




F I V E 
ESTUARIES
OFFSHORE WIND FARM

FIVE ESTUARIES
OFFSHORE WIND FARM
PRELIMINARY ENVIRONMENTAL
INFORMATION REPORT

VOLUME 3, CHAPTER 5: GROUND
CONDITIONS AND LAND USE

Document Reference 004685509-01
Revision A
Date March 2023





Project	Five Estuaries Offshore Wind Farm
Sub-Project or Package	Preliminary Environmental Information Report
Document Title	Volume 3, Chapter 5: Ground Conditions and Land Use
Document Reference	004685509-01
Revision	A

COPYRIGHT © Five Estuaries Wind Farm Ltd

All pre-existing rights reserved.

This document is supplied on and subject to the terms and conditions of the Contractual Agreement relating to this work, under which this document has been supplied, in particular:

LIABILITY

In preparation of this document Five Estuaries Wind Farm Ltd has made reasonable efforts to ensure that the content is accurate, up to date and complete for the purpose for which it was contracted. Five Estuaries Wind Farm Ltd makes no warranty as to the accuracy or completeness of material supplied by the client or their agent.

Other than any liability on Five Estuaries Wind Farm Ltd detailed in the contracts between the parties for this work Five Estuaries Wind Farm Ltd shall have no liability for any loss, damage, injury, claim, expense, cost or other consequence arising as a result of use or reliance upon any information contained in or omitted from this document.

Any persons intending to use this document should satisfy themselves as to its applicability for their intended purpose.

The user of this document has the obligation to employ safe working practices for any activities referred to and to adopt specific practices appropriate to local conditions.

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
A	Mar-23	Final for PEIR	SLR	GoBe	VE OWFL



GLOSSARY OF TERMS	6
5 Ground conditions and land use	10
5.1 Introduction.....	10
5.2 Statutory and policy context	10
National legislation	10
National policy statements	11
National planning policy	11
Local planning policy	12
Contaminated land	12
5.3 Consultation	18
5.4 Scope and methodology	24
Scope of the assessment	24
Study area	26
Data sources	28
Assessment methodology	30
5.5 Assessment criteria and assignment of significance	30
5.6 Uncertainty and technical difficulties encountered.....	35
5.7 Existing environment	35
General description and land use.....	36
Soil & agricultural land classification	37
Agri-environmental schemes.....	45
Statutory and non-statutory designated sites	46
Superficial deposits	49
Bedrock geology.....	55
Aquifer properties and groundwater source protection zones	57
Mineral safeguarding areas	57
Historical mining	58
Historical past use and contaminated land.....	59
Unexploded ordnance	60
Radon gas	60
5.8 Key parameters for assessment.....	61
5.9 Embedded mitigation.....	64
5.10 Environmental assessment	67
5.11 Environmental assessment: construction phase.....	68
Impact 1: short term risks to construction workers during development of landfall, OnSS and onshore cable routes	68



Impact 2: risks to offsite human receptors, such as occupants of residential properties bordering landfill, OnSS and onshore ECC.....	68
Impact 3: construction phase impacts upon soil/land quality.....	69
Impact 4: sterilisation of mineral deposits.....	73
Impact 5: risk from unexploded ordnance to construction workers and nearby residents	74
Impact 6: risk to environmental designations	75
5.12 Environmental assessment: operational phase.....	75
Impact 7: loss of agricultural land during operation of underground cables.....	75
Impact 8: loss of agricultural land during operation of the OnSS.....	76
Impact 9: ingress and accumulation of hazardous ground gases.....	77
Impact 10: structures and services laid in direct contact with contaminated soils and groundwater	78
5.13 Environmental assessment: decommissioning phase	78
Impact 11: short term risks to construction workers during decommissioning of the onshore ECC and associated infrastructure and Impact 12: risks to offsite human receptors, such as occupants of residential properties bordering the associated infrastructure with the project	78
5.14 Environmental assessment: cumulative effects.....	79
5.15 Inter-relationships	83
5.16 Transboundary effects.....	84
5.17 Summary of effects.....	84
5.18 Next steps	87
5.19 References	88

TABLES

Table 5.1: Legislation and policy context.....	13
Table 5.2: Summary of consultation relating to Ground Conditions and Land Use.....	19
Table 5.3: Data Sources	29
Table 5.4: Sensitivity/importance of the environment	31
Table 5.5: Impact magnitude definitions	33
Table 5.6: Matrix to determine effect significance.....	35
Table 5.7 Route sections for the Onshore ECC.....	36
Table 5.8: Agricultural Land Classification.....	44
Table 5.9 Percentage of BMV Resource within Essex	45
Table 5.10: Superficial Geology.....	55
Table 5.11 Mineral Safeguarding Areas within the VE PEIR Boundary.....	58
Table 5.12: Maximum design scenario for the project alone.....	61
Table 5.13: Embedded mitigation measures relating to Ground Conditions and Land Use.....	64
Table 5.14: Description of Tiers of other developments considered for cumulative effect assessment.	79



Table 5.15: Projects considered within the Ground Conditions and Land Use cumulative effect assessment.....	81
Table 5.16: Cumulative MDS.....	82
Table 5.17: Summary of effects for ground conditions and land use	84

FIGURES

Figure 5.1 Study Area.....	27
Figure 5.2 Agricultural Land Classification Overview.....	38
Figure 5.3a Agricultural Land Classification Sections 1 to 5 (1).....	39
Figure 5.4 Superficial Geology Overview.....	48
Figure 5.5a Superficial Geology Sections 1 to 5 (1)	50
Figure 5.6 Bedrock Geology Overview	56



GLOSSARY OF TERMS

Term	Definition
Ancient Woodland	Typically, a woodland that has existed continuously since 1600 or before (this can include areas where trees have been cut down and/ or replanted).
Array Areas	The areas where the WTGs will be located.
Cable Works TCC	TCC associated with cable works.
DCO	An order made under the Planning Act 2008 granting development consent for a NSIP from the Secretary of State for Business, Energy and Industrial Strategy.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact in question with the sensitivity of the receptor in question, in accordance with defined significance criteria.
ES	The documents that collate the processes and results of the EIA.
European sites	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan	A voluntary consultation process with specialist stakeholders to agree the approach to the Environmental Impact Assessment.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial, resulting from the activities associated with the construction, operation and maintenance, or decommissioning of the project.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2010.
Landfall	The landfall denotes the location where the offshore export cables are brought ashore and jointed to the onshore cable circuits in TJBs.



Local Nature Reserve	Statutory designation for places with wildlife or geological features that are of special interest locally.
Maximum Design Scenario	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures are commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts through the assessment process.
Onshore ECC	At PEIR, the Onshore ECC is the wider cable corridor within which the typically 60 m cable route is located. The Onshore ECC is typically approximately 200 m to 250 m wide, however some areas require a wider corridor (such as where trenchless crossing may take place).
OnSS	Where the power supplied from the wind farm is adjusted (including voltage, power quality and power factor as required) to meet the UK System-Operator Transmission-Owner Code for supply to the National Grid substation.
OnSS Access Zone	The area which will contain the final OnSS access route (both construction and operational)
OnSS Construction Zone	The area in which the final OnSS TCC footprint will be located.
OnSS Zone	The area in which the final OnSS footprint will be located.
PEIR	The PEIR is written in the style of a draft ES and forms the basis of statutory consultation. Following that consultation, the PEIR documentation will be updated into the final ES that will accompany the application for the DCO.
Special Area of Conservation	A special area of conservation is defined in the European Union's Habitats Directive, also known as the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora.



DEFINITION OF ACRONYMS

Term	Definition
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AoS	Area of Search
BEIS	Department for Business, Energy and Industrial Strategy
BMV	Best and Most Versatile
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practise
CSS	Countryside Stewardship Schemes
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
ECC	Export Cable Corridor
EACN	East Anglia Connection Node
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act 1990
ES	Environmental Statement
ESS	Environmental Stewardship Schemes
ETG	Expert Topic Group
HDD	Horizontal Directional Drilling
IEMA	Institute of Environmental Management & Assessment
LCRM	Land Contamination Risk Management
LDP	Local Development Plan
LoGS	Local Geological Site
MCA	Mineral Consultation Area
MDS	Maximum Design Scenario
MIIA	Mineral Infrastructure Impact Assessment
MLP	Minerals Local Plan
MSA	Mineral Safeguarding Area
NE	Natural England



Term	Definition
NPS	National Policy Statement
NPS EN-1	Overarching National Policy Statement for Energy
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
OWF	Offshore Wind Farm
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PCL	Potential Contaminant Linkages
PINS	The Planning Inspectorate
PPG	Planning Practice Guidance
PPL	Public Policy and Legislation
RIGS	Regionally Important Geological Site
SAC	Special Area of Conservation
SPZ	Source Protection Zone
SSS	Site Selection Study
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TCC	Temporary Construction Compound
TJB	Transition Joint Bay
UXO	Unexploded Ordnance
VE	Five Estuaries Offshore Wind Farm. (The Project)
WIIA	Waste Infrastructure Impact Assessment
WTG	Wind Turbine Generator
m	Metre
km	Kilometre



5 GROUND CONDITIONS AND LAND USE

5.1 INTRODUCTION

- 5.1.1 This chapter has been prepared by SLR and presents an assessment of the potential effects on Ground Conditions and Land Use of the onshore works (including construction, operation and maintenance (O&M) and decommissioning) associated with the Five Estuaries Offshore Wind Farm (hereafter referred to as VE).
- 5.1.2 This chapter has been informed by the following Preliminary Environmental Information Report (PEIR) chapters:
- > Volume 3, Chapter 1: Onshore Project Description;
 - > Volume 3, Chapter 4: Onshore Biodiversity and Nature Conservation; and
 - > Volume 3, Chapter 6: Hydrology and Flood Risk.
- 5.1.3 This Ground Conditions and Land Use chapter will:
- > Describe the existing baseline established from desk studies, dedicated surveys and consultation;
 - > Outline the potential environmental effects on Ground Conditions and Land Use arising from VE, based on the information gathered and the analysis and assessments undertaken to date;
 - > Provide an assessment of the potential direct and indirect impacts of the VE, including the construction and operation and maintenance and decommissioning phases, on Ground Conditions and Land Use;
 - > Identify any assumptions and limitations encountered in compiling the environmental information; and
 - > Highlight any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified at the relevant stage in the PEIR process.
- 5.1.4 The effects considered in this chapter include those on geological conditions and resources that form part of the onshore physical environment. Effects on hydrogeology and groundwater (including groundwater abstractions) are considered in Volume 3, Chapter 6: Hydrology and Flood Risk.

5.2 STATUTORY AND POLICY CONTEXT

- 5.2.1 This section identifies the legislation and policy that has informed the assessment of effects with respect to Ground Conditions and Land Use.
- 5.2.2 VE will be developed in accordance with the following European legislation, National legislation, National and Local Planning Policy and Strategy, and other relevant guidance.
- 5.2.3 A summary of the legislation and policies of relevance to this chapter are provided in the sections below and in Table 5.1 together with an indication of where each requirement is addressed.

NATIONAL LEGISLATION

- 5.2.4 The objectives of this chapter are met through the following UK legislation, relevant to the protection of the ground environment:
- > The Environmental Permitting (England and Wales) Regulations 2016;



- > The Environment Act 1995 sets out roles and responsibilities for the Environment Agency;
- > The Environment Act 2021 sets out the new UK framework for environmental protection including biodiversity, nature conservation and waste reduction; and
- > Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 set out the key stages in the assessment process, including review and monitoring.

NATIONAL POLICY STATEMENTS

5.2.5 The National Policy Statements (NPS) are the principal policy for determining Nationally Significant Infrastructure Projects (NSIP). As such, this assessment has made explicit reference to the relevant NPS requirements.

5.2.6 Those relevant to the landscape and visual aspects of the onshore elements of VE are:

- > Overarching National Policy Statement for Energy (EN-1, (DECC 2011));
- > National Policy Statement for Renewable Energy Infrastructure (EN-3 (DECC, 2011)); and
- > National Policy Statement for Electricity Networks Infrastructure (EN-5 (DECC 2011)).

5.2.7 The NPSs provide the main policy tests in relation to the Proposed Development. The NPSs are currently being revised and draft versions were published for consultation in 2021. In addition to the current NPS, the draft NPSs have therefore also been reviewed in Table 5.1 to determine the emerging expectations and changes from previous iterations of the NPSs. This includes the Draft Overarching NPS EN-1 (DBEIS, 2021), Draft NPS EN-3 (DBEIS, 2021) and Draft NPS EN-5 (DBEIS, 2021). Draft policies are included in the table where they differ from the extant policy.

NATIONAL PLANNING POLICY

5.2.8 The National Planning Policy Framework (NPPF), prepared by the Department for Communities and Local Government was published in March 2012 and revised in July 2021, sets out the Government's planning policies for England and how these are expected to be applied, along with the National Planning Practice Guidance (PPG) which expands on policies contained in the NPPF.

5.2.9 Section 15 of the NPPF sets out the requirements for conserving and enhancing the natural environment. A core aim of the NPPF is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. Applicants should seek to recognise benefits from natural capital and ecosystem services including the economic value and other benefits of best and most versatile agricultural land.

5.2.10 Section 17 of the NPPF sets out the requirements for planning policy to facilitate the sustainable use of minerals, including the requirement to safeguard minerals from sterilisation by non-mineral development.

5.2.11 It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.



LOCAL PLANNING POLICY

- 5.2.12 The Essex Minerals Local Plan (MLP 2014) has been considered as part of this assessment. As part of an ongoing review to ensure the MLP meets the Test for Soundness of new plans (NPPF Paragraph 35) a Call for Sites exercise for mineral extraction and mineral infrastructure closed on 9 November 2022.
- 5.2.13 Policy S8 of the MLP requires that a non-mineral proposal located within a Mineral Safeguarding Area (MSA) which exceeds defined thresholds must be supported by a Minerals Resource Assessment to establish the existence, or otherwise, of a mineral resource capable of having economic importance.
- 5.2.14 This chapter also considers:
- > Essex and Southend-on-Sea Waste Local Plan 2017; and
 - > Tendring District Local Plan 2013-2033 and Beyond Publication Draft and Tendring District Council, July 2017 Emerging Local Plan:
 - > Public Policy and Legislation (PPL) 4 Biodiversity and Geodiversity.

CONTAMINATED LAND

- 5.2.15 Specific UK legislation and guidance on the assessment of contaminated land is principally provided under:
- > Part 2A of the Environmental Protection Act (EPA) 1990, as inserted by Section 57 of the Environment Act 1995;
 - > The Land Contamination Risk Management (LCRM) guidance (Environment Agency, 2021) which indicates that a Conceptual Site Model (CSM) should identify those contamination sources, pathways and receptors which are “likely” to represent an “unacceptable” risk either to human health or the surrounding environment;
 - > Contaminated Land Statutory Guidance 2012 (ref: PB13735) is intended to explain how Local Authorities should implement the regime as detailed by EPA 1990, including how they should go about deciding whether land is contaminated land in the legal sense of the term;
 - > Construction Industry Research and Information Association (CIRIA) C552 (Contaminated Land Risk Assessment. A guide to good practice) examines the risk assessment of contaminated land and explains the key elements of risk assessment practices and procedures; and
 - > Design Manual for Roads and Bridges (DMRB), (2020) LA101 Sustainability and environment. Appraisal. Introduction to environmental assessment.

OTHER RELEVANT GUIDANCE

- 5.2.16 Relevant UK guidance on good practice for construction projects that will be referenced during assessment is detailed in the following documents:
- > Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (IEMA, 2004 and 2006 as amended);
 - > DMRB LA 109 Geology and Soils (DMRB 2019), which provides a framework for assessing and managing the effects associated with geology and soils;
 - > Department for Environment, Food & Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009);
 - > IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (February 2022);



- > Ministry of Agriculture, Fisheries and Food, Agricultural land classification of England and Wales - revised guidelines and criteria for grading the quality of agricultural land (1988); and
- > Good Practice Guide for Handling Soils (Institute of Quarrying, 2021).

5.2.17 Table 5.1 outlines the relevant legislation and policy context in relation to this chapter.

Table 5.1: Legislation and policy context

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
EPA 1990. Part 2A - Contaminated Land Statutory Guidance	The legislation should manage the identification of contamination sources, pathways and receptors which are “likely” to represent an “unacceptable” risk either to human health or the surrounding environment; The legislation in relation to contaminated land thus enables central government to protect and improve environmental quality of historical contamination and in pursuing policies to re-use and redevelop sites ensures developers and local authorities are aware of potential contamination issues.	The identification of potential contamination is presented in Section 5.7. The PEIR boundary has been selected to avoid sites with known contamination, such as landfills and industrial land use areas.
LCRM Guidance	Makes provision for the identification and remediation of contaminated land under Part 2A of the Environmental Protection Act 1990.	The identification of potential contamination is presented in Section 5.7
Overarching National Policy Statement for Energy (NPS EN-1) (DECC, 2011)	Paragraph 4.2.5 advises that when considering cumulative effects, the ES should provide information on how the effects of the applicant’s proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence).	Cumulative ground conditions and land use effects of the onshore infrastructure are considered in Section 5.14..
NPS EN-1 (DECC, 2011)	Paragraph 4.2.7 advises that ‘In some instances it may not	Volume 3, Chapter 1 - Onshore Project



Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	<p>be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.'</p> <p>At paragraph 4.2.8 it is stated that, where this is the case, the need to ensure that the likely worst-case environmental effects are set out and assessed.</p>	<p>Description sets out the details of the project and which areas are and are not settled in precise detail.</p> <p>Section 5.8 sets out the maximum design parameters that have been defined to ensure that the worst-case ground conditions and land use effects are assessed.</p>
NPS EN-1 (DECC, 2011)	<p>In relation to Good Design, paragraph 4.5.3 advises that <i>'the IPC should satisfy itself that the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible'</i></p>	<p>Section 5.9 of this Chapter sets out the embedded mitigation that is included for VE and section 5.11 assesses ground and land use impacts.</p> <p>Matters relating to the design of the Project will be further developed in the DCO Application.</p>
NPS EN-1 (DECC, 2011)	<p>In relation to Good Design, paragraph 4.5.4 sets out that the applicants should be able to demonstrate how the design process was conducted, and how the design evolved and design decisions were made. This is in order for the Secretary of State (SoS) to consider the application. In doing so the SoS <i>'should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security</i></p>	<p>The evolution of the design is set out Volume 1, Chapter 4: Site Selection and Alternatives and Volume 3, Chapter 1 - Onshore Project Description.</p> <p>How the design has evolved in relation to ground condition impacts is included in Section 5.9 of this Chapter.</p>



Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	<i>requirements which the design has to satisfy’.</i>	
NPS EN-1 (DECC, 2011)	Paragraph 5.3.3: <i>‘Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ... geological conservation importance’</i>	The effects of onshore infrastructure associated with VE on designated sites of geological conservation importance are considered in Section 5.10.
NPS EN-1 (DECC, 2011)	Paragraph 5.3.7: <i>‘As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to ... geological conservation interests, including through mitigation and consideration of reasonable alternatives ...; where significant harm cannot be avoided, then appropriate compensation measures should be sought’</i>	The effects of onshore infrastructure associated with VE on designated sites of geological conservation importance are considered in Section 5.10.
NPS EN-1 (DECC, 2011)	Paragraph 5.10.8: <i>‘Applicants should seek to minimise impacts on the best and most versatile agricultural landand identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination’.</i>	<p>The evolution of the design is set out Volume 1, Chapter 4: Site Selection and Alternatives and Volume 3, Chapter 1 - Onshore Project Description.</p> <p>The effects of onshore infrastructure associated with VE on best and most versatile soils are considered in Section 5.11.</p> <p>Although the onshore infrastructure does not utilize previously developed land, an assessment of the potential for impacts to</p>



Legislation/ Policy	Key Provisions	Section Where Comment Addressed
		occur from contamination is provided in Section 5.11.
NPS EN-1 (DECC, 2011)	Paragraph 5.10.9 <i>'Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.'</i>	The effects of onshore infrastructure associated with VE on safeguarded mineral are considered in Section 5.11.
Draft Overarching National Policy Statement for Energy (EN-1) (DBEIS, 2021)	EN -1, 5.11.8 <i>"Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification (ALC)) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed";</i>	The effects of onshore infrastructure associated with VE on soils and ALC importance are considered in Section 5.11
National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (DECC 2011)	Paragraphs 2.6.42 and 2.6.43 relate to the need for flexibility in the project details owing to the complex nature of offshore wind farm development. It is recognised that this may include the location and configuration of turbines and associated development (including offshore substations), the exact turbine dimensions and the precise cable type and route. In accordance with Section 4.2 of EN-1 and recognising there may be a need for flexibility in the consent it is stated that 'Where this is sought and the	Section 5.8 sets out the maximum design parameters that have been defined to ensure that the worst-case ground conditions and land use effects are assessed.



Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	<p>precise details are not known, then the applicant should assess the effects the project could have (as set out in EN-1 paragraph 4.2.8) to ensure that the project as it may be constructed has been properly assessed (the Rochdale Envelope). In this way the maximum adverse case scenario will be assessed, and the IPC should allow for this uncertainty in its consideration of the application and consent.'</p>	
<p>NPPF (2021)</p>	<p>Para 174. <i>“Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of ... geological value and soils ...; ... including the economic and other benefits of the best and most versatile agricultural land, ... preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, ... pollution or land instability. ...and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”</i></p>	<p>The effects of onshore infrastructure associated with VE are considered in Section 5.11</p>
	<p>Para 183 a) <i>“a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination...”</i></p>	<p>The identification of potential contamination is presented in Section 5.7</p>



Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	<p>Para 184 <i>“84: Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rest with the developer and/or landowner.”</i></p>	<p>The identification of potential contamination is presented in Section 5.7</p>
	<p>Para 210 b) <i>“safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas⁷⁰; and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked); d) set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place;”</i></p>	<p>The effects of onshore infrastructure associated with VE on safeguarded mineral are considered in Section 5.11</p>
	<p>Para 214 <i>“Minerals planning authorities should plan for a steady and adequate supply of industrial minerals by: b) encouraging safeguarding or stockpiling so that important minerals remain available for use;”</i></p>	<p>The effects of onshore infrastructure associated with VE on safeguarded mineral are considered in Section 5.11</p>

5.3 CONSULTATION

- 5.3.1 To date consultation with regards to the scope of the Ground Conditions and Land Use assessment has been outlined within the Scoping Report (2021) and via the Public Consultation and Exhibition held between July and August 2022.
- 5.3.2 Consultation with specific stakeholders has also been undertaken under the Evidence Plan through Expert Topic Groups (ETG) in November 2022, with non-statutory consultation taking place in August 2022.
- 5.3.3 A Scoping Opinion for VE was received from the Planning Inspectorate (PINS) in November 2021.



5.3.4 Table 5.2 below summarises the issues relevant to this chapter which have been highlighted by consultees and indicates how, if possible, these issues have been addressed.

Table 5.2: Summary of consultation relating to Ground Conditions and Land Use

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
14 January 2020 Pre-Scoping Expert Topic Group Meeting	SCC disagreed with mineral deposits being screened out of the EIA Scoping Report.	Minerals have been screened into the Scoping and the PEIR, Section 5.4.
3 August 2021 Pre-Scoping Expert Topic Group Meeting	Essex County Council historic and existing landfill information should be requested from Essex County Council's Minerals and Waster Authority. The consideration of gravel and brick pits within the county should be included within the EIA.	Identification of historic, existing landfill and mineral sites are included within Section 5.7.
November 2021 PINS on behalf of SoS Scoping Opinion	Operational impacts on geology and ground conditions.	The Inspectorate notes that effects on the environment arising from ground disturbance during construction would be assessed as part of the ES. The Inspectorate agrees that this matter can be scoped out on the basis that further impacts on ground conditions are unlikely to lead to additional LSE.
	The Planning Inspectorate does not agree to scope out loss of agricultural land during operation of underground cables on the basis <i>“that underground cables have the potential to restrict agricultural uses during operation and that the area of restricted use should be quantified both in terms of extent and agricultural land grade.</i>	Loss of agricultural land during operation has been assessed within Section 5.11 in this Chapter.



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	<p><i>Accordingly, the ES should include an assessment of this matters or evidence demonstrating agreement with the relevant consultation bodies and the absence of LSE.”</i></p>	
	<p>The Planning Inspectorate agrees that routine maintenance effects on sterilisation of minerals & loss of agricultural land can be scoped out of the assessment</p>	<p>The maintenance works which are expected to occur would be localised and subject to control measures to reduce risks and impacts. The Inspectorate notes that the sterilisation of mineral deposits is listed as an impact which would be covered in the assessment of construction effects.</p>
	<p>The Planning Inspectorate considers that an appropriate, consistent buffer zone around relevant receptors should be included with justification for the size of the buffer zone around the Study Area.</p>	<p>The study area for the baseline data collection for ground conditions and land use has been discussed and agreed with stakeholders and is described within Section 5.4 in this Chapter.</p>
	<p>The Planning Inspectorate notes on methodology – quantitative effects, that where ground investigation and quantitative assessments are available they should be included within the assessment.</p>	<p>The methodology is described within Section 5.4 of this chapter. Where ground investigation and quantitative assessments are available they will be included within the assessment.</p>
	<p>The Planning Inspectorate notes that the ES should identify potential risks and contaminant linkages from potential sources of contamination on agricultural land from sources such as slurry, fertiliser, fuel storage and fertiliser use.</p>	<p>These comments are addressed in Section 5.11 in this Chapter.</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	<p>The Planning Inspectorate notes that the ES should indicate how leaks or spills of contaminants during construction or the bulk storage of potential contaminants is unlikely.</p>	<p>Section 5.11 in this Chapter and information is included within the Embedded Mitigation Section 5.9 of this Chapter. See also, Volume 7, Report 3: Draft Code of Construction Practice.</p>
	<p>The Planning Inspectorate notes that the ES should also assess the potential for other sources of ground gas such as natural soils that are subject to contamination.</p>	<p>No potential sources of ground gas from natural soils have been identified (Section 5.7).</p>
	<p>The Planning Inspectorate notes that the ES should also consider the potential for natural soils and groundwater conditions to lead to an aggressive chemical environment for services and structures.</p>	<p>Potential sources of aggressive ground conditions have been identified in Section 5.7, and are assessed in Section 5.11.</p>
	<p>The Planning Inspectorate notes that the ES should consider whether a Materials management Plan (MMP), and if required use of the Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Code of Practice (DOW:COP) and donor / receiver site process is required as a mitigation measure for the scheme.</p>	<p>Potential risks arising from land contamination have been assessed within Section 5.11 of this chapter. VE has been selected to avoid sites with known contamination, such as landfills and industrial land use. Should unexpected contamination be identified during construction a series of measures are set out within Section 5.9 of this Chapter, and will be included in the Draft Code of Construction Practice (CoCP).</p>
	<p>The Planning Inspectorate notes that the ES should also describe how soil would be handled and stored.</p>	<p>Measures on the storage and handling of soil are included as part of Volume 7, Report 3: Draft Code of Construction Practice. Information is</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		included within the Embedded Mitigation Section 5.9 of this Chapter.
	Tendring District Council Members raise concern that the proposed cable routes and tunnelling will impact large areas of farmland and residents' gardens. Further that underground cables will disturb agricultural land drains and irrigation systems.	VE has been selected to avoid residential properties and gardens. Whilst there is predicted to be a temporary impact upon agricultural land during the construction phase, the reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the cable has been installed. Field drainage will be reinstated. Discussed in Section 5.11 in this Chapter.
	Essex County Council <i>"Part of the application site is located within land which is designated as a Mineral Safeguarding Area (MSA) and therefore the application is subject to Policy S8 of the Essex Minerals Local Plan 2014 (MLP)."</i>	Minerals Resource Assessment (MRA) will be included as an appendix to this chapter as part of the ES. Identification of MSA is included within Section 5.7.
	Essex County Council A Waste Infrastructure Impact Assessment (WIIA) should be undertaken as <i>"the application site passes through a Waste Consultation Area associated with the Little Bentley Waste Water Treatment Works (WWTW)."</i>	VE onshore ECC route has been refined since the Scoping Report and no longer passes through or near the Waste Consultation Area. Therefore, a Waste Infrastructure Impact Assessment is no longer required.
	Essex County Council Raises the importance of a Site Waste Management Plan (SWMP). That it <i>"is vitally important that the best use is made of available resources."</i> As set out in the NPPF and development plan documents.	The approach to managing waste is set out within the Draft Code of Construction Practice. Information is included within the Embedded Mitigation Section 5.9 of this Chapter.



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	<p><i>“Paragraph 8 of the NPPF recognises the importance of “using natural resources prudently and minimising waste” Policy S4 of the Minerals Local Plan (2014) advocates reducing the use of mineral resources through reusing and recycling minerals generated as a result of development/ redevelopment. Not only does this reduce the need for mineral extraction, it also reduces the amount sent to landfill. Clause 4 specifically requires: “The maximum possible recovery of minerals from construction, demolition and excavation wastes produced at development or redevelopment sites. This will be promoted by on-site re-use/ recycling, or if not environmentally acceptable to do so, through re-use/ recycling at other nearby aggregate recycling facilities in proximity to the site.”</i></p>	
<p>1 November 2022 Expert Topic Group Meeting</p>	<p>ETG members agreed the overall assessment strategy, key guidance, data sources and study areas to be included in the assessment.</p>	<p>The assessment methodology and the study area is detailed within Section 5.4, baseline characterisation is detailed within Section 5.7</p>
<p>12 August 2022 Essex County Council</p>	<p>Minerals</p> <p>State its response relates to the refined area of the larger area of search of October 2021.</p> <p>States part of the application site is located within land designated as a MSA and therefore subject to Policy S8 of the Essex Minerals Local</p>	<p>A MRA will be included as part of the ES. Identification of MSA is included within Section 5.7.</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	<p>Plan 2014 (MLP). States an MRA will be requires as the area of 308.8ha is larger than the 5ha threshold. Provides detailed information on what they scope of the MRA should be.</p> <p>States that the application site does not pass through a Mineral Consultation Area (MCA) and therefore, a Mineral Infrastructure Impact Assessment (MIIA) would not be required.</p> <p>Waste</p> <p>States a WIIA would be required as the project passes through a Waste Consultation Area.</p> <p>State the importance of a SWMP and provides information on the policy requirement and scope.</p>	<p>VE onshore ECC route has been refined since the Scoping Report and no longer passes through or near the Waste Consultation Area. Therefore, a WIIA is no longer required.</p> <p>The approach to managing waste is set out within the draft Code of Construction Practice. Information is included within the Embedded Mitigation Section 5.9 of this Chapter.</p>

5.4 SCOPE AND METHODOLOGY

SCOPE OF THE ASSESSMENT

IMPACTS SCOPED IN FOR THE ASSESSMENT

5.4.1 It was previously considered (at scoping) that the loss of agricultural land during operation would be assessed as part of the construction phase impacts. It has been decided that to provide a clear assessment of the loss of agricultural land during the operational phase, this impact has been separated out and addressed independently as Impact 8.

5.4.2 The following impacts have been scoped into this assessment:

> Construction:

- > Impact 1: Short term risks to construction workers during works activities on landfall, onshore substation (OnSS) and onshore cable routes;



- > Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes;
- > Impact 3: Construction phase impacts upon soil/land quality;
- > Impact 4: Sterilisation of mineral deposit;
- > Impact 5: Risk from unexploded ordnance to construction workers and nearby residents; and
- > Impact 6: Risk to environmental designations.
- > Operation and Maintenance:
 - > Impact 7: Loss of agricultural land during operation of underground cables;
 - > Impact 8: Loss of agricultural land during operation of the OnSS;
 - > Impact 9: Ingress and accumulation of hazardous ground gases; and
 - > Impact 10: Structures and services laid in direct contact with contaminated soils and groundwater.
- > Decommissioning:
 - > Impact 11: Short term risks to construction workers during decommissioning of OnSS, ECC and associated infrastructure; and
 - > Impact 12: Risks to offsite human receptors, such as occupants of residential properties bordering the associated infrastructure with the project.

IMPACTS SCOPED OUT OF THE ASSESSMENT

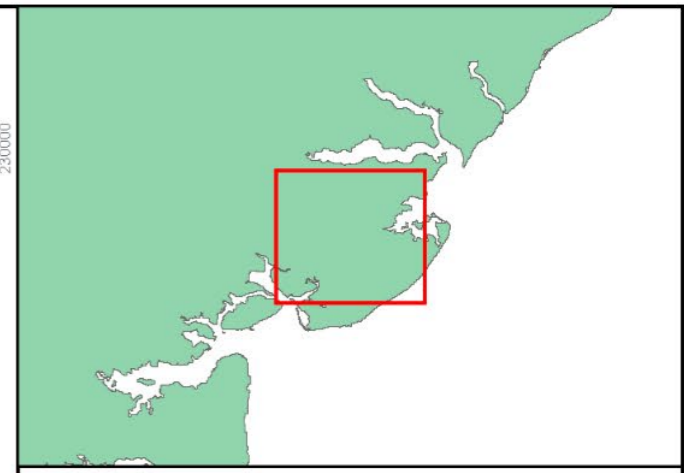
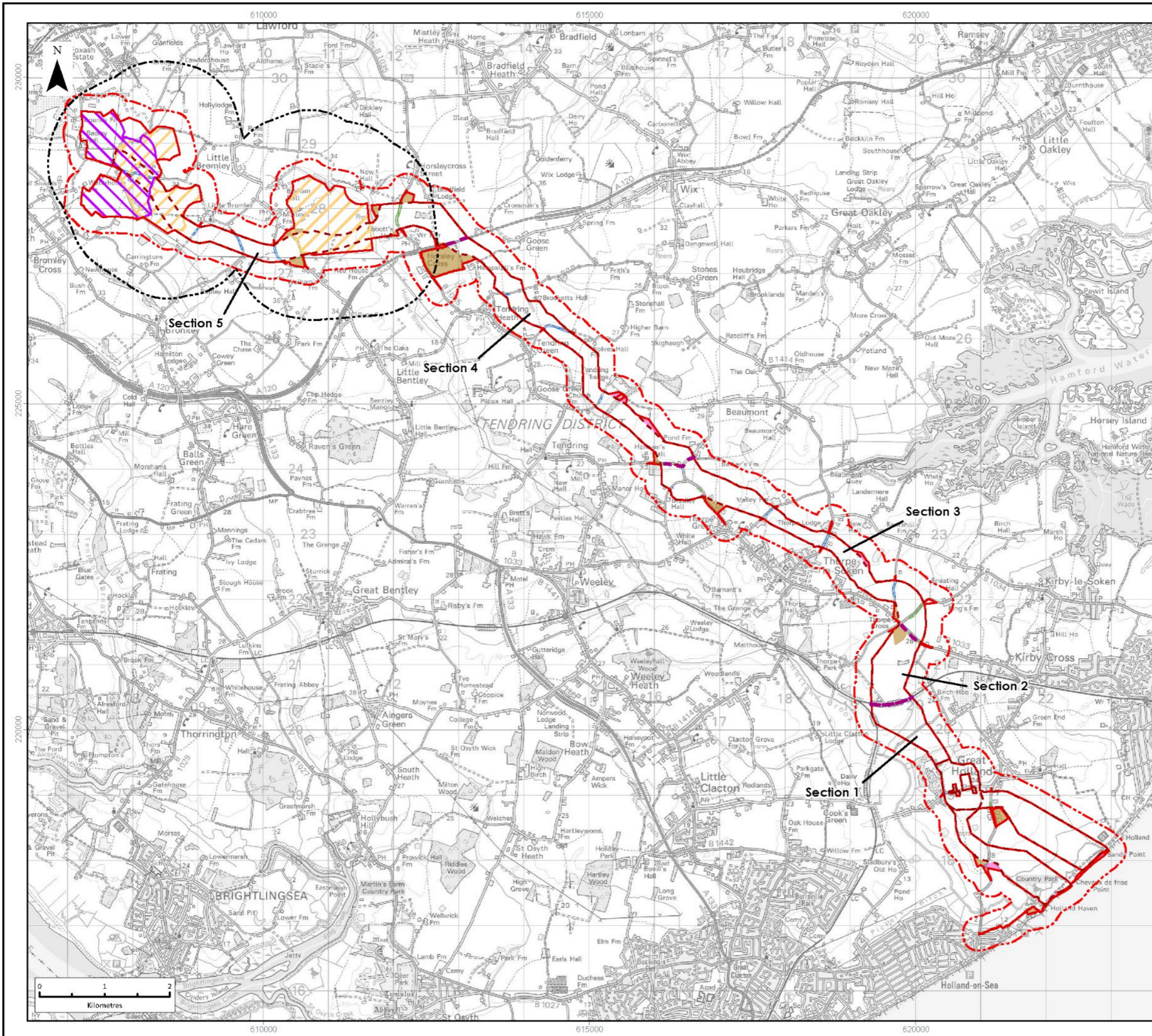
5.4.3 On the basis of the baseline environment and the project description outlined in Volume 1, Chapter 3: Onshore Project Description and in accordance with the Scoping Opinion (PINS, 2021), a number of impacts have been scoped out, these include:

- > Construction and decommissioning:
 - > Risks posed to sensitive surface water and groundwater resources will be addressed as part of the hydrology and hydrogeology chapter.
- > Operation and Maintenance:
 - > Operational impacts on geology and ground conditions; and
 - > Routine maintenance effects on sterilisation of minerals & loss of agricultural land.



STUDY AREA

5.4.4 The study area for the baseline data collection for ground conditions and land use comprises is shown on Figure 5.1 and comprises the onshore elements of VE from Landfall to the East Anglia Connection Node (EACN) Substation, plus a buffer of 1 km buffer around the two proposed OnSS search areas, and a 250 m buffer around the landfall and the onshore export cable corridor (ECC) (including haul roads and temporary construction compound (TCC) areas). These buffers encapsulate the Zone of Influence (Zol) of the impacts as identified and therefore all receptors within have been characterised for the purposes of assessment.



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Onshore Substation Areas of Search 1 km Buffer
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Data Source:
© Crown copyright [and database rights] (2022) 0100031673 OS OpenData.

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
Study Area

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
FIGURE 5.1

SCALE: 1:60,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





- 5.4.5 The 250 m buffer is from relatively shallow excavations for the onshore ECC, with no disturbance outside the ECC and reinstatement of current land use following construction. The wider 1 km buffer for the OnSS search area reflects the permanent nature of this development. The study area and available data have been discussed and agreed with stakeholders. It is considered beyond these distances geographic separation between development and the receptor results in the absence of an effect to ground conditions and land use.
- 5.4.6 For agricultural land classification and soils, the Study Area encompasses all of the land being considered within the Project boundary. The rationale for this is that agricultural land quality is impacted by the direct deterioration and loss of the resource itself. This predominately occurs by direct actions on soil quality via construction related activities.
- 5.4.7 This study area has been separated into several Onshore Route Sections which are shown on Figure 5.1 and described as follows:
- > Route Section 1- Landfall to the south of the Eastern main railway line through Thorpe le Soken;
 - > Route Section 2-; Land north of the Eastern main railway line through Thorpe le Soken, to the B1033 road;
 - > Route Section 3-Land north of the B1033 road to the B1035 road;
 - > Route Section 4-Land north of the B1035 road to the A120 road; and
 - > Route Section 5- Land north of the A120 up to the OnSS search areas and National Grid EACN Substation search area.

DATA SOURCES

- 5.4.8 Baseline data with respect to ground conditions and land use has been collected from publicly available information and open-source data from a range of sources.
- 5.4.9 A desk-based review of soil and geological maps, Ordnance Survey (OS) mapping and Digital Terrain Model (DTM) mapping has been undertaken. Third party data from bodies such as the Environment Agency (EA) and DEFRA's MAGIC website has been used to characterise the geological features and identify any geological designated areas. Table 5.3: Data Sources below provides a list of data sources.



Table 5.3: Data Sources

DATA	REFERENCE/ SOURCE
Agricultural Land Classification (ALC)	Natural England
Soil Type and Character	UK Soil Observatory; http://www.ukso.org/static-maps/soils-of-england-and-wales.html and Cranfield Soil and Agrifood Institute Soilscales map viewer
Geology	British Geological Survey (BGS) Onshore Geoindex; https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
Groundwater Source Protection Zones (SPZ)	
Mines and quarries	
Coal Authority Map	The Coal Authority website interactive mapping https://mapapps2.bgs.ac.uk/coalauthority/home.html
Historic Active Landfills and Waste Management Sites	Environment Agency (data.gov.uk) and Essex County Council & Groundsure Enviro Data Viewer https://www.groundsure.io/#
Statutory and Non-Statutory Environmental Designations	DEFRA Multi-Agency Geographic Information for the Countryside (MAGIC) https://magic.defra.gov.uk/magicmap.aspx
Locally Important Geological Sites	GeoEssex records relating to Local Geological Sites (LoGS) formerly Regionally Important Geological/Geomorphological Sites (RIGS). http://www.geoessex.org.uk/
Radon	Public Health England: UK Radon Map
Unexploded Ordnance (UXO)	Zetica UXO: Risk Maps
Land use	Google Earth aerial photography
Historical Maps	Historical Ordnance Survey maps (where available). https://www.oldmapsonline.org/
Minerals Local Plan (adopted July 2014) and; Essex and Southend on Sea Waste Local Plan (adopted July 2017)	Essex County Council https://www.essex.gov.uk/minerals-waste-planning-policy/waste-local-plan

5.4.10 A site walkover survey of the study area was undertaken on the 13 September 2022 and 14 September 2022. This ground truthing survey was undertaken by SLR Consulting Ltd, access to the proposed OnSS search areas and ECC route was obtained on foot by Public Rights of Way and local roads.



5.4.11 The data sources have also included Envirocheck reports obtained for the OnSS search areas and the onshore ECC.

ASSESSMENT METHODOLOGY

- 5.4.1 There are no published guidelines or criteria for assessing and evaluating effects on ground conditions and land use within the context of an EIA. In the absence of this, the proposed assessment is based on a methodology derived from the Institute of Environmental Management and Assessment (IEMA) guidance, Design Manual for Roads and Bridges (2019) and the Land Contamination Risk Management (LCRM).
- 5.4.2 Professional judgement and a qualitative risk assessment methodology have been used to assess the findings in relation to each of these criteria to give an assessment of significance for each potential impact. Once the degree of impact and sensitivity has been assessed these are then combined to determine the likelihood of each potential overall effect occurring.
- 5.4.3 This approach provides a mechanism for identifying the areas where site specific mitigation measures will be required, in addition to embedded mitigation, and for identifying mitigation measures appropriate to the risk presented by the development proposals. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.
- 5.4.4 Volume 1, Chapter 3 EIA Methodology details the general impact assessment method, and the following sections describe more specifically the methodology used to assess the potential impacts of the project on ground conditions and land use.

5.5 ASSESSMENT CRITERIA AND ASSIGNMENT OF SIGNIFICANCE

SENSITIVITY

- 5.5.1 The approach for determining the significance of effects is a two stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts on those receptors. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. Unless stated otherwise the terms used to define sensitivity and magnitude are based on those described in the LA109 Geology and Soils methodology (DMRB, 2019) and A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022).
- 5.5.2 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which is set out in Table 5.4. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.
- 5.5.3 It should be noted that the sensitivity criteria adopted for land quality relating to contamination was based on the tolerance of the site to change i.e. that known contaminated sites will be more sensitive to the ground-breaking aspects of development, during the construction phase, than those areas where no contamination is present.



Table 5.4: Sensitivity/importance of the environment

Receptor sensitivity/ importance	Description	Receptor
High	<p>Receptor is high value and critical importance at a national or regional level. Receptor is vulnerable to impacts that may arise from the project and recoverability is long term and receptor has limited potential for substitution.</p>	<p>Geology:</p> <ul style="list-style-type: none"> > UNESCO Geoparks, Sites of Special Scientific Interest (SSSI) or Geological Conservation Review sites (GCR) with internationally important geomorphological or geological features; and > Special Area of Conservation (SAC), SSSI or GCR with nationally important geomorphological or geological features. <p>Soils:</p> <ul style="list-style-type: none"> > Soils supporting protected features within a European site and/ or UK designated site (e.g., UNESCO Geoparks, SPA, SAC SSSI or Areas of Outstanding Natural Beauty (AONB), Special Landscape Area, and GCR); and/ or > ALC Classes 1, 2 and 3a- Excellent to Good Quality agricultural land. <p>Contamination:</p> <ul style="list-style-type: none"> > Presence of regulatory determined contaminated land (Part 2A EPA designated). <p>Human:</p> <ul style="list-style-type: none"> > VE construction workers.
Medium	<p>Receptor is of moderate value with regional or local importance. Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability.</p>	<p>Geology:</p> <ul style="list-style-type: none"> > Regionally Important Geological Site (RIGS) or Local Geological Sites (LoGS). <p>Soils:</p> <ul style="list-style-type: none"> > Soils supporting protected or valued non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Site's, Sites of Nature Conservation Importance); and / or > ALC Classes 3b Moderate Land capable of producing a moderate range of crops. <p>Mineral Resources:</p>



Receptor sensitivity/ importance	Description	Receptor
		<ul style="list-style-type: none"> > Mineral Safeguarding Area (regionally important resource). Contamination: <ul style="list-style-type: none"> > Areas of potential concern identified by Local Authority under their statutory investigation of contaminated land (under Part 2A; EPA 1990). Human: <ul style="list-style-type: none"> > Off-site and nearby neighbours.
Low	Receptor is of low value with local or no importance. Receptor is not generally vulnerable to the impacts that may arise from the project and/or has a high recoverability.	Geology: <ul style="list-style-type: none"> > Locally important sites (e.g. non designated geological exposures, former quarry's / mining sites). Soils: <ul style="list-style-type: none"> > Soils supporting valued features within non-designated notable or priority habitats/landscapes; and > ALC Classes 4 and 5 Poor to Very Poor Quality– Improved grassland and rough grazing or Urban soils.
Negligible	Receptor is of negligible value with no importance. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability.	Geology: <ul style="list-style-type: none"> > Common geological features of limited use for knowledge/study. Soils: <ul style="list-style-type: none"> > Urban (Built-up or 'hard' uses). Contamination: <ul style="list-style-type: none"> > No areas of previously developed land with no areas of potential concern relating to contaminated land identified.

MAGNITUDE

5.5.4 The potential magnitude of impact would depend upon whether the potential effect would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential effect resulting from VE are also determining factors.

5.5.5 The following definitions apply to the time periods used in the magnitude assessment:



- > Long term: Greater than five years;
 - > Medium term: Two to five years; and
 - > Short term: Less than two years.
- 5.5.6 For the purposes of this assessment, construction related impacts that do not extend beyond the construction phase of the VE; a short-term magnitude will be assigned.
- 5.5.7 The criteria that have been used to assess the magnitude of impact are defined in Table 5.5. This approach uses the term “beneficial” for an advantageous or positive effect on an environmental resource or receptor or “adverse”, for a detrimental or negative effect on an environmental resource or receptor.

Table 5.5: Impact magnitude definitions

Magnitude	Description/ reason
High	Permanent loss of over 20 ha of BMV agricultural land (Grades 1, 2, and 3a) or more than 60% total regional BMV resource.
	Permanent loss of geological feature likely to cause exceedance of statutory objectives and/or breaches of legislation; severe damage to key characteristics, features or elements
	Contamination - significant contamination identified, contamination heavily restricts future use of land. (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major long-term improvement of attribute quality (Beneficial).
Medium	Permanent loss of between 5 – 20 ha of BMV agricultural land, or long term loss of more than 20ha of BMV land or more than 30% of the regional BMV resource.
	Partial loss of geological feature but not adversely affecting the overall integrity; partial loss of/damage to key characteristics, features or elements with/without exceedance of statutory objectives or with/without breaches of legislation.
	Contamination – Significant contamination could be present. Control/remediation measures are required to reduce risks to human health/make land suitable for intended use (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).



Low	<p>Permanent loss over less than 5 ha of BMV land, or long term loss of between 5 and 20 ha of BMV or more than 10% of the regional BMV resource. Short term loss of more than 20 ha of BMV land.</p> <p>Some measurable change to geological feature attributes, quality or vulnerability; reversible or minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.</p> <p>Contamination - Significant contamination is unlikely with a low risk to receptors. Best practice measures can be implemented to minimise risks (Adverse).</p>
	<p>Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).</p>
Negligible	<p>No discernible loss or detrimental alteration to one or more characteristics, features or elements; impact of insufficient magnitude to affect the overall use/integrity</p> <p>Contamination – no risks identified, no requirement for control measures to reduce risks to receptors or to make land suitable for intended use (Adverse).</p>
	<p>Very minor or no benefit to or positive addition of one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity (Beneficial).</p>

SIGNIFICANCE OF EFFECTS

- 5.5.8 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into level of significance as identified in Table 5.6.
- 5.5.9 Table 5.6 provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgment and interpretation. In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.
- 5.5.10 Effects of ‘**major**’ and ‘**moderate**’ significance are considered to be ‘significant’ in terms of the EIA Regulations. A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given.



Table 5.6: Matrix to determine effect significance

		Sensitivity				
		High	Medium	Low	Negligible	
Magnitude	Negative	High	Major	Major	Moderate	Minor
		Medium	Major	Moderate	Minor	Negligible
		Low	Moderate	Minor	Minor	Negligible
	Neutral	Negligible	Minor	Minor	Negligible	Negligible
		Low	Moderate	Minor	Minor	Negligible
	Beneficial	Medium	Major	Moderate	Minor	Negligible
		High	Major	Major	Moderate	Minor

5.6 UNCERTAINTY AND TECHNICAL DIFFICULTIES ENCOUNTERED

- 5.6.1 This preliminary assessment is based on design information and publicly available data obtained from the EA, Natural England, local authorities and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.
- 5.6.2 Overall a moderate level of certainty has been applied to the study. The information accessible in order to complete the assessment is considered sufficient to establish the comprehensive baseline, for the purposes of undertaking the EIA, within the VE onshore Ground Conditions and Land Use study area, therefore, there are no data limitations that would affect the conclusions of this assessment.
- 5.6.3 The Maximum Design Scenario (MDS) identified in Section 5.8 have been selected as that having the potential to result in the greatest impact on an identified receptor or receptor group. These scenarios have been selected from the details provided in the onshore project description (Volume 3, Chapter 1). Effects of greater significance are not predicted to arise should any other development scenario to that assessed here be taken forward in the final design scheme, within the assessed boundaries.

5.7 EXISTING ENVIRONMENT

- 5.7.1 This section describes the potential environmental receptors within the Ground Conditions and Land Use study area (Figure 5.1) where significant effects may arise as a result of the Project, based on the MDS. Observations from the baseline survey and desk study have been included where relevant.



5.7.2 The onshore ECC has been broken down into a number of Route Sections which describe the route in relation to significant local features. The Route Sections are listed in Table 5.7 Table 5.7 Route sections for the Onshore ECC. along with a short description defining the extent of each respective section.

Table 5.7 Route sections for the Onshore ECC.

Route Section – Onshore	Description
Route Section 1	This Route Section encompasses the landfall options at Holland Haven including beach access from Manor Way.
Route Section 2	This Route Section continues north from the Great Eastern Main Line spur to the west of Kirby Cross across agricultural fields towards the B1033 (Thorpe Road).
Route Section 3	This Route Section passes north of the B1033 (Thorpe Road) and the B1034 (Sneating Hall Lane) then continues north-west through agricultural land around Thorpe Le Soken crossing Landermere Road, Golden Lane towards the intersection of Thorpe Road/Swan Road.
Route Section 4	This Route Section continues northwards through agricultural fields to the east of Tendring village, passing to the east of Tendring Heath towards the A120 (Harwich Road).
Route Section 5	Route Section 5 encompasses the area to the north of the A120 to where the project would connect to the National Grid and includes the OnSS Search Areas.

GENERAL DESCRIPTION AND LAND USE

5.7.3 Land use within the ground conditions and land use study area is predominantly agricultural, situated between the coastal settlements of Holland-on-Sea, Frinton-on-Sea and Ardleigh.

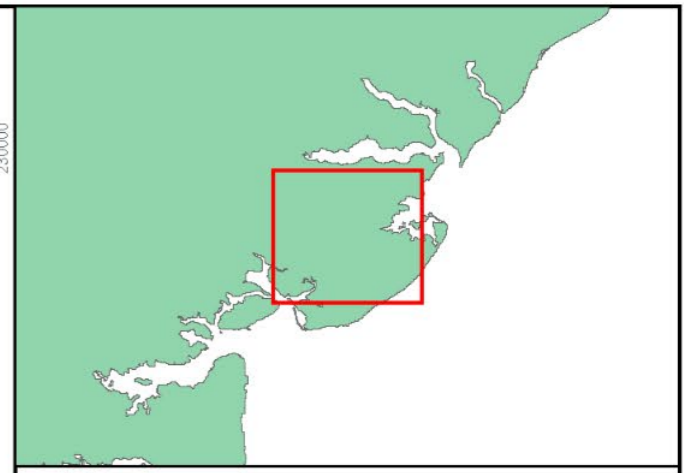
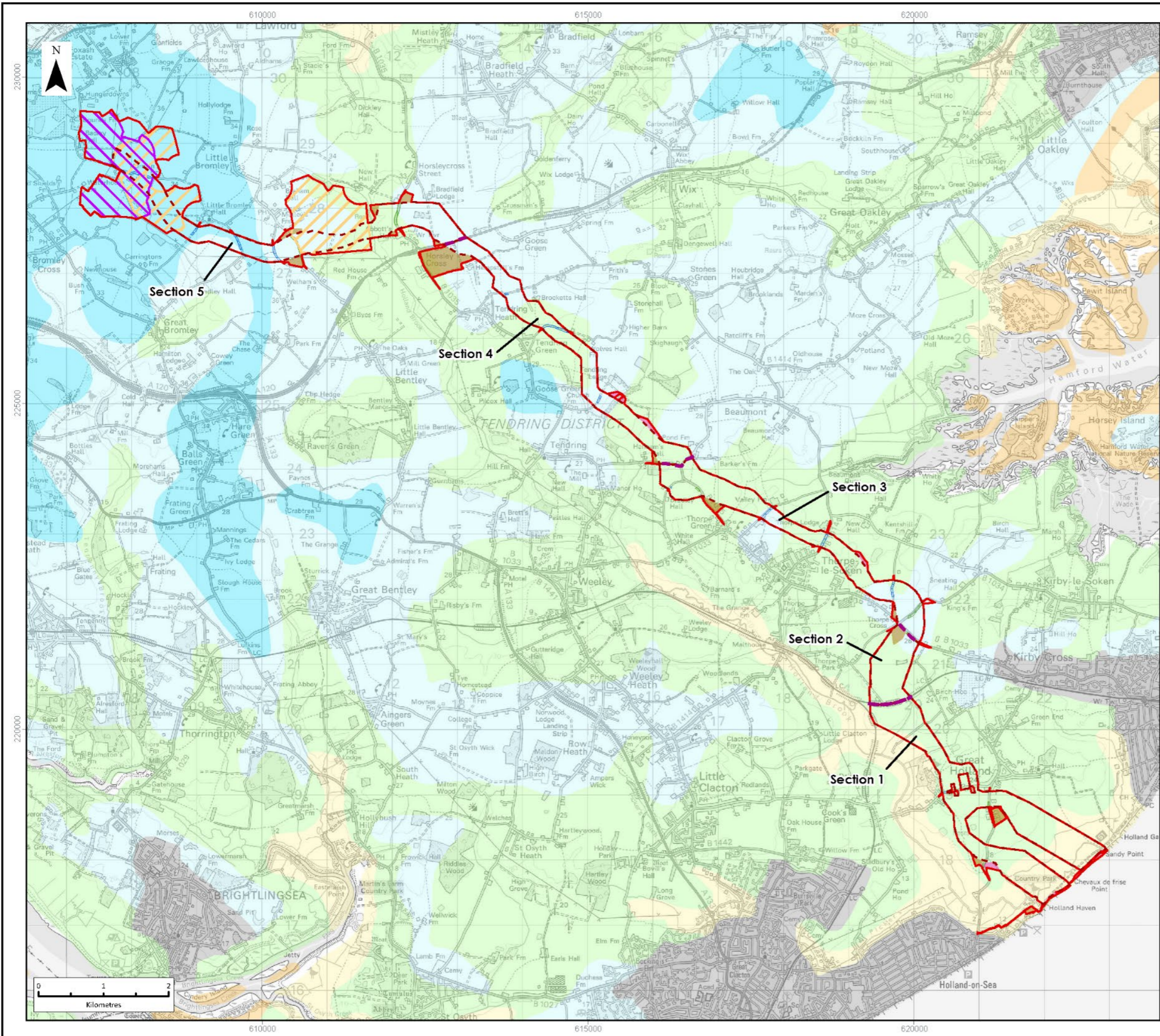
5.7.4 The coastal area of the proposed landfall is between the relatively populated towns of Holland-on-sea and Frinton-on-sea. There are pedestrian walkways adjacent to the coast in the form of a promenade. A water treatment plant is located to the north of Manor Lane. Natural England sites and Holland Haven Marshes SSSI extends parallel to the coast along the hydrology and flood risk study site. Frinton Golf Course is to the east of the site. Man-made sea-defences are present including Frinton promenade embankment, groyne and Princes Esplanade Wall.



- 5.7.5 The land to the north west between Great Holland and Ardleigh is predominantly agricultural, low lying land with a network of brooks and ditches. Hedgerows and woodland are limited to field boundaries. The A120 near Horsley Cross and a number of other B roads, minor roads and the Eastern Mainline railway spur to Walton-on-the-Naze also cross or are evident within the Onshore ECC study area.
- 5.7.6 Ground level data across the study area indicates that the land is relatively flat with shallow gradients. The lowest elevations are noted around Holland Brook and the coastal area of Holland Haven Marshes at around 5 m above ordnance datum (AOD). The majority of the study area lies between 10 and 20 m AOD.

SOIL & AGRICULTURAL LAND CLASSIFICATION

- 5.7.7 The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soils, further defining them as four soilscales:
- > Loamy and clayey soils (coastal flats with naturally high groundwater);
 - > Loamy and clayey soils (floodplain with naturally high groundwater);
 - > Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils; and
 - > Slightly acid loamy and clayey soils (impeded drainage).
- 5.7.8 The district comprises a significant proportion of high grade agricultural land, predominantly used for intensive farming. A review of the available ALC mapping has been undertaken, the land is categorised into one of the following grades:
- > Grade 1: excellent quality agricultural land;
 - > Grade 2: good quality agricultural land;
 - > Grade 3a: good to moderate quality agricultural land;
 - > Grade 3b: moderate quality agricultural land;
 - > Grade 4: poor quality agricultural land;
 - > Grade 5: very poor quality agricultural land; or
 - > Urban.
- 5.7.9 The published ALC mapping indicates where Grade 3 may be present, but does not differentiate between Grade 3a and 3b. Table 5.8 below provides a breakdown of the ALC for each section of the PEIR boundary. The ALC classification is also presented in Figure 5.2 and Figure 5.3..



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Non-Agricultural
- Urban

Data Source:
 © Crown copyright (and database rights) (2022) 0100031473 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

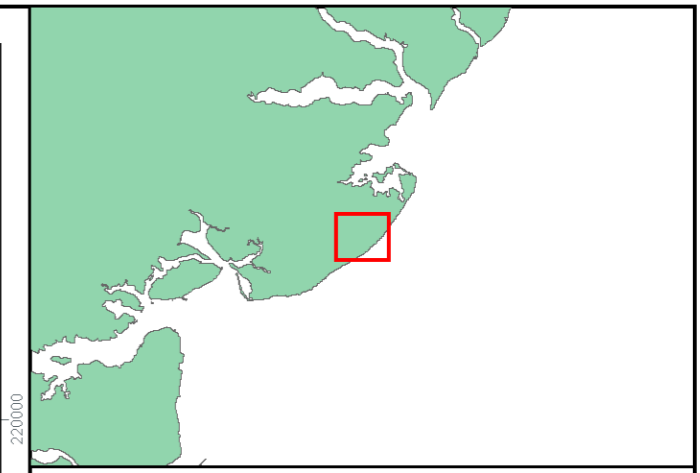
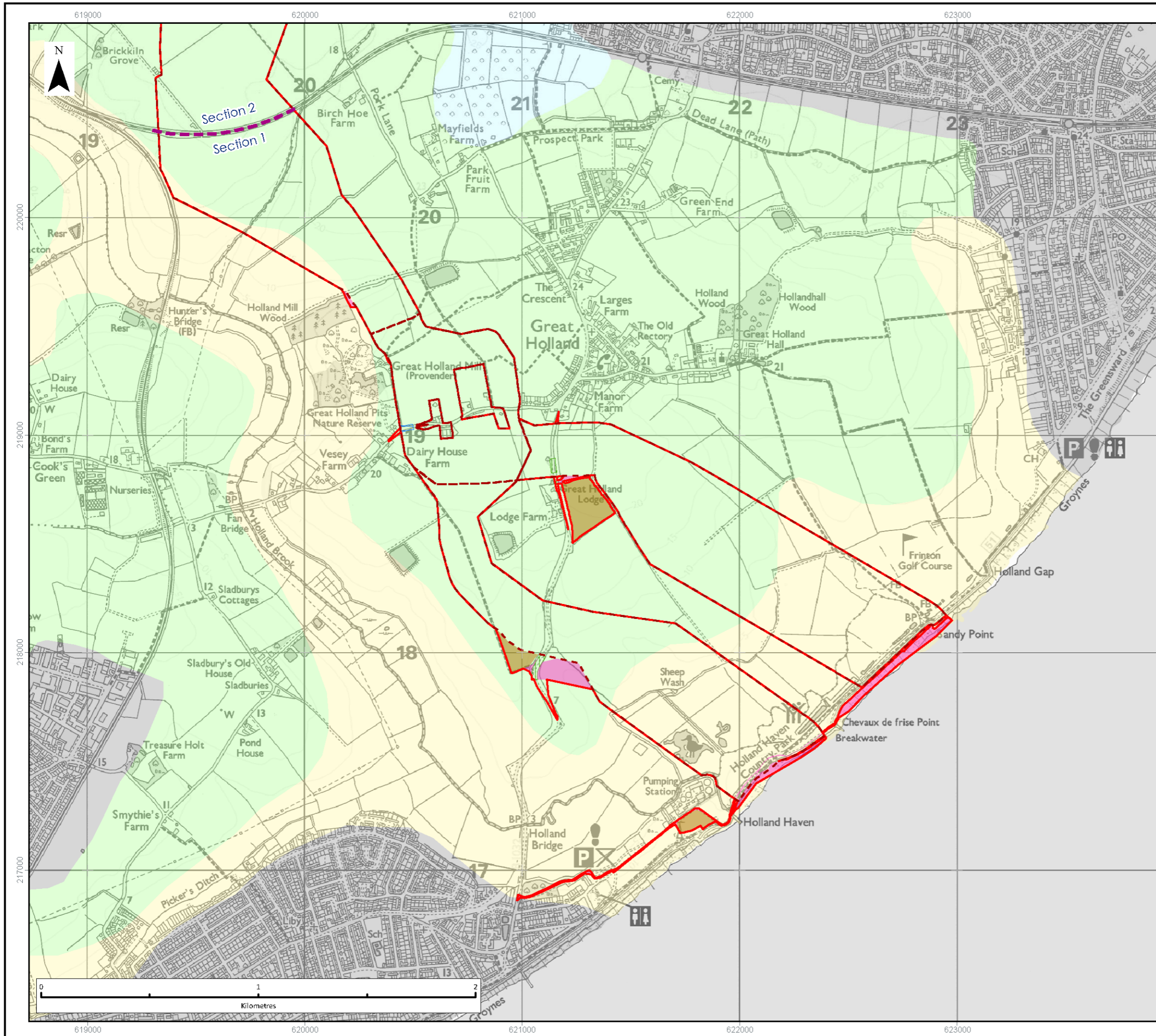
DRAWING TITLE:
 Agricultural Land Classification Overview

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.2

SCALE: 1:60,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 2
- Grade 3
- Grade 4
- Urban

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

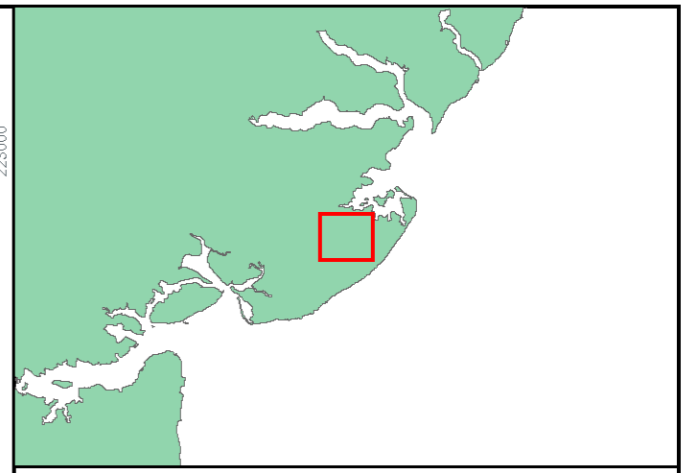
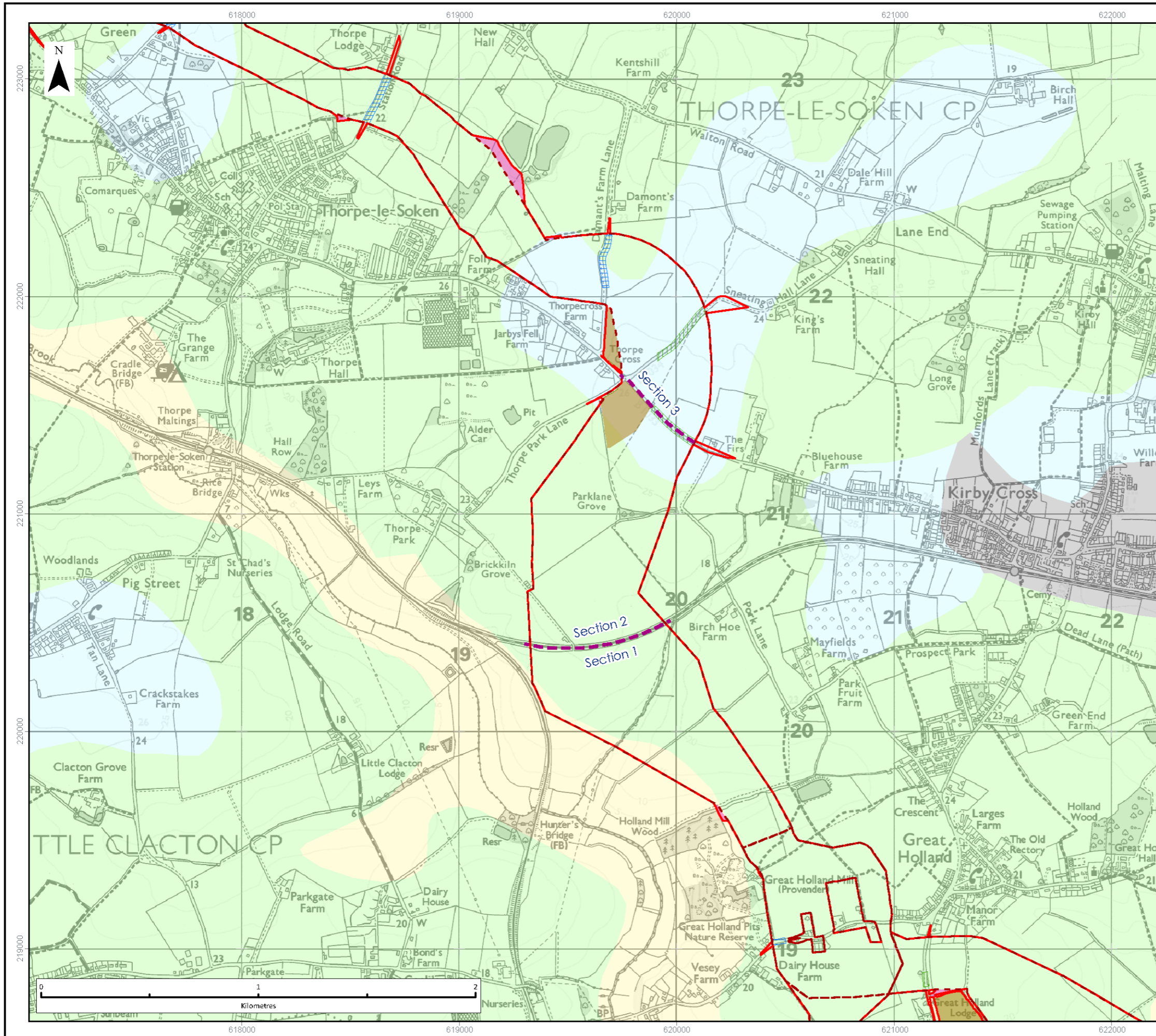
DRAWING TITLE:
 Agricultural Land Classification
 Section 1

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.3
 Page 1 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 2
- Grade 3
- Grade 4
- Urban

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

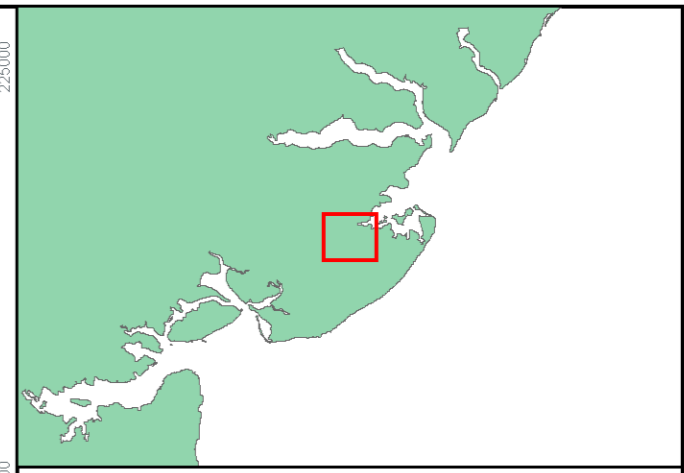
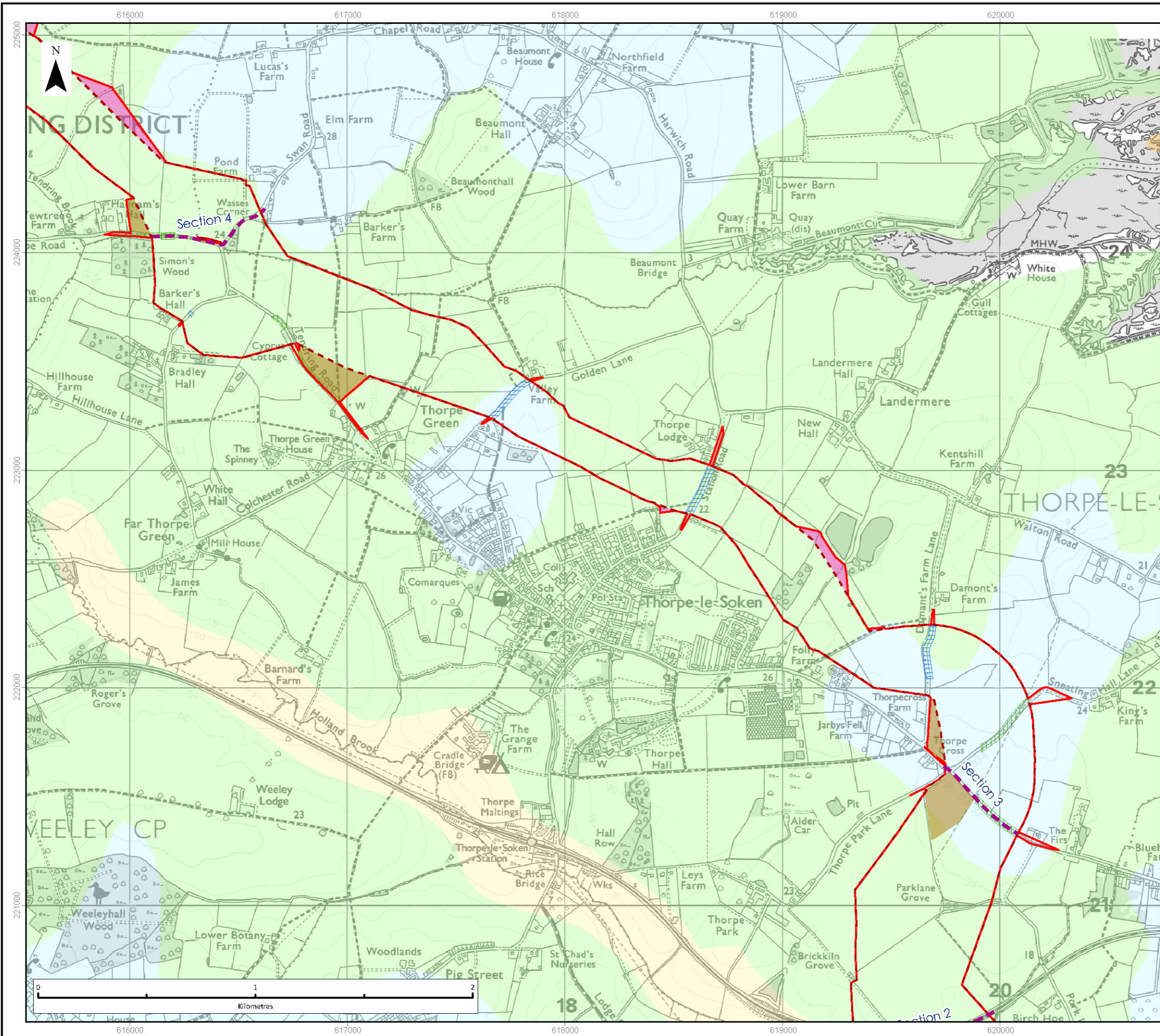
DRAWING TITLE:
 Agricultural Land Classification
 Section 2

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.3
 Page 2 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 2
- Grade 3
- Grade 4
- Non-Agricultural

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

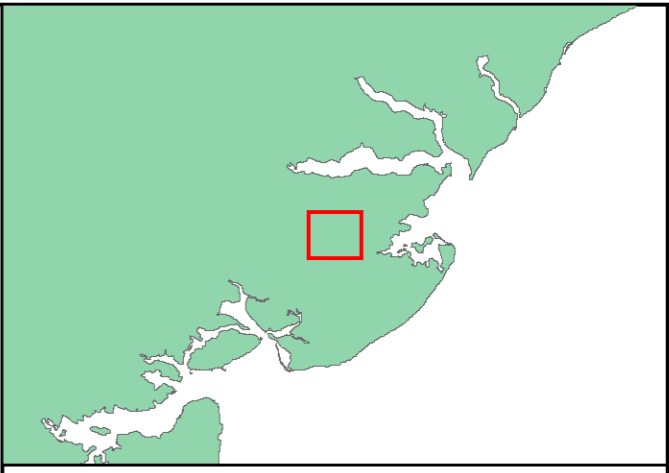
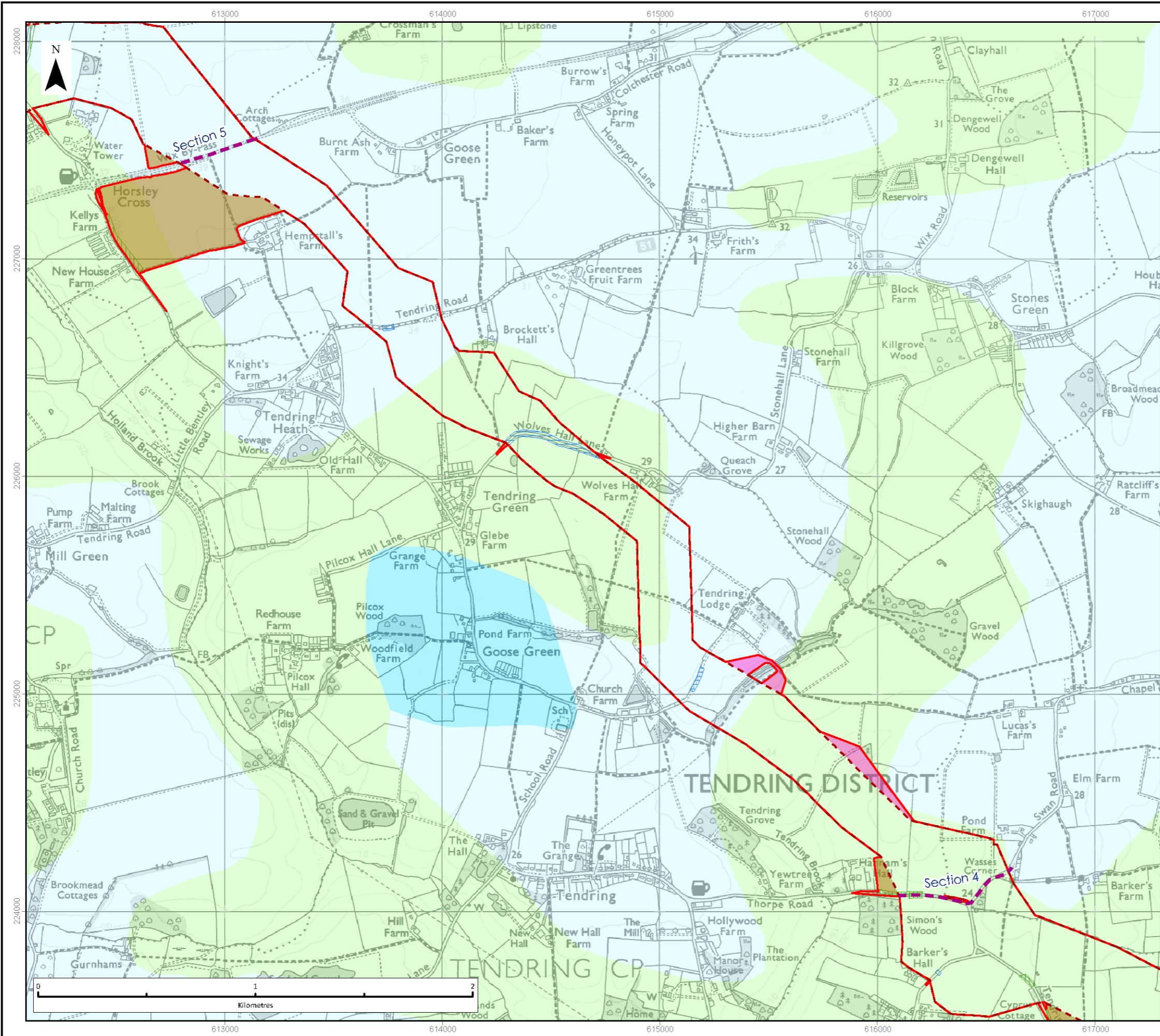
PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Agricultural Land Classification
 Section 3

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.3
 Page 3 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3

Data Source:
 © Crown copyright (and database rights) (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

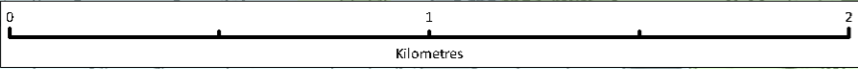
PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

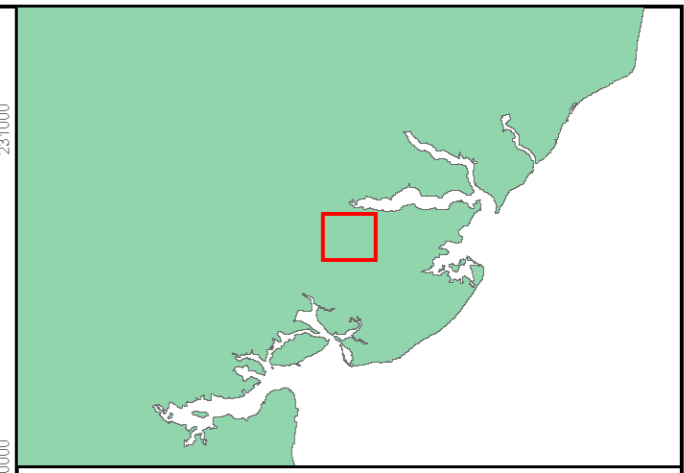
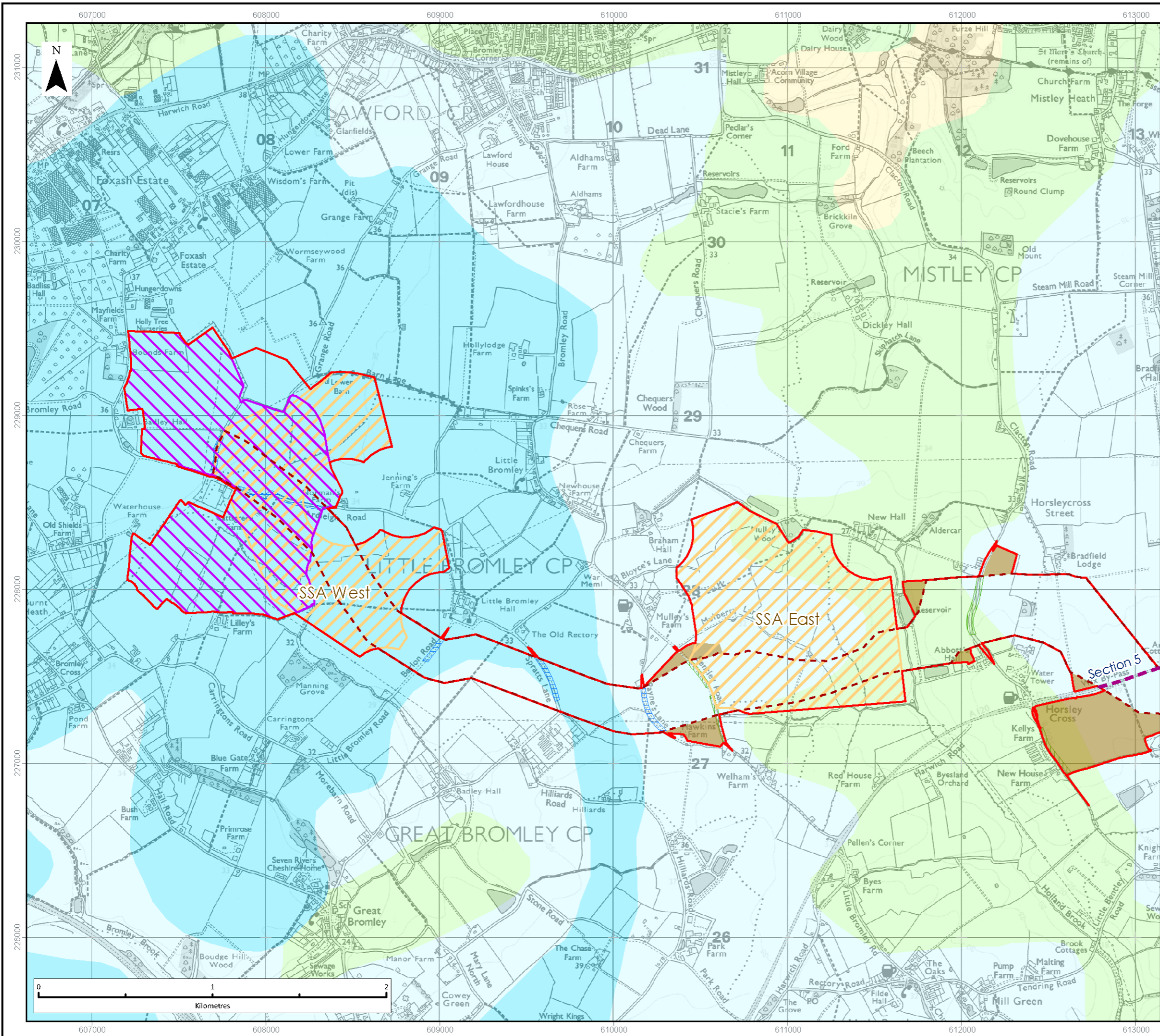
DRAWING TITLE:
 Agricultural Land Classification
 Section 4

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.3
 Page 4 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 4

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Agricultural Land Classification
 Section 5

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.3
 Page 5 of 5

SCALE: 1:22,500 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





Table 5.8: Agricultural Land Classification

Route Section -Onshore	Agricultural Land Quality
Route Section 1	Grade 3 – 175.45 ha, 67.46% Grade 4 – 84.52 ha, 32.50% Urban – 0.12 ha, 0.04%
Route Section 2	Grade 2 – 9.89 ha, 16.10% Grade 3 – 51.56 ha, 83.90%
Route Section 3	Grade 2 – 120.20 ha, 71.69% Grade 3 – 47.47 ha, 28.31%
Route Section 4	Grade 2 – 71.96 ha, 44.71% Grade 3 – 88.98 ha, 55.29%
Route Section 5 – Onshore Cable Route	Grade 1 – 125.33 ha, 57.27% Grade 2 – 71.83 ha, 32.83% Grade 3 – 21.66 ha, 9.90%
Route Section 5 – OnSS Search Areas	<u>SSA East</u> Grade 2 – 72.17 ha, 62.66% Grade 3 – 43.00 ha, 37.43% <u>SSA West</u> Grade 1 – 105 ha, 100%

5.7.10 The Table 5.9 below presents the BMV ALC grades as a percentage of the total BMV grade land within Essex. Grade 4, 5 and urban land have not been included in the table below.



Table 5.9 Percentage of BMV Resource within Essex

ALC Grade (BMV only)	Percentage of ALC grade land within the PEIR Boundary	ALC grade land within the PEIR Boundary as a percentage of the total ALC grade land in Essex
Grade 1	21.16	3.61
Grade 2	25.11	0.18
Grade 3 (undifferentiated)	45.95	0.35

AGRI-ENVIRONMENTAL SCHEMES

5.7.11 Landowners within the PEIR boundary are potentially part of two types of stewardship schemes Environmental Stewardship Schemes (ESS) and Countryside Stewardship Schemes (CSS). Further consideration will be required when the route is refined for ES.

5.7.12 ESS provide funding and advice to farmers, tenants and other land managers to encourage effective environmental management of land.

5.7.13 There are three levels to the scheme:

- > Entry Level Stewardship (ELS) – includes Uplands ELS (UELS): simple and effective land management agreements with priority options;
- > Organic (OELS) – includes Uplands OELS: organic and conventional mixed farming agreements; and
- > Higher Level Stewardship (HLS): more complex types of management and agreements tailored to local circumstances.

5.7.14 Mapping information obtained from the Natural England datasets has identified that Entry Level plus Higher Level Stewardship within the PEIR boundary. The OnSS search areas and PEIR boundary for Route Sections 2 - 5 are not on land subject to any ESS, however the PEIR boundary for Route Section 1 crosses land with Entry Level plus Higher Level Stewardship Scheme agreements (137.15 ha).

5.7.15 CSS provide funding to farmers and land managers to improve their local environment. CS supports a range of enhanced environmental outcomes from restoring wildlife habitats and creating woodlands, to managing flood risk. Similarly to ESS CSS has several aspects to the scheme:

- > Mid-Tier;
- > Higher Tier; and
- > Capital Grants.



- 5.7.16 Mapping information obtained from the Natural England datasets has identified that Countryside Stewardship Schemes within the PEIR boundary. There are no CSS within PEIR boundary for Route Section 2. Within Route Section 1 24.39 ha is situated on land subject to a Mid-Tier or Higher Tier CSS, similarly 67.53 ha within Section 3, 107.63 ha within Section 4 and 111.88 ha within Section 5 respectively.
- 5.7.17 The UK government has begun undertaking a reform of agricultural policy, this includes the transition to Environment Land Management Schemes (ELM) which started in 2022 and will eventually replace ESS and CSS. There will be three new schemes:
- > Sustainable Farming Incentive;
 - > Countryside Stewardship; and
 - > Landscape Recovery

STATUTORY AND NON-STATUTORY DESIGNATED SITES

- 5.7.18 Mapping information obtained from the DEFRA MAGIC website identified limited designations, such as SSSI and LoGS within the study area. No SAC and no RAMSAR sites are located within the study area.
- 5.7.19 The designations relevant to Ground Conditions and Land Use within the study area are shown on Figure 5.4, listed and described below:
- > Route Section 1:
 - > Holland on Sea Cliff SSSI – This is located about 250 m to the south of a VE Off Route Haul Road, on the coast east of The Esplanade, Holland on Sea. The housing of east of the B1032 separates the SSSI from the proposed VE haul road. This SSSI is cited for the gravel in the cliff at Holland-on-Sea5. dates from just before and just after the Thames was diverted and contains important information about the evolution of the Thames and its tributaries during the Ice Age; and
 - > Great Holland Pits Nature Reserve LoGS – This is recorded as a ‘potential’ LoGS. This is located near the western boundary of VE, between 5 to 45 m west of VE, north of Little Clacton Road. Noted for being a former gravel pit in the Cooks Green Gravel, laid down by the Thames-Medway river. The site is now an Essex Wildlife Trust nature reserve. The site is known to have been backfilled post gravel excavation (see Section 1.8.29), it is reported that there are no current exposures of gravel.

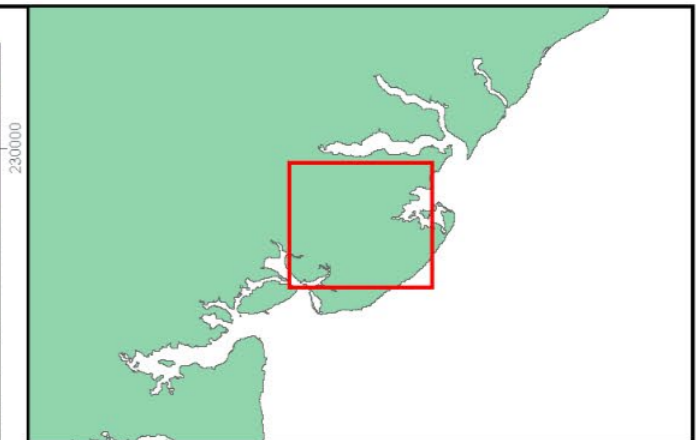
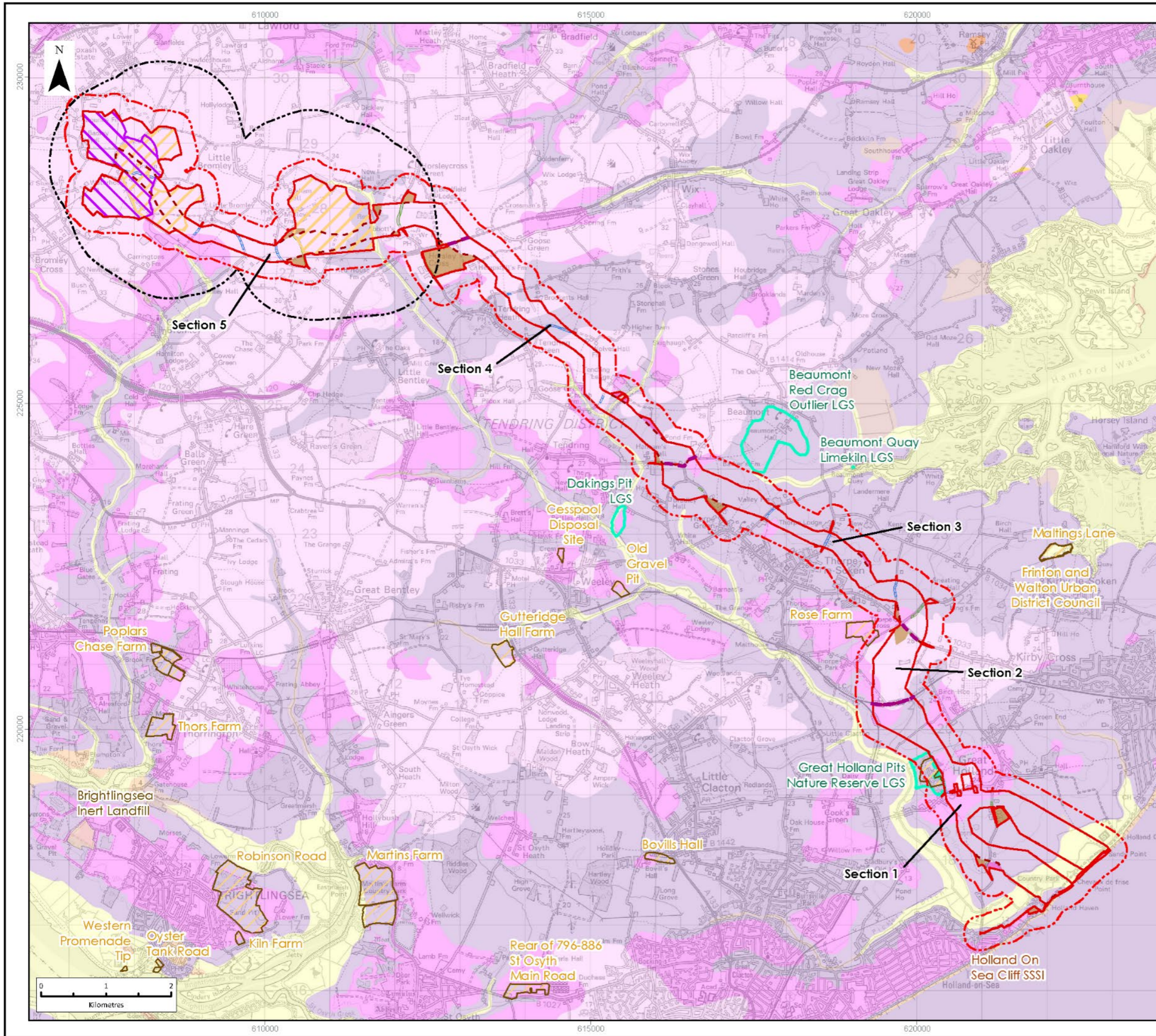
5.7.20 There are no designated sites within Route Sections 2, 3, 4 or 5.

5.7.21 There are also two sites designated for geological, interests that are present within 1 km of the onshore ECC route, which are described below. It is considered that the distance between VE and the designated site provides geographical separation. Therefore, the designated sites are beyond the zone of influence from VE and are not considered further within this assessment:

- > Route Section 3:



- > **Beaumont Red Crag Outlier LoGS** – This is a ‘notified’ LoGS. This is located 275 m to the east of VE, situated between the settlements of Beaumont and Thorpe-le-Soken. The site is noted for the high ground at Beaumont Hall that is capped with an outlier of shelly Red Crag which is visible in rabbit burrows and on footpaths. The Red Crag in this part of Essex contains loose sand with abundant fossil shells and fossils of marine animals. Site is private land and accessible only on public footpaths; and
- > **Daking Pit LoGS** - This is recorded as a ‘potential’ LoGS. This site is located about 680 m to the east of VE, north west of the settlement of Weeley. This site is a former gravel pit in the Cooks Green Gravel. A rich assemblage of Palaeolithic artefacts has been recovered from this former pit. There is no current exposure of the gravel and the land is in private ownership.



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Onshore Substation Areas of Search 1 km Buffer
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Holland on Sea Cliff Site of Special Scientific Interest (SSSI)
- Local Geological Site (LGS)
- Authorised Landfill Site
- Historic Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright [and database rights] (2022) 0100031473 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Superficial Geology Overview

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.4

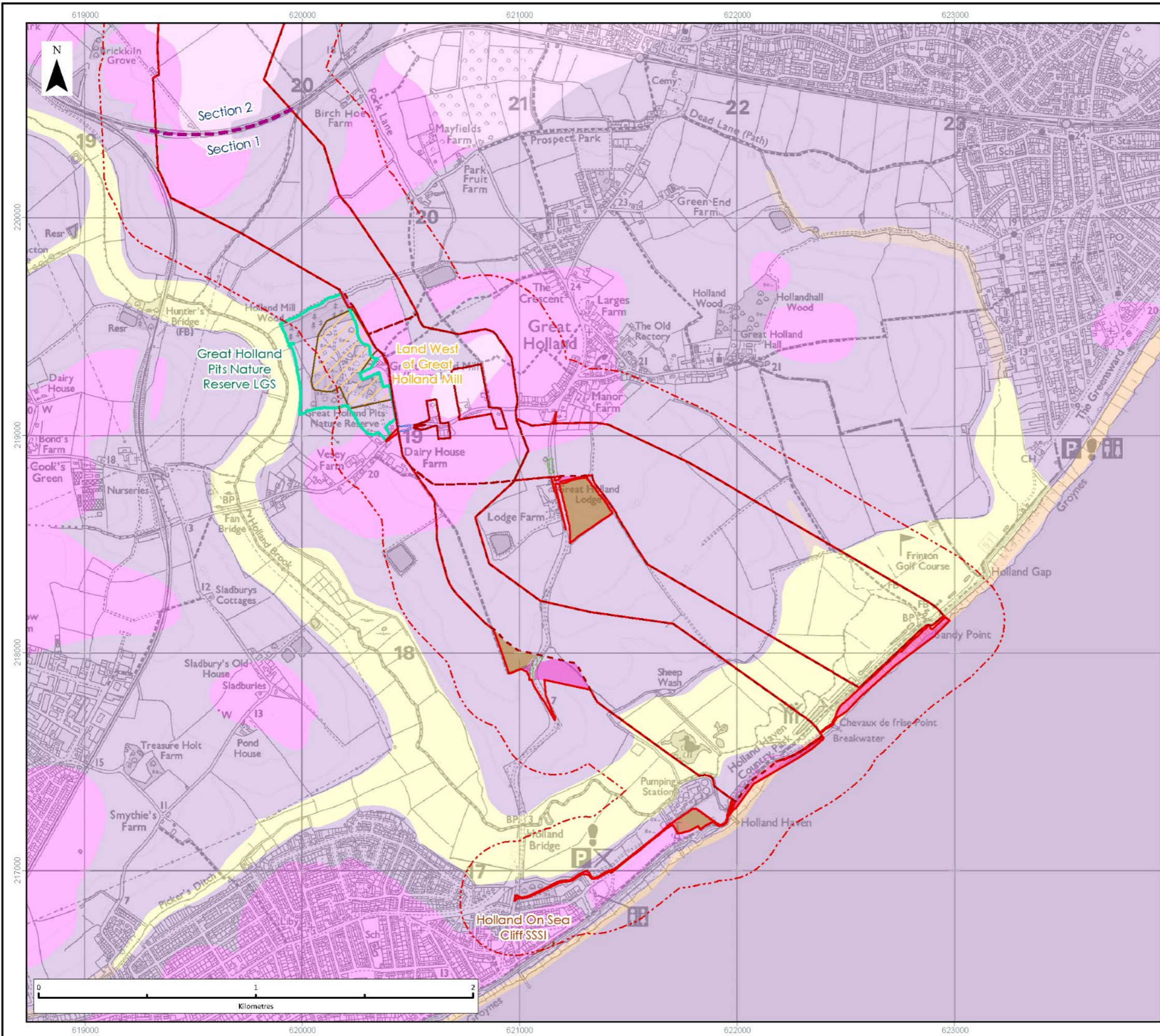
SCALE: 1:60,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid.





SUPERFICIAL DEPOSITS

- 5.7.22 British Geological Survey (BGS) mapping indicates that superficial deposits differ across the area and are absent across some parts of the route and bedrock is mapped as surface. BGS Borehole records indicate that where present, significant thicknesses of superficial deposits may be present along the proposed route.
- 5.7.23 Where superficial deposits are mapped the proposed route crosses over Storm Beach Deposits and Alluvium where it landfalls. Further inland the route crosses over Cover Sands and which are underlain by the Kesgrave Catchment Subgroup.
- 5.7.24 From examination of the geological map 1:50,000 Series Solid and Drift Geology Map England and Wales, Sheet 224 & 242 - Colchester and Brightlingsea, the following deposits are evident (as shown on Figure 5.5):
- > Storm Beach Deposits - (gravels, cobbles and boulders) restricted in width to the present beach areas and extending several kilometres parallel to the coast;
 - > Alluvium – unconsolidated clays, silts, sand and gravels deposited by the Holland Brook and other streams;
 - > Cover Sand – aeolian blanket deposits of clay, silt and sands over lowland areas; and
 - > Kesgrave Catchment Subgroup – sands and gravels deposited by glacial meltwater.



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Holland on Sea Cliff Site of Special Scientific Interest (SSSI)
- Local Geological Site (LGS)
- Historic Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

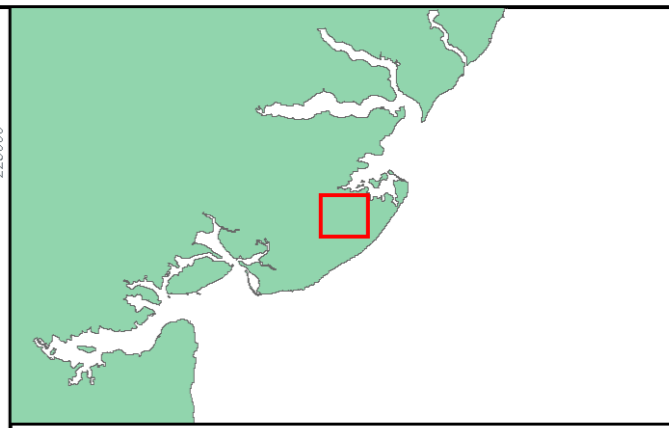
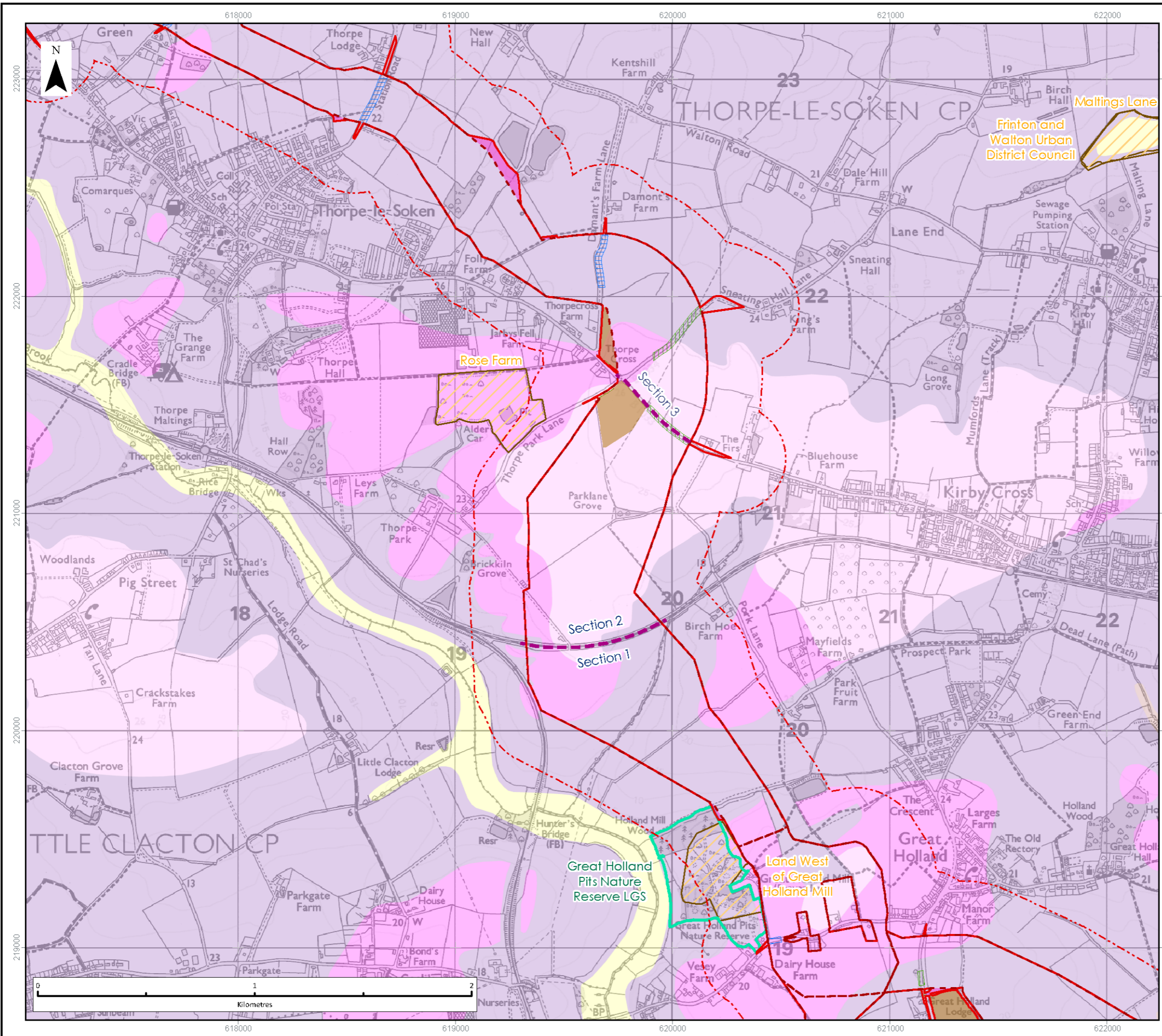
DRAWING TITLE:
 Superficial Geology
 Section 1

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.5
 Page 1 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Local Geological Site (LGS)
- Historic Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

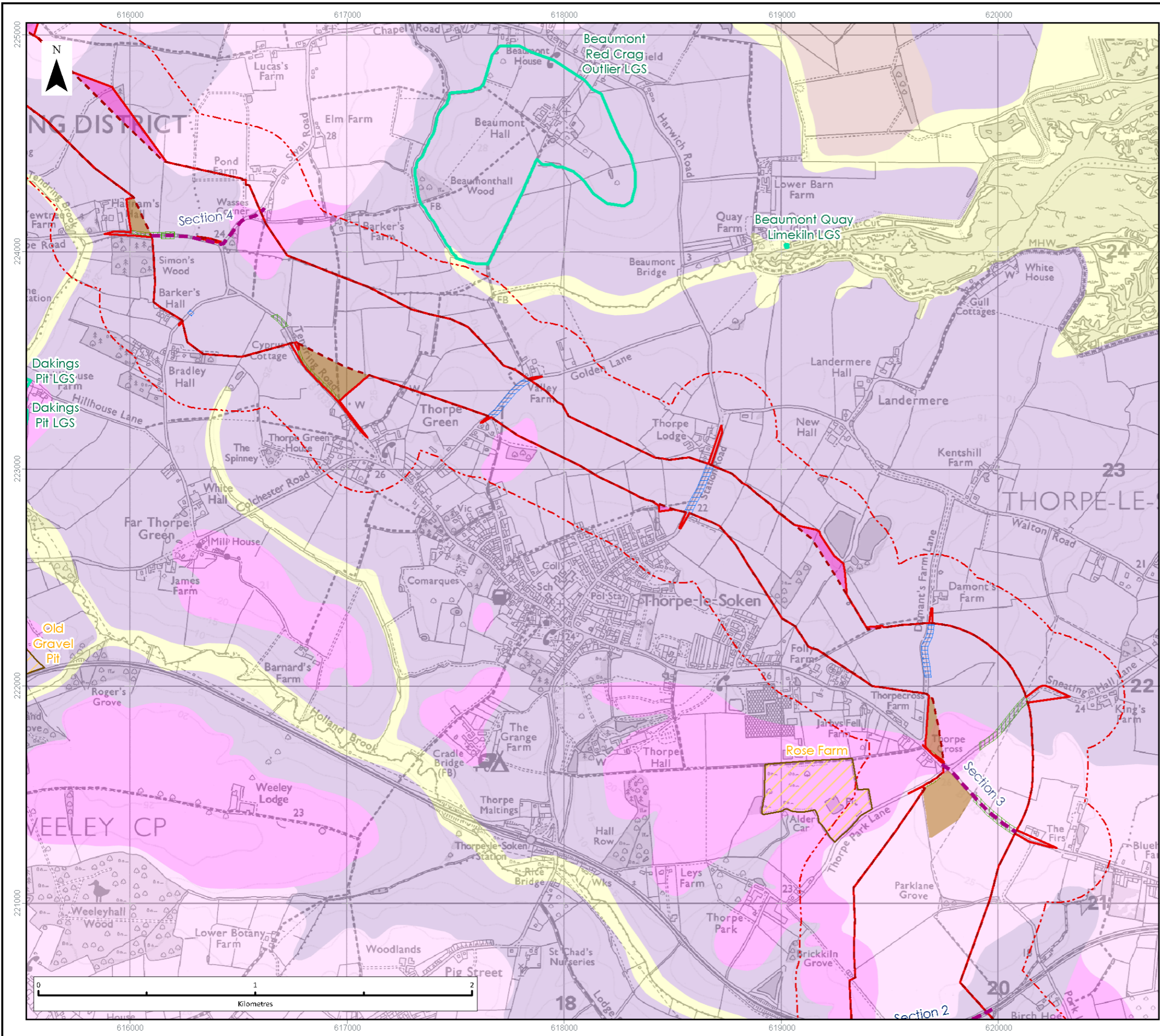
DRAWING TITLE:
 Superficial Geology
 Section 2

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.5
 Page 2 of 5

SCALE: 1:18,000	PLOT SIZE: A3	DATUM: OSGB 1936	PROJECTION: British National Grid
-----------------	---------------	------------------	-----------------------------------





LEGEND

- Onshore Red Line Boundary
- - - Onshore Red Line Boundary 250 m Buffer
- . . . Onshore Export Cable Route
- - - Onshore Cable Route Section
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Local Geological Site (LGS)
- Historic Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

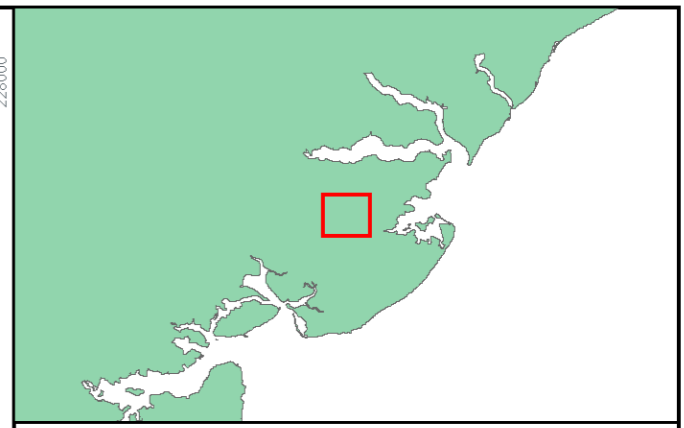
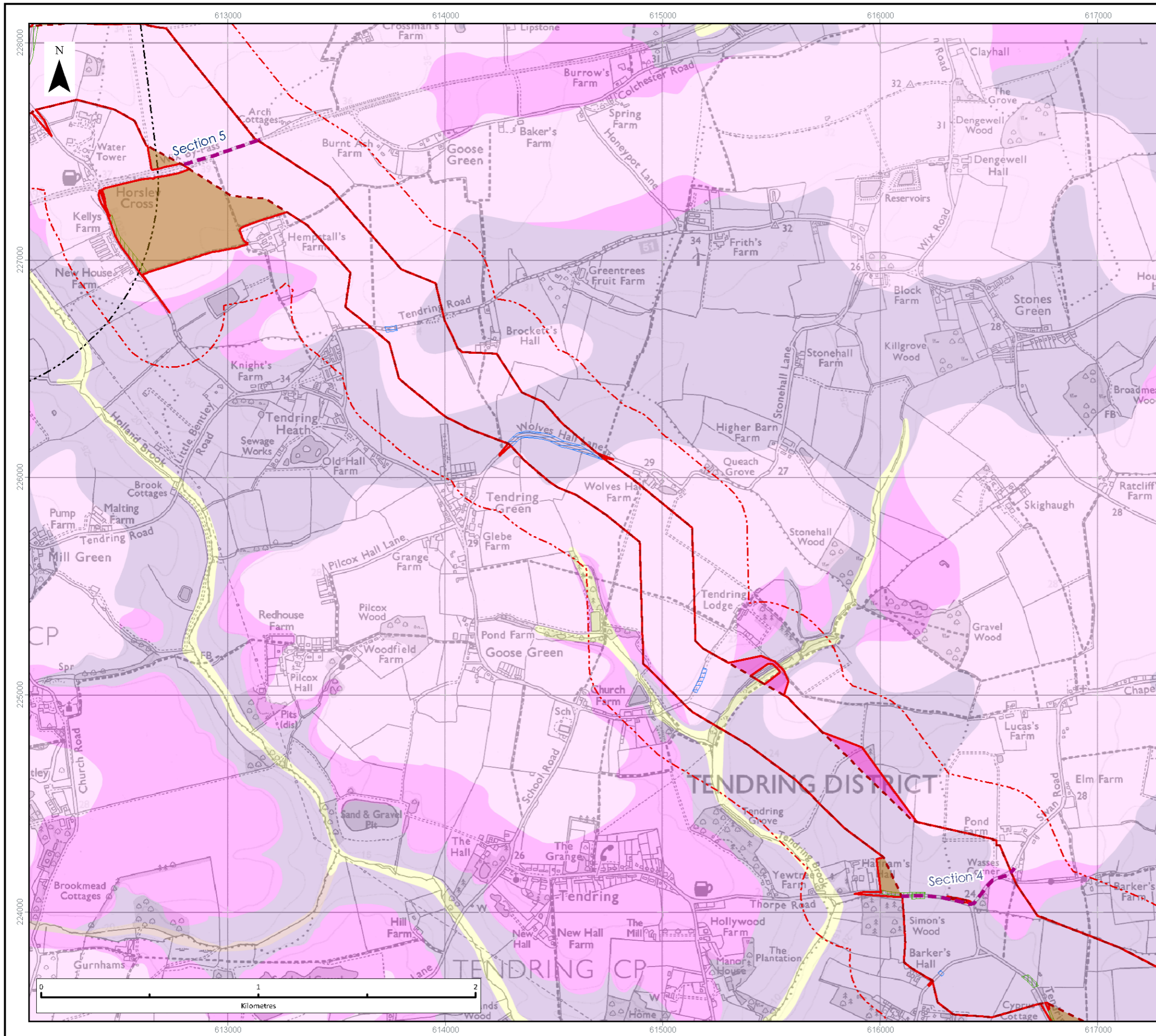
PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Superficial Geology
 Section 3

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.5
 Page 3 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section
- Onshore Substation Areas of Search 1 km Buffer
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright (and database rights) (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

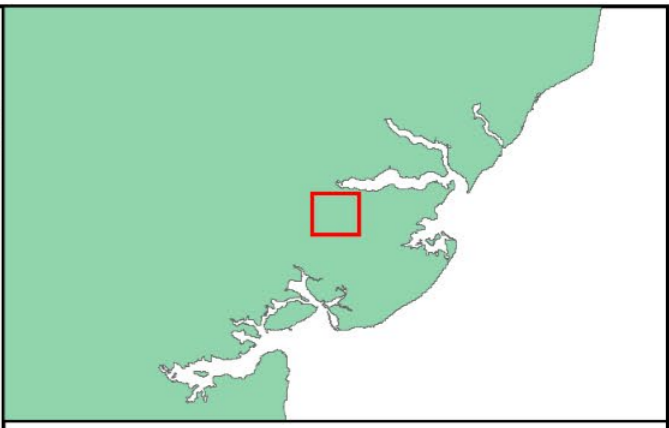
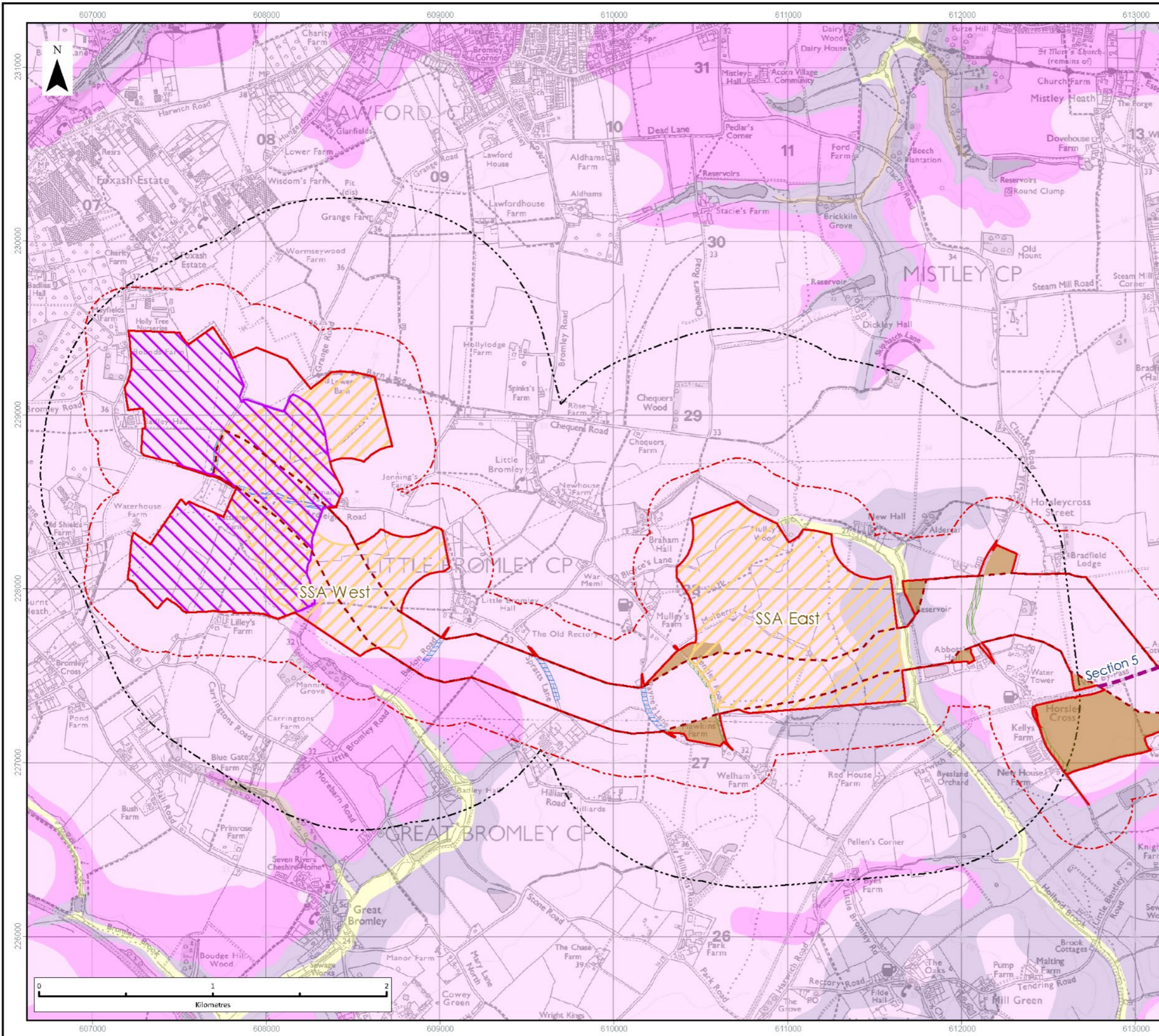
DRAWING TITLE:
 Superficial Geology
 Section 4

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.5
 Page 4 of 5

SCALE: 1:18,000 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid





LEGEND

- Onshore Red Line Boundary
- - - Onshore Red Line Boundary 250 m Buffer
- - - Onshore Export Cable Route
- Onshore Cable Route Section
- National Grid Area of Search
- Onshore Substation Areas of Search
- Onshore Substation Areas of Search 1 km Buffer
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

Data Source:
 © Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
 © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021.
 Superficial Geology data obtained via BGS WMS.
 British Geological Survey ©NERC. All Rights Reserved.
 © Environment Agency copyright and/or database right 2018. All rights reserved.
 Contains information © Local Authorities

PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Superficial Geology
 Section 5

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:
 FIGURE 5.5
 Page 5 of 5

SCALE: 1:22,500 PLOT SIZE: A3 DATUM: OSGB 1936 PROJECTION: British National Grid



5.7.25 There are two geological designations, the Holland on Sea Cliff SSSI and Great Holland Pits Nature Reserve, associated with the superficial geology in the study area. However, the superficial deposits within the study area and environs are widespread throughout Essex and Suffolk and of limited use for knowledge.

Table 5.10: Superficial Geology

Route Section – Onshore	Superficial Geology
Route Section 1	Storm Beach Deposits, Alluvium and Kesgrave Catchment Subgroup.
Route Section 2	Cover Sand and Kesgrave Catchment Subgroup.
Route Section 3	Cover Sand and Kesgrave Catchment Subgroup. Bedrock mapped at surface across most of the section.
Route Section 4	Alluvium, Cover Sand and Kesgrave Catchment Subgroup.
Route Section 5	Alluvium, Cover Sand and Kesgrave Catchment Subgroup.

BEDROCK GEOLOGY

5.7.26 BGS data shown on Figure 5.6 indicates the bedrock geology is consistent across the study area; the area is underlain by Thames Group (clay, silt and sands) of Palaeogene age. The unit is of Ypresian Age and formed 55.8-48.6 million years ago within the Palaeogene period. The Thames Group was deposited in environments ranging from marine shoreface ranging out to outer marine shelf. The published data indicates that the London Clay Formation is the Thames Group strata present beneath the site.

5.7.27 There are no geological designations or important sites associated with the solid geology in the study area.



AQUIFER PROPERTIES AND GROUNDWATER SOURCE PROTECTION ZONES

- 5.7.28 The hydrological and hydrogeological setting of the onshore study area are described in detail within Volume 3, Chapter 6: Hydrology and Flood Risk.
- 5.7.29 The superficial deposits are of low sensitivity, comprising Secondary (A) and Secondary (B) aquifers and unproductive strata. The bedrock Thames Group are impermeable, deposits that have been classified as unproductive.
- 5.7.30 The Environment Agency has defined Source Protection Zones (SPZ) for potable groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones are determined by the time it would take for contamination or pollution to travel through the ground to reach a principal groundwater abstraction point.
- 5.7.31 There are no sensitive zones (i.e. SPZ1 or 2) within the study area. The land within and surrounding Route Section 5 northern half of Route Section 4 are located within a designated SPZ3. The Route Sections 1, 2 and 3 not located within an SPZ. Please refer to Volume 3, Chapter 6: Hydrology and Flood Risk for further details.

MINERAL SAFEGUARDING AREAS

- 5.7.32 'Safeguarding' is the process used in the planning system to ensure the protection of mineral resources from the risk of sterilisation from non-mineral development. Essex County Council have used a number of criteria to identify to develop MSAs that have highlight areas of geology that could constitute an economically viable resource.
- 5.7.33 The study area overlies several areas defined as being safeguarded for '*Sand and Gravel (Including Silica Sand)*' and is therefore subject to Policy S8 of the Essex MLP.
- 5.7.34 The MLP states that the definition of the safeguarded sand and gravel extent is "All glacial sand and gravel resources, glaciofluvial sand and gravel resources and river terrace deposits as identified from BGS mapping and other supplementary sources of evidence". These mineral safeguarded areas (MSA) therefore do not necessarily extend to the same extent as the mapped superficial deposits shown on the BGS mapping data.
- 5.7.35 An area of approximately 294 ha is designated as a MSA within the Route Sections 1 to 5. Within the SSA East and SSA West approximately 47 ha and 105 ha respectively are designated as a MSA for sand and gravel. Overall, this equates to approximately 41% of the PEIR boundary designated as an MSA.
- 5.7.36 Table 5.11 shows the MSA coverage for VE within the PEIR boundary.



Table 5.11 Mineral Safeguarding Areas within the VE PEIR Boundary

Route Section – Onshore	Approximate Area (ha)
Route Section 1	74.0
Route Section 2	4.0
Route Section 3	None
Route Section 4	25.0
Route Section 5	191.0
SSA East	47.0
SSA West	105.0

HISTORICAL MINING

5.7.37 The study area, according to the Coal Authority website interactive mapping, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.

5.7.38 An assessment of the BGS recorded mineral sites data indicates that no active quarry workings are present within the study area. There are no ceased workings within Route Sections 2, 3 or 4. There are however historic ceased gravel pits recorded within:

- > Route Section 1:
 - > Holland Gravel Pit;
 - > Great Holland Mill Gravel Pit; and
 - > Hodgnelles Farm Gravel Pit;
- > Route Section 5:
 - > On the 1875 historic mapping a very small gravel pit (approximately 10 m²) within agricultural fields in the northwest corner of SSA East alongside a track it noted. This is thought to have been backfilled.¹

¹ Mott Macdonald (2022), Five Estuaries Wind Farm Onshore Substation Geotechnical and Geo-environmental Desk Study - S27



5.7.39 The historic quarry workings are small scale gravel pits with a limited extent. On this basis, potential impacts on the proposed development arising from historical mining is scoped out of the subsequent construction or operational assessment as there is no pathway between the mining and the development.

HISTORICAL PAST USE AND CONTAMINATED LAND

5.7.40 The 1:10,000 scale historical maps for the study area have been reviewed. In general, these show that the study area has been predominantly under agricultural use, with scattered settlements, from the 1800s to the present day.

5.7.41 Although limited evidence of potentially contaminative land uses has been identified within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is considered low.

5.7.42 There are no active petrol stations or garages within the PEIR study area. Satellite imagery of the study area, in particular urban sections from the last 25 years indicate no presence of potentially contaminative activities such as heavy industry, petrol stations or garages.

5.7.43 The Environment Agency and Essex County Council websites together with Envirocheck reports were consulted for the presence of Waste Management Sites (authorised and historic) and waste related activities. The search identified no waste sites within the study area.

5.7.44 The Environment Agency website was consulted for the presence of landfills (authorised and historic). There are no active landfill sites within the study area. However, the search identified two historic landfills lie within the study area;

> Route Section 1:

- > The historic landfill within the Great Holland Mill gravel pit on land west of Great Holland, directly adjacent to the PEIR RLB boundary. This site is now Great Holland Pits Nature Reserve owned by Essex Wildlife Trust.

> Route Section 2:

- > The historic landfill within the Thorpe-le-Soken gravel pit, on land at Rose Farm. The southern part of the site lies within the 250 m buffer zone of the RLB. This was a licensed industrial landfill between 1978 to 1991 for inert material.

5.7.45 The former landfills are shown on Figure 5.4 and Figure 5.5 and are considered to present a very low risk given the nature of the fill material (inert).

5.7.46 The Envirocheck reports have indicated no historical pollution incidents relevant to this ground conditions and land use chapter.



UNEXPLODED ORDNANCE

5.7.47 The Zetica UXO mapping indicates the potential for Unexploded Ordnance (UXO) to be present as a result of World War Two (WWII) bombing. A review of areas impacted by UXO has been undertaken to consider whether the onshore infrastructure associated with VE has the potential to be impacted by UXO.

- > Route Section 1:
 - > The coastal area and about 200 m inland including Holland Haven Country park are recorded as medium risk, while the remainder of Route Section 1 is generally recorded as low risk.
- > Route Section 2, 3, and 4:
 - > These study areas are indicated as Low Risk.
- > Route Section 5 / SSA East and SSA West
 - > To the south of Little Bromley (south of SSA West) lies a temporary compound (TCC zone 10-A) which the UXO mapping indicates was recorded as a 'Strategic Target - Luftwaffe Target'. There are a number of other recorded targets in between Little Bentley and Great Bromley, however these are outside of the study area and considered to pose no risk to the development.

5.7.48 A Preliminary UXO Threat Assessment report was undertaken for SSA West as part of the Envirocheck Report. This report indicates that there are written records that Little Bromley and the surrounding fields were subject to bombing in WWII.

5.7.49 A Preliminary UXO Threat Assessment report was undertaken for SSA East within Route Section 5. This report indicates that RAF Great Bromley was located 725 m to the south west as well as several other defence features or bombing targets within 1 km of SSA West.

5.7.50 It is considered in both reports that the land within the PEIR boundary has remained undeveloped pre and post WWII and the proposed development is likely to extend into previously undisturbed land, therefore there is potential for an *"unplanned encounter with UXO to occur"*.

RADON GAS

5.7.51 The UK Radon Map indicates that the majority of the study area does not lie within a Radon Affected Area, as less than 1% of properties are at or above the above the National Radiological Protection Board (NRPB) action level.

5.7.52 Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576². Current advice confirms that protection measures would not be required for any permanently enclosed structure. This is therefore not considered further in this assessment of the Proposed Development.

² BSI Standards Publication 2013, BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)



5.8 KEY PARAMETERS FOR ASSESSMENT

- 5.8.1 The MDS criteria identified in Table 5.12 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These criteria have been selected from the details provided in the onshore project description (Volume 3, Chapter 1: Onshore Project Description).
- 5.8.2 Effects of greater significance are not predicted to arise should any other development scenario, based on details within the project design envelope, to that assessed here be taken forward in the final design scheme. The MDS takes into consideration designed-in mitigation as described in Table 5.12.

Table 5.12: Maximum design scenario for the project alone

Potential effect	Maximum adverse scenario assessed	Justification
Construction		
Impact 1: Short term risks to construction workers during development of landfall, OnSS and onshore cable routes	<p>Cables will be installed directly or in ducts, with installation undertaken in sections. The cables will be installed in one trench per circuit (maximum of 4 trenches for up to 3 circuits), with each trench up to 3.5 m wide and up to 2 m deep.</p> <p>Eight TCC locations along the onshore ECC.</p>	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to ground that may have potential contamination.
Impact 2: risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes	<p>The OnSS will include the construction footprint of the substation infrastructure and development platform (including landscaping). Permanent area of the OnSS footprint assumes an Air Insulated Switchgear (AIS) substation which has the greater footprint of 280 m x 210 m, plus an operational access road. Two potential substation search areas are currently included (SSA East and SSA West) in the assessment.</p> <p>TJB maximum size 30 m x 80 m.</p> <p>HDD (or alternative trenchless crossing technique) crossings required for landfall; larger surface watercourses; key roads; and some utility crossings. The maximum HDD depth will be up to 20 m.</p>	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance impact on offsite human receptors
Impact 3: construction phase	As above for Impact 2.	The MDS includes the maximum development



Potential effect	Maximum adverse scenario assessed	Justification
impacts upon soil/land quality		footprint (temporary and permanent) and therefore the largest possible area of disturbance to soil and/or land quality.
Impact 4: Sterilisation of mineral deposits	As above for Impact 2.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance/ sterilisation of safeguarded minerals.
Impact 5: Risk from unexploded ordnance to construction workers and nearby residents	Potential identification or exploration or UXO within the two OnSS search areas currently included (SSA East and SSA West).	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to UXO.
Impact 6: Risk to environmental designations	As above for Impact 2.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to environmental designations.
Operation		
Impact 7: Loss of agricultural land during operation of underground cables	Permanent onshore cables will be buried (apart from joint bay access points).	The MDS includes the maximum development footprint (permanent) and therefore the largest possible area of loss to agricultural land.
Impact 8: Loss of agricultural land during operation of OnSS	Permanent area of the OnSS footprint assumes an Air Insulated Switchgear (AIS) substation which has the greater footprint of 280 m x 210 m, plus an operational access road. Two potential substation search areas are currently	The MDS includes the maximum development footprint (permanent) and therefore the largest



Potential effect	Maximum adverse scenario assessed	Justification
	included (SSA East and SSA West) in the assessment.	possible area of loss to agricultural land.
Impact 9: Ingress and accumulation of hazardous ground gases	Interaction with unexpected contaminated land through cable positioning or HDD (or alternative trenchless crossing technique) crossings.	The MDS includes the maximum development footprint (permanent) and therefore the largest possible area of disturbance to agricultural land.
Impact 10: Structures and services laid in direct contact with contaminated soils and groundwater	Routine maintenance of the OnSS. Permanent onshore cables will be buried (apart from joint bay access points). Potential contaminants affecting the integrity of subsurface materials such as buried concrete and plastic service pipes.	The onshore ECC provides potential lateral pathways for contamination flow which could indirectly affect soils and land quality.
Decommissioning		
Impact 11: Short term risks to construction workers during decommissioning of Onshore ECC and associated Infrastructure.	<p>Removal of the OnSS including any areas of hardstanding.</p> <p>Buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance.</p> <p>Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning.</p>	Removal of infrastructure represents greatest disturbance and disruption to human receptors.
Impact 12: Risks to offsite human receptors, such as occupants of residential properties bordering the associated infrastructure with the project	Removal of the OnSS including areas of hardstanding and the removed of TJB at landfall.	Removal of all infrastructure represents greatest disturbance and disruption to human receptors.



5.9 EMBEDDED MITIGATION

5.9.1 The embedded mitigation contained in Table 5.15 are mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design of relevance to the topic, these include project design measures, compliance with elements of good practice and use of standard protocols. Where the assessment determined significant effects accounting for embedded mitigation, further measures may be required, which are presented as additional mitigation. Table 5.17 presents additional mitigation measures. These have typically been put forward where:

- > An effect is significant in EIA terms, even with embedded mitigation, but additional mitigation measures are available to reduce the level of effect; or
- > Mitigation has been proposed but has not yet been agreed with regulators, stakeholders, etc. or it is unproven.

Table 5.13: Embedded mitigation measures relating to Ground Conditions and Land Use

Parameter	Mitigation measures embedded into the project design
General	
Site Selection	The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Land take will be reduced as far as practicable. Reinstatement of land to its original use will be undertaken as far as practical following the completion of the construction works.
Project Design	Careful routing of the onshore ECC and design of key crossing points, including use of HDD to avoid key areas of sensitivity.
Environmental Permit	Consent may be required for the works (e.g. drilling, crossing, culverting, passing under or through) affecting the sea defence structures or other infrastructure, in accordance with Environmental Permitting (England and Wales) Regulations 2016. The conditions of the consents would be specified to ensure that construction does not result in significant alteration to the ground conditions and land use.
Construction	
Code of Construction Practice (CoCP)	A CoCP will be submitted as part of the DCO application. The CoCP will include measures to control the potential impacts to ground conditions and land use. A Draft CoCP (Volume 7, Report 3) is provided.
Pollution Prevention	The CoCP will incorporate measures to prevent pollution. Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, drilling fluids and chemicals) will



Parameter	Mitigation measures embedded into the project design
	<p>be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses.</p> <p>Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. will have a 110% capacity. To minimise ground contamination and contaminated runoff to surface water or groundwater.</p> <p>A Pollution Prevention and Emergency Incident Response Plan (PPEIRP) will be prepared and held on all construction sites to follow in the event of an environmental emergency.</p>
Soil Management	<p>The Draft CoCP incorporates the outline principles of soil management and mitigation measures to ensure protection of soils. A Soil Management Plan (SMP) will be developed and will be produced in advance of construction. The SMP will provide further details of mitigation measures and best practice handling techniques during stripping, handling and reinstatement to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement following the construction of the onshore works.</p>
Agricultural Operations	<p>Where required, crossing points will be used so that livestock and vehicles can cross the working width. General disruption impacts will be mitigated by keeping landowners updated with project progress.</p> <p>The Project will seek to liaise with landowners to agree terms with affected parties including any loss of ongoing payments or penalties relating to agri-environmental stewardship schemes.</p>
Best Practice	<p>All construction work will be undertaken in accordance with Volume 7 Report 3: Draft Code of Construction Practice, and good practice guidance including, but not limited to:</p> <ul style="list-style-type: none"> > Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001); > CIRIA – SuDS Manual (C753) (CIRIA, 2015b): <ul style="list-style-type: none"> > No discharge to main river watercourses will occur without permission from Environment Agency(SuDS Manual); > Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); and > Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual). > DEFRA Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009); and



Parameter	Mitigation measures embedded into the project design
	<ul style="list-style-type: none"> > Good Practice Guide for Handling Soils (Institute of Quarrying, 2021).
Contaminative Material	<p>In order to mitigate the potential impacts associated with excavation of potentially contaminative material:</p> <ul style="list-style-type: none"> > Should identified areas of potential concern occur in close proximity to the Project, the cable route will be microsited where possible to maintain a 25 m buffer; > The Code of Construction Practice will identify the procedures to be followed should an area of contamination be encountered. Areas where these materials are found will be photographed and annotated on a site drawing. Where necessary works on site at that location will cease until any identified contamination has been assessed by a suitably qualified Environmental Consultant in accordance with The Contaminated Land (England) Regulations 2006; > Construction workers will follow good site practice and hygiene rules; > Personal protective equipment (PPE), including nitrile gloves, protective overalls, safety goggles and face mask will be worn where appropriate, especially by those workers who are likely to be coming into contact with contaminated soil or water, such as those carrying out hand digging activities; > All works will be carried out in accordance with BS5930: 1999 (The Code of Practice for Site Investigations) and BS10175:2001 (Investigation of Potentially Contaminated Sites); > Use of the waste hierarchy to determine the most sustainable option for all surplus soils that are generated on site; > Re-instatement of topsoil; > Inclusion of excavated subsoil that is suitable for use within the design as landscaping material at the OnSS to minimise offsite movements; > Segregation of waste subsoil for offsite management from subsoil suitable for reinstatement on site; > Identification of suitable local schemes that are suitable for offsite reuse or recycling of surplus subsoil; > Any wastes found to be hazardous, will be stockpiled or stored separately from any non- hazardous stockpiles. Appropriate action will be taken in accordance with The Waste Enforcement (England and Wales) Regulations 2018 makes amendments to the Environmental Protection Act (1990) and the Environment Act (1995); and



Parameter	Mitigation measures embedded into the project design
	<p>> Use of a SWMP to monitor wastes arisings and ensure adherence to duty of care and wastes legislation on site and also the anticipation of sustainable waste management practices by maximising waste prevention, reuse and recycling for material destined for offsite waste management. This will actively discourage sending waste to landfill.</p>
<p>Operation</p>	
<p>General</p>	<p>The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would follow good practice in line with the prevailing future guidance and legislation with regard to measures such as the storage and management of potentially polluting substances, emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff and routine inspection to prevent or contain leaks of any pollutants.</p> <p>Where required good practice will be undertaken to excavate and replace without impacting soil quality significantly during any cable replacement.</p>
<p>Agricultural Operations</p>	<p>Any permanent restriction of non standard agricultural activities will be discussed with affected landowners to minimise impacts.</p>
<p>Decommissioning</p>	
<p>General</p>	<p>Decommissioning practices would incorporate measures like the construction phase, to prevent pollution. These measures should include emergency spill response procedures, control of surface water and clean up and remediation of any contaminated soils. Exposed cables ducts will be sealed with an appropriate water proofing material to mitigate flood risk or creation of preferential flow pathways.</p>
<p>General</p>	<p>No decision has yet been made regarding the final approach to decommissioning for the Project as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator with a decommissioning plan provided.</p>

5.10 ENVIRONMENTAL ASSESSMENT

5.10.1 The impacts of the onshore construction of VE have been assessed on Ground Conditions and Land Use in the onshore study area, as shown in Figure 5.1. The following sections describe the potential impacts during the construction, operational and decommissioning phases of the Project.



- 5.10.2 The ECC and OnSS will be designed to avoid where possible, known areas of potential concern to minimise excavation of potentially contaminated material.
- 5.10.3 A description of the potential effect on Ground Conditions and Land Use receptors caused by each identified impact is given below.

5.11 ENVIRONMENTAL ASSESSMENT: CONSTRUCTION PHASE

IMPACT 1: SHORT TERM RISKS TO CONSTRUCTION WORKERS DURING DEVELOPMENT OF LANDFALL, ONSS AND ONSHORE CABLE ROUTES

- 5.11.1 As set out in Section 5.7 the potential for contaminants contained within excavated ground and stockpiled materials is very unlikely. Aerial photography and preliminary site walkover have not indicated any visible impact suggesting the likely magnitude of contamination, if present is very low. The published data review indicates that there are no known contaminated sites within the study area.
- 5.11.2 If it does occur that contamination is likely to be associated with previous farming practices such as usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. If disturbed during construction works, there is a possibility that sources of contamination could be mobilised causing potential harm on construction workers and/or human receptors.
- 5.11.3 The embedded mitigation for potentially contaminative materials and Draft CoCP (Table 5.13) will set out procedures to be followed should sources of contamination (e.g. buried asbestos) are discovered during construction phase works. As a part of the construction and operation of the site workers will adhere to site-specific risk assessment and method statement.
- 5.11.4 If unexpected contamination is encountered or suspected, the works would cease in that area and assessment by a suitably qualified land contamination specialist would be made to determine appropriate actions. Soil (soil vapour/ groundwater) samples would be collected and analysed. The risks associated with contamination would be assessed. If required, a remediation strategy would be designed and agreed with EA and Essex County Council before implementation.
- 5.11.5 The impact of short term risks to construction workers is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for VE construction workers, as set out in Table 5.4. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 2: RISKS TO OFFSITE HUMAN RECEPTORS, SUCH AS OCCUPANTS OF RESIDENTIAL PROPERTIES BORDERING LANDFALL, ONSS AND ONSHORE ECC.

- 5.11.6 The excavation of cable trenches, earthworks and the movement and stockpiling of soils have the potential to mobilise existing ground contamination (if present). This could result in impacts to human health through, inhalation and ingestion of contaminants.
- 5.11.7 As set out in Section 5.7 the potential for contaminants contained within excavated ground and stockpiled materials is very unlikely. Aerial photography and preliminary site walkover have not indicated any visible impact suggesting the likely magnitude of contamination, if present is very low. The published data review indicates that there are no known contaminated sites within the study area.



- 5.11.8 The potential impacts and embedded mitigation is as set out in Paragraphs 5.11.2 to 5.11.4.
- 5.11.9 The impact of the construction of the OnSS and Onshore ECC is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **medium** for offsite human receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 3: CONSTRUCTION PHASE IMPACTS UPON SOIL/LAND QUALITY

ONSHORE CABLE ROUTE INFRASTRUCTURE

- 5.11.10 The Agricultural Classification of the soil within the PEIR boundary for the Route Sections is dominated by Grade 3 (52.65%) and is therefore considered to be of moderate to good quality. Overall, c.90% of the onshore PEIR boundary Route Sections are mapped as ALC Grade 1, 2 or 3.
- 5.11.11 The onshore cable route sections do interact with areas of Grade 1 and Grade 2 land where available space is limited and there are a number of other constraints including watercourses, residential properties, ancient woodland and roads.
- 5.11.12 It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b where Grade 3 is mapped as present. Where Grade 3 is present, a worst case scenario will be assumed that it is entirely or comprises a majority of ALC Grade 3a. As outlined in Table 5.4, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity. Therefore, based on the criteria in Table 5.4, sensitivity of the PEIR boundary Route Sections 1 to 5 are assessed as **high**.
- 5.11.13 The construction corridor of the onshore export cables will be contained within the PEIR Boundary and will cover a corridor of land, up to 27 km length and approximately 60 m wide within the Open Trench section of the ECC, there will however be some exceptions which may require widths up to 120 m e.g. trenchless crossings, such as HDD's.
- 5.11.14 Site clearance and preparation works for installation of the onshore ECC and the preparation of haul roads have the potential to impact the soil quality and resource. Potential impacts identified include:
- > Over compaction of agricultural and amenity soils caused by the use of heavy machinery onsite;
 - > Over compaction of agricultural and amenity soils caused by storage of construction equipment at the site;
 - > Structural deterioration of soil materials during excavation, soil handling, storage and replacement;
 - > Erosion and loss of soils during soil handling, storage and replacement; and
 - > Homogenisation and loss of characteristic horizons during excavation, storage and replacement.
- 5.11.15 These direct impacts on soil quality can also have potential indirect impacts on soil fertility and drainage.



- 5.11.16 The construction methodology (as set out in Volume 3, Chapter 1: Onshore Project Description) will ensure that the direct impacts on soil resulting from excavation will be limited spatially to the onshore ECC and temporally to a one off process of excavation, storage and replacement.
- 5.11.17 The onshore ECC does route through areas of predominantly agricultural land. The onshore ECC cable will be constructed sections, within these sections the works will be sequential therefore in most cases the land will not be taken out of existing use for the full construction duration.
- 5.11.18 Whilst there will be a temporary impact upon agricultural land during the construction phase within each working section, the reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the cable has been installed. Field drainage will be reinstated and the indicative minimum burial depth (from ground surface to the top of the cable ducting), will allow cultivation of land. Measures to reduce the impact of construction works on agricultural soils are included as part of the Draft CoCP.
- 5.11.19 The potential for long-term impacts resulting from the construction works is assessed as negligible, although careful soil handling will be required in order to preserve soil, structure, texture and avoid compaction within sensitive locations such as productive arable fields or high quality pasture.
- 5.11.20 Mitigation to ensure soils are protected during the development process will be undertaken and will be managed through planning and operation of best practice site management techniques (Table 5.13). The principles that will be adopted to manage potential impacts upon soil during construction within the onshore ECC will be set out as part of the SMP produced in advance of construction. The SMP will provide details of mitigation measures and best practice handling techniques to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement during the construction of the onshore works.
- 5.11.21 Given the features affected, i.e. agricultural soils, roadsides and amenity land; plus the limited and short term nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. The impact of the onshore ECC construction on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

ONSS

- 5.11.22 The agricultural classification of the soil within SSA West is entirely Grade 1 and is therefore considered to be of excellent or good quality.
- 5.11.23 The ALC Grade within SSA East is 62.66% Grade 2 and 37.43% Grade 3. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b where Grade 3 is mapped as present. As outlined in Table 5.4, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.
- 5.11.24 Where Grade 3 is present, a worst case scenario will be assumed that it is entirely or comprises a majority of ALC Grade 3a. Therefore, based on the criteria in Table 5.4, sensitivity of the two OnSS search areas are assessed as **high**.



- 5.11.25 The clearance and preparation of the OnSS and associated construction zone, will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar potential impacts are anticipated in terms of the physical parameters of soil quality within the OnSS and associated construction zone and access zones (compaction, structural deterioration during excavation and storage, homogenization and loss of characteristic horizons as set out in Paragraph 5.11.14).
- 5.11.26 Given the features affected, i.e. agricultural soils, roadsides and amenity land; plus the limited and short term nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. The impact of the onshore OnSS on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.
- 5.11.27 There is potential for mobilisation of bulk materials such as concrete or entrainment of stockpiled material from excavations during OnSS construction to result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in localised land contamination. However, through controls set out in within the best practice embedded mitigation measures (Table 5.13) the potential impact would be mitigated, and the magnitude of the impact is assessed as **low** resulting in an effect of **minor adverse** and therefore not significant.

TJB CONSTRUCTION

- 5.11.28 Route Section 1 shown on Figure 5.1 encompasses the landfall options between Frinton-on-sea and Holland-on-sea. There are currently two options being explored as part of the PEIR. A final option will be presented at DCO.
- 5.11.29 The TJBs will be used to join the onshore and offshore cables at Landfall. The land within both the landfall options has been identified on the available mapping as ALC Grade 4. Grade 4 is mapped the length of the coast between Frinton-on-Sea and Holland-on Sea and approximately 800m inland. To the north of the indicative HDD landfall locations the ALC grade is mapped as Grade 3.
- 5.11.30 The soil within the two landfall options is described as loamy and clayey soils of coastal flats. These soils have formed on an area of the clay bedrock which is mapped as absent of superficial deposits. The sensitivity of the soils has been assessed as **low**.
- 5.11.31 The clearance and preparation of the TJB site will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts to those described in Paragraphs 5.11.14, are anticipated for the TJB construction. Once the joint is completed the TJBs are covered and the land above reinstated. The construction of the TJBs are expected involve a small area of permanent land take area where link boxes and access manholes will be located, the MDS is set out in Table 5.12. This permanent land take will lead to a permanent loss of soils.



- 5.11.32 Based on the proposed construction methodology (as set out in Volume 3, Chapter 1) and the embedded mitigation (Table 5.13), the impacts are likely to be associated with localised excavation and the permanent loss of soils is expected to be significantly less than 5 ha, therefore the magnitude of the impact is assessed as **low**.
- 5.11.33 The impact of the TJBs construction phase on soil/land quality is considered to be of **low** adverse magnitude, and the sensitivity of receptors affected is considered to be **low** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

TRENCHLESS CROSSING WORKS

- 5.11.34 The agricultural classification of the soil within the PEIR boundary for the route sections is dominated by Grade 3 (52.65%) and is therefore considered to be of moderate to good quality. Overall, c.90% of the onshore PEIR boundary route sections are mapped as ALC Grade 1, 2 or 3. Therefore, based on the criteria in Table 5.4, sensitivity of the PEIR boundary Route Sections 1 to 5 are assessed as **high**.
- 5.11.35 The subsurface geology is mapped as the London Clay formation. The London Clay formation is a clay with an impermeable nature and has the potential to contain selenite crystals and disseminated pyrite. Pyrite is a major sulphur bearing mineral and there is the potential it could present aggressive ground conditions. The sensitivity of the subsurface geology is assessed as **medium**.
- 5.11.36 As set out for the onshore ECC works above, implementation of the embedded mitigation measures discussed in Table 5.13 and the measures proposed within the Draft CoCP would ensure that the potential for incidents detrimental to soil and land quality occurring is minimised and would reduce the magnitude of the impact of any such incidents.
- 5.11.37 The potential impact would arise from the drilling activity and could lead to bentonite and or drilling fluids/ hydraulic fluids being released into the soils and or ground water. In consideration of pollution prevention measures, these techniques would be managed effectively with a negligible magnitude of impact.
- 5.11.38 The impact on ground conditions and land quality from the trenchless techniques would be direct (shore works only) or indirect (via onshore watercourses discharging to the coast) and of an intermittent nature and of short duration.
- 5.11.39 The impact of the trenchless techniques during construction phase on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors and medium for subsurface geology. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.



IMPACT 4: STERILISATION OF MINERAL DEPOSITS

- 5.11.40 A principle of the site selection process was to avoid MSAs where possible. The Project avoids areas safeguarded for Chalk, Brickearth and Clay. The VE substation search areas are located in proximity to the existing Lawford Substation and the NGET EACN substation search area. The existing substation, the land surrounding and over 3 km is designated as a sand and gravel MSA. Consequently, given the large area of mapped potential resources, while taking into account the unknown nature quantity of any potential resource and the limited amount that would potentially be sterilised within the OnSS area, other site selection factors were given more weight.
- 5.11.41 As described in the baseline characterisation (Section 5.7) mapped safeguarded mineral deposits occur within the PEIR boundary for Route Sections 1, 2 and 5 and the OnSS search areas. The safeguarded minerals are sands and gravels.
- 5.11.42 Sand and gravel is mapped as abundant in extent across Tendring District and Essex. Essex County Council have designated MSAs for sand and gravel within the Essex County Council MLP. Mineral Safeguarding Areas and the safeguarded sand and gravel deposits are considered to be of regional importance and therefore the sensitivity of the receptor is considered to be **medium**.
- 5.11.43 There is however little published information about the presence and nature of these potential mineral deposits. Therefore, their quality and potential use as an aggregate or industrial mineral resource is currently unconfirmed. Further discussions with the relevant officers at Essex County Council will continue prior to the submission of the DCO.
- 5.11.44 The installation of a trench within the onshore ECC, which runs the length of up to 27 km and a working width of approximately 60 m has the potential to sterilise potential resources within the footprint during the construction period. The operational width will be smaller including the onshore export cables and easement. However, the areas impacted along the onshore ECC are spread along a narrow linear route rather than a single large area which are likely to make the viability of extraction along the cable route unfeasible.
- 5.11.45 The OnSS location within the OnSS search areas has the potential to sterilise mineral resource across a single area. The permanent footprint of the OnSS (estimated to be about 6ha) if located within an area identified as Mineral Safeguarding Areas would prevent extraction of resources within the permanent footprint of VE during construction and for the duration of operation (20 to 40 years).
- 5.11.46 Should minerals be present beneath the onshore cable route and OnSS locations, the impacts of sterilisation are considered to be long-term (duration of operation), as such the magnitude of effect is considered to be medium. However, the proportion of the total Mineral Safeguarding Areas that would effectively be sterilised is considered to be small in respect to the overall county mineral resources safeguarded. The impacts of sterilisation across the wider construction areas are considered to be temporary during construction, as such the magnitude of effect is considered to be low.



- 5.11.47 Without mitigation the potential impact on the mineral resource resulting from the construction and operation of VE is medium magnitude on a medium sensitivity receptor, representing an impact of moderate adverse significance.
- 5.11.48 Policy S8 of the Essex County Council MLP requires that a non-mineral proposal located within an MSA which exceeds defined thresholds (more than 5ha for sand and gravel) must be supported by a Minerals Resource Assessment to establish the existence, or otherwise, of a mineral resource capable of having economic importance.
- 5.11.49 A Mineral Resource Assessment will be produced in consultation with Essex County Council Mineral Planning Authority regarding the likely presence, quality and extent of the potential mineral resource. Together with the practicality and viability of extraction of the potential mineral resource and environmental impact to enable a quantification of the amount of mineral that may be sterilised.
- 5.11.50 Following the mitigation described above, it is considered that the magnitude of the impact from VE to mineral resources during construction would reduce to low on the medium sensitivity receptor. Therefore, the residual impact would be of **minor** adverse significance, which is not significant in EIA terms.

IMPACT 5: RISK FROM UNEXPLODED ORDNANCE TO CONSTRUCTION WORKERS AND NEARBY RESIDENTS

- 5.11.51 As set out in Section 5.7 the potential for UXO within the onshore ECC Sections 2, 3 and 4 of the onshore ECC is low risk. The impact from UXO within Route Sections 2, 3 and 4 is considered to be of **negligible** magnitude, and the sensitivity receptors (construction worker and nearby residents) to UXO affected is considered to be **high**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.
- 5.11.52 The UXO risk level for Route Section 1 (the coastal areas and approximately 200 m inland is recorded as medium risk level. Within the study area for Route Section 5 the OnSS search areas SSA West and SSA East are recorded to have the potential for UXO given the military activity in the vicinity as described in Section 5.7. The sensitivity of the receptors within Route Section 1, Route Section 5, the OnSS search areas SSA West and SSA East has been determined as **medium**.
- 5.11.53 Mitigation measures have been recommended for the OnSS search areas within Route Section 5 as part of the Preliminary UXO Threat Assessment and will be included within the Draft CoCP (Volume 7, Report 3: Draft Code of Construction Practice).
- 5.11.54 It is assessed that with the mitigation measures in place the impact of unplanned UXO within Section 1, Section 5 and the OnSS search areas is considered to be of **negligible** adverse magnitude, and the sensitivity of receptors affected is considered to be **high** for construction workers and nearby residents. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.



IMPACT 6: RISK TO ENVIRONMENTAL DESIGNATIONS

- 5.11.55 There are two designated sites Holland on Sea Cliff SSSI and Great Holland Pits Nature Reserve potential LoGS associated with the superficial geology within the study area. The presence of VE within a designated geological site has the potential to damage or have an adverse impact to the features of the designated site.
- 5.11.56 Holland on Sea Cliff SSSI is located about 250 m to the south of a VE Off Route Haul Road, on the coast east of The Esplanade, Holland on Sea. There is no infrastructure associated with the Proposed Development within the SSSI and the housing east of the B1032 separates the SSSI from the proposed VE PEIR boundary. The Holland on Sea Cliff SSSI is considered geographically separated from VE by the housing within the settlement of Holland on Sea and is therefore the sensitivity determined as **low**.
- 5.11.57 Great Holland Pits Nature Reserve potential LoGS is located near the western boundary of VE, between 5 to 45 m west of VE, north of Little Clacton Road, VE does not lie within the boundary of the LoGS. The site is now an Essex Wildlife Trust nature reserve. The site is known to have been backfilled post gravel excavation, it is reported that there are no current exposures of gravel. The sensitivity of the Great Holland Pits Nature Reserve LoGS is determined as **low**.
- 5.11.58 Where the boundary of VE is in very close proximity to the LoGS control of working areas and marking out of the site boundary would be employed to avoid disturbance to these areas from construction plant and activities. The controls which would be adopted at site in accordance with the final Code of Construction Practice and best practice (Table 5.1 Table 5.13: Embedded mitigation measures relating to Ground Conditions and Land Use) would ensure that the potential magnitude of impact on the designated SSSI and LoGS is negligible.
- 5.11.59 The impact of the construction phase on designated sites is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **low** for the designated sites. The significance of the residual effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

5.12 ENVIRONMENTAL ASSESSMENT: OPERATIONAL PHASE

- 5.12.1 The impacts of the operation and maintenance of VE have been assessed on Ground Conditions and Land Use in the onshore study area.
- 5.12.2 A description of the potential changes on Ground Conditions and Land Use receptors caused by each identified impact is given below.

IMPACT 7: LOSS OF AGRICULTURAL LAND DURING OPERATION OF UNDERGROUND CABLES

- 5.12.3 The following section considers the potential impact of a reduction in available soil resource through the presence of the onshore ECC during the operation of VE.
- 5.12.4 There will be no permanent land take associated with the operational onshore export cable with the exception of the man-hole covers associated with the TJBs and joint bays, where access is needed to link boxes. There may be an increase in impermeable surfacing associated with the onshore cable route arising from permanent access routes required for inspection and maintenance of the TJBs at landfall and joint bays along route.



- 5.12.5 The onshore cable would be buried underground. The construction phase would include restoration of the land above the cable to its former land use. Best practice and soil handling principles for reinstatement will be set out within the CoCP. In addition, as stated in Paragraph 5.11.17 field drainage will be reinstated and the indicative minimum burial depth (from ground surface to the top of the cable ducting), which will allow cultivation of land.
- 5.12.6 As noted in Volume 3, Chapter 1: Onshore Project Description, activity during operation will be limited to periodic inspection and maintenance activity of infrastructure within the onshore ECC. Any repair activity would be of a similar nature to the construction phase (albeit at a much reduced scale).
- 5.12.7 The impact of the operational phase on agricultural land is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high**. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 8: LOSS OF AGRICULTURAL LAND DURING OPERATION OF THE ONSS

- 5.12.8 A principle of the site selection process was to avoid BMV land where possible. This approach is aligned with NPS EN-1 para 5.10.8, which advises that BMV land should be avoided where possible except where it would be inconsistent with other sustainability considerations and sensitive receptors (including but not limited to infrastructure, residential and archaeology). The VE substation search areas are unavoidably located in close proximity to the existing Lawford Substation and the NGET EACN substation search area. The existing substation, the land surrounding and over 3 km beyond is mapped as a BMV land. Due to the need to locate the OnSS in close proximity to the NGET EACN substation search area and taking into account other environmental constraints, it has therefore not been possible on this occasion to avoid BMV land.
- 5.12.9 The agricultural classification of the soil within SSA West is entirely Grade 1 and is therefore considered to be of excellent or good quality.
- 5.12.10 The ALC Grade within SSA East is 62.66% Grade 2 and 37.43% Grade 3. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b where Grade 3 is mapped as present. As outlined in Table 5.4, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.
- 5.12.11 Where Grade 3 is present, a worst case scenario will be assumed that it is entirely or comprises a majority of ALC Grade 3a. Therefore, based on the criteria in Table 5.4, sensitivity of the two OnSS search areas are assessed as **high**.
- 5.12.12 Soil will also be removed and used for landscaping or sterilised under the foundation footprint of the OnSS and therefore the soils will be subject to an irreversible change over the whole feature. The OnSS will be located within the OnSS search areas. The OnSS footprint will not cover the whole of the OnSS search areas, at this stage the permanent footprint of the OnSS is proposed to be about 6ha in size. Additional land is also required for planting/ screening.
- 5.12.13 The total area of farmed land within Essex is 210,328 ha and represents 59% of the county (Essex County Council, 2019). The footprint of the onshore PEIR boundary constitutes approximately 0.52% of the county resource and the OnSS footprint represents approximately 0.003% of this resource area.



- 5.12.14 Whilst the permanent loss of agricultural land at the OnSS at a local level is of medium magnitude, in the context of the county resource the loss of agricultural land is of negligible magnitude at less than 1% of the total Essex resource.
- 5.12.15 Furthermore, the IEMA guidance (2022) acknowledges that whilst it may not be possible to entirely mitigate the loss of agricultural land, it may be possible to mitigate the displacement of the soils.
- 5.12.16 The guidance also acknowledges that intensive agriculture can lead to losses of soil function. Soil functions could be improved through enhancement and an increase in biodiversity. The land beneath the OnSS may be lost to agriculture, but the soils can be conserved for beneficial use and be sustainably re-used within the Project elsewhere including appropriate landscaping potentially as set out in the Landscape and Ecology Design Principles Plan (LEDPP) (Volume 7, Report 5).
- 5.12.17 Due to the small area of the permanent operational infrastructure in the context of the regional resource and the additional landscaping footprint which may have the potential to mitigate the loss in soil functions, the impact of the OnSS operation on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 9: INGRESS AND ACCUMULATION OF HAZARDOUS GROUND GASES

- 5.12.18 Ground gases generated by mobilisation of existing contaminant deposits of fill could accumulate in confined spaces, such as structures and deep excavations, resulting in the accumulation of poor air quality and a risk of asphyxiation and explosion.
- 5.12.19 The design of the route has considered contaminated land and the layout has been designed to avoid any areas of potential contamination. The distance from potentially contamination sources and the impermeable nature of the clay bedrock geology across the route minimises the risk of potential pathways and precludes the need for gas mitigation.
- 5.12.20 The bedrock geology, the London Clay Formation has the potential to create aggressive ground conditions³ if sulphur bearing minerals within the geology attack the concrete structures laid down as part of VE. Any Ground investigations as part of the design and construction will determine the exact nature and properties of the ground conditions and bedrock. This information will be used to inform the requirements of detailed design.
- 5.12.21 The impact of the ingress and accumulation of ground gases is considered to be of **negligible** magnitude, and the sensitivity of receptors (construction workers) affected is considered to be **high**. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

³ Mott Macdonald (2022), 5 Estuaries Offshore Windfarm, Geotechnical and Geo-environmental Desk Study - S99



IMPACT 10: STRUCTURES AND SERVICES LAID IN DIRECT CONTACT WITH CONTAMINATED SOILS AND GROUNDWATER

- 5.12.22 Certain contaminants can have a long-term impact on the integrity of subsurface materials such as buried concrete and plastic service pipes.
- 5.12.23 The design of the route has considered contaminated land and the layout has been designed to avoid any areas of potential contamination. Although no potential sources for contamination have been identified, as part of the project design phase appropriate materials will be selected that provide adequate protection from any unexpected contaminated soils and/or groundwater.
- 5.12.24 During operation and maintenance of the OnSS the end user is unlikely to come into contact with soils or groundwater as the hardstanding at ground level will provide a barrier between any potential contaminants.
- 5.12.25 The impact of the structures laid in contact with contaminated soils or groundwater is considered to be of **negligible** magnitude, and the sensitivity of soil and land receptors affected is considered to be **low**. The significance of the residual effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

5.13 ENVIRONMENTAL ASSESSMENT: DECOMMISSIONING PHASE

- 5.13.1 The impacts of the decommissioning of VE have been assessed on Ground Conditions and Land Use in the onshore study area.
- 5.13.2 No decision has yet been made regarding the final decommissioning policies for the Project as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator.
- 5.13.3 However, it is considered likely that the proposed onshore substation would be removed and will be reused or recycled and that the onshore cables would also be removed and recycled, with the transition bays and cable ducts (where used) left in situ. For the purposes of a worst-case scenario, it is considered that magnitude of impact and effects associated with decommissioning would be no greater than those identified for the construction phase.

IMPACT 11: SHORT TERM RISKS TO CONSTRUCTION WORKERS DURING DECOMMISSIONING OF THE ONSHORE ECC AND ASSOCIATED INFRASTRUCTURE AND IMPACT 12: RISKS TO OFFSITE HUMAN RECEPTORS, SUCH AS OCCUPANTS OF RESIDENTIAL PROPERTIES BORDERING THE ASSOCIATED INFRASTRUCTURE WITH THE PROJECT

ONSHORE CABLE ROUTE INFRASTRUCTURE

- 5.13.4 With respect to the buried onshore cables, these are likely to be pulled through the ducts and removed, with the ducts themselves left in situ after decommissioning. At the present time, allowing the ducts to remain in place is considered an acceptable option with minimal environmental impact.



5.13.5 The impact of the decommissioning of the Onshore ECC is considered to be of **negligible** magnitude, and the sensitivity of construction worker receptors affected is considered to be **high**, off-site human receptors are considered medium sensitivity. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

ONSS AND TJB

5.13.6 It is anticipated that the OnSS and TJB would be gradually dismantled on site with certain infrastructure removed for recycling or re-use. The decommissioning works may involve removal of some or all of the impermeable hard-standing surfacing and structures, following this the area is likely to be remediated and returned to its pre-VE state.

5.13.7 During decommissioning phase, in relation to the OnSS and TJBs the impacts on construction workers will be similar to those assessed for the construction phase (Paragraphs 5.11.1 to 5.11.4) and expected to be of a similar duration.

5.13.8 The impact of the decommissioning of the OnSS and TJB is considered to be of **negligible** magnitude, and the sensitivity of construction worker receptors affected is considered to be **high**, off-site human receptors are considered medium sensitivity. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

5.14 ENVIRONMENTAL ASSESSMENT: CUMULATIVE EFFECTS

5.14.1 This cumulative impact assessment for ground conditions and land use has been undertaken in accordance with the methodology provided in Volume 1, Annex 3.1: Cumulative Effects Assessment Methodology. This list of projects remains indicative, pending the results of surveys yet to be reported and other projects potentially being added to, or removed from, the list between now and the ES being prepared. Each project, plan or activity has been considered and scoped in or out on the basis of effect-receptor pathway, data confidence and the temporal and spatial scales involved. All relevant longlist plans and projects were allocated into tiers reflecting varying levels of certainty. These are defined in Volume 1, Annex 1.3: Cumulative Effects Assessment Methodology, and outlined here in Table 5.14.

Table 5.14: Description of Tiers of other developments considered for cumulative effect assessment.

Tiers	Development Stage
Tier 1	Projects under construction.
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented.
	Submitted applications, whether under the Planning Act 2008 or other regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
	Projects under the Planning Act 2008 where a PEIR has been submitted for consultation.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.



	<p>Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.</p> <p>Identified in other plans and programmes (as appropriate) which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward.</p>
--	--

- 5.14.2 The projects and plans selected as relevant to the assessment of impacts to ground conditions and land use are based upon an initial screening exercise undertaken on a long list. Each project, plan or activity has been considered and scoped in or out on the basis of effect–receptor pathway, data confidence and the temporal and spatial scales involved. For the purposes of assessing the impact of the VE on Ground Conditions and Land Use in the region, the cumulative effect assessment technical note submitted through the EIA Evidence Plan and forming Technical Annex 1.3.1 of this PEIR screened in a number of projects and plans as presented in Table 5.15.
- 5.14.3 The greatest potential for cumulative effects arises when the construction phase of another development overlaps with the construction phase of the VE. Cumulative effects are considered to have the potential to be significant only where such an overlap may exist, as activities that could be potentially detrimental to the ground conditions and land use environment are greatly reduced during the operational phase of developments.
- 5.14.4 Therefore, potential cumulative effects to geology and the soils environment between VE and other proposed or consented developments are considered plausible only where the development footprint of both developments overlap.
- 5.14.5 It is considered that geographic separation between developments, results in the absence of a cumulative effect to geology and the soils environment. Based on geographic separation between VE and other proposed or consented developments located within a 500 m radius, the majority of other projects have been scoped out of the cumulative assessment.



Table 5.15: Projects considered within the Ground Conditions and Land Use cumulative effect assessment.

Development type	Project	Status	Data confidence assessment/ phase	Tier
Energy – Proposed modification to part of the 13KV OHL line network	18/00832/OHL	Permitted development. 10 Jul 2018	Medium data confidence - sourced from Tendring District Council The modifications are proposed to line networks stretching from Lawford Grid Substation to the north and northeast.	Tier 1
Energy – North Falls Offshore Wind Farm (OWF)	EN010119	Scoping Opinion. 16 July 2021. Application is expected to be submitted to the Planning Inspectorate in 2023	High - Scoping Opinion. Source PINS Onshore cable route through Tendring District.	Tier 2
Electricity Transmission - East Anglia Connection Node Substation (EACN Substation)		Scoping Opinion. 14 December 2022. Application is expected to be submitted to the Planning Inspectorate Q4 2024	High – Scoping Opinion. Source PINS Part of the RLB is located on land adjacent to Lawford Substation, Little Bromley.	Tier 2



Table 5.16: Cumulative MDS.

Impact	Scenario	Justification
Cumulative risk to construction workers and offsite human receptors during development of landfall, OnSS and onshore cable routes.	Other developments being constructed at the same time in the same area as VE.	The impacts to construction workers will be confined to the work area for all scenarios. Impacts to offsite human receptors such as, landowners, land users and neighbouring land users has the potential to be exacerbated by other projects undergoing construction at the same time increasing potential disturbance to land.
Cumulative impacts upon soil/land quality.	Other developments being constructed at the same time in the same area as VE.	This scenario increases ground disturbance to agricultural land and any potentially contaminated land.
Cumulative loss of agricultural land	Other developments being constructed and then subsequently operated at the same time in the same area as VE.	This scenario increases the overall permanent loss of agricultural land within the immediate area of the OnSS.
Cumulative impact of sterilisation of mineral deposits.	Other developments being constructed at the same time in the same area as VE.	Impacts to Mineral Safeguarding Areas may be exacerbated by other projects if within the same safeguarding area.
Cumulative risks to environmental designations.	Other developments being constructed at the same time in the same area as VE.	Impacts to environmental designations may be exacerbated by other projects.

5.14.6 The various scenarios for the impacts outlined above may lead to potential cumulative effects on ground conditions and land use.

5.14.7 The proposed modification to part of the 13KV OHL line network (18/00832/OHL) marginally overlaps with the northern boundary of SSA West. It is anticipated that this project would have undergone construction and have been completed before the commencement of construction of VE. Therefore, there would be no cumulative impacts associated with this development.



- 5.14.8 The North Falls OWF project and the EACN Substation project are both in the process of preparing their respective PEIR following the PINS scoping response for each project, and as a result no definitive layouts or construction programme are available to assess fully how the projects overlap and interact with VE. A worst case scenario will be assumed for this assessment whereby each project overlaps with VE spatially and temporally.
- 5.14.9 Given the timing of proposed construction activities for the projects detailed in Table 5.15, the scale of developments, they are likely to be required to include measures to control potential detrimental effects of the development on ground conditions and land use, such as measures through a CoCP..
- 5.14.10 Construction impacts on ground conditions via increased disturbance would potentially be increased should the projects overlap spatially and temporally. However, it is anticipated that this will be managed by appropriate mitigation measures. It is considered unlikely that there would be any cumulative effects during construction on ground conditions and land use associated with the listed projects as any potential impacts will be minimised by adoption of mitigation measures.
- 5.14.11 The potential cumulative construction impacts of the above listed developments are not likely to result in significant adverse effects on the ground conditions and land use.
- 5.14.12 The North Falls OWF and the EACN Substation have the potential to overlap spatially with VE which could lead to an effect on a similar area of agricultural land. Should the projects overlap, this has the potential to lead to a cumulative permanent loss of agricultural land during operation. The loss of agricultural land resulting from the permanent land take of VE together with North Falls and EACN could be significant at a local scale, however it would be considered not significant at a county scale.
- 5.14.13 As the projects co-ordinate and progress through further design refinement prior to DCO submission a better understanding of the potential cumulative impacts will be gained. Therefore, at this stage it is anticipated that the cumulative effect on permanent loss of agricultural land during operation has the potential to be significant in EIA terms.

5.15 INTER-RELATIONSHIPS

- 5.15.1 This chapter has considered the effect of the onshore elements of VE on ground conditions and land use in relation to the proposed onshore infrastructure. Effects on hydrology and flood risk are considered in Volume 3, Chapter 6. Effects on marine geology, oceanography and physical processes are considered in Volume 2, Chapter 2 and marine water and sediment quality are considered in Volume 2, Chapter 3.
- 5.15.2 The potential for effects of VE to result in consequential effects on other receptors would be controlled by the measures set out in this chapter. The effects identified within this chapter are predicted to be minor or negligible adverse. None of these effects would be significant in EIA terms. Given the localised nature of the effects, there is not considered to be potential for significant inter-related effects on any offshore receptors.
- 5.15.3 There are not considered to be any significant inter-related effects between offshore and onshore parts of VE in terms of ground conditions and land use.



5.16 TRANSBOUNDARY EFFECTS

- 5.16.1 Based upon the nature of the site, and the baseline ground conditions as identified by this initial assessment, it is considered that any impacts, if present, will be localised. It is therefore judged that there will not be any transboundary impacts relating to ground conditions and land use.
- 5.16.2 Transboundary effects were agreed by PINS to be scoped out of the assessment. Therefore, this impact will be scoped out from further consideration within the EIA.

5.17 SUMMARY OF EFFECTS

- 5.17.1 The potential ground conditions and land use receptors in the study area comprise soils, geology and construction workers who may be exposed to ground contamination and minerals safeguarding areas and UXO. These receptors vary in their environmental sensitivity from low to high.
- 5.17.2 The assessed magnitude of the various identified impacts of VE on ground conditions and land use, primarily soils vary from high to negligible (adverse). Overall, through the implementation of mitigation measures, including those specified Volume 7, Report 3: Draft Code of Construction Practice, it is considered that the likely overall effect of VE on ground conditions and land use throughout the construction, operation and decommissioning of VE is not significant in EIA terms.
- 5.17.3 Table 5.17: Summary of effects for ground conditions and land use below provides the effects and mitigation measures for summary of effects.

Table 5.17: Summary of effects for ground conditions and land use

Description of effect	Effect	Additional mitigation measures	Residual impact
Construction			
Impact 1: short term risks to construction workers during construction of landfall, OnSS and onshore cable routes	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 2: risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects



Description of effect	Effect	Additional mitigation measures	Residual impact
Impact 3: construction phase impacts upon soil/land quality	Onshore ECC – Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	OnSS –Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	TJB – minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	Trenchless crossing – minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 4: sterilisation of mineral deposits	Moderate adverse	Mitigation will take the form of a Mineral Resource Assessment to determine the extent and quality of any potential deposits and address possible prior extraction	Minor adverse
Impact 5: risk from unexploded ordnance to construction workers and nearby residents	Minor adverse	Mitigation recommended by UXO risk assessment	No significant adverse residual effects
Impact 6: risk to environmental designations	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Operation			



Description of effect	Effect	Additional mitigation measures	Residual impact
Impact 7: loss of agricultural land during operation of underground cables	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 8: loss of agricultural land during operation of OnSS	Minor adverse	Not Applicable	No significant adverse residual effects
Impact 9: ingress and accumulation of hazardous ground gases	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 10: structures and services laid in direct contact with contaminated soils and groundwater	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Decommissioning			
Impact 11: Short Term Risks To Construction Workers During Decommissioning Of ECC And Associated Infrastructure	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 12: Risks To Offsite Human Receptors, Such As Occupants Of Residential Properties Bordering The Associated Infrastructure With The Project	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects



5.18 NEXT STEPS

5.18.1 The following steps will be undertaken in order to progress the assessment from PEIR stage to DCO Application stage:

- > Once more detailed project design information is available, the assessment presented in this chapter along with the proposed mitigation will be reviewed, updated if necessary, and presented in the DCO application;
- > Any feedback received from consultees in relation to the PEIR will be reviewed, a response provided, and if any updates to the assessment and / or the proposed mitigation are required this will be done as part of the DCO application; and
- > A Minerals Resource Assessment (MRA) will be included as part of the ES which accompanies the DCO application.



5.19 REFERENCES

- Essex County Council (2019), Green Essex, Appendices, https://consultations.essex.gov.uk/rci/green-essex-strategy/supporting_documents/GE_Appendices_24042019_2%202.pdf
- GoBe (2021), 'Five Estuaries Offshore Wind Farm Five Estuaries Offshore Wind Farm Environmental Impact Assessment: Scoping Report'[Accessed online: February 2023]
- The Planning Inspectorate (2021), 'Scoping Opinion: Proposed Five Estuaries Offshore Wind Farm'
- Department for Environmental Food & Rural Affairs (2009), 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf [Accessed: October 2022]
- Environment Agency Guidance: Land contamination risk management (LCRM), <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> [Accessed online: October 2022]
- Institute of Environmental Management & Assessment (2022), 'A New Perspective on Land and Soil in Environmental Impact Assessment' https://s3.eu-west-2.amazonaws.com/iema.net/documents/knowledge/policy/impact-assessment/J35787_IEMA_Land_and_Soils_Guidance.pdf [Accessed online: October 2022]
- Department of Energy and Climate Change (2021), 'Draft Overarching National Policy Statement for Energy (EN-1)'
- Department of Energy and Climate Change (2021) 'Draft National Planning Policy Statement for Renewable Energy Infrastructure (EN-3)'
- Department of Energy and Climate Change (2012), 'Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)'
- Department for Environmental Food & Rural Affairs (2012), 'Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance'
- Department for Environmental Food & Rural Affairs, Environment Agency, 'Model Procedures for the Management of Land Contamination, Contaminated Land Report 11 (CLR11)'
- Mott Macdonald (2022): '5 Estuaries Offshore Windfarm Geotechnical and Geo-environmental Desk Study – S27'
- Mott Macdonald (2022): '5 Estuaries Offshore Windfarm Geotechnical and Geo-environmental Desk Study – S99'
- Rudland, D.J., Lancefield, R.M., Mayell, P.N (2001), 'Contaminated Land Risk Assessment: A Guide to Good Practice (C552)', CIRIA, 2001.
- Standards for Highways (2019), 'Sustainability & Environment Appraisal. LA 109 Geology and Soils, Rev 0 (2019)'
- The UK Government (2021), 'National Planning Policy Framework'



F I V E 
ESTUARIES
OFFSHORE WIND FARM

PHONE
EMAIL
WEBSITE
ADDRESS

COMPANY NO

0333 880 5306

fiveestuaries@rwe.com

www.fiveestuaries.co.uk

Five Estuaries Offshore Wind Farm Ltd

Windmill Hill Business Park

Whitehill Way, Swindon, SN5 6PB

Registered in England and Wales

company number 12292474

