.

Ref 63 Association of Geotechnical and Geoenvironmental Specialists (2012). Guidance on dealing with contamination during an intrusive investigation.

National Grid Lion Link Limited

Company number 14722364

1-3 Strand

London

WG2N-5EH

United Kingdom

nationalgrid.com/lionlink