Environmental Impact Assessment Report
Volume 1, Chapter 19: Ground Conditions and Contamination

MarramWind Offshore Wind Farm

December 2025

MarramWind

Document code:	MAR-GEN-ENV-REP-WSP-000044
Contractor document number:	852346-WEIS-IA-I6-RP-G2-69432
Version:	Final for Submission
Date:	08/12/2025
Prepared by:	WSP UK Limited
Checked by:	WSP UK Limited
Accepted by:	MarramWind Limited

Contents

Volume 2, Figures

19. Ground Conditions and Contamination

19.1 Introduction

19.1.1.1 This ground conditions and contamination Chapter of the Environmental Impact Assessment (EIA) Report presents the results of the assessment of the likely significant effects on ground conditions and contamination receptors that may arise from the construction, operation and maintenance (O&M) and decommissioning of the onshore Project landward of mean low water springs. It should be read in conjunction with the project description provided in **Chapter 4: Project Description** and the relevant parts of the following Chapters and Appendix:

- **Chapter 20: Water Resources and Flood Risk**: The water resources and flood risk section will address the net impact on water quality caused by the mobilisation of historical contamination and the significance of the introduction of new contaminants. Potential effects on water quality and water availability, and on flood risk receptors are considered.
- **Chapter 22: Land Use**: Ground conditions and contamination are inter-related with land use as ground conditions may limit or allow certain land uses to take place. The land use chapter considers the effects of the Project on agricultural activities and other land uses.
- **Chapter 23: Terrestrial Ecology and Ornithology**: The land use chapter uses habitat and agricultural land use information confirmed through surveys and desk-based research.
- **Chapter 24: Onshore Archaeology and Cultural Heritage**: Soil functions can include the preservation of archaeological remains therefore ground conditions are important and the onshore archaeology and cultural heritage assessment is informed by the ground conditions and contamination section.
- **Chapter 28: Climate Resilience**: The interference with climate resilience with ground conditions and contamination is captured in the in-combination climate impacts assessment.
- **Chapter 29: Greenhouse Gases**. The interference with greenhouse gases (GHG) with ground conditions and contamination is captured in the in-combination GHG impacts assessment in relation to carbon storage in soils, and in particular peat.
- **Chapter 30: Socio-Economics**: Land contamination and soil / agricultural land health can interact with socio-economics such as by presenting constraints to economic activities. Therefore, the ground condition and contamination assessment informs the socio-economics assessment.
- **Volume 3, Appendix 23.1 Ecological Desk Study**: Details the nature conservation designations within the Onshore Red Line Boundary and surrounding area.

19.1.1.2 This Chapter describes:

- the legislation, planning policy, guidance and other documentation that has informed the assessment (**Section 19.2: Relevant legislative and policy context**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to ground conditions and contamination have been addressed (**Section 19.3: Consultation and engagement**);
- the scope of the assessment for ground conditions and contamination (**Section 19.4: Scope of the assessment);**
- the data sources and methods used for gathering baseline data including surveys where appropriate (**Section 19.5: Methodology for baseline data gathering**);
- the overall environmental baseline (**Section 19.6: Baseline conditions**);
- the basis for the EIA Report (**Section 19.7: Basis for the EIA Report**);
- methodology for EIA Report (**Section 19.8** and **Section 19.9: Methodology for EIA Report**);
- the assessment of ground conditions and contamination effects (**Section 19.10: Assessment of effects: Construction**; **Section 19.11: Assessment of effects: operation and maintenance**; **Section 19.12: Assessment of effects: Decommissioning**);
- a summary of effects (**Section 19.13: Summary of effects**);
- consideration of transboundary effects (**Section 19.14: Transboundary effects**);
- consideration of inter-related effects and cumulative effects (**Section 19.15: Inter-related effects** and **Section 19.16: Assessment of cumulative effects**);
- a summary of residual effects for ground conditions and contamination (**Section 19.17: Summary of residual likely significant effects**);
- a reference list is provided (**Section 19.18: References)**; and
- a glossary of terms and abbreviations is provided (**Section 19.19: Glossary of terms and abbreviations)**.

19.1.1.3 This Chapter is also supported by the following appendix:

- **Volume 3, Appendix 19.1: Phase 1 Contaminated Land Report**.

19.2 Relevant legislative and policy context and technical guidance

19.2.1 Legislative and policy context

19.2.1.1 This Section identifies the relevant legislation and policy context that has informed the scope of the ground conditions and contamination assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 2: Legislative and Policy Context**, which provides an overview of the relevant legislative and policy context for the Project. **Chapter 2: Legislative and Policy Context** is supported by **Volume 3, Appendix 2.1: Planning Policy Framework**, which provides a detailed summary of international, national, marine and local planning policies of relevance to the EIA. Individual policies of

specific relevance to this assessment and associated appendices have been taken into account.

19.2.1.2 This summary provides a foundation for understanding the specific requirements that this Chapter must address in terms of assessing and mitigating impacts on receptors and relevant environmental issues.

19.2.1.3 The legislation relevant to ground conditions and contamination include:

- Environmental Protection Act 1990.

19.2.1.4 The policies relevant to ground conditions and contamination include:

- Aberdeenshire Local Development Plan (LDP), 2023 (Aberdeenshire Council, 2023a).
- National Planning Framework 4 (Scottish Government, 2023a);
- Scottish Environment Protection Agency (SEPA): Position Statement on Planning and Soils (SEPA, 2022a);
- Position Statement on Land Protection (SEPA, 2022b);
- Planning Advice Note 33: Development of contaminated land (Scottish Government, 2017);
- The Scottish Soil Framework (Scottish Government, 2009); and
- Planning Advice Note 60: Natural Heritage (Scottish Government, 2000);

19.2.2 Relevant technical guidance

19.2.2.1 Other information and technical guidance relevant to the assessment undertaken for ground conditions and contamination include:

- Institute of Environmental Management and Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022);
- Land Remediation and Waste Management Guidelines (SEPA, 2022c);
- Code of practice for ground investigations (BS 5930:2015+A1:2020) (BSI, 2020);
- LCRM statutory guidance (Environment Agency, Northern Ireland Environment Agency, SEPA, Natural Resources Wales, Society of Brownfield Risk Assessment, 2020);
- The Environmental Impact Assessment Handbook - A Practical Guide for Planners, Developers and Communities (3rd Edition) (Carroll *et al*., 2019);
- A Handbook on Environmental Impact Assessment (NatureScot and Historic Environment Scotland, 2018);
- Investigation of potentially contaminated sites. Code of practice (BS 10175:2011+A2:2017) (British Standards Institution (BSI), 2017);
- Peatland Survey: Guidance on Developments on Peatland (Scottish Government *et al*., 2017);
- Regulatory Guidance: Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA *et al*., 2010);
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009);

- Environmental Protection Act 1990 – Part IIA Contaminated Land: Statutory Guidance Edition 2 (Scottish Government, 2006); and
- Geological Conservation: a Guide to Good Practice (ST118) (Natural England, 2006).

19.3 Consultation and engagement

19.3.1 Overview

19.3.1.1 This Section describes the consultation and stakeholder engagement undertaken on the Project in relation to ground conditions and contamination. This includes early engagement, the outcome of and response to the Scoping Opinions (Onshore Scoping Opinion (Aberdeenshire Council, 2023b) and Offshore Scoping Opinion (Scottish Government, 2023b)) in relation to the ground conditions and contamination assessment, non-statutory consultation, and the findings of the Project's Statutory Consultation. An overview of engagement undertaken for the Project as a whole can be found in Section 5.5 of **Chapter 5: Approach to the EIA**.

19.3.2 Key issues

19.3.2.1 A summary of the key issues raised during statutory and non-statutory consultation, specific to ground conditions and contamination, is outlined below in **Table 19.1**, together with how these issues have been considered in the production of this EIA Report.

Table 19.1 Stakeholder issues responses – ground conditions and contamination

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
Aberdeenshire Council.	35	22 March 2023.	*"The baseline conditions for the scoping site area are noted. The Council raises no concerns relating to these."*	The Council's agreement is noted. Details of the baseline for ground conditions and contamination are set out in **Section 19.6**.
	36	22 March 2023.	*"Table 6.1.5 of the Scoping Report indicates the likely significant effects regarding ground condition and contamination effects. The proposed approach to assessment (scoped in or out) included within this table is welcomed. The Council agrees with the approaches indicated and does not suggest any topics be altered. The justifications given to scoping out impacts (paragraphs 6.1.84 to 6.1.87 inclusive) are noted and accepted."*	The Council's agreement is noted. Details of effects that are scoped in for assessment and effects that have been scoped out are provided in **Section 19.4**.
	37	22 March 2023.	*"The Council's Contaminated Land Service was consulted and noted that the information included within this chapter is acceptable, with particular reference to the intention to produce a Phase 1 Geoenvironmental Desk Study for submission as part of a planning application. It is encouraged that this report be submitted to the Council as soon as possible so any contaminated land issues identified within the Phase 1 report can be resolved via further investigation to assist the application process. I would be pleased to advise who to contact to discuss contaminated land matters should you wish to speak with the officer directly."*	A Phase 1 Contaminated Land Report has been produced in accordance with LCRM and is included as **Volume 3, Appendix 19.1**.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
	38	22 March 2023.	*"NatureScot advises in their consultation response that the list of designated geological Site of Special Scientific Interest (SSSIs) in Chapter 6.1 does not include the Hill of Longhaven and potential impacts upon it should be assessed and included within the EIA Report alongside the other geological SSSIs noted."*	Hill of Longhaven SSSI has been considered as part of onshore optioneering and potential impacts on the designated geological features have been considered in the assessment. Following refinement of the design, there are no sensitive geological receptors within the Onshore Red Line Boundary or study area (see current baseline in **Section 19.6**).
	39	22 March 2023.	*"SEPA makes comment in relation to disturbance and re-use of excavated peat and other carbon rich soils in point 3 of their response. It is suggested that a planning submission must demonstrate how the layout has been designed to minimise peat disturbance and outline mitigation / preventative measures to avoid peat degradation."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. Mitigation is in place (use of trenchless crossing) to avoid peat, removing the need for a Peat Management Plan (PMP). The Project will comply with Guidance on Developments on Peatland: Peatland Survey (Scottish Government *et al.*, 2017) and SEPA guidance Developments on Peat and Offsite Uses of Waste Peat (2017), as required.
	40	22 March 2023.	*"A detailed peat depth map must also be included within a submission, with overlays showing how the development avoids deep peat areas and other sensitive receptors (for example, Groundwater Dependent Terrestrial Ecosystems (GWDTEs)), alongside a table indicating quantities of peat excavation, where it will be re-used during reinstatement and widths and depths of peat to be*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.2a Soils** and **Figure 19.2b Soil texture** show soil types and soil textures, including peat, within the Onshore Red Line Boundary. **Volume 2, Figure 19.3 Peat and peaty soils** shows the locations of peat and peaty

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
			re-used, along with how it is to be kept wet must also be included."	soils from the Soil Map of Scotland (1:25,000), and identifies the values assigned to these soils based on the Carbon and Peatland 2016 map.
	41	22 March 2023.	*"A PMP should be considered, depending on volumes of peat to be encountered. Guidance referenced within SEPA's response can assist in this consideration, however I would suggest speaking directly to SEPA should you wish further assistance / clarification on this point."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils from the Soil Map of Scotland (1:25,000), and identifies the values assigned to these soils based on the Carbon and Peatland 2016 map. Mitigation is in place (use of trenchless crossing) to avoid peat, removing the need for a PMP.
	43	22 March 2023.	*"Should you become aware of other developments using a similar corridor route to your proposed, or that may affect the same area, consideration should be given to potential cumulative impacts with those developments."*	Cumulative effects are considered in **Section 19.16**.
	44	22 March 2023.	*"The Council agree that transboundary effects are unlikely in regard to ground conditions and contamination."*	The Council's agreement is noted. Transboundary effects have been scoped out and the basis for this is provided in **Section 19.14**.
	45	22 March 2023.	*"Use of Horizontal Directional Drilling (HDD) is welcomed to cross sensitive areas where open trenching should be avoided."*	The Council's approval of the use of trenchless crossings is noted. This approach has been used to enable the Project to avoid peat shown at an area of coniferous plantation woodland (at National Grid Reference [NGR] NK 10372 51342).

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
Aberdeenshire Council	188	22 March 2023.	*"I note those parts of the Scoping Report relevant to contaminated land (sections 6.1 and 6.4) and the intention produce a Phase 1 Geoenvironmental Desk Study for submission as part of the planning application. This is acceptable. It would aid matters if the report is submitted to this service as soon as possible, such that any contaminated land issues identified by that report can be resolved via further investigation or condition at the planning application stage."*	A Phase 1 Geoenvironmental Desk Study has been produced in accordance with LCRM and is included **Volume 3, Appendix 19.1**.
	688	27 June 2023.	*"Aberdeenshire Council acknowledge that they have nothing recorded from a ground conditions and contaminated land perspective at the landfalls presented. There is a major large area of contaminated land at Longside Airfield which is north of where the Project is proposing, however, if crossing Longside Airfield Aberdeenshire, the Council would be looking for consultation with SEPA given potential for radiological materials to have been used there."*	A Phase 1 Geoenvironmental Desk Study, which includes consideration of the potential for radioactive contamination at Longside Airfield, has been produced in accordance with LCRM and is included as **Volume 3, Appendix 19.1**.
	882	19 December 2024.	*"Contaminated Land* *As discussed in the meeting of 21st November 2024, the onshore site as defined by the Statutory Consultation 1 boundary overlaps or encloses over 120 parcels of potentially contaminated land (PCL) ranging from small quarries and locally significant point sources such as sheep dips and licenced petroleum storage to long linear structures such as the former railway line to Peterhead and large areas of land like the former Royal Air Force (RAF) Longside and its satellite camps and facilities.*	Following optioneering for the Project, most of the former RAF Longside Airfield is not in the Onshore Red Line Boundary and the Cocklaw - Former Radar Station is no longer in the study area. The Onshore Red Line Boundary is shown in **Volume 2, Figure 4.1 Onshore Red Line Boundary and indicative onshore infrastructure**. A Phase 1 Contaminated Land Report, which includes consideration

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
			These satellite camps and facilities are to the east and south of the airfield. The second Statutory Consultation boundary (October 2024) contains a subset of the above 120+ PCL. It is noted that this boundary appears to exclude the former RAF Longside airfield; however, historic mapping shows the outline to be different to that chosen by the applicant and extend into within the Statutory Consultation 2 boundary. *It is noted from the applicant's presentation that the two favoured locations for the siting of the substation site area, B and C, are in areas enclosing several of the former RAF Longside satellite camps, area B also including the former Small Arms and Ammunition Store, possibly part of the former Battle Headquarters site, and overlaps the south-eastern corner of the airfield (it is acknowledged that being north of the A950 that area is unlikely to be used for the substation).* *The other potential substation site areas, A, D, and E, also enclose PCL, area E the fewest: none of these are associated with the airfield.* *Should the proposals be the subject of a planning application this Service will require site investigation where the substation or cable route encounters PCL. As noted by other meeting contributors Unexploded Ordnance will need to be considered in the risk assessment. Where that PCL has a former RAF use, SEPA will be consulted, re radiological contamination, who may require appropriate investigation or other action.*	of the potential for radioactive and other contamination at Longside Airfield, has been produced in accordance with LCRM. The Geographical Information Systems dataset of potential contaminated land provided by Aberdeenshire Council has been used to inform the Phase 1 Contaminated Land Report and the baseline in **Section 19.6**. The Phase 1 Contaminated Land Report is included in **Volume 3, Appendix 19.1**.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
			This Service is able to provide information on some of the sites within the consultation boundary. A relevant extract of the Council PCL GIS overlay has been provided for the applicant under separate cover. Should information PCL sites be required, a timely request should be made via foi@aberdeenshire.gov.uk referencing the relevant site codes for which information is sought. It is expected that the request will be for those sites relevant to the substation area and cable route not the whole consultation SEPA phase 1 desk study should accompany any future application if excavations are proposed within a 1km radius of the following former airfields / Radar Stations to assist the Council in consideration of the risk from potential radioactive contamination from the past use of the land and potential for Radium-226 to still be present. The study should assess the potential for land contamination and what, if any further studies / assessments may be required: Peterhead (Longside) - Former Airfield NK 08000 47000 Cocklaw - Former Radar Station NK 08900 44200 *Notwithstanding the above, as confirmed at the meeting the Council has further information on smaller potentially Radium-226 contaminated sites outwith these 1km search areas associated with these airfields."*	
	886	19 December 2024.	*"Pollution Prevention, SEPA* *The submission must include a schedule of mitigation, which includes reference (to) best practice pollution prevention and construction techniques (for example, limiting the maximum area to be stripped of soils and peat at any one time) and*	The relevant embedded environmental measures to address the Council's comments are set out in **Table 19.23**.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
			regulatory requirements. Please refer to the Guidance for Pollution Prevention (https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/) and SEPAs water run-off from construction sites webpage (https://www.sepa.org.uk/regulations/water/pollution-control/water-run-off-from-construction-sites/) for more information."	
NatureScot	126	22 March 2023.	*"Geological SSSIs: The list of designated geological SSSIs in Chapter 6.1 does not include Hill of Longhaven which is notified for Quaternary interest. Potential impacts to this site should be assessed and included alongside the other geological SSSIs within the EIA."*	Hill of Longhaven SSSI has been considered as part of onshore optioneering potential impacts on the designated geological features have been considered in the assessment. Following refinement of the design, there are no sensitive geological receptors within the Onshore Red Line Boundary (see baseline in **Section 19.6**.
SEPA	13	15 September 2022.	*"An online meeting was held with SEPA on 15 September 2022 to discuss the approach to scoping for topics including ground conditions and land contamination. This confirmed that SEPA accepts the approach to contaminated land risk assessment set out in Land Condition Risk Management 2020. A request for information on landfill status, type and polygons for sites regulated by SEPA was also made. SEPA has confirmed that it does not hold polygon data for landfills, only point data (which has already been used to inform the Scoping Report). Due to the 2020 cyber-attack against SEPA, the data only covers the years 2015-2020 and not later years.*	The approach to contaminated land risk assessment set out in LCRM 2020 has been used. A Phase 1 Contaminated Land Report Geoenvironmental Desk Study has been produced in accordance with LCRM and is included as **Volume 3, Appendix 19.1**. Data on the SEPA Waste Sites and Capacity Tool (SEPA 2022c) has been consulted to inform **Volume 3, Appendix 19.1**.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
			Submitted at Scoping stage. *SEPA confirmed on 16 October 2024 the following:* *SEPA has handled your request under the Environmental Information (Scotland) Regulations 2024 (EIRs).* *Using the new boundary provided, we can confirm that there are no currently licenced landfills in or within a 250m radius of the search area. Regulation 14(1)(b) applies.* *Advice and Assistance* *All the landfill sites within the scoping area can be viewed on the landfill capacity tool: informatics.sepa.org.uk/WasteSiteCapacity/."*	
	152	20 February 2023.	*"3.2 The planning submission must a) demonstrate how the layout has been designed to minimise disturbance of peat and consequential release of CO2 and b) outline the preventative / mitigation measures to avoid significant drying or oxidation of peat through, for example, the construction of access tracks, drainage channels, cable trenches, or the storage and re-use of excavated peat. There is often less environmental impact from localised temporary storage and reuse rather than movement to large central peat storage areas."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils from the Soil Map of Scotland (1:25,000), and identifies the values assigned to these soils based on the Carbon and Peatland 2016 map. One area of peat is shown at an area of coniferous plantation woodland in the landfall(s) (at NGR NK 10372 51342). Mitigation is in place (use of trenchless crossing) to avoid disturbance to peat, removing the need for a PMP.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
	153	20 February 2023.	*"3.3 The submission must include:* *a) A detailed map of peat depths (this must be to full depth and follow the survey requirement of the Scottish Government's Guidance on Developments on Peatland - Peatland Survey (2017)) with all the built elements (including peat storage areas) overlain to demonstrate how the development avoids areas of deep peat and other sensitive receptors such as GWDTEs.* *b) A table which details the quantities of acrotelmic, catotelmic and amorphous peat which will be excavated for each element and where it will be re-used during reinstatement. Details of the proposed widths and depths of peat to be re-used and how it will be kept wet permanently must be included."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils from the Soil Map of Scotland (1:25,000), and identifies the values assigned to these soils based on the Carbon and Peatland 2016 map. Mitigation is in place (use of trenchless crossing) to avoid disturbance to peat, removing the need for a PMP.
	154	20 February 2023.	*"To avoid delay and potential objection proposals must be in accordance with Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste and our Developments on Peat and offsite uses of Waste Peat."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils from the Soil Map of Scotland (1:25,000), and identifies the values assigned to these soils based on the Carbon and Peatland 2016 map. Mitigation is in place (use of trenchless crossing) to avoid disturbance to peat, removing the need for a PMP.
	155	20 February 2023.	*"Dependent upon the volumes of peat likely to be encountered and the scale of the development, applicants must consider whether a full PMP (as detailed in the above guidance) is required or whether the above information would be best submitted as part of the schedule of mitigation."*	Optioneering of onshore infrastructure has sought to avoid areas of peat and carbon rich soils. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils from the Soil Map of Scotland (1:25,000), and identifies the

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
				values assigned to these soils based on the Carbon and Peatland 2016 map. Mitigation is in place (use of trenchless crossing) to avoid disturbance to peat, removing the need for a PMP.
	156	20 February 2023.	*"3.6 Please note we do not validate carbon balance assessments except where requested to by Scottish Government in exceptional circumstances. Our advice on the minimisation of peat disturbance and peatland restoration may need to be taken into account when you consider such assessments."*	This is noted. Assessment of the effects of the Project on greenhouse gases is provided in **Chapter 29: Greenhouse Gases**.
	166	20 February 2023.	*"8.2 The submission needs to demonstrate that there will be no discarding of materials that are likely to be classified as waste as any such proposals would be unacceptable under waste management licencing. Further guidance on this may be found in the document Is it waste - Understanding the definition of waste."*	The embedded environmental measures set out in **Table 19.23** include compliance with waste management licencing as required, compliance with SEPA guidance on the reuse of excavated materials, and soil management planning to avoid or minimise the permanent displacement of soils and to avoid damage to excavated soils that could result in them being unsuitable for reuse and subsequently requiring disposal as waste.

19.4 Scope of the assessment

19.4.1 Overview

19.4.1.1 This Section sets out the scope of the EIA for ground conditions and contamination. This scope has been developed as the Project's design has evolved and responds to stakeholder feedback received to-date, as set out in **Section 19.3**.

19.4.2 Spatial scope and study area

19.4.2.1 The spatial scope of the ground conditions and contamination assessment is defined as the Onshore Red Line Boundary (shown in **Volume 2, Figure 4.1**) with a 250 metre (m) buffer extending around it, which forms the study area. This buffer is applied inland only, other than in relation to land contamination receptors – where potential for impacts on the coastal environment are also considered. The following figures show the receptors within the study areas for geology, minerals, soils, carbon-rich soils and peatland, agricultural land (capability), and land contamination:

- **Volume 2, Figure 19.1a: Superficial geology and artificial ground**;
- **Volume 2, Figure 19.1b: Bedrock geology**;
- **Volume 2, Figure 19.2a: Soils**;
- **Volume 2, Figure 19.2b: Soil texture**;
- **Volume 2, Figure 19.3 Peat and peaty soils**;
- **Volume 2, Figure 19.4: Land capability for agriculture**; and
- **Volume 2, Figure 19.5: Land contamination and landfill**.

19.4.2.2 The 250m buffer is considered appropriate based upon professional experience in land contamination assessment in relation to the potential for contaminants to migrate from the site to offsite receptors through the soil or in groundwater, or to migrate onto the site through soil or in groundwater from offsite sources. It is acknowledged that contaminant migration beyond 250m can take place (such as when contaminants are released to surface water), however contaminated land risk assessment is concerned with identifying where unacceptable risk levels could be present due to a contaminant source in or on the land (including groundwater). Unless specific conditions are present (such as a preferential pathway, or contaminants are moving through highly permeable soils or rock) this is most likely to be observed within 250m of a source.

19.4.2.3 Geology, soils and agricultural land are geographically discrete and will typically not be substantially influenced by changes to their surroundings or vice versa, however, in relation to excavations, the hydrogeological effects of activities such as dewatering could potentially extend beyond the Onshore Red Line Boundary, and use of a 250m boundary therefore ensures that any sensitive receptors beyond the Onshore Red Line Boundary that may be affected are identified.

19.4.3 Temporal scope

19.4.3.1 The temporal scope of the assessment of ground conditions and contamination is the entire lifetime of the Project, which covers the construction, O&M, and decommissioning stages. The overall duration of the construction of the onshore infrastructure is expected to be up to nine years. It is anticipated that construction of the Project would commence in 2030.

19.4.3.2 It is anticipated that the construction of the Project will commence in 2030, with the first phase becoming fully operational by 2037. It is anticipated that the second phase of the Project would become fully operational by 2040 and the third phase by 2043. The operational lifetime of the Project for each phase is expected to be 35 years.

19.4.3.3 At decommissioning, the onshore substations and associated access roads will be removed and the site reinstated. The decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar types and levels of equipment and vehicles. The onshore substation site will be restored to its original state or made suitable for an alternative use. It is anticipated that the onshore export cables will be left in-situ with ends cut, sealed and buried to minimise environmental effects associated with removal. The underground structures of the joint bay(s), fibre optic cable (FOC) junction boxes and link boxes will be removed only if it is feasible with minimal environmental disturbance or if their removal is required to return the land to its current agricultural use.

19.4.4 Identified receptors

19.4.4.1 The spatial and temporal scope of the assessment enables the identification of receptors that may experience a change as a result of the Project. The receptors identified that may experience likely significantly effects for ground conditions and contamination are outlined in **Table 19.2**.

Table 19.2 Identified receptors requiring assessment for ground conditions and contamination

Receptor group	Receptors included within group
Geology / geodiversity	No sensitive receptors present. At the scoping stage for the Project, some geology / geodiversity receptors were identified in the Scoping Boundary. Following refinement of the Project search area, the study area does not include any sensitive geology / geodiversity sites.
Agricultural land and soils	<u>Soils including peat</u> Most land in the study area is undeveloped agricultural land where the naturally occurring soil horizons are likely to be present. The Soil Map of Scotland (1:25,000) scale shows that within the study area the most commonly occurring soils are gleys, which are poorly drained mineral soils. Peat is generally avoided following onshore optioneering for the Project, however some localised areas of peaty gleys and basin peat are also present. Details of the soils within the study area are provided in **Section 19.6.1**. **Volume 2**, **Figure 19.2a** shows the soil types present within the study area. **Volume 2, Figure 19.2b** shows the soil textures present within the study area. Soil texture and wetness are important in relation to soils' resilience to structural damage. **Volume 2, Figure 19.3** shows the locations of peat and peaty soils according to soil maps. <u>Agricultural land</u> In Scotland, agricultural land is classed according to the Land Capability for Agriculture (LCA) system, with Class 1 being the most

Receptor group	Receptors included within group
	versatile land for growing crops and Class 7 being land of very limited agricultural value (James Hutton Institute, 2025a). Land of LCA Classes 3.2, 4.1, 4.2, 5.2, 6.1, and 6.2 is present within the study area, as shown on **Volume 2, Figure 19.4**. No prime agricultural land (of Classes 1, 2, or 3.1, indicating land suitable for arable farming) is present within the study area.
Mineral resources	No sensitive receptors present. There are no areas of search for Minerals Development (Sand and Gravel reserves) or any Minerals Safeguarding Areas within the study area.
Land contamination	Potential land contamination receptors within the study area include the following: ● Human health: ▸ construction / ground workers; ▸ current site users – workers, other site users, members of the public; ▸ future site users – workers, other site users, members of the public; ▸ current adjacent land users - residents, workers, members of the public; and ▸ future adjacent land uses - residents, workers, members of the public. ● The water environment: ▸ groundwater (in superficial aquifers and bedrock aquifers); ▸ surface water (freshwater – rivers, streams, lakes, ponds etc. and coastal water); and ▸ water abstractions (groundwater and surface water). ● Property: ▸ agricultural property (crops and livestock); and ▸ the built environment (buildings, infrastructure, and buried utilities). ● Ecological receptors: ▸ Rattray Head to Peterhead Local Nature Conservation (LNC) Site.

19.4.5 Potential effects

19.4.5.1 Potential effects on ground conditions and contamination receptors that have been scoped in for assessment are summarised in **Table 19.3**.

Table 19.3 Potential effects for ground conditions and contamination

Receptor	Activity or impact	Potential effect
Construction stage		
Agricultural land and soils (including peat)	C1: Construction of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant.	Damage to soil during activities such as excavation, stockpiling and reinstatement, soil compaction caused by use construction plant / vehicles. The extent of the damage and the time taken for the soil health / soil functions to return to baseline conditions when construction activity has ceased will depend on the type of soil and the measures taken to protect soil during the work. Damage to soil structure / soil health is likely to result in a loss or reduction of soil functions. This could occur due to soil compaction, mixing of topsoil and subsoil during handling or storage, or soil erosion (from areas where vegetation has been stripped or from stockpiles due to wind or water). Soil erosion is likely to result in loss of soil organic matter. Damage to soil such as compaction, or mixing of topsoil and subsoil, could result in agricultural land capability being downgraded.
	C2: Permanent loss of soil / agricultural / other land due to construction of above ground elements of the Project.	The Project will require permanent development in the form the onshore substations, link boxes associated with jointing bays at landfall(s), joint bay(s), (not above ground but and along the onshore export cable corridor which will be buried at shallow depth (joint bay(s)) or at or above ground level.
	C3: Damage to land drainage systems during construction (excavation).	The maximum design scenario for construction effects on soils will be based on the maximum design scenario temporary development footprint for the landfall(s), onshore export cable corridor, including joint bay(s), access / haul roads, trenchless crossing compounds, potential temporary construction compounds, and onshore substations. This is to represent the maximum area where construction works may result in damage to (agricultural) land drainage systems, with subsequent impacts on soils.
Contaminated land receptors (humans [human health], the water environment [groundwater and surface water], ecological receptors, property [for example,	C4: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	Development can result in increased risks to receptors due to land contamination for example, mobilising contaminants by removing vegetation, introducing new receptors or pathways to receptors, or alternatively it can remove or lower risks to receptors for example, through changes to land use or through remediation.

Receptor	Activity or impact	Potential effect
grazing animals], the built environment [buildings and services])	C5: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust).	Potential to introduce new sources of contamination and cause deterioration of land quality / water quality due to accidental spills or releases.
O&M stage		
Contaminated land receptors (humans [human health], the water environment [groundwater and surface water], ecological receptors, property [for example, grazing animals], the built environment [buildings and services])	O1: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	Development can result in increased risks to receptors due to land contamination for example, mobilising contaminants by removing vegetation, introducing new receptors or pathways to receptors, or alternatively it can remove or lower risks to receptors for example, through changes to land use or through remediation.
Decommissioning stage		
Agricultural land and soils (including peat)	D1: Decommissioning of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant.	The detail and scope of the decommissioning will be determined by the relevant legislation and guidance at the time along with the proposed end-use for the land. As such, for the purposes of a maximum design scenario, impacts no greater than those identified for the construction stage are expected for the decommissioning stage. It is anticipated that the onshore cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.
Contaminated land receptors (humans [human health], the water environment [groundwater and surface water], ecological receptors, property [for example, grazing animals], the built environment [buildings and services])	D2: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	Development can result in increased risks to receptors due to land contamination for example, mobilising contaminants by removing vegetation, introducing new receptors or pathways to receptors, or alternatively it can remove or lower risks to receptors for example, through changes to land use or through remediation.

Receptor	Activity or impact	Potential effect
Contaminated land receptors (humans [human health], the water environment [groundwater and surface water], ecological receptors, property [for example, grazing animals], the built environment [buildings and services])	D3: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust).	Potential to introduce new sources of contamination and cause deterioration of land quality / water quality due to accidental spills or releases.

19.4.6 Effects scoped out of assessment

19.4.6.1 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out activity or impact is considered in turn in **Table 19.4**.

Table 19.4 Activities or effects scoped out of assessment

Activity or impact	Rational for scoping out
Geology / geodiversity	
Permanent damage to a locally or nationally important geological feature (construction, O&M or decommissioning)	Following refinement of the Project search area since Scoping, the study area does not include any sensitive geology / geodiversity sites and significant effects on geology / geodiversity are therefore unlikely.
Mineral resources	
Sterilisation of mineral resources due to permanent development (including onshore substations, transition joint bay(s) and buried cables) (construction, O&M or decommissioning)	Following refinement of the Project search area since Scoping, the study area does not include any Areas of Search for Minerals Development (Sand and Gravel reserves) or any Minerals Safeguarding Areas and significant effects on mineral resources are therefore unlikely.
Agricultural land and soils (including peat)	
Disturbance to / damage to soil or agricultural land, of the onshore export cables and grid connection cables (O&M)	Maintenance requirements that would entail disturbance of soil are likely to be minimal, infrequent and localised during operation of the Project. Significant effects on soil or agricultural land during the operation stage are therefore unlikely.

Activity or impact	Rational for scoping out
Contaminated land receptors	
Health effects on groundworkers due to land contamination (construction, O&M or decommissioning)	All works for the Project from construction through O&M and decommissioning must comply with the law. Health effects on ground workers during construction, maintenance activities during O&M or decommissioning, caused by direct contact, inhalation and / or ingestion of soils and dusts, are scoped out, as any work which may bring these workers or other site users into contact with contaminants would be subject to The Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974, which require that safe working practices are in place as part of normal construction health and safety management so that risks to these types of workers are controlled. Legal obligations include the requirement for appropriate risk assessments and method statements for all construction related activities and the use of appropriate working methods, training and Personal Protective Equipment (PPE).
Accidental release of contaminants to ground (O&M) for example, leaks from oil containing equipment in onshore substations, leaks from vehicles or equipment used for day-to-day activities	Effects on receptors caused by accidental release of contaminants to ground during operation (for example, leakages of oil from onshore substation equipment) are scoped out on the basis of the Project being designed and constructed to comply with industry good practice for pollution prevention, the above ground infrastructure being secure and only accessible to suitably trained and authorised workers, and all operations being subject to the Health and Safety at Work Act etc. 1974, and regulations made under this Act. Maintenance requirements that would entail vehicle or plant use on areas without designated access routes are likely to be minimal, infrequent and localised during operation of the Project.

19.5 Methodology for baseline data gathering

19.5.1 Overview

19.5.1.1 Baseline data collection has been undertaken to obtain information over the study area described in **Section 19.4: Scope of the assessment**. The current and future baseline conditions are presented in **Section 19.6: Baseline conditions.**

19.5.2 Desk study

19.5.2.1 The data sources that have been collected and used to inform this ground conditions and contamination assessment are summarised in **Table 19.5**.

Table 19.5 Data sources used to inform the ground conditions and contamination chapter

Source	Date	Summary	Coverage of study area
Geology / geodiversity			
British Geological Survey (BGS) GeoIndex	Accessed July 2025.	Geological mapping at 1:50,000 scale and borehole records.	Full coverage of the study area.
NatureScot, SiteLink	Accessed July 2025.	Details and extents of designated sites including SSSIs, Special Areas of Conservation (SACs) and Geological Conservation Review (GCR) sites (NatureScot, 2025a).	Full coverage of the study area.
Mineral resources			
Aberdeenshire Council, Aberdeenshire LDP 2023, Appendix 14 Areas Safeguarded or Identified as Areas of Search for Minerals Development	Accessed July 2025.	Maps showing areas safeguarded or identified as areas of search for minerals development (Aberdeenshire Council, 2023).	Full coverage of the study area.
Soils and agricultural land capability			
James Hutton Institute, Capability map: LCA (partial cover), 1984 to 1987	Accessed July 2025.	LCA Classes shown at 1:63,360 scale (James Hutton Institute, 2025a).	Full coverage of the study area.
James Hutton Institute, Soil map: Soil Map (partial cover), 2022	Accessed July 2025.	Shows the distribution of soil types across most of Scotland's cultivated agricultural soils and some adjacent uplands (James Hutton Institute, 2025b).	Full coverage of the study area.
James Hutton Institute, Thematic map: Map of	Accessed July 2025.	Shows soil texture based on individual soil profiles held within the Scottish Soils Database for soil series shown on the 1:25 000 scale	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
soil texture in nitrate vulnerable zones (NVZs), 2011		maps that delineate the NVZs. Measured particle size data for each soil horizon (layer) was classified to a depth of 80 centimetres (cm) into a soil texture type based on the British Standard Texture Classes and assigned to one of the five categories (shallow soils - SS, sands - S, sandy loams - SL, other mineral soils – other mineral soils (OMS), humose soils - HS, peaty soils – PS) (James Hutton Institute, 2025b). The OMS category is assigned to silts and clay, it includes sandy silt loam, silt loam and clay soils.	
James Hutton Institute, Point data: National Soils Inventory of Scotland (NSIS) (1978 to 1988)	Accessed July 2025.	Provides point data for sampling locations used for the NSIS, detailing the soil type found at each location.	One point is in the study area and in the Onshore Red Line Boundary at National Grid Reference NK10000 50000.
James Hutton Institute, Carbon and peatland 2016 map	Accessed July 2025.	Shows the distribution of carbon and peatland classes across Scotland and assigns a value to indicate the likely presence of carbon-rich soils, deep peat and priority peatland habitat for each mapped area, at a coarse scale (James Hutton Institute, 2016). Five classes are assigned for peat soils from Class 1 – nationally important carbon-rich soils, deep peat and priority habitat, to Class 5 – where soils are carbon rich and deep peat may be present, but soil information takes precedence over vegetation data, and no peatland habitat is recorded. The map also identifies mineral soil, unknown soil types, and non-soil (for example, lochs, built up areas, rock and scree).	Full coverage of the study area.
NatureScot, Peatland ACTION Peat depth and condition	Accessed July 2025.	NatureScot has prepared a consolidated spatial dataset of peat depth measurement collected across Scotland. The information was collected during peat depth surveys conducted as part of various assessments carried out on sites that formed part of the Peatland ACTION project (2013 to 2023) (NatureScot, 2025b).	The map records no peat depth surveys undertaken within the study area.

Source	Date	Summary	Coverage of study area
Land contamination			
Aberdeenshire Council, Potential contaminated land dataset (ENQ-2024-0657 PCL information)	January 2025.	Request for information made to Aberdeenshire Council who provided polygons and site names for areas of land identified by Aberdeenshire Council as being potentially affected by land contamination.	Full coverage of the study area.
WSP (2025) Phase 1 Contaminated Land Report	July 2025.	**Volume 3, Appendix 19.1** produced in accordance with LCRM. This Report also includes a geotechnical risk register.	Full coverage of the study area.

19.5.3 Site surveys

19.5.3.1 The site surveys that have been conducted and used to inform this ground conditions and contamination assessment are summarised in **Table 19.6**.

Table 19.6 Site surveys undertaken

Survey type	Scope of survey	Coverage of study area
Ground conditions and land use walkover survey (site reconnaissance), November 2023 **Detailed in: Volume 3, Appendix 19.1**	Site walkover of onshore substation site to record land use.	Onshore substation site only.
Ground conditions and land use walkover survey (site reconnaissance), September 2024 **Detailed in: Volume 3, Appendix 19.1**	Site walkover of onshore substations and landfall(s) and onshore export cable corridor to record land use. Use to obtain information on the ground conditions, land use and environmental setting.	Onshore substation site, landfall(s) and onshore export cable corridor.

19.5.4 Data limitations

19.5.4.1 There are no known data limitations at the time of this study relating to ground conditions and contamination that affect the robustness of the assessment of this EIA Report.

19.6 Baseline conditions

19.6.1 Current baseline

Soils

19.6.1.1 Information on the soils present in the study area presented in **Table 19.7** has been obtained from the Soil Map of Scotland and map of soil texture in NVZs as detailed in **Table 19.5** and shown in **Volume 2, Figure 19.2a** and **Figure 19.2b**.

19.6.1.2 The most frequently occurring soils throughout the Onshore Red Line Boundary, as shown on **Figure 19.2a** are:

- Gleys: gleys develop under conditions of permanent or intermittent waterlogging. These soils will often have been artificially drained to enable agriculture, as is evident by the presence of drainage channels in the Onshore Red Line Boundary. The soil colour will typically be greyish due to depletion of iron in reducing conditions, the soils often have grey gley patches and ped faces as well as rusty, ochreous mottles. Soil affected by surface water will generally have more gleying in the upper horizons, decreasing in intensity with depth, while soils affected by fluctuating (and seasonally high) groundwaters will generally have more intense gleying in the lower soil horizons. The soil texture map (**Volume 2, Figure 19.2b**) describes these as other mineral soils (OMS). OMS is a general category applied to silty and clay soils.

19.6.1.3 Other soil types and textures occurring within the Onshore Red Line Boundary (see **Volume 2, Figure 19.2a** and **Figure 19.2b**) are as follows:

- In the landfall(s), the Soil Map of Scotland (see **Volume 2, Figure 19.2a**) shows 'immature soils', confirmed on **Volume 2, Figure 19.2b** as sand soils, these are present at the coastline. Moving inland from the coast, these are overlain by OMS.
- An area of peat is shown to the south-east of St Fergus (see **Volume 2, Figure 19.2a**), within an area of coniferous plantation woodland (at NGR NK 10496 51319) and a field. Disturbance to peat, if present at this area, will be avoided by the use of a trenchless crossing.
- Alluvial soils occur along the onshore export cable corridor of the Annachie Burn and tributaries (see **Volume 2, Figure 19.2a**), typically comprising OMS but sandy loams are present locally (see **Volume 2, Figure 19.2b**). Alluvial soils will typically be avoided by the Project by the use of trenchless crossings.
- Peaty gleys occur at Kinloch Farm around ponds and the onshore export cable corridor of the Cuttie Burn (see **Volume 2, Figure 19.2a**). In the onshore export cable corridor from the landfall(s) to the onshore substations in the west of Inverugie a small area of peaty gleys is present.
- In the onshore export cable corridor from the landfall(s) to the onshore substations, alluvial soils occur along the onshore export cable corridor of the River Ugie and at Downiehills Farm where a tributary of the River Ugie intersects the corridor (see **Volume 2, Figure 19.2a**), typically comprising OMS but sandy loams are present locally (see **Volume 2, Figure 19.2b**). Alluvial soils also occur in the west of the onshore substation site and in the east of the onshore export cable corridor from the onshore substations to Netherton Hub, where the same tributary intersects the Onshore Red Line Boundary. Alluvial soils will typically be avoided by the Project by the use of trenchless crossings.
- At the south-east corner of the onshore substation site and west of the tributary at East Thunderton in the onshore export cable corridor B, brown soils (OMS) are present (see **Volume 2, Figure 19.2a**).
- A small area of humus-iron podzols (identified as a mineral podzols on **Volume 2, Figure 19.2a**) is also present west of the tributary at East Thunderton (shown as mineral podzols on **Volume 2, Figure 19.2a**), these are generally sand soils but may have a sandy loam topsoil (see **Volume 2, Figure 19.2b**). Where the Burn of Faichfield and tributaries intersect the onshore export cable corridor from the onshore substations to Netherton Hub, the soils include alluvial soils and humus-iron podzols.

19.6.1.4 The indicative soil texture throughout the onshore export cable corridor, shown on **Volume 2, Figure 19.2b**, is variable, ranging from light sand soils to heavier clays, with some organic soils also present locally. The most frequently occurring soils of the Peterhead Association are likely to be clay loams or clays, as described in the Soil Survey of Scotland (Macauley Institute for Soil Research, 1982). Soil texture, along with soil wetness / moisture, and soil structure influence how resilient a soil will be to damage caused by handling. The clay loams or clays of the Peterhead Association will be more susceptible to structural damage than sand soils.

19.6.1.5 Organic soils will largely be avoided by the Project. Peat soils are carbon-rich and are defined in Scotland as having more than 60 per cent organic matter and at least 50cm thickness (NatureScot, 2023). One area of peat soil is shown in the landfall(s) and is intersected by segment L1, this could potentially meet the criteria defined above for peat soil. Disturbance to this peat soil, shown in an area of coniferous plantation woodland and an adjacent field (at NGR NK 10496 51319), as shown on **Volume 2, Figure 19.2a** and **Volume 2, Figure 19.3**, will be avoided by using a trenchless crossing. Avoidance of peat

soil is in accordance with the peat hierarchy, as per commitment M-068 (see **Table 19.23**). There two are localised areas of peaty gleys occurring within arable farmland in the Onshore Red Line Boundary. The northernmost area occurs in the landfall(s) and is intersected by segment L1. These soils will be avoided by using a trenchless crossing. The second area occurs within the onshore export cable corridor from the landfall(s) to the onshore substations in a field which has been used for arable agriculture. These peaty soils are therefore likely to have been disturbed, and shallow peat layers damaged / lost / mixed with other soils through cultivation (ploughing, tilling etc) and harvesting. Shallow peat layers could still be encountered by the Project in this area however these would most likely occur within the subsurface rather than at surface, due to the long period of agricultural land use.

Table 19.7 Recorded soils by Project zone

Project zone	Soil association, Soil Map Unit (based on Soil Map [partial cover] 2022)	Parent material	Major soil group, major soil subgroup or component soils (soil complexes only)	Drainage	Indicative soil texture based on Soil texture NVZ 2011 map
Landfall(s)	Links, Culbin.	Windblown sands.	Regosols, noncalcareous regosols.	Excessively drained.	Sand soil.
	Links, Dornoch.	Windblown sands.	Regosols, noncalcareous regosols.	Freely drained.	Sand soil.
	Blackwater, Blackwater.	Dark grey raised beach deposits of silty clay partially overlain by blown sand.	Noncalcareous regosols, gleys.	Not stated	OMS (silty or clay soils) over sand.
	Mixed Bottom Land.	N/A – present in narrow stream channels and gullies, unstable steep slopes along valley sides, and cliffs.	Mobol.	Not stated.	Sand soil.
	Organic Soils, Basin Peat.	Organic deposits.	N/A (Basin peats).	Not stated.	Peat soil.
	Alluvial Soils, Alluvial Soils: undifferentiated texture and drainage.	Recent riverine and lacustrine alluvial deposits.	Alluvial Soils, undifferentiated alluvial soils.	Undifferentiated drainage class.	OMS (silty or clay soils) but sandy loam in places.

Project zone	Soil association, Soil Map Unit (based on Soil Map [partial cover] 2022)	Parent material	Major soil group, major soil subgroup or component soils (soil complexes only)	Drainage	Indicative soil texture based on Soil texture NVZ 2011 map
	Peterhead, Peterhead.	Till derived from sediments of Old Red Sandstone age containing some igneous and metamorphic rocks and conglomerate cobbles.	Gleys, non calcareous gleys, and localised areas of peaty gleys.	Poorly drained, and (peaty gleys) very poorly drained.	OMS (silty or clay soils) (typically clay loam or clay soils).
	Corby, Corby.	Glacio-fluvial deposits of sands and gravels derived from acid rocks.	Podzols.	Freely drained.	Sand soil but may have a sandy loam topsoil.
Onshore export cable corridor from the landfall(s) to the onshore substations	Peterhead, Peterhead.	Till derived from sediments of Old Red Sandstone age containing some igneous and metamorphic rocks and conglomerate cobbles.	Gleys, non calcareous gleys, and localised areas of peaty gleys.	Poorly drained, and (peaty gleys) very poorly drained.	OMS (silty or clay soils) (typically clay loam or clay soils).
	Alluvial Soils, Alluvial Soils: undifferentiated texture and drainage.	Recent riverine and lacustrine alluvial deposits.	Alluvial Soils, undifferentiated alluvial soils.	Undifferentiated drainage class.	OMS (silty or clay soils) but sandy loam in places.
Onshore substation site	Peterhead, Peterhead.	Till derived from sediments of Old Red Sandstone age containing some igneous and metamorphic rocks and	Gleys, non calcareous gleys.	Poorly drained.	OMS (silty or clay soils) (typically clay loam or clay soils).

Project zone	Soil association, Soil Map Unit (based on Soil Map [partial cover] 2022)	Parent material	Major soil group, major soil subgroup or component soils (soil complexes only)	Drainage	Indicative soil texture based on Soil texture NVZ 2011 map
		conglomerate cobbles.			
	Peterhead, Blackhouse.	Till derived from sediments of Old Red Sandstone age containing some igneous and metamorphic rocks and conglomerate cobbles.	Brown soils, brown earths.	Imperfectly drained.	OMS (silty or clay soils) (typically clay loam or clay soils)
	Alluvial Soils, Alluvial Soils: undifferentiated texture and drainage.	Recent riverine and lacustrine alluvial deposits.	Alluvial Soils, undifferentiated alluvial soils.	Undifferentiated drainage class.	OMS (silty or clay soils) but sandy loam in places.
Onshore export cable corridor from the onshore substations to Netherton Hub	Alluvial Soils, Alluvial Soils: undifferentiated texture and drainage.	Recent riverine and lacustrine alluvial deposits.	Alluvial Soils, undifferentiated alluvial soils.	Undifferentiated drainage class.	OMS (silty or clay soils) but sandy loam in places.
	Peterhead, Blackhouse.	Till derived from sediments of Old Red Sandstone age containing some igneous and metamorphic rocks and conglomerate cobbles.	Brown soils, brown earths.	Imperfectly drained.	OMS (silty or clay soils) (typically clay loam or clay soils).
	Corby, Corby.	Glacio-fluvial deposits of sands and gravels derived from acid rocks.	Podzols, humus-iron podzols.	Freely drained.	Sand soil but may have a sandy loam topsoil.

Project zone	Soil association, Soil Map Unit (based on Soil Map [partial cover] 2022)	Parent material	Major soil group, major soil subgroup or component soils (soil complexes only)	Drainage	Indicative soil texture based on Soil texture NVZ 2011 map
	Tarves, Pitmedden.	Drifts derived from biotite-gneisses, hornblende schists or diorites and mixed drifts derived from acid and basic rocks.	Gleys, noncalcareous gleys.	Poorly drained.	OMS (silty or clay soils) but may have a sandy loam subsoil.
	Boyndie, Boyndie.	Glacio-fluvial deposits of sands.	Podzols, humus-iron podzols.	Freely drained.	Sand soil or sand soil but may have a sandy loam topsoil.
	Boyndie, Dallachy.	Glacio-fluvial deposits of sands.	Gleys, non calcareous gleys.	Poorly drained.	Sand soil but may have a sandy loam topsoil.

19.6.1.6 One soil survey point completed for the NSIS is located at NGR NK 10000 50000 at 40m Above Ordnance Datum in the landfall(s), west of segment L1. This records the major soil group as gleys, the natural drainage of the soil profile as poor, and the soil parent material as till. A topsoil thickness ('A' horizon) of 43cm was recorded comprising dark brown loam. The subsoil ('B' horizon) extended to 54cm below ground level and comprised a brown sandy clay loam. Weathered rock aka overburden ('C' horizon) was recorded to 101cm depth, comprising reddish brown clay loam.

Soils in nature conservation areas or sensitive ecological areas

19.6.1.7 The Project generally avoids areas designated for nature (including biodiversity and geodiversity) conservation, except for the coastal area at the landfall(s) which includes an area designated by Aberdeenshire Council as a LNC site. Disturbance to soils within this area will be avoided by the Project by installing ducts and associated onshore export cables by using trenchless crossing techniques. This is an embedded environmental measure (M-005 and M-027) in **Table 19.23**.

Agricultural land

19.6.1.8 Information on the agricultural land quality in the study area is presented in **Table 19.8** has been obtained from the LCA (partial cover) map, as detailed in **Table 19.5** and shown in **Volume 2, Figure 19.4**. The map shows the distribution of the different land lasses across virtually all of Scotland's cultivated agricultural land and adjacent uplands. Land is classed based on its physical characteristics (the soil, climate and relief) in terms of its potential productivity and flexibility to grow crops.

19.6.1.9 The LCA system Classes are defined as follows, and Classes 1 to 3.1 are known as prime agricultural land:

- Class 1 - Land capable of producing a very wide range of crops;
- Class 2 - Land capable of producing a wide range of crops;
- Class 3.1 - Land capable of producing consistently high yields of a narrow range of crops and / or moderate yields of a wider range. Short grass leys are common;
- Class 3.2 - Land capable of average production though high yields of barley, oats and grass can be obtained. Grass leys are common;
- Class 4.1 - Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal;
- Class 4.2 - Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops;
- Class 5.1 - Land capable of use as improved grassland. Few problems with pasture establishment and maintenance and potential high yields;
- Class 5.2 - Land capable of use as improved grassland. Few problems with pasture establishment but may be difficult to maintain;
- Class 5.3 - Land capable of use as improved grassland. Pasture deteriorates quickly;
- Class 6.1 - Land capable of use as rough grazings with a high proportion of palatable plants;
- Class 6.2 - Land capable of use as rough grazings with moderate quality plants;
- Class 6.3 - Land capable of use as rough grazings with low quality plants;
- Class 7 - Land of very limited agricultural value; and
- Urban for example, developed areas (though in some instances the mapping will not reflect recently developed areas due to the maps being published earlier).

19.6.1.10 Most of the land in the Onshore Red Line Boundary and study area is Class 3.2, lower grades are also present, generally in coastal areas and in proximity to watercourses a detailed in **Table 19.8** and shown on **Volume 2, Figure 19.4**.

Table 19.8 Agricultural land quality by Project zone

Project zone	LCA Class	Area covered by LCA Class
Landfall(s)	6.2	St Fergus Links and Craigewan Links, dunes.
	4.1	Scotston, Peterhead Golf Club, wooded area south of Cuttie Burn. Includes part of the Scotstown landfall and most of the Lunderton South landfall.
	3.2	Most of the landfall(s), between South Scotston and Cairnhill, and at Lunderton and Hallmoss. Present in part of the Scotstown landfall, all of the Lunderton North landfall and a small portion of the Lunderton South landfall.
	4.2	Cuttie Burn, where it intersects this zone.

Project zone	LCA Class	Area covered by LCA Class
Onshore export cable corridor from the landfall(s) to the onshore substations	4.2	Cuttie Burn and River Ugie, where they intersect this zone.
	6.1	River Ugie, where it intersects this zone.
	3.2	Most of the onshore export cable corridor from the landfall(s) to the onshore substations.
	6.1	River Ugie, where it intersects this zone, west of Inverugie (at small area of peaty gleys).
Onshore substation site	3.2	Most of the onshore substation site.
	4.2	Area in the south-west by tributary of the River Ugie, where it intersects this zone.
Onshore export cable corridor from the onshore substations to Scottish and Southern Electricity Networks (SSEN) Netherton Hub	3.2	All of the onshore export cable corridor from the onshore substations to SSEN Netherton Hub.

Nature conservation designations

19.6.1.11 Within the Onshore Red Line Boundary there are two areas with non-statutory nature conservation designations. These are detailed in **Chapter 23: Terrestrial Ecology and Ornithology** and comprise the Rattrayhead to Peterhead Coast LNC Site and Ancient Woodland along the banks of the River Ugie.

19.6.1.12 Physical disturbance to shallow soils in both areas will be avoided by the Project by using trenchless crossings for the installation of landfall cable ducts and associated onshore export cables.

Geology, hydrogeology and hydrology

19.6.1.13 The anticipated geology in the Onshore Red Line Boundary detailed in the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**) and presented in this Chapter, is based on BGS 1:50,000 scale geological mapping, and BGS borehole records, The superficial geology and areas of mapped artificial ground are shown on **Volume 2, Figure 19.1a**. The bedrock geology is shown on **Volume 2, Figure 19.1b**.

19.6.1.14 Due to the large area covered by the Project the geology and applicable aquifer designations are described by zones and segments as shown on Figure 2 in **Volume 3, Appendix 19.1** as follows:

- Landfall(s): Scotstown landfall, **Table 19.9**;
- Landfall(s): Lunderton North landfall, **Table 19.10**;
- Landfall(s): Lunderton South landfall, **Table 19.11**;
- Landfall(s): segment L1, **Table 19.12**;
- Landfall(s): segment L2, **Table 19.13**;
- Landfall(s): segment L3, **Table 19.14**;

- Landfall(s): segment L4, **Table 19.15**;
- Onshore export cable corridor from the landfall(s) to the onshore substations: segment A1, **Table 19.16**;
- Onshore export cable corridor from the landfall(s) to the onshore substations: segment A2, **Table 19.17**;
- Onshore substation site **Table 19.18**; and
- Onshore export cable corridor from the onshore substations to Netherton Hub: segment B1, **Table 19.19.**

19.6.1.15 Aquifer designations in the tables listed above are based on BGS 1:625,000 scale hydrogeological mapping and information obtained from SEPA's Water Classification Hub (SEPA, 2025a).

Table 19.9 Geology and hydrogeology summary (Scotstown landfall)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	The area near the beach car park is recorded as worked ground associated with a former sand pit.	NK15SW5 (1978) – St Fergus Links Sand Pit (area of mast): • Blown Sand to 4.6m below ground level (bgl); • Post-Glacial Beach Deposits (sandy gravel with pebble band at top) to >5.6m bgl; and • groundwater at 5.4m bgl. NK15SW2 (1977) – Located ≈180m north of the site. • Post-Glacial Beach Deposits (sandy gravel) to 2.8m bgl; • Till (stiff silty clay to 7.7m bgl	Not Mapped	Small areas of thin Made Ground may be present associated with the road development, rifle range, and former sand pit. Made Ground may also be present relating to the disused canal to the north-west and any potential infill materials are unknown. A potential underground tank was also observed adjacent to the access road.
Superficial Deposits	West: Lacustrine Deposits (clay, silt and sand) East: Blown Sand Marine Beach Deposits recorded along the beach section.		Fraserburgh Sand and Gravel groundwater body (SEPA ID: 150800) mapped along the shoreline, with a 'Good' overall status in 2023. BGS map the superficial deposits as a locally important aquifer in the blown sands, with significant intergranular flow.	Anticipated to be at least 5m thick based on BGS borehole records.
Bedrock	Crinan Subgroup and Tayvallich Subgroup (Semipelite,		Fraserburgh groundwater body (SEPA ID: 150634) with a 'Good' overall status in 2023.	Depth to bedrock is unknown due to limited BGS borehole information.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	Pelite and Psammite)	underlain by clayey sand and gravel) to 12.1m bgl; • Glacial Sand and Gravel proven to 12.4m bgl; and • groundwater at 0.80m bgl.	BGS map the Argyll Group as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Flow mechanism is virtually all through fractures and other discontinuities.	

Table 19.10 Geology and hydrogeology summary (Lunderton North landfall)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	N/A	NK14NW4 (1977) – centre of site: • Till (clay becoming stiff with depth) to 4.20m bgl; • Glaciolacustrine Deposits (clayey sandy silt) to 8.0m bgl; • Till (sandy clay) to 10.90m bgl; • weathered granite proven to 11.20m bgl; and • groundwater not encountered.	Not mapped.	Made Ground is not anticipated within the landfall.
Superficial Deposits	West: Hatton Till Formation (diamicton, clay, sand and gravel). East: Blown Sand Marine Beach Deposits recorded along the beach section.		Fraserburgh Sand and Gravel groundwater body (SEPA ID: 150800) mapped along the shoreline, with a 'Good' overall status in 2023. BGS map the superficial deposits as a locally important aquifer in the blown sands, with significant intergranular flow.	Superficial deposits anticipated to underlie the site and at least 10m thick in centre of site.
Bedrock	North: Crinan Subgroup and Tayvallich Subgroup (Semipelite, Pelite and Psammite). South-west: Forest of Deer Pluton. (Melagranite, Biotite).		Fraserburgh groundwater body (SEPA ID: 150634) with a 'Good' overall status in 2023. BGS map the Argyll Group and igneous intrusions as low productivity aquifers with small amounts of groundwater in near	Granitic bedrock proven in centre of site at 11.20m bgl.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	South-east: Peterhead Pluton (Granite).		surface weathered zone and secondary fractures. The igneous strata also have rare springs. Flow mechanism for each group is virtually all through fractures and other discontinuities.	

Table 19.11 Geology and hydrogeology summary (Lunderton South landfall)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	N/A	NK14NW5 (1978) – southern boundary: • Till (stiff clay) to 8.60m bgl; • Glaciolacustrine Deposits (stiff laminated clay) to 11.0m bgl; • Till (stiff clay) proven to 18.30m bgl; and • groundwater at 8.40m bgl.	Not mapped.	Limited Made Ground is anticipated within the landfall area and if present may be encountered as reworked natural soils as part of the Golf Course development or from agricultural use.
Superficial deposits	West: Hatton Till Formation. East: Blown Sand (occurs at Peterhead Golf Course where it is within the landfall extent). Marine Beach Deposits recorded along the beach section.		Fraserburgh Sand and Gravel groundwater body (SEPA ID: 150800) mapped along the shoreline, with a 'Good' overall status in 2023. BGS map the superficial deposits as a	Superficial deposits anticipated to underlie the site and at least 18m thick in south of site.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
			locally important aquifer in the blown sands, with significant intergranular flow.	
Bedrock	Peterhead Pluton (Granite).		Fraserburgh groundwater body (SEPA ID: 150634) with a 'Good' overall status in 2023. BGS map the igneous intrusion as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures, with rare springs. Flow mechanism is virtually all through fractures and other discontinuities.	Bedrock anticipated to be at depths >18m bgl in south of site.

Table 19.12 Geology and hydrogeology summary (landfall (s): segment L1)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses	NK05SE9 (1977) – Kinloch Farm St Fergus (near centre of segment):	Not mapped.	Thicknesses are anticipated to be limited and potentially greater if

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	including disused canal, agricultural uses, and in proximity of properties.	Soil to 0.60m bgl. • Till to 9.2m bgl (stiff clay with gravel and rare boulders); • Glaciolacustrine deposits (laminated or banded sandy silt) to >19.0m bgl; and • groundwater at 11.5m bgl.		the disused canal has been infilled.
Superficial deposits	Lacustrine Deposits (clay, silt and sand) in the north to near crossing CRL101. Between CRL101 and the southern end comprises Hatton Till Formation (diamicton, clay, sand and gravel).		Not mapped by SEPA. BGS map the superficial deposits in the north of segment L1 as a locally important aquifer in the blown sands in the east and the Quaternary Sands and Gravels in the west, both with significant intergranular flow. The southern end of this segment is mapped as a concealed aquifer of limited potential, in a region without significant groundwater within the Quaternary Coastal and Fluviatile Alluvium. Note: the strata descriptions and extents differ slightly due to differences in scale (1:50,000 and 1:625,000).	Anticipated to be at least 19m thick in centre of the segment area.
Bedrock	Crinan Subgroup and Tayvallich Subgroup (Semipelite, Pelite and Psammite)		Bedrock groundwater body mapped as Fraserburgh (SEPA ID: 150634), 'Good' condition in 2023. BGS map the Argyll Group as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Flow mechanism is virtually all through fractures and other discontinuities.	Depth to bedrock is unknown due to limited BGS borehole information.

Table 19.13 Geology and hydrogeology summary (landfall(s): segment L2)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses including disused canal, former corn mill, agricultural uses, and in proximity of properties.	NK04NE9 (1977) – Cairnhill Farm Peterhead (near south of segment): • Soil to 0.50m bgl; • Till (gravelly clay) to >8.0m bgl; • terminated due to 'rock obstruction'; and • groundwater at 2.90m bgl. NK14NW4 (1977) – Lunderton Farm Peterhead (near east of segment): • Clayey soil to 0.40m bgl; • Till (stiff gravelly clay) to 4.20m bgl; • Glaciolacustrine deposits (clayey sandy silt with laminations) to 8.0m bgl; • Till (sandy gravelly clay) to 10.90m bgl; • weathered granite to >11.20m bgl; and • groundwater not encountered.	Not mapped.	Thicknesses are anticipated to be limited and potentially greater if the disused canal has been infilled.
Superficial deposits	Hatton Till Formation (diamicton, clay, sand and gravel). Alluvium (clay, silt, sand and gravel) also present as a strip along the River Ugie in the south of the segment.		Not mapped by SEPA. BGS map the east of the segment as a locally important aquifer in the blown sands, with significant intergranular flow. The western end of this segment is also mapped as a concealed aquifer of limited potential, in a region without significant groundwater within the Quaternary Coastal and Fluviatile Alluvium. Note: the strata descriptions and extents differ slightly due to differences in scale (1:50,000 and 1:625,000).	Anticipated to be at least 8m thick in south of the segment and proven to at least 10.90m in the east.
Bedrock	West: Crinan Subgroup and Tayvallich Subgroup (Semipelite, Pelite and Psammite). East: Forest of Deer Pluton (Melagranite, Biotite).		Bedrock groundwater body mapped as Fraserburgh (SEPA ID: 150634), 'Good' condition in 2023. South of segment between River Ugie and crossing CRL203: Bedrock groundwater body mapped as Mintlaw (SEPA ID: 150655), 'Good' condition. BGS map the Argyll Group (west) and igneous pluton (east) as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures.	Bedrock proven at 10.90m bgl near the east of the segment.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
			Rare springs are also present within the pluton. Flow mechanism is virtually all through fractures and other discontinuities.	

Table 19.14 Geology and hydrogeology summary (landfall(s): segment L3)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses including disused canal, agricultural uses, and in proximity of properties.	NK14NW4 (1977) • Lunderton Farm Peterhead (near east of segment); • Clayey soil to 0.40m bgl; • Till (stiff gravelly clay) to 4.20m bgl; • Glaciolacustrine deposits (clayey sandy silt with laminations) to 8.0m bgl; • Till (sandy gravelly clay) to 10.90m bgl; • weathered granite to >11.20m bgl; and • groundwater not encountered.	Not mapped.	Thicknesses are anticipated to be limited and potentially greater if the disused canal has been infilled.
Superficial deposits	Hatton Till Formation (diamicton, clay, sand and gravel).		Not mapped by SEPA. BGS map the east of the segment as a locally important aquifer in the blown sands, with significant intergranular flow. The western end of this segment is also mapped as a concealed aquifer of limited potential, in a region without significant groundwater within the Quaternary Coastal and Fluviatile Alluvium. Note: the strata descriptions and extents differ slightly due to differences in scale (1:50,000 and 1:625,000).	Anticipated to be at least 8m thick in south of the segment and proven to at least 10.90m in the east.
Bedrock	West: Crinan Subgroup and Tayvallich Subgroup (Semipelite, Pelite and Psammite). East: Forest of Deer Pluton		Bedrock groundwater body mapped as Fraserburgh (SEPA ID: 150634), 'Good' condition in 2023. BGS map the Argyll Group (west) and igneous pluton (east) as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Rare springs are also present within the pluton.	Bedrock proven at 10.90m bgl near the east of the segment.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	(Melagranite, Biotite).		Flow mechanism is virtually all through fractures and other discontinuities.	

Table 19.15 Geology and hydrogeology summary (landfall(s): segment L4)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses including disused canal, former railway line, pumps, agricultural uses, and in proximity of properties or roads.	NK14NW5 (1977) – Mains of Inverugie, Peterhead (400m south of eastern end of segment): • Soil and peat to 1.50m bgl; • Till (stiff laminated gravelly clay) to 8.60m bgl; • Glaciolacustrine deposits (laminated stiff clay) to 11.0m bgl; • Till (stiff gravelly clay to 15.7m, sandy gravelly clay) to >18.3m bgl; and • groundwater at 8.40m bgl.	Not mapped.	Thicknesses are anticipated to be limited and potentially greater where the disused canal has been infilled in the west, within land parcel 6290.
Superficial deposits	Hatton Till Formation (diamicton, clay, sand and gravel).		Not mapped by SEPA. BGS map the east of the segment as a locally important aquifer in the blown sands, with significant intergranular flow. The western end of this segment is also mapped as a concealed aquifer of limited potential, in a region without significant groundwater within the Quaternary Coastal and Fluviatile Alluvium. Note: the strata descriptions and extents differ slightly due to differences in scale (1:50,000 and 1:625,000).	Limited BGS borehole data within the segment, however proven to be at least 18m thick 400m south of the segment.
Bedrock	West: Forest of Deer Pluton (Melagranite, Biotite). East: Peterhead		East of the segment: Bedrock groundwater body mapped as Fraserburgh (SEPA ID: 150634), 'Good' condition in 2023.	Depth to bedrock is unknown due to limited BGS borehole information that

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	Pluton (Granite).		West: Bedrock groundwater body mapped as Mintlaw (SEPA ID: 150655), 'Good' condition. BGS map the Argyll Group (west) and igneous pluton (east) as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Rare springs are also present within the pluton. Flow mechanism is virtually all through fractures and other discontinuities.	encountered bedrock.

Table 19.16 Geology and hydrogeology summary (onshore export cable corridor from the landfall(s) to the onshore substations: segment A1)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses including railway line, airfield in the area north of Downiehill, infilled ground workings near to and including redevelopment of the Brick and Tile Works, or agricultural uses, and in proximity of properties or roads.	NK04NE14 (1995) – Easterton Farm (north of segment): • Drift to 3.0m bgl; and • Bedrock to 39.0m bgl. NK04NE15 (1995) – Holmlea Inverugie BH1 (north of segment, 300m east offsite): • Stoney till to 6.0m bgl; • 'Rotten soft rock' to 9.80m bgl; • harder broken rock to 12.0m bgl; • hard black grey rock and black grey with red seams' to 120m bgl; and	Not mapped.	Thicknesses are anticipated to be limited generally in fields as reworked natural soils. Greater thicknesses are expected in the south of the segment where the airfield boundary extended onto site, infilling of worked ground in the south-east, and demolition and redevelopment of the historical Brick and Tile Works.
Superficial deposits	Hatton Till Formation (diamicton, clay, sand and gravel) beneath majority of		Not mapped by SEPA. BGS map the north of the segment near the River Ugie as a concealed aquifer of limited potential, in a region without	Limited BGS borehole information available, superficial deposit thickness in the north of the segment reportedly varies between 3m to

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
	segment A1, with a small area of Alluvium (clay, silt, sand and gravel) and no mapped deposits at the River Ugie.	• stable groundwater level at 6.0m bgl. NK04NE16 (1995) – Holmlea Inverugie BH2 (north of segment, 300m east of site): • Stoney till to 6.0m bgl; • weathered soft rock to 15.0m bgl; • garder black rock to 27.0m bgl; • Granite to 120.0m bgl; and • stable groundwater level at 6.0m bgl. NK04NE8 (1977) – Peterhead Disused Airfield (south of segment, 340m west): • Till (gravelly clay) to 4.20m bgl; and • weathered granite to >4.40m bgl.	significant groundwater within the Quaternary Coastal and Fluviatile Alluvium. Note: the strata descriptions and extents differ slightly due to differences in scale (1:50,000 and 1:625,000).	6m. An offsite borehole in the south also recorded superficial deposits up to 4.20m thick.
Bedrock	North (CRL204 to CRA101): Crinan Subgroup and Tayvallich Subgroup (Semipelite, Pelite and Psammite). Mid (CRA101 to CRA106): Forest of Deer Pluton (Melagranite, Biotite). South (CRA106 to CRA109): Peterhead Pluton (Granite).		Bedrock groundwater body mapped as Mintlaw (SEPA ID: 150655), 'Good' condition. BGS map the Argyll Group (north) and igneous intrusions as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Rare springs are also present within the plutons. Flow mechanism is virtually all through fractures and other discontinuities.	Limited BGS borehole information available, bedrock recorded in the north of the segment at between 3m to 6m. An offsite borehole in the south also recorded bedrock at 4.20m.

Table 19.17 Geology and hydrogeology summary (onshore export cable corridor from the landfall(s) to the onshore substations: segment A2)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – may be present from historical uses or agricultural uses.	No boreholes onsite or within 500m.	Not mapped.	Thicknesses are anticipated to be limited generally in fields as reworked natural soils. Made Ground may potentially be present in the east where the historical camp site / sewage disposal works was located adjacent to site.
Superficial Deposits	Hatton Till Formation (diamicton, clay, sand and gravel).		Not mapped by SEPA or BGS.	Limited BGS borehole information available for this segment. A distant borehole within the disused airfield to the west recorded limited thickness of superficial deposits up to 4.20m bgl.
Bedrock	Peterhead Pluton (Granite) with a small section in the north comprising Forest of Deer Pluton (Melagranite, Biotite).		Bedrock groundwater body mapped as Mintlaw (SEPA ID: 150655), 'Good' condition. BGS map the igneous intrusions as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures, with rare springs. Flow mechanism is virtually all through fractures and other discontinuities.	Limited BGS borehole information available for this segment. A distant borehole within the disused airfield to the west recorded bedrock at 4.20m bgl.

Table 19.18 Summary of geology and hydrogeology (onshore substation site)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	Not mapped by BGS – however may be present as reworked soils from agricultural use, historical camp sites, and earthworks undertaken to remove hedgerows and waste material bund. Topsoil mounds observed during 2024 walkover.	No available BGS borehole data within or within 250m of the site.	Not mapped by SEPA or BGS.	Made Ground anticipated onsite relating to the historical camp site in the centre and historical stockpile of waste materials (including corrugated metal sheets, potentially asbestos containing). However, during the 2024 walkover the bund had been cleared and camp site area subject to earthworks, with topsoil mounds observed. Given the recorded lack of historical site uses, Made Ground is anticipated to be <1m thick.
Superficial deposits	Hatton Till Formation (diamicton, clay, sand and gravel) across most of the study area. A small area of Alluvium (clay, silt, sand and gravel) along the surface water in the north-west.		Not mapped by SEPA or BGS.	Typical thickness of 10m+. Till anticipated to cover the majority of the site, potentially thinner in the north-west where alluvium is mapped along the surface water.
Bedrock	Peterhead Pluton (Granite).		Mintlaw groundwater body (SEPA ID: 150655) with a 'Good' overall status in 2023. BGS maps this as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures, with rare springs. Flow mechanism is virtually all through fractures and other discontinuities.	N/A

Table 19.19 Geology and hydrogeology summary (onshore export cable corridor from the onshore substations to SSEN Netherton Hub: segment B1)

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
Made Ground	~80m x 100m circular worked ground (Void) mapped in west of segment between a field drain and Burn of Faichfield. Old quarry present south-east of West Thunderton on historical mapping.	NK04NE7 (1978) – West Thunderton Farm, Longside (onsite): • Peaty soil to 0.60m bgl; • Fluvioglacial sand and gravel (gravelly silty clayey sand) to 5.0m bgl and stiff laminated silty clay to 5.60m bgl; • Granite to >5.8m bgl; and • Groundwater at 3.0m bgl. NK04NE4 (1977) – Bridge of Faichfield, Longside (120m north-west of site): • soil and Made Ground to 2.0m bgl; • Alluvium (sandy gravel) to 5.70m bgl; • Till (stiff sandy gravelly clay) to 6.70m bgl; • terminated due to 'rock obstruction'; and • groundwater at 2.70m bgl.	Not mapped.	Infill materials and depth of worked ground in the west or old quarry in the east are unknown. Made Ground also anticipated as limited thickness of reworked soils in fields, or greater where historical developments were present for example, Small Arms Ammunition (SAA) site and Battle Headquarters east of East Thunderton.
Superficial deposits	East: Banchory Till Formation (diamicton). Mid: Alluvium (clay, silt, sand and gravel), Glaciofluvial Sheet Deposits (gravel, sand and silt) and Glaciofluvial Ice Contact Deposits (gravel, sand and silt). West: Banchory Till Formation (diamicton).		Not mapped by SEPA. BGS map the west of the segment around the Burn of Faichfield as a concealed aquifer of limited potential, in a region without significant groundwater within the Quaternary Coastal and Fluviatile Alluvium.	An onsite borehole recorded superficial deposits up to 5.60m thick in the centre of site. Superficial deposits are anticipated beneath the majority of the site, however a small area with no deposits is recorded west of West Thunderton.
Bedrock	The majority of segment B1 is underlain by the Peterhead Pluton (Granite), with a section west of crossing CRB103 underlain by Forest of Deer Pluton (Melagranite, Biotite).		Bedrock groundwater body mapped as Mintlaw (SEPA ID: 150655), 'Good' condition. BGS map the igneous intrusions as a low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures, with rare springs. Flow	An onsite borehole recorded bedrock at 5.60m bgl in the centre of site. An offsite borehole to the north-west recorded a rock obstruction at 6.70m bgl however this may be related to a boulder obstruction or bedrock.

Geological unit / stratum	Typical strata description	BGS borehole log description	SEPA / BGS aquifer designation	Extent onsite and thickness (m)
			mechanism is virtually all through fractures and other discontinuities.	

19.6.1.16 Further details of the hydrogeology and details of surface watercourses and other surface water features in the study area are provided in **Chapter 20: Water Resources and Flood Risk**, and also in the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**).

Geodiversity

19.6.1.17 Information available from NatureScot (NatureScot, 2025) confirms that there are no geological SSSIs or GCR sites within the study area for ground conditions and contamination.

Mineral resources

19.6.1.18 Following refinement of the Project search area since Scoping, the study area does not include any Areas of Search for Minerals Development (Sand and Gravel reserves) or any Minerals Safeguarding Areas. This is based on the following information:

- the Safeguarding Resources proposals map of the Aberdeenshire Council LDP (Aberdeenshire Council, 2023) shows areas of search for minerals. This confirms there are no areas of search within the study area; and.
- the map also shows mineral safeguarding areas and confirms that there are none within the study area.

Land contamination

19.6.1.19 Based on the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**), most of the land within the landfall(s), onshore export cable corridor, and the onshore substation site, is likely to be free from significant risks from land contamination. However, localised potential contamination sources are present.

19.6.1.20 The potential sources of contamination were identified based on review of a Groundsure Insight report and historical maps, site walkover for the Project, information provided by Aberdeenshire Council, SEPA data, recent and historical aerial photography (Google Earth Pro), planning searches, and other sources as listed in the **Volume 3, Appendix 19.1**.

19.6.1.21 Identified potential sources are summarised in **Table 19.20** and detailed in the Phase 1 Contaminated Land Report by project zone, proposed landfall(s) and onshore export cable corridor, and their locations are shown on **Volume 2, Figure 19.5**. Following refinement of the design, most sources are outside the Onshore Red Line Boundary.

Table 19.20 Summary of potential land contamination sources

Source from Phase 1 Contaminated Land Report (Volume 3, Appendix 19.1)	Relevant features on Volume 2, Figure 19.5
Onsite sources (within Onshore Red Line Boundary)	
Made Ground, leaks or spills, associated with Longside Airfield, former RAF Peterhead (only the north-east portion of the former RAF airfield is onsite, no former technical areas)	12
Made Ground, leak or spills, associated with historical RAF Peterhead secondary sites – including former camps, former Battle Headquarters and former SAA store	23, 24, 25, 27, 40
Agricultural sources: Made Ground or waste deposited on land, former / disused buildings and structures, leaks and spills from vehicles, tanks, former sheepwash, use of chemicals (herbicides, pesticides) for arable farming	3, 8, 35, 40, 41, 42, 48, 50, 51
Former railway land	31
Disused canals (including Inverquinzie Canal)	30, 33
Other Made Ground: potentially infilled land (old quarries, ground workings, etc), a former rifle range, radio mast, former corn mill	2, 10, 16, 26, 30, 33, 34, 40, 45, 46, 52
Offsite sources (within 250m of the Onshore Red Line Boundary)	
Landfill / Made Ground associated with North Kirkton Landfill	1
Made Ground, leaks or spills, associated with Longside Airfield, former RAF Peterhead (historical uses including fire tender house, huts, onshore substations, hangars, works flight store, transformer, fuel storage, offices, miniature rifle range, within 250m)	12
Current activities within Longside Airfield (include: Thunderton Industrial Estate, oilfield service activities, contract vehicles, Buchan Aero Club)	12A, 12B, 12C, 12D
Made Ground, leak or spills, associated with historical RAF Peterhead secondary sites – including former camps, former sewage treatment plant, some in current commercial use (garages, depot, transport)	5, 13, 14, 17, 18, 19, 20, 21, 22, 28
Agricultural sources: Made Ground or waste deposited on land, tanks, poultry farm	4, 6, 7, 9, 15, 36, 37
Commercial developments including haulage, pallets and Buchan Biogas Plant	43
Other Made Ground: potentially infilled land (old quarries, ground workings, etc), a former mill, radio tower station	16, 26, 38, 44, 47, 53
Pumping stations (possible sewage)	11, 49
Heating oil tanks (including at residential properties) and wells	51, other small and localised sources are not shown
Graveyard	39

Source from Phase 1 Contaminated Land Report (Volume 3, Appendix 19.1)	Relevant features on Volume 2, Figure 19.5
Vehicle repair, testing and servicing garage	29

19.6.1.22 Longside Airfield was formerly RAF Peterhead. RAF Peterhead was mostly constructed by July 1941 and later bombed in November 1941 by a Ju88 aircraft which dropped two bombs, however the bomb locations are not recorded (Smith, 1983). The airfield was then used as a dummy army camp in 1943 and closed in 1946, prior to being auctioned off in 1959. Since this period, the airfield has undergone some redevelopment with demolition of some structures such as the control tower in 1969 and historical hangars, use as a helipad and a storage facility for oilfield services. Buchan Aero Club use a small section of the former runway in the north of the airfield.

19.6.1.23 According to a historical site layout plan showing the RAF site layout, the north-east area of the airfield is within the Onshore Red Line Boundary. Within the airfield, buildings and hangars may have been heated by fuel oil fired boilers, vehicle and aircraft refuelling and maintenance will have taken place, and transformers present in the airfield may have contained oils including polychlorinated biphenyls based on their age. Waste disposal around former buildings may have also taken place. Given the military use of the airfield and the period of military operations it is likely that explosives and (radium-226) luminised equipment or paints would have been used and handled within the airfield footprint. A former miniature rifle range was present in the north-east of the airfield (not within Onshore Red Line Boundary) and these can be a source of heavy metals contamination including lead and antimony. No large-scale aircraft scrapping is recorded to have taken place, which lowers the likelihood of radium-226 contamination being present, though it cannot be ruled out. The Onshore Red Line Boundary overlaps the north-east corner of the airfield where no technical buildings or waste disposal areas are recorded, however the presence of Made Ground or historical leaks of spills in this area cannot be ruled out. Although the airfield had a fire station, the period of RAF operations indicates that it is unlikely that per- and polyfluoroalkyl substances firefighting foams would have been held or used on the site (and there a no recorded fires since that may have resulted in the use of the foams by the local fire service later in the airfield's history).

19.6.1.24 The airfield had several secondary associated sites, some of which are within the Onshore Red Line Boundary and others are adjacent to it or within the wider study area. These included camps, Battle Headquarters, and a sewage treatment works. Some secondary sites within the study area have been redeveloped for commercial uses including as garages, a depot, and for transport. Within the Onshore Red Line Boundary, at the onshore substation site and segment B1 of the onshore export cable corridor, they have been restored back to agricultural land.

19.6.1.25 There are no recorded licenced or historically licenced landfills within the study area, however Aberdeenshire Council records North Kirkton Landfill at the coast, north of the Lunderton North landfall. This area is also partly shown by the BGS as worked ground – void, indicating possible infilling. No details of the landfill contents or any remedial measures such as lining or capping are available.

19.6.1.26 There is potential for Made Ground from wide range of sources within the onshore export cable corridor, although this is expected to be limited in extent. The onshore export cable corridor is intersected by a disused canal and by a former railway. Some former ground workings are present that may have been infilled, ad hoc waste disposal to ground is possible and some waste mounds (generally agricultural wastes) were observed during walkover. Some radio masts are present that may be installed in Made Ground. Some former commercial land uses were present, including a mill and a brick and tile works, that

have since been demolished. Typical contaminants associated with Made Ground can include asbestos, heavy metals, total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, acidic or alkaline pH, other organic and inorganic compounds, and ground gases (including carbon dioxide and methane).

19.6.1.27 Agricultural land is expected to be generally free from significant contamination, however in addition to waste disposal or storage on land, some farming activities can result in chemicals including pesticides, herbicides, heavy metals, and organic chemicals being present released to ground, which may accumulate over time. The use of vehicle and machinery can also result in leakages of fuels and oils to ground and there may be small-scale storage of fuels either for vehicles and plant or in the form of fuel oil for heating at agricultural or residential properties.

19.6.1.28 Other small-scale sources include pumping stations, which may handle sewage, a parking area at Scotstown beach (possible fuel / oil leaks from vehicles) and a former rifle range present within the sand dunes up to 1900s.

19.6.1.29 No previous ground investigations or remediation are recorded to have taken place within the Onshore Red Line Boundary or study area for land contamination.

19.6.1.30 The risk assessment process completed for the land contamination receptors detailed in **Table 19.2** is outlined **Section 19.9**. The Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**) includes consideration of the current risk level to identified potential receptors by the potential sources summarised above.

19.6.2 Future baseline

19.6.2.1 Without the Project, the land within the study area is generally likely to remain in its current use, which is mainly agriculture.

19.6.2.2 As a result of climate change, the United Kingdom (UK) is likely to see hotter drier Summers and warmer wetter Winters, coupled with increased frequency of extreme weather occurrences such as heat waves, dry spells, heavy rain and flooding. This has the potential to affect soils, by changing soil properties and functions related to organic matter, water and soil erosion for example, soil erosion by wind and water is likely to increase, resulting in loss of soil and loss of organic matter, changes to rainfall patterns and groundwater levels will affect vegetation, in turn affecting soil organisms, and there may be increased potential for soil contamination to occur as a result of contaminants transported in flood waters. At present, the effects of climate change on soils and the rate of change to soils because of climate change, are not sufficiently well understood to be quantified, however, the likely effects of climate change on soils (soil health and soil function) are overall likely to be negative rather than positive.

19.6.2.3 To some extent agriculture can be adapted to mitigate the effects of climate change, for example by changes to tillage, extensions to fallow periods, diversifying crops, changing inputs such as fertilizers, and changes to planting density or planting times. Climate change effects such as increased intensity of flooding could contribute to soil compaction, waterlogging and erosion, which could potentially result in agricultural land capability being reduced / downgraded, however, a reduction in rainfall could also result in higher grades for wetter areas. As is the case for soil generally, there is too much uncertainty over the scale and timing of the effects to predict them accurately, and as agricultural land is already managed there is scope for alternative management approaches to both mitigate negative effects and promote positive effects.

19.6.2.4 In relation to land contamination, relevant requirements would either be identified under Part 2A of the Environmental Protection Act, or for future developments, the Town and Country Planning Act 1990. Part 2A of the Environmental Protection Act requires local

authorities to identify PCL in their area and ensure potential risks from historical contamination are assessed and mitigated accordingly. Aberdeenshire Council maintains a database of PCL within its planning authority boundary. For future developments in the study area, the Town and Country Planning Act 1990 requires the consideration of the potential for contamination to be present. Where necessary a developer would be required to carry out remediation of contamination to ensure the development site is suitable for the proposed end use.

19.6.2.5 Therefore, it is reasonable to conclude that in the absence of the Project there would not be a detrimental change in land contamination status within the study area.

19.7 Basis for the EIA Report

19.7.1 Maximum design scenario

19.7.1.1 The process of assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the planning application, marine licences applications and s.36 consent.

19.7.1.2 The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse effect and as a result effects of greater adverse significance would not arise should any other scenario (as described in **Chapter 4: Project Description**) to that assessed within this Chapter be taken forward in the final Project design.

19.7.1.3 The maximum design scenario parameters that have been identified to be relevant to ground conditions and contamination are outlined in **Table 19.21** and are in line with the project design envelope (**Chapter 4: Project Description**).

19.7.1.4 The maximum design scenario is applied to calculate the areas where soils and agricultural land will potentially be affected by temporary and permanent development, respectively. It refers to permanent ‘hard’ and ‘soft’ development, with hard development examples including construction of buildings, removal of soils and replacement with engineered fill materials or structures, or sealing of soils below hardstanding, and soft development examples being areas of landscaping, habitat creation, or sustainable drainage systems.

19.7.1.5 The terms ‘hard’ and ‘soft’ development are used below to denote areas where development results in the naturally occurring soils being covered (typically by hardstanding, buildings or aggregates) and / or lost (for instance, soils are excavated and not restored), and areas where despite a land use change, the natural soil reprofile can be retained (for example, change from an agricultural field to area of permanent habitat).

Table 19.21 Temporary and permanent development areas based on the maximum design scenario

Impact / activity	Maximum design scenario parameter	Justification
Construction		
C1: Construction of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant	Landfall(s): Assumes maximum footprint of construction activities for all landfall options (Option 2: Scotstown and Lunderton): • temporary access road/s up to 6m wide, location see **Volume 2, Figure 4.1**; • temporary construction compound area 345m x 70m; • up to seven below ground transition joint bay(s), typically 12m long x 3.5m wide x 2.5m deep; • up to eight cable ducts; • cable ducts installed using HDD (or similar trenchless technique) installation methodology. In relation to trenchless crossings, HDD has been presented in the EIA. Whilst other trenchless methods are available, HDD is presented herein as it is likely to have the largest construction impact. Landfall construction works duration: • phase 1 – up to 1 year; • phase 2 – up to 1 year; and • phase 3 – up to 1 year. Onshore export cable corridor: • temporary access roads / haul roads up to 6m wide, location see **Volume 2, Figure 4.1**; • for the onshore export cable corridor from the landfall(s) to the onshore substations, the onshore export cable corridor is up to 89m wide and an approximate length of 11km; • up to seven trenches, with typical trench depth of up to 1.5m. Typical depth cover including intimate (engineered) backfill will be 0.9m to 1.2m. All topsoil can therefore be reinstated if	The maximum design scenario for construction effects on soils will be based on the maximum design scenario temporary development footprint for the landfalls, onshore export cable corridor, including joint bay(s), access / haul roads, trenchless crossing compounds, potential temporary construction compounds, and onshore substations. This is to represent the maximum area where construction works may result in damage to soil due to soils being temporarily excavated or otherwise disturbed (such as by vehicle movements on in situ soils) during construction. The phasing of the construction work will have a bearing on the timing and duration of soil disturbance (such as the period that soils need to remain in temporary stockpiles and the climatic conditions, which will affect soil wetness and susceptibility to damage during handling or during vehicle movements).

Impact / activity	Maximum design scenario parameter	Justification
	suitable for use, and some or all of the original subsoil, above the cable ducts and intimate backfill around them; • onshore export cable corridor from the onshore substations to the SSEN Netherton Hub, the corridor is up to 99m wide and an approximate length of 2.35km; • up to six trenches, with typical trench depth of up to 1.5m; and • typical depth cover including intimate (engineered) backfill will be 0.9m to 1.2m. All topsoil can therefore be reinstated if suitable for use, and some or all of the original subsoil, above the cable ducts and intimate backfill around them. Joint bay(s) and link boxes: • typically, joint bay(s) are located every 600m to 1000m. For a maximum design scenario assessment, it is assumed that there are 8 to 24 joint bay locations from landfall(s) to the onshore substations, and seven joint bay locations from the onshore substations to SSEN Netherton Hub; • at each joint bay location, along the onshore export cable corridor from the landfall(s) to the onshore substations, there are up to six joint bay(s); • at each joint bay location, along the onshore export cable corridor from the onshore substations to SSEN Netherton Hub, there are up to seven joint bay(s); • each joint bay has an approximate area of 27m^2 (9m long by 3m wide), and depth of up to 2m; • joint bay construction duration per compound (does not include cable pulling duration) is six to ten weeks; • each joint bay will have an associated link box and FOC junction box that will be accessible at surface level; and • each link box has an approximate area of 3m^2 (3m long by 1m wide), and depth of up to 1.5m, with a 0.9m square access cover, which may be 10m from the associated joint bay.	

Impact / activity	Maximum design scenario parameter	Justification
	The temporary construction corridor may require widening beyond the standard width to allow enough space for access / equipment at crossing points with roads, rivers or utilities, and to avoid other obstacles to installation. Trenchless crossings: • the onshore export cable corridor widens to up to 300m at locations where trenchless crossings are required; • up to 22 trenchless crossing compounds including HDD (or similar trenchless technique) entry pits; • trenchless crossing compound dimensions: up to 300m x 50m (width and length); and • six to twelve months construction duration per trenchless crossing location (does not include cable pulling duration). A crossings schedule is provided in the **Volume 3, Appendix 4.1: Crossings Register**. Temporary construction compounds: • up to three temporary primary construction compound locations (each up to 125m x 125m in area); • up to 6 temporary secondary construction compound locations (each up to 100m x 100m in area); • construction of each joint bay will require a temporary construction compound (each up 30m x 85m in area). Onshore export cable corridor construction works duration: • phase 1 – up to 2.5 years; • phase 2 – up to 1 year; and • phase 3 – up to 1 year. Onshore substations: • up to 15 hectares (ha) permanent area for the onshore substations with associated permanent access roads up to 4.2ha, plus additional land for drainage / landscaping areas	

Impact / activity	Maximum design scenario parameter	Justification
	estimated at approximately 36ha, all of which will be located within the Onshore Red Line Boundary; and • up to 3.06ha additional temporary construction compound area. Onshore substation's construction works duration: • phase 1 – up to 3 years; • phase 2 – up to 3 years; and • phase 3 – up to 3 years.	
C2: Permanent loss of soil / agricultural / other land due to construction of above ground elements of the Project	Landfall(s): Assumes maximum footprint of construction activities for all landfall options (option 2: Scotstown and Lunderton): • up to seven below ground transition joint bay(s), typically 12m long x 3.5m wide x 2.5m deep; • up to eight cable ducts; and • cable ducts installed using HDD (or similar trenchless technique) installation methodology. Joint bay(s): • typically, joint bay(s) are located every 600m to 1000m; • at each joint bay location, along the onshore export cable corridor from the landfall(s) to the onshore substations, there are up to six joint bay(s); • at each joint bay location, along the onshore export cable corridor from the onshore substations to SSEN Netherton Hub, there are up to seven joint bay(s); • each joint bay has an approximate area of 27m^2 (9m long by 3m wide), and depth of up to 2m. The depth of cover allowed for joint bay(s) of 150mm to 200mm (0.15m to 0.2m) so for soils a maximum design scenario of only 0.15m is used in this assessment; and • joint bay construction duration per compound (does not include cable pulling duration) is six to ten weeks.	The maximum design scenario assumes that development could take place anywhere within the Onshore Red Line Boundary. At the onshore export cable corridor from the landfall(s) to the onshore substations, and from the onshore substations to SSEN Netherton Hub, it is likely that all topsoil can be reinstated, and some or all of the original subsoil, above the cable ducts and intimate (engineered) backfill around them, with the land restored back to agricultural use. These areas are therefore considered only as temporary development areas.

Impact / activity	Maximum design scenario parameter	Justification
	The temporary construction corridor may require widening beyond the standard width to allow enough space for access / equipment at crossing points with roads, rivers or utilities, and to avoid other obstacles to installation. Onshore substations: • up to 15ha permanent area for the onshore substations with associated permanent access roads up to 4.2ha, plus additional land for drainage / landscaping areas estimated at approximately 36ha, all of which will be located within the Onshore Red Line Boundary.	
Impact C3: Damage to land drainage systems during construction (excavation)	Refer to Impact C1.	The maximum design scenario for construction effects on soils will be based on the maximum design scenario temporary development footprint for the landfalls, onshore export cable corridor, including joint bay(s), access / haul roads, trenchless crossing compounds, potential temporary construction compounds, and onshore substations. This is to represent the maximum area where construction works may result in damage to (agricultural) land drainage systems, with subsequent impacts on soils.
Impact C4: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of	Refer to Impact C1.	The maximum design scenario assumes that development could take place anywhere within the Onshore Red Line Boundary. The Project could result in changes to the baseline level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).

Impact / activity	Maximum design scenario parameter	Justification
vegetation, ground reprofiling, removal of hardstanding)		
Impact C5: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust)	Refer to Impact C1.	The landfall(s), onshore export cable corridor, including joint bay(s), access / haul roads, trenchless crossing compounds, potential temporary construction compounds, and onshore substations, represent the areas where construction works may result in ground condition effects, for example from spills or leaks from construction equipment or minerals sterilisation and provides for maximum design scenario assessment to allow for micro siting within the Onshore Red Line Boundary. The design assumptions for temporary construction activities such as volumes of potentially contaminating substances and frequency of refuelling activities are reasonable maximum assumptions from which to assess the risk of soil or groundwater contamination. The design assumptions represent the largest area on which temporary development will be undertaken and therefore the largest area in which construction works may result in ground condition effects.
O&M		
Impact O1: Changes to the level of risk associated with land contamination due to change of land use,	Refer to Impact C4.	The maximum design scenario assumes that development could take place anywhere within the Onshore Red Line Boundary. The Project could result in changes to the baseline level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).

Impact / activity	Maximum design scenario parameter	Justification
introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding)		
Decommissioning		
D1: Decommissioning of the landfall(s), onshore export cables and substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant	Refer to Impact C2. Onshore substations: • The onshore substations and associated access roads will be removed and the site reinstated. • The decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar types and levels of equipment and vehicles. Assessment assumptions as per construction stage. Onshore export cable corridor: The onshore export cables will be left in-situ with ends cut, sealed and buried to minimise environmental effects associated with removal. The underground structures of the joint bay(s), FOC junction boxes and link boxes will be removed only if it is feasible with minimal environmental disturbance or if their removal is required to return the land to its current agricultural use.	The detail and scope of the decommissioning will be determined by the relevant legislation and guidance at the time along with the proposed end-use for the land. As such, for the purposes of a maximum design scenario, impacts no greater than those identified for the construction stage are expected for the decommissioning stage. It is anticipated that the onshore export cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.
Impact D2: Changes to the level of risk	Refer to Impact C4.	The detail and scope of the decommissioning will be determined by the relevant legislation and guidance at the time along with the proposed end-use for the land. As such, for the purposes of a

Impact / activity	Maximum design scenario parameter	Justification
associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding)		maximum design scenario, impacts no greater than those identified for the construction stage are expected for the decommissioning stage. It is anticipated that the onshore export cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.
Impact D3: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust)	Refer to Impact C5.	Onsite disassembly of equipment and demolition of structures would have potential for soil or groundwater contamination due to spills, leaks and waste generated. The detail and scope of the decommissioning will be determined by the relevant legislation and guidance at the time along with the proposed end-use for the land. As such, for the purposes of a maximum design scenario, impacts no greater than those identified for the construction stage are expected for the decommissioning stage. It is anticipated that the onshore export cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.

Table 19.22 Temporary and permanent development areas based on the maximum design scenario parameters

Zone	Project element	No.	Length (m)	Width (m)	Area (m^2)	Area (ha)	Depth of excavation (m)
Temporary development areas (maximum footprint of soil disturbance and / or excavation)							
Landfall(s)	Temporary access roads[a].	N/A – various locations and lengths (see **Volume 2, Figure 4.1**).	1,881	6	11,286	1.13	0.3[b]
Onshore export cable corridor from the landfall(s) to the onshore substations	Temporary access roads[a].	N/A – various locations and lengths.	775	6	4,650	0.47	0.3[b]
Onshore substations	Temporary access roads[a].	N/A – no additional land for access roads (see **Volume 2, Figure 4.1**).	N/A	N/A	N/A	N/A	N/A
Onshore export cable corridor from the onshore substations to Netherton Hub	Temporary access roads[a].	N/A – various locations and lengths (see **Volume 2, Figure 4.1**).	513	6	3,078	0.31	0.3[b]
Subtotal (temporary access roads):					**19,014**	**1.90**	N/A
Landfall(s)	Temporary construction compound(s).	1	345	70	24,150	2.42	N/A

Zone	Project element	No.	Length (m)	Width (m)	Area (m^2)	Area (ha)	Depth of excavation (m)
Onshore export cable corridor from the landfall(s) to the onshore substations and from the onshore substations to Netherton Hub	Primary temporary construction compounds.	3	-	-	3 x 15,625 = 46,875	3 x 1.56 = 4.68	N/A
	Secondary construction compounds.	6			6 x 10,000 = 60,000	6 x 1.00 = 6.00	N/A
Trenchless crossing compounds in the onshore export cable corridor from the landfall(s) to the onshore substations and from the onshore substations to Netherton Hub	Trenchless crossing construction compound(s).	22	50	Search areas range in width from 93m to 300m	220,000	22.00	N/A
Onshore substations	Temporary construction compound.	1	-	-	30,600	3.06	N/A
Subtotal (temporary construction compounds):					**381,625**	**38.16**	N/A
Onshore export cable corridor from the landfall(s) to the	Onshore export cable corridor, including haul road, six trenches, and	N/A	7,100[e]	89	631,900	63.19	1.5[c] (trenches).

Zone	Project element	No.	Length (m)	Width (m)	Area (m^2)	Area (ha)	Depth of excavation (m)
onshore substations	joint bay temporary compounds.						
Onshore export cable corridor from the onshore substations to Netherton Hub	Onshore export cable corridor, including haul road, seven trenches, and joint bay temporary compounds.	N/A	1,150[e]	99	113,850	11.39	1.5[c] (trenches).
Subtotal (onshore export cable corridor, including haul road, and seven trenches):					**745,750**	**74.58**	N/A
Grand total (all temporary development – temporary access roads, temporary construction compounds, trenchless crossing compounds and onshore export cable corridors):					**1,146,389**	**114.64**	N/A
Permanent hard development (maximum footprint of permanent feature where soils are permanently removed or covered with hard surfaces)							
Landfall(s)	Transition joint bay(s).	7	12	3.5	294	0.03	2.5
Onshore export cable corridor from the landfall(s) to the onshore substations	Joint bay(s).	144[d]	9	3	3,888	0.39	2.0
Onshore export cable corridor from the landfall(s) to the	Link boxes.	144[d]	3	1	432	0.04	1.5

Zone	Project element	No.	Length (m)	Width (m)	Area (m^2)	Area (ha)	Depth of excavation (m)
onshore substations							
Onshore export cable corridor from the onshore substations to Netherton Hub	Joint bay(s).	49[d]	9	3	1,323	0.13	2.0
Onshore export cable corridor from the onshore substations to Netherton Hub	Link boxes.	49[d]	3	1	147	0.01	1.5
Onshore substations	Onshore substations.	N/A	N/A	N/A	150,000	15.00	N/A
Onshore substations	Permanent access roads.	N/A	N/A	N/A	42,000	4.20	N/A
Grand total (all permanent hard development):					**198,084**	**19.80**	N/A
Permanent soft development							
Onshore substations	Drainage / landscaping areas.	N/A	N/A	N/A	361,838	36.2	N/A
Grand total (all permanent development):					**559,922**	**56.0**	N/A
Permanent rights of servitude							

Zone	Project element	No.	Length (m)	Width (m)	Area (m^2)	Area (ha)	Depth of excavation (m)
Offshore export cable corridor from the landfall(s) to the onshore substations	Land subject to permanent servitude.	N/A	11,000[f]	61	671,000	67.10	N/A
Offshore export cable corridor from the onshore substations to Netherton Hub	Land subject to permanent servitude.	N/A	2,350[f]	71	166,850	16.69	N/A
Grand total (permanent servitude):					**837,850**	**83.79**	**N/A**

[a] Temporary access road lengths are based on available design information for the Project. Only temporary access roads proposed through agricultural land or other undeveloped areas are included, routes along existing roads or tracks are excluded on the basis that these are already deemed to be permanently developed.
[b] The thickness of aggregate required for temporary access roads.
[c] Typical depth cover including intimate (engineered) backfill above the cable ducts installed by trenching will be 0.9 to 1.2m. All topsoil can therefore be reinstated if suitable for use, and it is likely that most of the natural subsoil can also be restored above the cable ducts and the intimate backfill around them, given the proposed depth of the trenches. With trenchless methods the depth at which the cable ducts are installed depends on the topology and geology at the crossing site and the nature of the feature being crossed.
[d] Joint bay(s) would typically be located every 600 to 1000m of the cable corridor, the total is the estimated maximum, there are up to 24 joint bay locations between the landfall(s) and onshore substations (giving a total of 168 joint bay(s), based on seven ducts) and up to six joint bay locations between the onshore substations and SSEN Netherton Hub (giving a total of 42 joint bay(s), based on seven ducts). Each joint bay will have an associated link box and FOC junction box that will be accessible at surface level. Joint bay(s) will be buried under 0.15m to 0.20m thickness of soil cover, based on this limited depth of soil cover, these are treated in the assessment as areas of permanent hard development, as are the link boxes which installed at ground level with a 0.9m square access chamber cover.
[e] The onshore cable corridor lengths have been amended to remove overlap with trenchless crossing search areas.
[f] The permanent servitude will include the trenchless crossings and the maximum cable corridor length is therefore applied.

19.7.2 Embedded environmental measures

19.7.2.1 As part of the Project design process, a number of embedded environmental measures have been adopted to reduce the potential for adverse impacts on ground conditions and contamination. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to consultation.

19.7.2.2 These measures also include those that have been identified as good or standard practice and include actions t-hat would be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and are set out in the EIA Report.

19.7.2.3 **Table 19.23** sets out the relevant embedded environmental measures within the design and how these affect the ground conditions and contamination assessment.

19.7.2.4 The phasing of the construction work will have a bearing on the timing and duration of soil disturbance (for example, the period where soils need to remain in temporary stockpiles, also the climatic conditions, which will affect soil wetness and susceptibility to damage during handling or during vehicle movements). The measures to limit the impacts on soils during construction are set out in detail in the Outline Soil Management Plan (SMP) in **Volume 4, Outline Construction Environmental Management Plan** (CEMP) (embedded environmental measure M-070).

Table 19.23 Relevant ground conditions and contamination embedded environmental measures

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay(s) to the onshore substations. An additional section of the onshore export cable corridor will run from the onshore substations to the grid connection point at SSEN Netherton Hub. Cables are typically installed in ducts in a standard buried trench arrangement with appropriate insulation, providing protection from temperature extremes and changes in soil moisture.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	Installation of cables below ground will enable all topsoil to be reinstated if suitable for use, and some or all of the original subsoil, above the cable and intimate backfill around them.
M-002	Sensitive sites will be avoided by the temporary and permanent onshore project footprint including Special Protection Areas (SPAs), SACs, SSSIs, National Nature Reserve, Local Nature Reserves (LNR), Local Wildlife Sites, Ancient woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust land, listed buildings and scheduled monuments, potable water supply abstractions, floodplains and geomorphic risk areas.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP**, description of Project and planning conditions.	This measure avoids impacts on soils in sensitive sites.
M-005	To reduce the environmental impact of the landfall, a trenchless solution is to be implemented to install ducts. Determination of the most suitable trenchless landfall crossing method will be undertaken during the detailed design stage of the Project, following geotechnical investigation of the onshore and nearshore areas.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP,** description of Project and planning conditions.	This measure avoids disturbance to shallow soils in sensitive sites.
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is relevant to the control of construction and

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
	Management (2024) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration and vehicle standards.	Amended at EIA Report		decommissioning works for the Project to prevent impacts to sensitive receptors where contaminants in soils could potentially be mobilised as dust.
M-013	During both construction and operation stages, vehicle maintenance and refuelling / oil changes for machinery / equipment will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. The areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals), will comply with industry good practice for pollution prevention, be appropriately bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, local watercourses, or sensitive land based receptors. Such areas will be sited at least 10m from a watercourse, in accordance with the SEPA CAR Practical Guide (SEPA, 2024), and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. An Incident Management Plan will be in place during construction and operation. All works will be carried out in accordance with The Pollution Prevention and Control (Scotland) Regulations 2012 and the Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to avoid construction work resulting in new land contamination impacts and to ensure that prompt suitable action is taken in the event of an accidental release to ground or water to avoid / minimise impacts. The Outline CEMP now reflects the replacement of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 with the Environmental Authorisations (Scotland) Regulations 2025 (EASR), effective from 1 November 2025 (Scottish Government, 2025).

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
M-015	During construction topsoil and subsoil will be stored within the construction working corridor of the onshore export cable corridor. The topsoil and subsoil will be stored in separate stockpiles, in line with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009). Any suspected or confirmed contaminated soils will be separated, contained and tested before removed and adequate leachate / runoff drainage will be implemented to prevent migration of contaminants from stockpiles.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect excavated topsoil and subsoil resources to ensure they are suitable for restoration / reuse and includes measures to quarantine any suspected contaminated material to avoid cross contamination.
M-016	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to minimise erosion or transport of sediment from construction. Options such as bog-matting, geotextiles, floating roads will be considered by the principal contractor for sensitive sections of the onshore export cable corridor to reduce impact. The Outline CEMP will include a commitment to review and implement additional protective measures for soil stockpiles, if needed, to control sediment run-off due to heavy rainfall / flood conditions and maintain soils in a drier condition.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to help minimise soil compaction and erosion caused by vehicles or plant operating on soft / wet ground and to protect watercourses from silty runoff from exposed soils.
M-017	Potential risks to human health or environmental receptors from any unexpected ground contamination will be avoided by the use of PPE and the adoption of appropriate good working practices by the construction workforce, and by the inclusion of an unexpected contamination protocol in the Outline CEMP.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect the workforce during construction of the Project to avoid ground workers being exposed to contaminants in soils or groundwater.
M-018	Prior to construction, an unexpected contamination protocol will be produced in line with UK statutory guidance (LCRM) (Environment Agency, 2020) to	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to ensure that suspected contaminated soils, groundwater or other materials

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
	minimise the potential risks to human health and the water environment from any unexpected ground contamination. The protocol will take into account the requirements for the use of PPE and adoption of best practice methods during construction.			are suitably assessed through testing, quarantined to avoid cross contamination with unaffected soils / water, and that the assessment is undertaken and recorded in accordance with LCRM (Environment Agency, 2020).
M-021	All aspects of the construction work will be in accordance with the Health and Safety at Work Act. 1974 and regulations made under the Act, and the Construction (Design and Management) Regulations 2015.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect the workforce and members of the public during construction of the Project to avoid ground workers being exposed to contaminants or other ground hazards.
M-023	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect soils and water from damage / pollution caused by flooding or silty runoff.
M-025	Any disposal offsite of excavated material will be undertaken in consultation with the landowner / occupier and in accordance with the Waste Management Regulations, including the Environmental Protection Act 1990, The Environmental Protection (Duty of Care) (Scotland) Regulations 2014, and The Waste (Scotland) Regulations 2012.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to ensure suitable reuse of excavated material in accordance with waste legislation.
M-027	At any sensitive features identified along the onshore export cable corridor, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. Where it is necessary to cross	Scoping Amended at EIA Report	**Volume 4: Outline CEMP**, management plans and planning conditions.	This measure avoids disturbance to shallow soils in sensitive sites.

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
	sensitive features, such as watercourses and woodland, trenchless construction methods will be used to install ducts under the crossed feature, which the onshore export cables are then pulled through via entry and exit pits.			
M-063	A CEMP will be implemented by the contractor in accordance with **Volume 4: Outline CEMP**. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. The CEMP identifies the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction stage.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and Planning conditions.	The Outline CEMP includes an Outline SMP to protect soils and a requirement to ensure that any excavated material suspected to be contaminated can be segregated until suitable testing, and risk assessment, has been completed to confirm its suitability for reuse or suitable disposal options.
M-066	The permanent rights of servitude for the onshore export cable corridor will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	Scoping Amended at EIA Report	Planning conditions.	This measure minimises the area of land and soils where restrictions will apply on land use / activities. It is expected that in general, the current agricultural activities within the onshore export cable corridor will be able to continue during operation of the Project, within the area of permanent rights or servitude.
M-067	A Phase 1 Contaminated Land Report (also known as a Preliminary Risk Assessment [PRA]) will be completed prior to submission of the EIA Report to identify the potential for the Project to encounter areas of potential land contamination The desk study will inform the development of the preliminary conceptual site model (i.e., the plausible sources, pathways and	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	A Phase 1 Contaminated Land Report has been produced to inform the assessment of land contamination impacts in this Chapter, to confirm the baseline risks to land contamination receptors and any likely change to

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
	receptors of land contamination) and include a risk assessment to inform any further actions, such as intrusive ground investigation or remediation, needed to ensure that the land is suitable for the intended future use. This is in accordance with the LCRM requirement for a Tier 1: PRA as the first stage of land contamination assessment to determine whether there are any potentially unacceptable risks requiring further assessment / actions.			these risk levels because of the Project. It will also be used to inform planning of construction of the Project, including ground investigation and soil and / or groundwater chemical testing for contaminants as required, with assessments undertaken and recorded in accordance with LCRM. The Phase 1 Contaminated Land Report is included as **Volume 3, Appendix 19.1**.
M-068	Desk-based information review (yet to be supplemented by site investigations) indicates that peat may be encountered by the Project. The Project will therefore apply the general principles in published SEPA guidance Developments on Peat and offsite Uses of Waste Peat (SEPA, 2017) to peat management, including use of the peat management hierarchy, the first principle of which is to minimise peat excavation and disturbance. A PMP will be developed if peat cannot be avoided.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	The Project has used desk-based information to avoid possible impacts on peat through design, notably the refinement of the Onshore Red Line Boundary and the use of trenchless crossings to avoid disturbance to shallow soils.
M-069	The construction work will comply with regulations, including the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) and associated SEPA guidance. Any necessary authorisations will be obtained from SEPA and complied with. Construction activities which may require authorisation from SEPA include discharging run-off from construction areas, work on the riverbank;	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect soils and water from damage / pollution caused by flooding or silty runoff, or chemicals present in runoff. The Outline CEMP now reflects the replacement of the Water Environment (Controlled Activities) (Scotland) Regulations

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
	the installation of coffer dams; dewatering excavations; and use of herbicides.			2011 with the Environmental Authorisations (Scotland) Regulations 2025 (EASR), effective from 1 November 2025 (Scottish Government, 2025).
M-070	Soils and excavated materials will be managed in accordance with regulatory guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA, *et al*., 2010), and Waste Management Guidelines for the re-use of excavated materials and remediation. The best practice for soil handling in the Construction Code of Practice (Defra, 2009) will be applied for handling of topsoil and subsoil. An Outline SMP will be developed for use during construction to protect soil resources and agricultural land quality. The SMP will be used in conjunction with a PMP as required i.e., if the Project encounters areas of peat.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect excavated soils from damage, ensure suitable reuse of excavated material in accordance with waste legislation, and to support the reuse of clean topsoil, subsoil or other materials and avoid these being disposed of as waste. The Outline Soil Management Plan (SMP) will be included in the **Volume 4: Outline CEMP**.
M-071	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to help minimise soil compaction and erosion caused by vehicles or plant operating on soft / wet ground. The restoration of excavated soils as early as practicable helps to minimise deterioration in soil quality and to enable restored soils to recover to baseline condition. Segregation of topsoil and subsoil enables soils to be placed in reverse order to excavation to restore the original soil horizons. Local storage of soils enables the original soils to

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
				go back where they came from, supporting the restoration of the baseline land use and land quality (including agricultural land quality).
M-072	Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and / or mitigated as part of the Project, and the Incident Management Plan will be followed.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to ensure that suspected contaminated soils, groundwater or other materials are suitably assessed through testing, quarantined to avoid cross contamination with unaffected soils / water, and that the assessment is undertaken and recorded in accordance with LCRM (Environment Agency, 2020). It also helps to ensure that the reuse, treatment and reuse, or disposal of materials is in accordance with waste legislation.
M-073	The Applicant will ensure that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (LCRM) and other guidance (including BS 10175). The precise design of any remediation strategy will be confirmed in the detailed design after planning consent. If remediation is needed, this will be designed using the sustainable remediation decision-making process set out in the UK Sustainable Remediation Forum (SuRF-UK, 2010) Framework for Assessing the Sustainability of Soil and Groundwater Remediation.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure ensures that the assessment of land contamination is undertaken and recorded in accordance with LCRM (Environment Agency, 2020), to protect land contamination receptors and ensure compliance with contaminated land legislation.

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
M-074	All ground investigation work and construction work associated with the Project will be completed in accordance with the Control of Asbestos Regulations 2012 (CAR 2012). With regard to asbestos containing materials or asbestos fibres encountered on or within the ground during ground works, CAR 2012 requires that measures are taken to prevent fibre release and to prevent the spread of asbestos, the location where asbestos is suspected or confirmed must be recorded and control measures put in place to prevent exposure.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	This measure is to avoid construction work resulting in new land contamination impacts and to protect the workforce and members of the public during construction.
M-075	Where practicable the Project will avoid areas of active mineral extraction, mineral safeguarding or mineral search areas.	Scoping	**Volume 4: Outline CEMP** and planning conditions.	The Project has used desk-based information to avoid possible impacts on mineral resources through design, notably the refinement of the Onshore Red Line Boundary.
M-076	Where trenchless techniques are not required or are not practical, the crossing of drainage ditches or engineered channels may be by open cut techniques or the installation of culverts or bridges to allow water to continue flowing. Where this is the case, this will be done in accordance with The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended, and the General Binding Rules in the SEPA Practical Guide (SEPA, 2024). Appropriate authorisations from SEPA will be applied for, if required for the Project.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure is to protect land drainage systems, and to protect soils and water from damage / pollution caused by flooding or silty runoff. The Outline CEMP now reflects the replacement of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 with the Environmental Authorisations (Scotland) Regulations 2025 (EASR), effective from 1 November 2025 (Scottish Government, 2025). The General Binding Rules in the

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to ground conditions and contamination assessment
				SEPA Practical Guide (SEPA, 2024) will continue to be applicable.
M-083	The permanent footprint of the onshore substations, landfall(s), transition joint bays and onshore export cable corridor will be minimised to that required for the safe operation and maintenance of the equipment in order to minimise land take.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP** and planning conditions.	This measure minimises the land take required for the Project to minimise permanent effects on soil resources and soil functions.
M-112	The Project will aim to avoid permanent development on prime agricultural land (Class 1, 2 or 3 LCA grades) with the aim of preserving the best quality agricultural land for its future food / biomass production capability and other soils functions where reasonably possible.	Scoping Amended at EIA Report	**Volume 4: Outline CEMP**, description of Project and planning conditions.	This measure avoids impacts on soils within the best quality agricultural land. No prime agricultural land is included in the Onshore Red Line Boundary (see baseline in **Section 19.6**).

19.7.2.5 Further detail on the embedded environmental measures in **Table 19.23** is provided in the **Volume 3, Appendix 5.2: Commitments Register**, which sets out how and where particular embedded environmental measures will be implemented and secured.

19.8 Methodology for EIA Report: soils and agricultural land (land capability)

19.8.1 Introduction

19.8.1.1 The project-wide approach to assessment is set out in **Chapter 5: Approach to EIA.** Whilst this has informed the approach that has been used in this ground conditions and contamination assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of the ground conditions and contamination assessment.

19.8.2 Value of receptor: soils and agricultural land (land capability)

19.8.2.1 The assessment of the likely significant effects for soil resources and agricultural land is based on the extent of soil resources and agricultural land (and the agricultural land capability) that may be affected and whether the effects are temporary or permanent. The assessment is informed by:

- information about the construction, O&M and decommissioning activities associated with the Project;
- relevant national policy, strategy, legislation and guidance documents; and
- stakeholder engagement feedback.

19.8.2.2 The assessment takes into consideration the sensitivity of the affected receptor or resource, and the magnitude of change from the baseline conditions resulting from the Project. This results in an evaluation of significance and an indication of likely significant effects.

19.8.2.3 Definitions of receptor sensitivity that will be used in the assessment are provided in **Table 19.24**. The receptor sensitivity assessment approach is designed to take account of key soil functions and ecosystem services, including as a growing medium for crops, as a store of organic matter including carbon, providing habitat and supporting biodiversity, and soil's role in the hydrological cycle. There are many interactions between soil and receptors covered in other sections, including those provided in **Chapter 20: Water Resources and Flood Risk**; **Chapter 22: Land Use**; **Chapter 23: Terrestrial Ecology and Ornithology**: **Chapter 24: Onshore Archaeology and Cultural Heritage**; **Chapter 28: Climate Resilience,** and **Chapter 30: Socio-Economics**.

19.8.2.4 The sensitivity applied to soils is based on the most sensitive receptor identified from the criteria in **Table 19.24**. For the Onshore Red Line Boundary, most of the soil resources present occur within agricultural land, with the Project avoiding peat and avoiding soils in areas with nature conservation designations (as detailed in **Chapter 23: Terrestrial Ecology and Ornithology)**. This means that the main criteria determining soil resource sensitivity is the LCA class (as described in the baseline in **Section 19.6.1**).

Table 19.24 Sensitivity of receptor / resource (soil and agricultural land)

Sensitivity	Criteria / description
Very high	LCA Class 1 or 2 agricultural land. Soils directly supporting internationally designated sites or national site network (for example, SAC, SPA, Ramsar). Peat: nationally important carbon-rich soils (peat soil with >60% organic carbon and >50cm thickness – deep peat), and / or an irreplaceable habitat such as blanket bog or raised bog, with peatland vegetation or peat soil with potential for peatland habitat restoration.
High	LCA Class 3.1 agricultural land. Soils directly supporting a UK designated site (for example, SSSI, LNR). Located within peaty soils (aka organo-mineral soils), peaty soil (soil not meeting the description of peat soil [aka deep peat], humose soils (organic-rich mineral soils).
Moderate	LCA Class 3.2 agricultural land. Soils supporting non-statutory designated sites (for example, Local Wildlife Sites, Ancient Woodland, Open Mosaic Habitat). Mineral soils.
Low	LCA Classes 4.1 to 7 agricultural land. Soils supporting non-designated notable or priority habitats, soils on greenfield sites or soils providing notable community / other benefits (for example, amenity land in urban areas, parks and gardens).
Very low	Other soils, not in agricultural use or providing notable community / other benefits (for example, badly damaged or contaminated soils, soils on previously developed land, including soils formerly sealed by development).

19.8.2.5 **Table 19.24** assigns the highest sensitivity to soils performing key agricultural functions, organic matter (including carbon) storage / cycling functions, and biodiversity / wildlife supporting functions at an international or national level. The best land for growing crops in Scotland is known as 'prime agricultural land', as defined in **Section 19.6**, and soils within land in this category are assigned very high (LCA Class 1 and 2) or high sensitivity (LCA Class 3.1). All soils carry out multiple functions, and these can include flood risk mitigation, soil's role in filtering surface run-off and regulating aquifer recharge, and the preservation of archaeological remains. Effects on water resources and flood risk receptors, and archaeology, are assessed separately in **Chapter 20: Water Resources and Flood Risk**, and **Chapter 24: Onshore Archaeology and Cultural Heritage,** respectively.

19.8.2.6 Disturbance of soil cannot be avoided by the Project, and soil is vulnerable to damage during handling and storage, even if the effect is only temporary, with some soil types being less resilient to handling than others. For the purposes of the assessment, soil sensitivity is assessed on a soil function basis. However, it is also acknowledged that during construction, the soil type (for example, topsoil or subsoil, and specific types of each) and its structural qualities can influence its sensitivity and resilience to structural damage during handling, storage and placement. This level of detail needs to be addressed in soil management planning and will be informed by soil survey and ground investigation. The embedded environmental measures for the Project include development of a SMP (see **Table 19.23**).

19.8.2.7 Peat has high sensitivity to handling and presents specific issues for storage and reinstatement / reuse. Following refinement of the design, it is anticipated that deep peat can be avoided. As such, specific management measures for the protection of peat, or protection of site users and the surrounding environment (for example, from acidic water runoff) from peat related hazards / impacts (for example, from ground stability issues), which

would include development of a PMP, are not needed. However, commitment M-070 in **Table 19.23** states that the SMP will include a protocol to be followed if peat is encountered unexpectedly during construction.

19.8.3 Magnitude of changes: agriculture (agricultural land capability) and soils

19.8.3.1 The assessment of the magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change in the context of relevant legislation, policy standards and guidance. The soils within the Onshore Red Line Boundary are mainly located on agricultural land, and the approach to the assessment of magnitude of change is based on current planning guidance for soils within agricultural land, as explained below **Table 19.25**.

19.8.3.2 Soil functions are often inter-related, for example, a healthy agricultural soil capable of performing its biomass function to a high standard should also be capable of other key functions, such as storing flood water and supporting biodiversity, however, compaction of this soil would lead to a reduction in all these functions. **Table 19.25** provides examples of how the magnitude of change is determined with respect to soil resources and agricultural land.

19.8.3.3 Magnitude of change may be either beneficial or adverse. The criteria and examples in **Table 19.25** focus on adverse changes, however, beneficial changes may also occur and will be considered on a case-by-case basis as required.

Table 19.25 Magnitude of change for agricultural land and soils

Magnitude of change	Description example
Very high	Permanent or long-term temporary (>5 years) loss or significant degradation* of over 80ha of agricultural land or other soil.
High	Permanent or long-term temporary (>5 years) loss or significant degradation of between 50ha to 80ha of agricultural land or other soil.
Medium	Permanent or long-term temporary (>5 years) loss or significant degradation of between 20ha to 50ha of agricultural land or other soil.
Low	Permanent or long-term temporary (>5 years) loss or degradation of up to 20ha of agricultural land or other soil or temporary damage over 20ha which will rectify without mitigation.
Very Low	Temporary damage to areas up to 20ha which will rectify without mitigation.

*Significant degradation in this context means that a key soil function is significantly reduced, an example could be that agricultural land classification is reduced due to changes in the soil's structure (for example, due to compaction).

19.8.3.4 The magnitude of change in **Table 19.25** used for assessing impacts on soils and agricultural land is based on the area of land affected. This is in accordance with the IEMA (now known as the Institute of Sustainability and Environmental Professionals [ISEP]) land and soils in EIA guidance (IEMA, 2022). Use of area to determine magnitude of change in

EIA reflects that soils are effectively a finite resource because they take a long time to form, and because they have unique characteristics depending on where they form (e.g., their geological 'parent material', the relief of the land, the climate, and the vegetation present).

19.8.3.5 There is no Scottish policy or guidance that defines an area of soil loss or damage that is significant in local or national terms. The National Planning Framework 4 (Scottish Government, 2023a) Soils Policy Principles (Policy 5) refers to the mitigation hierarchy and states that development proposals should first avoid and then minimise the amount of disturbance to soils from development, with a policy aim of soils being healthy and providing essential ecosystem services for nature, people and the economy. It refers specifically to protecting prime agricultural land, and (agricultural) land of lesser quality that is culturally or locally important for primary use, and states that the layout and design of proposals should minimise the amount of protected land that is required. Peatland and carbon-rich soils are also to be protected from development, and soils within areas with statutory nature conservation designations are also afforded protection. The general principle of avoiding or minimising the area of land and soil affected by development proposal is clear in the policy but there is no accompanying guidance that quantifies what may be considered a significant or unacceptable area of soil impact. Given the absence of a threshold in the policy or guidance, and to provide justification for the magnitude of change parameters used in **Table 19.25**, it has been considered appropriate to look at policy used elsewhere in the UK.

19.8.3.6 In England and Wales, planning policy refers to area thresholds in relation to development on agricultural land. In England, The Town and Country Planning (Development Management Procedure) (England) Order 2015 requires Natural England to be consulted on development that involves the loss of greater than 20ha of Grades 1, 2 or 3a agricultural land (defined as 'best and most versatile' land in England) that is not on an approved development plan.

19.8.3.7 Scotland uses the term 'prime agricultural land' to refer to LCA classes 1, 2, and 3.1 and the LCA land classification system functions in a similar way to the Agricultural Land Classification (ALC) system used in England and Wales (Ministry of Agriculture, Fisheries and Food, 1988). Both systems determine the 'class or 'grade' of the land based on factors including the climate, gradient, soil structure, thickness, stoniness, droughtiness, and wetness. The terms 'prime agricultural land' and 'best and most versatile land' are applied to land capable of growing a moderate to a very wide range of crops. ALC grade 1 and LCA class 1 are assigned to land with little or no limitations to agricultural use. ALC grade 2 and LCA class 2 apply to very good quality agricultural land, and ALC subgrade 3a and LCA class 3.1 apply to good quality agricultural land, which is either capable of consistently high yields of a narrow range of crops or moderate yields of a wider range of crops.

19.8.3.8 The Design Manual for Roads and Bridges (DMRB) LA109 guidance for assessing effects on geology and soils (Highways England, 2019) (which the IEMA land and soils guidance uses as a basis) also references a 20ha threshold in its magnitude descriptions in the methodology for assessing effects of projects, specifically for soils in agricultural land.

19.8.3.9 This figure of 20ha equates to a small farm, and 20ha is therefore used in **Table 19.25** as a threshold below which losses are considered to have a small magnitude effect on the national stock of agricultural land. A figure of 80ha of land is used to represent the size of a medium to large farm and loss of land on this scale therefore has a higher impact on the national agricultural land resource. UK Government information for 2024 (Defra, 2024) confirms that the average UK farm size was 82ha, but that almost half of all farms in the UK were less than 20ha. Average farm size in Scotland is not a useful indicator of what a significant loss of agricultural land might be, as a relatively small number of very large holdings account for a high proportion of the farmed area, and the average farm size is highly skewed as a result (Scottish Government, 2016).

19.8.3.10 It is recognised in the National Planning Framework 4 (Scottish Government, 2023a) that soils in prime agricultural land or in (agricultural) land of lesser quality that is culturally or locally important for primary use can perform multiple functions or ecosystem services (i.e., food / biomass production, but also functions such as flood management, water catchment management and carbon storage). This extends the consideration of effects on soils on agricultural land in planning decisions beyond agricultural production functions. This is reflected in the sensitivity assigned to soils in **Table 19.24**. Where no other protections are afforded to specific soils (e.g, mineral soils not in an area with a nature conservation designation), the LCA grade provides an indication of the ability of the soils to carry out other functions besides food and biomass production, such as flood attenuation, providing habitat for soil biodiversity, and storing carbon. The limitations affecting agricultural capability will also affect other soil functions. For example, soils in land with a low LCA class may be thin and stony, on steeply sloped land, and these soils cannot provide the same degree of flood attenuation, habitat, or carbon storage as soils in mid-grade or prime LCA land, which are on flatter land, are less stony, thicker, and less affected by high levels of wetness or doughtiness etc.

19.8.4 Significance evaluation: agriculture (agricultural land capability) and soils

19.8.4.1 During the assessment of effects for each identified receptor the sensitivity value in **Table 19.24** will be combined with the magnitude of change from **Table 19.25** to produce an overall significance rating based on the evaluation matrix shown in **Table 19.26.** A 'significant' effect is assessed as a Moderate or Major. The latter will be subject to further investigation as part of the EIA following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

19.8.4.2 The evaluation of significance for soil resources and agricultural land will be undertaken drawing upon information about the nature and extent of the soil resources present, their environmental setting and the type of construction activity proposed. For soils in agricultural land (in the absence of other soil characteristics or soil designations affecting sensitivity, as detailed in **Table 19.24**), the methodology assigns very high sensitivity (for LCA classes 1 and 2) or high sensitivity (for LCA class 3.1) to soils in prime agricultural land.

Table 19.26 Significance evaluation matrix

		Magnitude of change				
		Very high	**High**	**Medium**	**Low**	**Very low**
Sensitivity / importance / value	**Very high**	**Major (Significant).**	**Major (Significant).**	**Major (Significant).**	**Major (Significant).**	**Moderate (Potentially Significant).**
	High	**Major (Significant).**	**Major (Significant).**	**Major (Significant).**	**Moderate (Potentially Significant).**	**Minor (Not Significant).**
	Moderate	**Major (Significant).**	**Major (Significant).**	**Moderate (Potentially Significant).**	**Minor (Not Significant).**	**Negligible (Not Significant).**
	Low	**Major (Significant).**	**Moderate (Potentially Significant).**	**Minor (Not Significant).**	**Negligible (Not Significant).**	**Negligible (Not Significant).**
	Very low	**Moderate (Potentially Significant).**	**Minor (Not Significant).**	**Negligible (Not Significant).**	**Negligible (Not Significant).**	**Negligible (Not Significant).**

19.9 Methodology for EIA Report: land contamination

19.9.1 Introduction

19.9.1.1 The assessment and management of land contamination is usually based on the risk presented by the presence of a hazard (for example, contamination) for a given circumstance, for instance, the probability and consequence of an event occurring. However, EIA seeks to identify the magnitude of a change in status from baseline (impact) caused by the Project and the consequences of those changes (effects).

19.9.1.2 Consequently, for the land contamination assessment, the impact and its effect have been defined as the magnitude of the change in risk from baseline, through construction to post-development conditions.

19.9.1.3 The methodology used for assessing these risks is set out directly below.

19.9.2 Risk assessment – land contamination

19.9.2.1 The process of managing land contamination, as set out in the Environment Agency (2020) guidance LCRM, and as set out in CLR 11, is based on risk assessment. The use of LCRM has been agreed with SEPA. The assessment of risks from contaminated land is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of:

- a source of contamination;
- a receptor capable of being adversely affected by the contamination; and
- an active pathway capable of exposing a receptor to the contaminant.

19.9.2.2 The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both of the following.

19.9.2.3 the magnitude of the potential consequence (severity). It takes into account both the potential severity of the hazard and the sensitivity of the receptor; and

19.9.2.4 the magnitude of probability (likelihood). It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

19.9.2.5 The definitions for the qualitative risk assessment have been taken from Guidance for the Safe Development of Housing on Land Affected by Contamination Annex 4 (NHBC et al., 2008).

19.9.2.6 The likelihood classifications for the contaminant linkages being realised is presented in **Table 19.27**.

Table 19.27 Likelihood classification of contaminant linkage being realised

Classification	Definition	Examples
High Likelihood	There is a contaminant linkage, and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground / groundwater contamination could be present from chemical works, containing a number of Underground Storage Tanks (USTs).
Likely	There is a contaminant linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5m to 1.0m in a residential garden, or the top 0.5m in public open space. b) Ground / groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low Likelihood	There is a contaminant linkage, and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5m to 1.0m in public open space. b) Ground / groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.

Classification	Definition	Examples
Unlikely	There is a contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 years old containing a double skinned UST with annual integrity testing results available.

19.9.2.7 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the linkage being examined. The classification of consequence is presented in **Table 19.28**.

Table 19.28 Classification of consequence

Classification	Human health	Controlled water	Geodiversity	Property / structures / crops and animals	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the Environmental Protection Act (EPA) 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency Category 1 pollution incident including persistent and / or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to a geodiversity site, which is likely to result in a substantial adverse change in its functioning or harm to a site of special interest that endangers the long-term maintenance of the site.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance (Scottish Government, 2006) as death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive function. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "*significant harm*" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to Environment Agency Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to a geodiversity site, which may result in a substantial adverse change in its functioning or harm to a site of special interest that may endanger the long-term maintenance of the site.	Significant damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance (Scottish Government, 2006) as death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive function. Damage to building rendering it unsafe to occupy, for example, foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.

Classification	Human health	Controlled water	Geodiversity	Property / structures / crops and animals	Examples
Mild	Exposure to human health unlikely to lead to "*significant harm*".	Equivalent to Environment Agency Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture or commerce.	Minor or short-lived damage to a geodiversity site, which is unlikely to result in a substantial adverse change in its functioning or harm to a site of special interest that would endanger the long-term maintenance of the site.	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (for example, mild skin rash). Surface spalling of concrete.
Minor	No measurable effects on humans.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on a geodiversity site or site of special interest.	Repairable effects of damage to buildings, structures.	The loss of plants in a landscaping scheme. Discoloration of concrete.

19.9.2.8 The risk matrix to link the likelihood and consequence is shown in **Table 19.29**.

Table 19.29 Risk matrix

Likelihood Potential Consequence	Unlikely	Low	Likely	High
Severe	Moderate / Low Risk.	Moderate Risk.	High Risk.	Very High Risk.
Medium	Low Risk.	Moderate / Low Risk.	Moderate Risk.	High Risk.
Mild	Very Low Risk.	Low Risk.	Moderate / Low Risk.	Moderate Risk.
Minor	Very Low Risk.	Very Low Risk.	Low Risk.	Low Risk.

19.9.2.9 The overall risk definitions are summarised in **Table 19.30.**

Table 19.30 Risk definitions

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner / or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner / or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner / occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst that this harm if realised would normally be mild. It is unlikely that the site owner / or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

19.9.3 Significance evaluation methodology: land contamination

19.9.3.1 To use risk assessment as the basis for the evaluation of the significance of effects, it is necessary to evaluate the change in risk from baseline conditions to those during and following the Project. The baseline risk is assessed for potential contamination sources pre-development of the Project. A separate assessment of risk is then conducted for the site post-development (including environmental measures inherently embedded in the development) to enable an evaluation of the change in risk due to the Project.

19.9.3.2 **Table 19.31** uses the risk classification pre and post-development as the basis for a significance evaluation matrix for the purposes of EIA.

19.1.1.1 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of

19.9.3.3 a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the linkage being examined. The classification of consequence is presented in **Table 19.28**.

Table 19.31 Land contamination effects significance evaluation matrix

			Risk post-development (including embedded environmental measures)					
			Very Low	**Low**	**Moderate / Low**	**Moderate**	**High**	**Very High**
Risk pre-development.	**Existing receptors.**	**Very High.**	Major Positive (**Significant**).	Major Positive (**Significant**).	Moderate Positive (**Potentially Significant**).	Moderate Positive (**Potentially Significant**).	Minor Positive (**Not Significant**).	Negligible (**Not Significant**).
		High	Major Positive (**Significant**).	Moderate Positive (**Potentially Significant**).	Moderate Positive (**Potentially Significant**).	Minor Positive (**Not Significant**).	**Negligible** (**Not Significant**).	Minor Negative (**Not Significant**).
		Moderate	Moderate Positive (**Potentially Significant**).	Moderate Positive (**Potentially Significant**).	Minor Positive (**Not Significant**).	**Negligible** (**Not Significant**).	Minor Negative (**Not Significant**).	Moderate Negative (**Potentially Significant**).
		Moderate / Low.	Moderate Positive (**Potentially Significant**).	Minor Positive (**Not Significant**).	Negligible (**Not Significant**).	Minor Negative (**Not Significant**).	Moderate Negative (**Potentially Significant**).	Moderate Negative (**Potentially Significant**).
		Low	Minor Positive (**Not Significant**).	Negligible (**Not Significant**).	Minor Negative (**Not Significant**).	Moderate Negative (**Potentially Significant**).	Moderate Negative (**Potentially Significant**).	Major Negative (**Significant**).
		Very Low.	Negligible (**Not Significant**).	Minor Negative (**Not Significant**).	Moderate Negative (**Potentially Significant**).	Moderate Negative (**Potentially Significant**).	Major Negative (**Significant**).	Major Negative (**Significant**).
	No receptor present pre-development	**N/A**	Minor Negative (**Not Significant**).	Moderate Negative (**Potentially Significant**).	Moderate Negative (**Potentially Significant**).	Major Negative (**Significant**).	Major Negative (**Significant**).	Major Negative (**Significant**).
	Risks that remain at moderate, high, or very high post-development are unlikely to be considered acceptable and further environmental measures will be required to enable the development to proceed.							

19.10 Assessment of effects: construction stage

19.10.1 Introduction

19.10.1.1 This Section provides an assessment of the effects for ground conditions and contamination from the construction of the onshore elements of the Project.

19.10.1.2 The assessment methodology set out in **Section 19.8** has been applied to assess effects to ground conditions and contamination from the Project.

19.10.1.3 The maximum assessment scenario relating to construction in the landfall(s), the onshore export cable corridor and the onshore substation site, in regard to damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant, is presented in **Table 19.21** and the areas affected are defined in **Table 19.22**.

19.10.2 Impact C1: construction of the landfall(s), onshore export cables and substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant

Overview

19.10.2.1 The maximum assessment scenario relating to construction in the landfall(s), the onshore export cable corridor and the onshore substation site, in regard to damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant, is presented in **Table 19.21** and the areas affected are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.8**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

19.10.2.2 The maximum area of impact of temporary development for the Project is 114.64ha as shown in **Table 19.22**. This is the combined maximum area where temporary construction work will take place, including temporary access roads through farmland (1.90ha), temporary construction compounds and trenchless crossing compounds (38.16ha), the onshore export cable corridor from the landfall(s) to the onshore substations (63.19ha) and the onshore export cable corridor from the onshore substations to SSEN Netherton Hub (11.39ha). Except for nine existing roads / tracks crossed by the Project, all areas of temporary soil disturbance / excavation (not including deeper trenchless crossings which will avoid shallow soils) will take place in agricultural land.

Sensitivity or value of receptor

19.10.2.3 The sensitivity of the soils, based on the LCA class of the agricultural land, is considered to be **moderate**, reflecting that no prime agricultural land is present, the land is not subject to statutory nature conservation designations, and peat soils can be avoided through design. The land is mainly LCA class 3.2, defined in **Table 19.24** as a moderate sensitivity receptor. A small area of peaty soils occurs within the onshore export cable corridor from the landfall(s) to the onshore substations which could meet the criteria for a high sensitivity receptor however this area is small and as described in **Section 19.6.2** the soils are likely to have been damaged by the long period of agricultural land use. The peaty soils shown

are in an area c.219m in length and, based on an 89m wide corridor, will cover a maximum of c.1.90ha in area. This represents less than 0.1 percent of the maximum area affected by temporary development.

Magnitude of impact

19.10.2.4 There is the potential for damage to soils to occur wherever soils are excavated or otherwise disturbed (such as by the use of construction vehicles / plant in fields) over a maximum area of 114.64ha. This potentially results in a very high magnitude of change based on **Table 19.25**. However, relevant embedded environmental measures (**Table 19.23**) that will influence the magnitude of change include: soil handling in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) (M-015 and M-071), protection of soft or wet ground from compaction by construction traffic or plant (M-016), and management of excavated soils in accordance with an Outline SMP and guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA, *et al.,* 2010), and Waste Management (M-070). These measures will be secured by the Outline CEMP and planning conditions.

19.10.2.5 Key measures included in the Outline SMP in **Volume 4: Outline CEMP** (M-070) to minimise the temporary impacts on soils during construction include handling and storing topsoil and subsoil separately, not handling soils when they are too wet, minimising the length of time soils are temporarily stockpiled, and storing soils locally to the point of excavation so that they can be restored in the same area they came from.

19.10.2.6 In addition, it is noted that during excavation of the onshore export cable trenches for Phase 1, cable ducts will also be installed to enable the later phase cables (Phases 2 and 3) to be installed without having to re-excavate along the entire route (with the exception of excavations for the joint bay(s) required to connect each section of onshore export cable to the next which will be completed in three phases). This construction approach will minimise the number of times soils are disturbed over the lifetime of the construction phase of the Project.

19.10.2.7 With the implementation of these embedded environmental measures, the magnitude of the impact that construction activities relating to the Project will have on soils and agricultural land is considered to be reduced to **minor**.

Significance of residual effect

19.10.2.8 With the implementation of the embedded environmental measures (as shown in **Table 19.23**), the magnitude of the impact that construction activities relating to the Project will have on soils and agricultural land is **minor**. With the sensitivity of the receptor being **moderate**, and the magnitude **minor**, the effect is of **Minor Adverse (Not Significant)** significance in EIA terms.

19.10.3 Impact C2: permanent loss of soil / agricultural / other land due to construction of above ground elements of the Project

19.10.3.1 A summary of the residual effects arising from the construction stage of the Project are provided in **Table 19.32**.

Overview

19.10.3.2 The maximum assessment scenario relating to permanent development on soils and agricultural land for the Project includes construction of the landfall(s) transition joint bay(s), the onshore export cables, joint bay(s) and link boxes, and the onshore substations and

permanent access roads. This is detailed in **Table 19.22** and in combination amounts to an area of 19.80ha.

19.10.3.3 The area of land needed for the onshore substation site drainage and landscaping areas is approximately 36.2ha. This increases the permanent development area to >20.00ha. However, whilst there will be in additional land take, and loss of agricultural land, it is likely the existing soil horizons, and the baseline soil functions can generally be retained.

19.10.3.4 The predicted effect has been assessed based on the methodology provided in **Section 19.8**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

Sensitivity or value of receptor

19.10.3.5 The sensitivity of the soils, based on the LCA class of the agricultural land, is considered to be **moderate**, reflecting that no prime agricultural land is present, the land is not subject to statutory nature conservation designations, and peat soils can be avoided through design. The land needed for the permanent development is mainly LCA class 3.2, defined in **Table 19.24** as a moderate sensitivity receptor.

Magnitude of impact

19.10.3.6 The onshore elements of the Project will involve the permanent loss of up to 19.80ha of soils within agricultural land for hard development (as explained in **Section 19.7.1**). As defined in **Table 19.25** this will result in a low magnitude of change. This is a maximum design scenario, as the Project is committed to minimising the permanent footprint of the onshore substations and transition joint bay(s) to that required for the safe O&M of the equipment (M-083) in **Table 19.23**.

19.10.3.7 Where soils are disturbed or excavated, relevant embedded environmental measures in **Table 19.23** include protecting soils from damage during construction, soil excavation, storage and reinstatement / reuse, soil handling in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) (M-015 and M-071), protection of soft or wet ground from compaction by construction traffic or plant (M-016), and management of excavated soils in accordance with an Outline SMP and guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA, *et al*., 2010), and Waste Management (M-070). These measures will lower the impact on soils. These measures will be secured by the Outline CEMP and planning conditions.

19.10.3.8 With the implementation of the embedded environmental measures (as shown in **Table 19.23**), the magnitude of the impact associated with construction of the permanent infrastructure (hard development) for the Project on soils and agricultural land is **low**. With the sensitivity of the receptor being **moderate**, and the magnitude **low**, the effect is of **Minor Adverse (Not Significant)** significance in EIA terms.

19.10.3.9 In addition to the hard development, the onshore substation site drainage and landscaping requires an area of approximately 36.2ha (as defined in **Section 19.7.1**) for soft development. Most existing soils are likely to be retained within this area (most will stay in situ, where soils need to be excavated, consideration will be given in final design to reusing them within the area). The embedded environmental measures described above in **paragraph 19.10.3.7** will apply where soils need to be disturbed during construction of the Project, such as to form ponds. The proposed ponds cover a combined area of approximately 2.3ha where soils within agricultural land would be lost. For the remaining land and soils (approximately 33.9ha) there will be a permanent change to vegetation cover and cessation of agricultural activities, however the natural soil profiles should otherwise

remain unchanged. The land capability for agriculture potential of the land and soils of this area of 33.9ha should therefore remain largely unchanged (i.e., this land could be easily converted back to agricultural use at the end of the operational phase of the Project). Land use impacts of the Project, including the loss of agricultural land use, are considered in **Chapter 22: Land Use**.

19.10.3.10 The combined area of permanent development including hard development and soft development is 56ha. However, the combined area where soils will be lost is only 22.1ha (as defined in **Table 19.22**). Due to the combined area exceeding 20ha, this results in a combined magnitude of impact of **medium** on a **moderate** sensitivity receptor, which according to **Table 19.25** results in a **moderate** effect which is potentially significant in EIA terms. This is discussed further below.

19.10.3.11 The area proposed for development as the onshore substation landscaping and drainage area does not include prime agricultural land and the land is currently improved grassland, mainly used for livestock grazing (sheep). The worst-case area of soil and agricultural land where soil would be lost is only slightly above the 20ha threshold applied for a **low** magnitude of impact. In the final design the area may be less than 20ha.

19.10.3.12 As outlined above, most existing soils are likely to be retained within the onshore substation site drainage and landscaping area, either staying undisturbed other than during planting or being excavated (for pond creation) and reused within the Project where possible. This will enable soil functions other than agricultural functions (biomass production) to continue. During the operational phase of the Project there could be benefits to soil health within the onshore substation landscaping and drainage area, and as a result some soil functions could improve. Factors that could improve soil health include increased vegetation coverage, cessation of agricultural inputs such as pesticides, less disturbance to soils and vegetation by agricultural activities such as tilling, and less compaction of soils by farm vehicles and livestock. Soil health improvements could include improvements in soil biodiversity, which is integral to good soil structure and soil carbon storage.

19.10.3.13 For the reasons outlined above, in this instance, based on professional judgement, the moderate effect is considered to be not significant.

19.10.4 Impact C3: damage to land drainage systems during construction (excavation)

Overview

19.10.4.1 Land drains are likely to be present on all agricultural land affected by the Project and may include buried clay drains which could be encountered or damaged during construction of the Project. Damage to drains during construction work can result in ponding or waterlogging of previously well-drained land. The local impact of damage to drains can extend beyond an excavation footprint, causing waterlogging, erosion and compaction. The maximum assessment scenario where damage to land drainage could occur is considered to be the temporary development footprint.

19.10.4.2 The maximum assessment scenario for the landfall(s), the onshore export cable corridor and the onshore substation site, in regard to possible damage to land drainage due to excavations or the use of construction vehicles / plant, is presented in **Table 19.21** and the areas affected are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.8**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

19.10.4.3 The maximum area of impact of temporary development for the Project is 114.64ha as shown in **Table 19.22**. This is the combined maximum area where temporary construction work will take place, including temporary access roads through farmland (1.90ha), temporary construction compounds and trenchless crossing compounds (38.16ha), the onshore export cable corridor from the landfall(s) to the onshore substations (63.19ha) and the onshore export cable corridor from the onshore substations to SSEN Netherton Hub (11.39ha). Except for nine existing roads / tracks crossed by the Project, all areas of temporary soil disturbance / excavation (not including deeper trenchless crossings which will avoid shallow soils) will take place in agricultural land.

19.10.4.4 This includes construction of the landfall(s), onshore export cables and onshore substations, the areas of which are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.8**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

Sensitivity or value of receptor

19.10.4.5 The sensitivity of the soils, based on the LCA class of the agricultural land, is considered to be **moderate**, reflecting that no prime agricultural land is present, the land is not subject to statutory nature conservation designations, and peat soils can be avoided through design. The land is mainly LCA class 3.2, defined in **Table 19.24** as a moderate sensitivity receptor. A small area of peaty soils occurs within the onshore export cable corridor from the landfall(s) to the onshore substations which could meet the criteria for a high sensitivity receptor however this area is small and as described in **Section 19.6.2**, the soils are likely to have been damaged by the long period of agricultural land use. The peaty soils shown are in an area c.219m in length and, based on an 89m wide corridor, will cover a maximum of c.1.90ha in area. This represents less than 0.1 per cent of the maximum area affected by temporary development.

Magnitude of impact

19.10.4.6 There is the potential for damage to land drainage soils to occur wherever soils are excavated or otherwise disturbed (such as by the use of construction vehicles / plant in fields) over a maximum area of 114.64ha. This potentially results in a very high magnitude of change based on **Table 19.25**. However, relevant embedded environmental measures (**Table 19.23**) that will influence the magnitude of change include: protection of soft or wet ground from compaction by construction traffic or plant (M-016), and a commitment to protect and maintain / reinstate existing land drainage systems and to install suitable temporary drainage measures as needed (M-023). The measures will be secured by the Outline CEMP and planning conditions.

19.10.4.7 With the implementation of these embedded environmental measures, the magnitude of the impact that construction activities relating to the Project will have on soils and agricultural land is considered to be reduced to **minor**.

Significance of residual effect

19.10.4.8 With the implementation of the embedded environmental measures (as shown in **Table 19.23**), the magnitude of the impact that construction activities relating to the Project will have on soils and agricultural land is **minor**. With the sensitivity of the receptor being **moderate**, and the magnitude **low**, the effect is of **Minor Adverse (Not Significant)** significance in EIA terms.

19.10.5 Impact C4: changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding)

Overview

19.10.5.1 Most of the Onshore Red Line Boundary, including the landfall(s), the onshore export cable corridor, and the onshore substation site is in agricultural use and is expected to be generally free from land contamination posing a significant risk to human health, environmental, or property receptors.

19.10.5.2 However, potential sources of contamination that have the potential to impact on human health receptors, the water environment (groundwater and surface water), property (agricultural crops or grazing livestock, and building / infrastructure or utilities), and / or ecological receptors (the Rattray Head to Peterhead LNC Site) have been identified. No very high or high risks (as defined in **Table 19.30**) have been identified for current or future receptors for the identified sources. However, there are moderate / low risks identified for receptors (as detailed in **Table 19.2**) as follows:

- Moderate / low risks from various sources (including Made Ground, leaks or spills at Longside Airfield, former RAF Peterhead, associated former camps and other RAF Peterhead secondary sites, a historical rifle range at the landfall(s), Made Ground due to infilling of quarries / pits, disused canals, tanks, and former railway) to human health receptors (current and future site users) from onsite sources (for instance, within the Onshore Red Line Boundary) located in the landfall(s), the onshore export cable corridor, and the onshore substation site.
- Moderate / low risks to human health receptors (adjacent land users) from onsite sources (as listed in the bullet above) in the landfall(s), the onshore export cable corridor, and the onshore substation site.
- Moderate / low risks to current and future property (infrastructure, utilities, agricultural land including crops and grazing livestock) from various onsite sources (including Made Ground, leaks or spills at Longside Airfield, former RAF Peterhead, associated former camps and other RAF Peterhead secondary sites, Made Ground due to infilling of quarries / pits, disused canals, tanks, and former railway) at the landfall(s) and the onshore export cable corridor.
- Moderate / low risks from onsite sources to groundwater receptors (as listed in the first bullet above, also herbicides, pesticides and other chemicals applied to land during agricultural activities) in the landfall(s) and the onshore export cable corridor.
- Moderate / low risks from onsite sources to surface water receptors in the landfall(s) and the onshore export cable corridor (from sources as per groundwater receptors).
- One moderate / low risk to future site users associated with offsite Made Ground at the onshore substation site, and one moderate / low risk to current and future site users associated with Longside Airfield, former RAF Peterhead.
- One moderate / low risk from an offsite source (Made Ground, leaks or spills, associated with Longside Airfield, former RAF Peterhead) to a surface water drain at the onshore substation site. One moderate / low risk from an offsite source to a to a surface water drain at the onshore export cable corridor from the landfall(s) to the onshore substations (segment A1).

- One moderate / low risk to future property (onshore elements of the Project including cables, joint bay(s)) from an offsite source (Made Ground associated with Longside Airfield, former RAF Peterhead, and associated former camp sites 6 and 13) at the onshore export cable corridor zones.

19.10.5.3 The maximum assessment scenario relating to the changes to the level of risk associated with land contamination during construction of the Project change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding) are presented in **Table 19.21** and the areas affected are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.9**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

Sensitivity or value of receptor

19.10.5.4 The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, the water environment, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Project, as explained in **Section 19.9**.

Magnitude of impact

19.10.5.5 Relevant embedded environmental measures (**Table 19.23**) that will influence the magnitude of change (in this case an adverse change in risk level to a potential land contamination receptor) include:

19.10.5.6 The Applicant's commitment to ensuring that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (LCRM) (SEPA, Environment Agency, 2020) and other guidance (including BS 10175) (M-073); use of the findings of the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**) to inform an intrusive ground investigation to be undertaken during pre-construction for the Project, to ensure that the land is suitable for the intended future use (M-067) and ensuring that an unexpected contamination protocol is produced during pre-construction, in line with UK statutory guidance (LCRM) SEPA, Environment Agency, 2020), to minimise the potential risks to human health and the water environment from any unexpected ground contamination (M-017 and M-018).

19.10.5.7 In addition, the Outline CEMP includes an Outline SMP (M-070) which includes a requirement to ensure that any excavated material suspected to be contaminated can be segregated until suitable testing, and risk assessment, has been completed to confirm its suitability for reuse or suitable disposal options.

19.10.5.8 The above measures will be secured by the Outline CEMP and planning conditions.

Significance of residual effect

19.10.5.9 Whilst the probability of encountering contamination during construction increases by passing through potential sources of contamination, the result of the embedded environmental measures is that the probability of a pollutant linkage being realised is

reduced. As such, with the implementation of the embedded environmental measures, there should be no increase in the risk level as compared to baseline (current levels of risk to receptors from the identified sources). Based on the significance evaluation in **Table 19.31** the result is a **Negligible** effect, which is **Not Significant** in EIA terms.

19.10.6 Impact C5: release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust)

Overview

19.10.6.1 The construction activities for the Project include the setup of temporary construction compounds, and trenchless crossing compounds, also trenching to install the ducts and joint bay(s), and the creation of temporary vehicle access routes. At temporary construction compounds, it is likely that there will be a requirement for the storage of fuels for refuelling of plant and machinery, this has the potential to result in accidental fuel losses either because of loss of bulk containment minor leaks / spills during filling, or leaks and spills from vehicles or plant. Accidental spills or leaks could take place anywhere within the working corridor where vehicles or plant are being operated.

19.10.6.2 In addition, trenchless crossings will require the use of drilling fluids which will be stored at the trenchless crossing compound(s) with the potential for a release to ground due to loss of bulk containment.

19.10.6.3 The maximum assessment scenario relating to the release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust) are presented in **Table 19.21** and the areas affected are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.9**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

Sensitivity or value of receptor

19.10.6.4 The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, the water environment, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Project, as explained in **Section 19.9**.

Magnitude of impact

19.10.6.5 Relevant embedded environmental measures (**Table 19.23**) that will influence the magnitude of change by limiting the potential for accidental spillages and leaks or contamination caused by runoff or migration of dusts during construction comprise: M-013, M-015, M-016, M-017, M-018, M-021, M-023, M-025, M-069, M070, M-072, M-074, and M-

076. These relate to the implementation of best practice for storage of potentially polluting substances (such as fuels) or materials (such as excavated soils), set up of construction work (to ensure compliance with The Construction (Design and Management) Regulations 2015, the Health and Safety at Work Act etc.1974 and CAR 2012), control of construction activities and drainage, including incident management, and compliance with legislation and SEPA guidance for pollution prevention.

19.10.6.6 Drilling fluids used during trenchless crossings will be bentonite-based muds which are not classified as environmentally hazardous and do not contain groundwater hazardous substances and, therefore, a loss of containment would be mild at worst.

19.10.6.7 Whilst construction will introduce potential contamination sources, implementation of the embedded environmental measures reduced the potential for an impact on land contamination receptors, with any spillage or other release expected to be a mild impact at most, which would represent a very low risk.

Significance of residual effect

19.10.6.8 With the implementation of the embedded environmental measures, there should be no increase in the risk level as compared to baseline (current levels of risk to receptors from the identified sources). Based on the significance evaluation in **Table 19.31** the result is a **Negligible** effect, which is **Not Significant** in EIA terms.

19.11 Assessment of effects: operation and maintenance stage

19.11.1 Introduction

19.11.1.1 This Section provides an assessment of the effects for ground conditions and contamination from the O&M of the onshore elements of the Project.

19.11.1.2 The assessment methodology set out in **Section 19.8** has been applied to assess effects to ground conditions and contamination from the Project.

19.11.1.3 A summary of the residual effects arising from the O&M stage of the Project are provided in **Table 19.32**.

19.11.2 Impact O1: changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding)

Overview

19.11.2.1 Most of the Onshore Red Line Boundary, including the landfall(s), the onshore export cable corridor, and the onshore substation site is in agricultural use and is expected to be generally free from land contamination posing a significant risk to human health, environmental, or property receptors.

19.11.2.2 However, potential sources of contamination that have the potential to impact on human health receptors, the water environment (groundwater and surface water), property (agricultural crops or grazing livestock, and building / infrastructure or utilities), and / or ecological receptors (the Rattray Head to Peterhead LNC Site) have been identified. No very high or high risks (as defined in **Table 19.30**) have been identified for current or future receptors for the identified sources.

19.11.2.3 The maximum assessment scenario relating to the changes to the level of risk associated with land contamination during operation of the Project change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding) are presented in **Table 19.21** and the areas affected are defined in **Table 19.22**. Where predicted effects are identified, an assessment of the magnitude of change for each effect has been completed based on the methodology provided in **Section 19.9**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 19.23** have been implemented as part of the Project.

Sensitivity or value of receptor

19.11.2.4 The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, the water environment, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Project, as explained in **Section 19.9**.

Magnitude of impact

19.11.2.5 Relevant embedded environmental measures (**Table 19.23**) that will influence the magnitude of change (in this case an adverse change in risk level due to change of land use, introduction of new receptors, and / or changes to ground cover) to ensure that the site is suitable for use during the O&M stage include:

- the Applicant's commitment to ensuring that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (LCRM) (Environment Agency, 2020) and other guidance (including BS 10175) (M-073);
- the findings of the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**) will inform an intrusive ground investigation to be undertaken during pre-construction for the Project, to ensure that the land is suitable for the intended future use (M-067);
- **Table 19.23** includes measures (M-017 and M-018) to ensure that an unexpected contamination protocol is produced during pre-construction, in line with UK statutory guidance (LCRM) (Environment Agency, 2020), to minimise the potential risks to human health and the water environment from any unexpected ground contamination; and
- the Outline CEMP includes an Outline SMP (M-070) which includes a requirement to ensure that any excavated material suspected to be contaminated can be segregated until suitable testing, and risk assessment, has been completed to confirm its suitability for reuse or suitable disposal options.

19.11.2.6 The above measures will be secured by the Outline CEMP and planning conditions.

Significance of residual effect

19.11.2.7 The result of the embedded environmental measures is that the land permanently developed for the Project, including; transition joint bay(s), onshore substations, permanent onshore substation site access, landscaping and drainage, and land subject to temporary development works where excavated soils will be reinstated (temporary compounds,

trenchless crossing compounds and the onshore export cable corridor) will be suitable for the proposed use in line with LCRM.

19.11.2.8 As such, with the implementation of the embedded environmental measures, there should be no increase in the risk level as compared to baseline (current levels of risk to receptors from the identified sources). Based on the significance evaluation in **Table 19.31** the result is a **Negligible** effect, which is **Not Significant** in EIA terms.

19.12 Assessment of effects: decommissioning stage

19.12.1 Introduction

19.12.1.1 This Section provides an assessment of the effects for ground conditions and contamination from the decommissioning of the elements of the Project.

19.12.1.2 The assessment methodology set out in **Section 19.8** has been applied to assess effects to ground conditions and contamination from the Project.

19.12.2 Impact D1: decommissioning of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant

Overview

19.12.2.1 Decommissioning activities for the Project will include decommissioning of the onshore substations.

19.12.2.2 It is anticipated that the onshore cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.

19.12.2.3 Some setup of temporary compounds is possible and there could be a requirement for storage of fuels for refuelling of plant and machinery, which has the potential to result in accidental fuel losses either because of loss of bulk containment minor leaks / spills during filling, or leaks and spills from vehicles or plant. Accidental spills or leaks could take place anywhere vehicles or plant are being operated.

19.12.2.4 The maximum assessment scenario and area of soils and agricultural land potentially impacted, in relation to damage to soil during handling, storage, reinstatement or use of vehicles / plant during decommissioning, will be far smaller in scale than the maximum assessment scenario for construction presented in **Table 19.21** and **Table 19.22**.

Sensitivity or value of receptor

19.12.2.5 The sensitivity of the soils and agricultural land is considered to be **moderate** for areas where decommissioning is likely, reflecting that no prime agricultural land is present, the land is not subject to statutory nature conservation designations, and peat soils are avoided through design. The land is mainly LCA Class 3.2, defined in **Table 19.24** as a moderate sensitivity receptor. Areas permanently developed for the Project are likely to have had topsoil and / or subsoil permanently removed and would therefore be of lower sensitivity at the point of decommissioning than pre-construction.

Magnitude of impact

19.12.2.6 The assessment assumes that the relevant embedded environmental measures (**Table 19.23**) influencing the magnitude of change for decommissioning (in this case damage to soil resources and agricultural land) will, as a minimum, include (or be equivalent to) those applying to construction.

19.12.2.7 There is the potential for damage to soils to occur wherever soils are excavated or otherwise disturbed (such as by the use of vehicles / plant in fields). The area impacted during decommissioning will be less than that impacted during construction. It is assumed that embedded environmental measures that will influence the magnitude of change are as a minimum equivalent to those applied for construction (**Table 19.23**), which include: soil handling in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) (M-015 and M-071), protection of soft or wet ground from compaction by construction traffic or plant (M-016), and management of excavated soils in accordance with an Outline SMP and guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA, *et al*., 2010), and Waste Management (M-070). These measures will be secured by the Outline CEMP and planning conditions.

19.12.2.8 With the implementation of these embedded environmental measures, the magnitude of the impact that construction activities relating to the Project will have on soils and agricultural land is considered to be at worst **minor**.

Significance of residual effect

19.12.2.9 With the implementation of the embedded environmental measures, the magnitude of the impact that decommissioning activities relating to the Project will have on soils and agricultural land is **minor**. With the sensitivity of the receptor being a maximum of **moderate**, and the magnitude a maximum of **minor**, the effect is of **Minor Adverse (Not Significant)** significance in EIA terms.

19.12.3 Impact D2: changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding)

Overview

19.12.3.1 Decommissioning activities for the Project will include decommissioning of the onshore substations. Activities such as onsite disassembly of equipment and demolition of structures would have the greatest potential for soil or groundwater contamination due to spills or leaks, and wastes generated.

19.12.3.2 It is anticipated that the onshore cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.

19.12.3.3 Some setup of temporary compounds is possible and there could be a requirement for storage of fuels for refuelling of plant and machinery, which has the potential to result in accidental fuel losses either because of loss of bulk containment minor leaks / spills during filling, or leaks and spills from vehicles or plant. Accidental spills or leaks could take place anywhere vehicles or plant are being operated.

19.12.3.4 The maximum assessment scenario relevant to possible changes in land contamination risks, due to change of land use, introduction of new receptors, and / or changes to ground

cover, during decommissioning, will be far smaller in scale than the maximum assessment scenario for construction.

Sensitivity or value of receptor

19.12.3.5 The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, the water environment, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Project, as explained in **Section 19.9**.

Magnitude of impact

19.12.3.6 The assessment assumes that the relevant embedded environmental measures (**Table 19.23**) influencing the magnitude of change (in this case an adverse change in risk level to a potential land contamination receptor) will, as a minimum, include (or be equivalent to) those applying to construction for instance:

- a commitment to ensuring that the land is suitable for its proposed future use with respect to the potential for soil and groundwater contamination and, where necessary, that risk-based investigation and remediation would be undertaken in line with relevant statutory / industry guidance (M-073);
- the findings of the Phase 1 Contaminated Land Report (**Volume 3, Appendix 19.1**) and any further relevant desk studies, ground investigation, or remediation reports would inform an assessment of whether the land was suitable for the intended future use (M-067) and whether any additional action was needed (such as ground investigation and remediation);
- measures (M-017 and M-018) include establishment of an unexpected contamination protocol, in line with UK statutory guidance (LCRM), to minimise the potential risks to human health and the water environment from any unexpected ground contamination; and
- the Outline CEMP includes an Outline SMP (M-070) which includes a requirement to ensure that any excavated material suspected to be contaminated can be segregated until suitable testing, and risk assessment, has been completed to confirm its suitability for reuse or suitable disposal options.

19.12.3.7 The above measures will be secured by the Outline CEMP and planning conditions.

Significance of residual effect

19.12.3.8 With implementation of the embedded environmental measures, there should be no increase in the risk level as compared to baseline (current levels of risk to receptors from the identified sources). Based on the significance evaluation in **Table 19.31** the result is a **Negligible** effect, which is **Not Significant** in EIA terms.

19.12.4 Impact D3: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust)

Overview

19.12.4.1 Decommissioning activities for the Project will include decommissioning of the onshore substations. Activities such as onsite disassembly of equipment and demolition of structures would have the greatest potential for soil or groundwater contamination due to spills or leaks, and wastes generated.

19.12.4.2 It is anticipated that the onshore cables will be left in-situ with ends cut, sealed and buried to minimise effects associated with removal.

19.12.4.3 Some setup of temporary compounds is possible and there could be a requirement for storage of fuels for refuelling of plant and machinery, which has the potential to result in accidental fuel losses either because of loss of bulk containment minor leaks / spills during filling, or leaks and spills from vehicles or plant. Accidental spills or leaks could take place anywhere vehicles or plant are being operated.

19.12.4.4 The maximum assessment scenario relating to the release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust) during decommissioning will be far smaller in scale than the maximum assessment scenario for construction.

Sensitivity or value of receptor

19.12.4.5 The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, the water environment, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Project, as explained in **Section 19.9**.

Magnitude of impact

19.12.4.6 The assessment assumes that the relevant embedded environmental measures (**Table 19.23**) influencing the magnitude of change to limit potential for accidental spillages and leaks or contamination caused by runoff or migration of dusts during decommissioning will, as a minimum, include (or be equivalent to) those applying to construction for instance: M-013, M-015, M-016, M-017, M-018, M-021, M-023, M-025, M-069, M070, M-072, M-074, and M-076. These measures relate to the implementation of best practice for storage of potentially polluting substances (such as fuels) or materials (such as excavated soils or waste from decommissioning), design and control of decommissioning work to ensure compliance with The Construction (Design and Management) Regulations 2015, the Health and Safety at Work Act etc. 1974 and CAR 2012, measures to protect existing drainage systems or install suitable temporary drainage measures, also incident management procedures, and compliance with relevant legislation and SEPA guidance for pollution prevention. These measures will be secured by the Outline CEMP and planning conditions.

19.12.4.7 Implementation of the embedded environmental measures will reduce the potential for an impact on land contamination receptors, with any spillage or other release expected to be a mild impact at most, which would represent a very low risk.

Significance of residual effect

19.12.4.8 With implementation of the embedded environmental measures, there should be no increase in the risk level as compared to baseline (current levels of risk to receptors from the identified sources). Based on the significance evaluation in **Table 19.31** the result is a **Negligible** effect, which is **Not Significant** in EIA terms.

19.13 Summary of effects

19.13.1.1 A summary of the effects arising from the construction, O&M and decommissioning stages of the Project in relation to ground conditions and contamination are summarised in **Table 19.32**.

Table 19.32 Summary of effects during the construction, O&M and decommissioning stage of the Project on ground conditions and contamination

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effects
Construction					
Soils and agricultural land	**Moderate**	Impact C1: Construction of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant.	M-015 M-016 M-070 M-071	**Minor** magnitude of impact.	**Minor adverse effect (Not Significant).**
Soils and agricultural land	**Moderate**	Impact C2: Permanent loss of soil / agricultural / other land due to construction of above ground elements of the Project.	M-015 M-016 M-070 M-071 M-083	**Medium** magnitude of impact.	**Moderate adverse effect[a] (Not Significant).**
Soils and agricultural land	**Moderate**	Impact C3: Damage to land drainage systems during construction (excavation).	M-016 M-023	**Minor** magnitude of impact.	**Minor adverse effect (Not Significant).**
Land contamination receptors	Various – see **Volume 3, Appendix 19.1** for details.	Impact C4: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	M-017 M-018 M-067 M-070 M-073	N/A	**Negligible adverse effect (Not Significant).**
Land contamination receptors	Various – see **Volume 3, Appendix 19.1** for details.	Impact C5: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels	M-013 M-015 M-016 M-017 M-018	N/A	**Negligible adverse effect (Not Significant).**

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effects
		/ oils, release of contaminants from wastes by runoff or windblown dust).	M-021 M-023 M-025 M-069 M-070 M-072 M-074 M-076		
O&M					
Land contamination receptors	Various – see **Volume 3, Appendix 19.1** for details.	Impact O1: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	M-017 M-018 M-067 M-070 M-073	N/A	**Negligible adverse effect (Not Significant).**
Decommissioning					
Soils and agricultural land	**Moderate**	Impact D1: Decommissioning of the landfall(s), onshore export cables and onshore substations, transition joint bay(s) – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant.	M-015 M-016 M-070 M-071	**Minor** magnitude of impact	**Minor adverse effect (Not Significant).**
Land contamination receptors	Various – see **Volume 3, Appendix 19.1** for details.	Impact D2: Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and / or changes to ground cover (for example, removal of vegetation, ground reprofiling, removal of hardstanding).	M-017 M-018 M-067 M-070 M-073	N/A	**Negligible adverse effect (Not Significant).**

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effects
Land contamination receptors	Various – see **Volume 3, Appendix 19.1** for details.	Impact D3: Release of contaminants to ground (soil and / or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust.	M-013 M-015 M-016 M-017 M-018 M-021 M-023 M-025 M-069 M-070 M-072 M-074 M-076	N/A	**Negligible adverse effect (Not Significant).**

[a] See **Section 19.10** for rationale for moderate effect being considered not significant.

19.14 Transboundary effects

19.14.1.1 Transboundary effects arise when impacts from a development with one European Economic Area (EEA) State affects the environment of another EEA State(s). A screening of transboundary effects has been carried out and is presented in Appendix 4B of the Scoping Report (MarramWind Limited, 2023).

19.14.1.2 Based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely, there are not considered to be any transboundary effects on ground conditions and contamination receptors from the Project.

19.15 Inter-related effects

19.15.1.1 A description and assessment of the likely inter-related effects arising from the Project on ground conditions and contamination is provided in **Chapter 32: Inter-Related effects**.

19.16 Assessment of cumulative effects

19.16.1.1 A description and assessment of the cumulative effects arising from the Project on ground conditions and contamination is provided in **Chapter 33: Cumulative Effects Assessment**.

19.17 Summary of residual likely significant effects

19.17.1.1 There are no residual likely significant effects on ground conditions and contamination receptors assessed in this EIA Report Chapter.

19.18 References

Aberdeenshire Council, (2023a). *Aberdeenshire Council's Local Development Plan 2023.* [online] Available at: https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/ [Accessed: 8 August 2025].

Aberdeenshire Council, (2023b). *Aberdeenshire Council's Scoping Opinion for Offshore Wind Farm Project at MarramWind Offshore Wind Farm.* [online] Available at: https://upa.aberdeenshire.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RPB0TVCA04U00 [Accessed: 10 September 2025].

Aberdeenshire Council, (2024). *Aberdeenshire Council Pre-Application Advice Report.*

British Standards Institution (BSI), (2017). *Investigation of potentially contaminated sites. Code of practice – Code of practice (BS 10175:2011+A2:2017).* [online] Available at: https://knowledge.bsigroup.com/products/investigation-of-potentially-contaminated-sites-code-of-practice-code-of-practice [Accessed: 8 August 2025].

British Standards Institution (BSI), (2020). *Code of practice for ground investigations (BS 5930:2015+A1:2020).* [online] Available at: https://knowledge.bsigroup.com/products/code-of-practice-for-ground-investigations [Accessed: 8 August 2025].

Carroll, B., Fothergill. C., Murphy. J. and Turpin. T., (2019). *Environmental impact assessment handbook: A practical guide for planners, developers, and communities*. Third Edition. London, ICE Publishing.

Department for Environment Food and Rural Affairs (Defra), (2009). *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.* [online] Available at: https://assets.publishing.service.gov.uk/media/5b2264ff40f0b634cfb50650/pb13298-code-of-practice-090910.pdf [Accessed: 8 August 2025].

Department for Environment Food and Rural Affairs (Defra), (2024). *Farming Evidence Pack. A high-level review of the UK agricultural industry, July 2024.* [online] Available at: https://assets.publishing.service.gov.uk/media/66e7e0b33f1299ce5d5c3ed9/Farming_evidence_pack_16sept24.pdf [Accessed: 5 September 2025].

Environment Agency, Scottish Environment Protection Agency (SEPA), Natural Resources Wales (NRW) and Society of Brownfield Risk Assessment (SoBRA), (2020). *Land Contamination Risk Management (LCRM).* [online] Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm [Accessed: 8 August 2025].

Environmental Protection Act 1990. (c.43). [online] Available at: https://www.legislation.gov.uk/ukpga/1990/43/introduction [Accessed: 8 August 2025].

Institute of Environmental Management and Assessment (IEMA), (2022). *A New Perspective on Land and Soil in Environmental Impact Assessment.* [online] Available at: https://www.iema.net/media/3xejdu0u/2022-iema_land_and_soils_guidance.pdf [Accessed: 8 August 2025].

Health and Safety at Work etc. Act 1974. (c.37). [online] Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents [Accessed: 13 August 2025].

Highways England, (2019). *Sustainability and Environment Appraisal: LA 109 Geology and soils*. [online] Available at: https://www.standardsforhighways.co.uk/search/adca4c7d-4037-4907-b633-76eaed30b9c0 [Accessed: 24 September 2025].

Institute of Air Quality Management (IAQM), (2024). *Guidance on the assessment of dust from demolition and construction*. January 2023 (Version 2.2). [online] Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf [Accessed: 13 August 2025].

James Hutton Institute, (2016). *Carbon and Peatland 2016 Map.* [online] Available at https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ [Accessed: 8 August 2025].

James Hutton Institute, (2025a). *Land Capability for Agriculture (LCA) (partial cover).* [online] Available at: https://soils.environment.gov.scot/maps/capability-maps/land-capability-for-agriculture-partial-cover/ [Accessed: 8 August 2025].

James Hutton Institute, (2025b). *Soil maps*. [online] Available at: https://www.hutton.ac.uk/soil-maps/ [Accessed: 8 August 2025].

Macaulay Institute for Soil Research, (1982). *Soil Survey of Scotland: Eastern Scotland. 1:250,000 Sheet 5.* [online] Available at: https://soils.environment.gov.scot/maps/scanned-soil-maps/soil-survey-of-scotland-1250-000-scanned-maps/ [Accessed: 8 August 2025].

MarramWind Limited, (2023). *MarramWind Offshore Wind Farm Environmental Impact Assessment – Scoping Report*. [online] Available at: https://marramwind.co.uk/scoping-report [Accessed: 8 August 2025].

Ministry of Agriculture, Fisheries and Food (MAFF), (1988). *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* [online] Available at: https://publications.naturalengland.org.uk/publication/6257050620264448?category=5954148537204736 [Accessed: 24 September 2025].

Macauley Land Use Research Institute (1991) Land Classification for Agriculture. [online] Available at: https://www.hutton.ac.uk/sites/default/files/files/soils/LAND%20CAPABILITY%20CLASSIFICATION%20FOR%20AGRICULTURE.PDF [Accessed 7 November 2025].

National House Building Council (NHBC), Environment Agency and Chartered Institute of Environmental health (CIEH), (2008). *Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008 Volume 1*. [online] Available at: https://www.cieh.org/media/5926/guidance-for-safe-development-housing-on-contaminated-land-volume-1.pdf [Accessed: 8 August 2025].

Natural England, (2006). *Geological conservation: a guide to good practice (ST118).* [online], Available at: https://publications.naturalengland.org.uk/publication/83048 [Accessed: 8 August 2025].

NatureScot and Historic Environment Scotland, (2018). *A Handbook on Environmental Impact Assessment.* [online] Available at: https://www.nature.scot/doc/archive/environmental-impact-assessment-handbook-version-5-2018 [Accessed: 8 August 2025].

NatureScot, (2023). *Advising on peatland, carbon-rich soils and priority peatland habitats in development management.* [online] Available at: https://www.nature.scot/doc/advising-peatland-

carbon-rich-soils-and-priority-peatland-habitats-development-management [Accessed: 8 August 2025].

NatureScot, (2025a). *SiteLink map*. [online] Available at: https://sitelink.nature.scot/home. [Accessed: 8 August 2025].

NatureScot, (2025b). *NatureScot Spatial DataHub, used to access Peatland ACTION project (2013-2023) data*. [online] Available at: https://opendata.nature.scot/ [Accessed: 30 July 2025].

Scottish Environment Protection Agency (SEPA), (2017). *Developments on Peat and Off-Site Uses of Waste Peat.* [online] Available at: https://www.sepa.org.uk/media/287064/wst-g-052-developments-on-peat-and-off-site-uses-of-waste-peat.pdf [Accessed: 13 August 2025].

Scottish Environment Protection Agency (SEPA), (2022a). *Position Statement on Planning and Soils*. [online] Available at: https://www.sepa.org.uk/environment/land/soil/ [Accessed: 8 August 2025].

Scottish Environment Protection Agency (SEPA), (2022b). *Position Statement on Land Protection*. [online] Available at: https://www.sepa.org.uk/media/159201/ep-054_position_statement_on_land_protection.pdf [Accessed: 8 August 2025].

Scottish Environment Protection Agency (SEPA), (2022c). *Land Remediation and Waste Management Guidelines.* [online] Available at: https://www.sepa.org.uk/media/28317/land-remediation-and-waste-management-guidelines.pdf [Accessed: 8 August 2025].

Scottish Environment Protection Agency (SEPA), (2022d). *Scottish Waste Sites and Capacity Tool* [online] Available at https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-site-information/ [Accessed 8 August 2025].

Scottish Environment Protection Agency (SEPA), Civil Engineering Contractors Association and Environmental Industries Commission, (2010). *Regulatory Guidance, Promoting the sustainable reuse of greenfield soils in construction.* [online] Available at: https://www.sepa.org.uk/media/154233/reuse_greenfield_soils_construction.pdf [Accessed: 8 August 2025].

Scottish Environment Protection Agency (SEPA), (2024). *The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4.* [online] Available at: https://www.sepa.org.uk/regulations/water/ [Accessed: 8 August 2025].

Scottish Government, (2000). *Planning Advice Note 60: Natural Heritage.* [online] Available at Planning+Advice+Note+60+Planning+for+Natural+Heritage.pdf [Accessed: 8 August 2025].

Scottish Government, (2006). *Environmental Protection Act 1990 – Part IIA Contaminated Land: Statutory Guidance.* [online] Available at: https://www.gov.scot/publications/environmental-protection-act-1990-part-iia-contaminated-land-statutory-guidance/ [Accessed: 8 August 2025].

Scottish Government, (2009). *The Scottish Soil Framework.* [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2009/05/scottish-soil-framework/documents/0081576-pdf/0081576-pdf/govscot%3Adocument/0081576.pdf [Accessed: 8 August 2025].

Scottish Government, (2017). *Planning Advice Note (PAN) 33: Development of Contaminated Land.* [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/12/pan-33-development-of-contaminated-land/documents/planning-advice-

note-33-development-contaminated-land-pdf/planning-advice-note-33-development-contaminated-land-pdf/govscot:document/Planning%20advice%20note%2033%20-%20development%20of%20contaminated%20land.pdf [Accessed: 8 August 2025].

Scottish Government, (2023a). *National Planning Framework 4.* [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf [Accessed: 8 August 2025].

Scottish Government, (2023b). *MarramWind Offshore Wind Farm Environmental Impact Assessment – Scoping Opinion.* [online] Available at: https://marine.gov.scot/?q=node/23928 [Accessed: 10 September 2025].

Scottish Government (2025). The Environmental Authorisations (Scotland) Amendment Regulations 2025. [online] Available at: https://www.legislation.gov.uk/sdsi/2025/9780111062319/contents. [Accessed: 3 November 2025].

Scottish Government, Scottish Natural Heritage and Scottish Environment Protection Agency (SEPA), (2017). *Peatland Survey*, *Guidance on Developments on Peatland*. [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf [Accessed: 8 August 2025].

Smith, D.J., (1983). *Action Stations 7: Military Airfields of the North East and Northern Ireland*. Cambridge: Patrick Stephens Ltd. [online] Available at: https://archive.org/details/actionstations7m0000smit [Accessed: 29 October 2025].

Sustainable Remediation Forum UK (SuRF-UK), (2011). *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*, *Final, March 2010*. [online] Available at: https://claire.co.uk/projects-and-initiatives/surf-uk-new. [Accessed: 8 August 2025].

The Construction (Design and Management) Regulations 2015. (SI 2015 51). [online] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents [Accessed: 13 August 2025].

The Control of Asbestos Regulations 2012. (SI 2012 632). [online] Available at: https://www.legislation.gov.uk/uksi/2012/632/contents [Accessed: 13 August 2025].

The Environmental Protection (Duty of Care) (Scotland) Regulations 2014. (SI 2014 4). [online] Available at: https://www.legislation.gov.uk/ssi/2014/4/contents/made [Accessed: 13 August 2025].

The Pollution Prevention and Control (Scotland) Regulations 2012. (SI 2012 360). [online] Available at: https://www.legislation.gov.uk/ssi/2012/360/contents [Accessed: 13 August 2025].

The Town and Country Planning (Development Management Procedure) (England) Order 2015. (SI 2015 595). [online] Available at: https://www.legislation.gov.uk/uksi/2015/595/contents [Accessed: 13 August 2025].

The Waste (Scotland) Regulations 2012. (SI 2012 148). [online] Available at: https://www.legislation.gov.uk/ssi/2012/148#:~:text=1.%E2%80%94(1)%C2%A0These%20Regulations%20may%20be%20cited%20as [Accessed: 13 August 2025].

The Water Environment (Controlled Activities) (Scotland) Regulations 2011. (SI 2011 209). [online] Available at: https://www.legislation.gov.uk/ssi/2011/209/contents [Accessed: 13 August 2025].

Town and Country Planning Act 1990. (c.8). [online] Available at: https://www.legislation.gov.uk/ukpga/1990/8/contents [Accessed: 13 August 2025].

19.19 Glossary of terms and abbreviations

19.19.1 Abbreviations

Acronym	Definition
Bgl	Below ground level
BGS	British Geological Survey
CEMP	Construction Environmental Management Plan
cm	Centimetres
Defra	Department for Environment Food and Rural Affairs
EIA	Environmental Impact Assessment
FOC	Fibre Optic Cable
GCR	Geological Conservation Review
GWDTE	Groundwater Dependent Terrestrial Ecosystems
ha	Hectares
HDD	Horizontal Directional Drilling
IEMA	Institute of Environmental Management and Assessment
km	Kilometres
LCA	Land Capability for Agriculture
LCRM	Land Contamination Risk Management
LDP	Local Development Plan
LNR	Local Nature Reserve
m	Metres
NSIS	National Soils Inventory of Scotland
NVZ	Nitrate Vulnerable Zones
O&M	Operation and Maintenance
OMS	other mineral soils
PCL	potentially contaminated land
PMP	Peat Management Plan
PPE	Personal Protective Equipment
PRA	Preliminary Risk Assessment

Acronym	Definition
RAF	Royal Air Force
SAA	Small Arms Ammunition
SAC	Special Areas of Conservation
SEPA	Scottish Environment Protection Agency
SMP	Soil Management Plan
SPA	Special Protection Area
SSEN	Scottish and Southern Electricity Networks
UST	Underground Storage Tank

19.19.2 Glossary of terms

Term	Definition
Abstraction	Removal of water from surface water or groundwater reserves.
Alluvium	Material transported by rivers and deposited along its course.
Bund	A barrier, dam or mound used to contain or exclude water (or other liquids). Can refer to a bund made from earthworks material, sand etc. or a metal / concrete structure surrounding, for example, a fuel tank.
Carbon rich soils	NatureScot defines carbon rich soil as "*any soil with a surface organic layer (the O horizon as defined in the Scottish soil classification). In this context, it includes surface layers often referred to as peaty soil and peat soil*".
Contaminated land	The definition of land meeting the statutory definition of 'contaminated land' is given in Part 2A of the Environmental Protection Act 1990.
Discharge	Release of effluent waste into a watercourse or water body.
Environmental Quality Standard	A limit on concentrations of a chemical parameter established to protect the environment. Long term EQS are often set as an annual average concentration, short term EQS are set as a maximum allowable concentration or as a percentile value.
Land Capability for Agriculture Classification	The LCA Classification devised by the Macauley Land Use Research Institute (now the James Hutton Institute) classifies land based on its potential for growing different types of crops or for grazing use, taking into consideration soils, climate and landscape (Macauley Land Use Institute, 1991). The grading system is summarised below, from highest to lowest land capability, with prime agricultural land defined as land in Classes 1, 2 or 3.1: Class 1: Land capable of producing a very wide range of crops. (Prime agricultural land). Class 2: Land capable of producing a wide range of crops. (Prime agricultural land).

Term	Definition
	Class 3.1: Land capable of producing consistently high yields of a narrow range of crops and / or moderate yields of a wider range. Short grass leys are common. (Prime agricultural land). Class 3.2: Land capable of average production though high yields of barley, oats and grass can be obtained. Grass leys are common. Class 4.1: Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal. Class 4.2: Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops. Class 5.1: Land capable of use as improved grassland. Few problems with pasture establishment and maintenance and potential high yields. Class 5.2: Land capable of use as improved grassland. Few problems with pasture establishment but may be difficult to maintain. Class 5.3: Land capable of use as improved grassland. Pasture deteriorates quickly. Class 6.1: Land capable of use as rough grazings with a high proportion of palatable plants. Class 6.2: Land capable of use as rough grazings with moderate quality plants. Class 6.3: Land capable of use as rough grazings with low quality plants. Class 7: Land of very limited agricultural value. The LCA classification is based primarily on climate, several soil properties, (for example depth and stoniness), wetness, erosion risk and slope. There have been two phases of LCA mapping in Scotland the first was at 1:250,000 scale in 1981 and a later 1:50,000 scale phase in 1987. Several assumptions underpin the classification. The classification, as defined in Macauley Institute (2006): • "*is designed to assess the value of land for agriculture;* • *is based largely on physical characteristics and the degree to which they limit agricultural flexibility;* • *does not group land according to its most profitable use;* • *assumes a satisfactory level of management; and* • *does not include location, farm structure and condition and access to markets and therefore these criteria do not influence grading is based on current knowledge; revisions may be required with new experience or technological innovations*."
Land contamination	The term 'land contamination' is used to describe the presence or potential presence of contaminants in or on the land. However, even if contaminants are present, it does not necessarily mean that land meets the statutory definition of contaminated land.
Local Nature Conservation Sites	Local Nature Conservation Sites are non-statutory designations conferred by Aberdeenshire Council and given weight through local planning policy. These sites are selected through an election of criteria (criteria are area dependent) aimed at identifying 'substantive nature conservation value'.
Mineral soil	The Scottish Government define mineral soils as follows: "*Mineral soils are soils made up of predominantly sand, silt and clay particles with some (<15 %) organic matter*."
Peat soil	The Scottish Government define peat soil as follows: "*When soil has an organic layer at the surface which is more than 50cm deep, it is*

Term	Definition
	defined in Scotland as a peat soil (also referred to as an organic soil). Peat soils are often more than 1m deep and can occasionally be more than 10m deep."
Peatland habitat	The Scottish Government define peatland habitats as follows: "*Peatland habitats can be divided into four broad classes (blanket bog, upland raised bog, lowland raised bog, and fen) depending on the types of plants that formed the peat. Priority peatland habitats are subsets of these broad habitats which have been recognised under the Scottish Biodiversity Framework as being important to protect for their conservation and biodiversity value*."
Remediation	In the context of land contamination, remediation means actions taken to address risks associated with contaminants in the land that may be affecting or have potential to affect site users, the water environment or other receptors. Remediation can be voluntary or required by law. Under Part 2A of the Environmental Protection Act, the term 'remediation' includes assessment of condition, undertaking remedial work and monitoring the condition. In the context of Part 2A, remedial works should remove significant pollutant linkage(s), either by reducing or removing the contamination source, breaking the pathway(s) or removing receptors. It should be undertaken to an extent that there is no significant harm (or significant possibility of such harm) to human health and no significant pollution (or significant possibility of pollution) to the water environment or other receptors.
Sustainable remediation	Sustainable remediation is defined by SuRF UK as: "*the practice of demonstrating, in terms of environmental, economic and social indicators, that the benefit of undertaking remediation is greater than its impact and that the optimum remediation solution is selected through the use of a balanced decision-making process*."
Total Organic Carbon	The total amount of carbon found within an organic compound.

MarramWind