Environmental Impact Assessment Report

Volume 1, Chapter 16: Marine Archaeology and Cultural Heritage

MarramWind Offshore Wind Farm

December 2025

MarramWind

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16. Marine Archaeology and Cultural Heritage

16.1 Introduction

16.1.1.1 This marine archaeology and cultural heritage chapter of the Environmental Impact Assessment (EIA) Report presents the results of the assessment of the likely significant effects on marine archaeology and cultural heritage receptors that may arise from the construction, operation and maintenance (O&M) and decommissioning of the offshore Project, seaward of Mean High Water Springs (MHWS). 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 appendices:

- **Chapter 6: Marine Geology, Oceanography and Physical Processes**: Changes to marine geology, oceanography and physical processes have the potential to affect sensitive marine archaeology receptors through changes in the depositional environment and scour regimes. The information from the marine geology, oceanography and physical processes chapter will be used to inform this Chapter.
- **Chapter 17: Seascape, Landscape and Visual**: Changes to seascape, landscape and visual receptors have the potential to affect associated sensitive marine archaeology and cultural heritage receptors. The information from the seascape, landscape and visual chapter will be used to inform this Chapter.
- **Chapter 24: Onshore Archaeology and Cultural Heritage**: Changes to onshore archaeology and cultural heritage receptors have the potential to affect associated sensitive marine archaeology receptors within the intertidal environment. The information from the onshore archaeology and cultural heritage chapter will be used to inform this Chapter.

16.1.1.2 This Chapter describes:

- the legislation, planning policy, guidance and other documentation that has informed the assessment (**Section 16.2: Relevant legislative and policy context**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to marine archaeology and cultural heritage have been addressed (**Section 16.3: Consultation and engagement**);
- the scope of the assessment for marine archaeology and cultural heritage (**Section 16.4: Scope of the assessment**);
- the data sources and methods used for gathering baseline data, including surveys where appropriate (**Section 0: Methodology for baseline data gathering**);
- the overall environmental baseline (**Section 16.6: Baseline conditions**);
- the basis for EIA Report (**Section 16.7: Basis for EIA Report**);
- methodology for EIA Report (**Section 16.8: Methodology for EIA Report**);
- the assessment of marine archaeology and cultural heritage effects (**Section 16.9: Assessment of effects: construction**; **Section 16.10: Assessment of effects: operation and maintenance**; **Section 16.11: Assessment of effects: decommissioning**);
- summary of effects (**Section 16.12: Summary of effects**);

- consideration of transboundary effects (**Section 16.13: Transboundary effects**);
- consideration of inter-related effects and cumulative effects (**Section 16.14: Inter-related effects** and **Section 16.15: cumulative effects assessment**);
- a summary of residual effects for marine archaeology and cultural heritage (**Section 16.16: Summary of residual likely significant effects**);
- a reference list is provided (**Section 16.17: References**); and
- a glossary of terms and abbreviations is provided (**Section 16.18:**. **Glossary of terms and abbreviations**).

16.1.1.3 This Chapter is also supported by the following appendices in **Volume 3**:

- **Appendix 16.1: Offshore Historic Environment Desk-based Assessment;**
- **Appendix 16.2: Archaeological Assessment of Marine Geophysical Survey Data for the MarramWind Offshore Wind Farm;**
- **Appendix 16.3: Export Cable Corridor Geophysical Archaeology Analysis;**
- **Appendix 16.4: Stage 1 Marine Geoarchaeological Assessment;** and
- **Appendix 16.5: Protocol for Archaeological Discoveries.**

16.2 Relevant legislative and policy context and technical guidance

16.2.1 Legislative and policy context

16.2.1.1 This Section identifies the relevant legislation and policy context that has been used to determine the scope of the marine archaeology and cultural heritage assessment. Further information on policies relevant to this EIA Report 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 this EIA Report. Individual policies of specific relevance to this assessment and associated appendices have been taken into account.

16.2.1.2 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.

16.2.1.3 The legislation relevant to marine archaeology and cultural heritage include:

- The Marine Strategy Regulations 2010;
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive);
- Protection of Military Remains Act 1986;
- Merchant Shipping Act 1995;
- Historic Environment Scotland (HES) Act 2014;
- Electricity Act 1989;

- Marine and Coastal Access Act 2009;
- Marine (Scotland) Act 2010; and
- Water Environment (Controlled Activities) (Scotland) Regulations 2011.

16.2.1.4 The policies relevant to marine archaeology and cultural heritage include:

- Draft Updated Sectoral Marine Plan 2025 (Scottish Government, 2025);
- National Planning Framework 4 (Scottish Government, 2023a);
- Aberdeenshire Council Local Development Plan 2023 (Aberdeenshire Council, 2023a);
- Sectoral Marine Plan for Offshore Wind 2020 (Scottish Government, 2020); and
- Scotland National Marine Plan 2015, (Scottish Government, 2015).UK Marine Policy Statement (2011).

16.2.2 Relevant technical guidance

16.2.2.1 Other information and technical guidance relevant to the assessment undertaken for marine archaeology and cultural heritage include:

- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects Offshore Renewables Projects, (The Crown Estate, 2021).
- Historic Environment Scotland (HES) (2019 – updated May 2021) Scotland's Historic Marine Protected Areas (HMPA).
- The Chartered Institute for Archaeologists (CIfA) Code of Conduct, Standards and Guidance (2020a-e).
- Protocol for Archaeological Discoveries (PAD): Offshore Renewables Projects (The Crown Estate, 2014).
- Guidance for Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector (Gribble *et al*., 2011).
- Assessing Boats and Ships 1860-1913, 1914-1938 and 1939-1950. Archaeological Desk-Based Assessments in 3 volumes (Wessex Archaeology, 2011).
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (COWRIE, 2008).
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (COWRIE, 2007).
- Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006).

16.3 Consultation and engagement

16.3.1 Overview

16.3.1.1 This Section describes the consultation and stakeholder engagement undertaken on the Project in relation to marine archaeology and cultural heritage. This includes early engagement, the outcome of and response to the Scoping Opinions (Scottish Government, 2023b; Aberdeenshire Council, 2023b) in relation to the marine archaeology and cultural heritage 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**.

16.3.2 Key issues

16.3.2.1 A summary of the key issues raised during statutory and non-statutory consultation, specific to marine archaeology and cultural heritage, is outlined below in **Table 16.1**, together with how these issues have been considered in the production of this EIA Report.

Table 16.1 Stakeholder issues responses – marine archaeology and cultural heritage

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in this EIA Report
Aberdeenshire Council	17	17 August 2022, Email.	*"Aberdeenshire Council noted that they hold significant information on the marine zone as part of the Aberdeenshire Historic Environment Record, which should be consulted as part of the baseline development."*	The Aberdeenshire Historic Environment Record (HER) was consulted as part of the baseline development (**Volume 3, Appendix 16.1**). The data was received May 2025.
Marine Directorate – Licensing Operations Team (MD-LOT)	363	12 May 2023, MD-LOT Scoping Opinion (Scottish Government, 2023b).	*"5.12.1* *The Scottish Ministers are content with the proposed study area as shown in Figure 5.11.1 of the Scoping Report and agree with the basis for the Scoping assessment and embedded environmental measures. The Scottish Ministers, in line with the Aberdeenshire Council representation, welcome the Developer's recognition that approved National Planning Framework 4, introduces new requirements which will be considered in the EIA Report."*	The study area, scope of assessment and the embedded environmental measures are addressed in **Section 16.4** and **Section 16.7.2**, which includes new requirements (introduced by National Planning Framework 4).
MD-LOT	364	12 May 2023, MD-LOT Scoping Opinion (Scottish Government, 2023b).	*"5.12.2* *The Scottish Ministers advise in line with Aberdeen Council's representation that section 5.11.24 within the Scoping Report be expanded to include the Later Upper Palaeolithic period as artefacts have been identified dating to the Later Upper Palaeolithic period just outside Peterhead."*	The remains and potential for further remains relating to the Later Upper Palaeolithic period are considered in the desk-based assessment (**Volume 3, Appendix 16.1**) and the palaeolandscapes discussion in **Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3**.
MD-LOT	365	12 May 2023, MD-LOT Scoping Opinion (Scottish Government, 2023b).	*"5.12.3* *The Scottish Ministers are content that Unexploded Ordnance (UXO) is scoped out of the EIA Report, subject to the embedded measures being adopted and the application of a*	UXO is not considered further in the assessment. The UXO Management Plan will be produced post-consent.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in this EIA Report
			UXO Management Plan as noted in section 5.13.49 of the Scoping Report."	
MD-LOT	366	12 May 2023, MD-LOT Scoping Opinion (Scottish Government, 2023b).	*"5.12.4* *The Scottish Ministers support the HES representation that marine archaeology and cultural heritage should be scoped into the EIA Report, as confirmed in section 5.11 of the Scoping Report, and support the HES view that the impacts of the offshore development on onshore historic environment assets can be scoped out of the EIA Report."*	The assessment of impacts from the Project on marine archaeological and cultural heritage assets is in **Section 16.9** to **Section 16.11**. This has been scoped out for offshore and onshore archaeology (see Table 24.4 of **Chapter 24: Onshore Archaeology and Cultural Heritage**).
HES	422	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"We are content that the impacts of the offshore development on onshore historic environment assets can be scoped out of this aspect of the environmental impact assessment (table 5.11.8)."*	
HES	419	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"Proposed Development* *We understand that the proposed development comprises an offshore wind farm with onshore connections, with a total grid connection capacity of up to 3 Gigawatts. The number and specifications of the wind turbines have not yet been agreed, but for the basis of assessment, each turbine will have an individual generation capacity of up to 25 megawatts (MW). The Project is expected to have in the region of 126 to 225 floating turbines, installed at water depths ranging from 87 to 117.5m. This response relates to the marine elements of the proposed development."*	The updated description of the Project is in **Chapter 4: Project Description**.
HES	420	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation	*"Scope of assessment* *We agree an environmental impact assessment of the proposed development is required and that marine archaeology & cultural heritage should be included for*	The assessment of impacts from the Project on marine archaeological and cultural heritage assets is in **Section 16.9** to **Section 16.11**.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in this EIA Report
		Responses and Advice (Scottish Government, 2023b).	*consideration in the EIA, as indicated in the Scoping Report, section 5.11."*	
HES	421	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"We are generally content with the proposed methodology for the Environmental Impact Assessment of the onshore elements of the proposed development, as laid out in section 5.11 of the Scoping Report. However, in our pre-application consultations we requested further detailed information about the methodology, conclusions and rationale for chosen geophysical survey technical specifications, as noted in paragraph 5.11.9. We note that information from geophysical survey forms part of the baseline data provided here (para.5.11.22), but we do not have a record of the requested information, and it does not appear to be provided in the Scoping Report. The EIA Report will need to include this information."*	The details of the geophysical survey can be found in **Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3**.
HES	423	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"Further information* *Guidance about national policy can be found in our 'Managing Change in the Historic Environment' series available online at https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/managing-change-in-the-historic-environment-guidance-notes/* *Technical advice is available on our Technical Conservation website at https://conservation.historic-scotland.gov.uk/."*	The relevant guidance and technical advice provided by HES used to inform the assessment are listed in **Section 16.2**.
Aberdeenshire Council	631	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"Chapter 5.11 of the Scoping Report addresses Marine Archaeology and Cultural Heritage. The content of this was considered by the Council's Archaeology Service which provided the following comment. The Service noted that Section 5.11.24 should be expanded to include the Late Upper Palaeolithic period and not just the Mesolithic, given we now have identified lithic artefacts dating to this time occurring on*	The remains and potential for further remains relating to the Later Upper Palaeolithic period are considered in the desk-based assessment (**Volume 3, Appendix 16.1**) and the palaeolandscapes discussion in

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in this EIA Report
			land, including examples from just outside Peterhead. The Service also noted the intention to scope out UXO. The Service was satisfied with this approach subject to the embedded measures being adopted and the application of a UXO Management Plan as noted at Section 5.13.49 of the Scoping Report."	**Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3.** UXO is not considered further in the assessment. The UXO Management Plan will be produced post-consent.
Aberdeenshire Council	632	12 May 2023, MD-LOT Scoping Opinion Appendix 1: Consultation Responses and Advice (Scottish Government, 2023b).	*"The Archaeology Service also noted agreement with the basis for the scoping assessment and embedded environmental measures and welcomes the recognition that NPF4 introduces new requirements which will be taken into account of in the EIA and associated consenting documents. The Service agrees with the impacts which have been scoped out of the assessment."*	The study area, scope of assessment and the embedded environmental measures are addressed in **Section 16.4** and **Section 16.7.2**.
HES	665	13 May 2022, Meeting.	*"HES agree that considerations of impacts on marine archaeology are being considered in the export cable corridor optioneering and that effects arising from the cabling are scoped into the EIA."*	The study area and scope of assessment include the export cable corridor and the effects from the cabling are addressed in **Section 16.9** to **Section 16.11**.
HES	666	13 October 2022, Meeting.	*"HES requested that the EIA report fully justifies the methodology, conclusions and rationale for the selection of the methods used for offshore surveys and that these are clearly laid out for review. HES will look for survey resolution and how that helps pick up archaeological features, and why that resolution was selected."*	The methodology, conclusions and rationale for the offshore surveys and the archaeological assessment of the results are presented in **Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3**.
HES	672	22 June 2022, Meeting.	*"Preliminary site investigation of the MarramWind array site found an unchartered* [sic - uncharted] *wreck. A temporary exclusion zone (TEZ) has been established. Advice from one of the Project's heritage experts is that the wreck is of a turret deck ship from 19th / early 20th century. There are records of three losses in the general area - the most likely is a merchant vessel possibly lost in 1917 during World War 1. This wreck*	AEZ's have been proposed for all high and medium potential anomalies identified as part of the archaeological assessment of the geophysical survey results. The AEZ's will be agreed with MD-LOT's archaeological advisor. The

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in this EIA Report
			has been reported to the UK Hydrographic Office as a navigational and fishing hazard. This will be added into the Project's baseline. Possible sampling for geoarchaeological works. An Archaeological Exclusion Zone (AEZ) to be agreed with HES."	justification for AEZs and the methodology used to determine proposed AEZ size is detailed in **Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3**.
HES	759	08 October 2024, Letter.	*"The Project noted the HES response to the MarramWind Scoping Report noted a request for information regarding the methodology, conclusions and rationale for chosen offshore geophysical survey technical specifications to be provided to HES. It is proposed to present this information to HES during pre-application consultation, whilst simultaneously summarising the findings of the survey (pending completion of the ongoing archaeological interpretation of the marine geophysical survey data and discussing the need for and approach to the AEZ. This is currently anticipated to be prepared in Q4 2024. The Project will contact HES before the end of 2024 in this regard.* *HES responded 8 October 2024. We look forward to consolation from WSP with regards to offshore AEZs, particularly in light of the discovery of the SS Tobol."*	Further consultation with HES was undertaken in July 2025. The results of the consultation is used to inform the assessment. AEZ development is detailed in **Volume 3, Appendix 16.2** and **Volume 3, Appendix 16.3** and summarised in **Section 16.6.1**.
HES	760	08 October 2024, Letter.	*"HES apologised that the link to technical advice in our Scoping response did not work. You can find this advice here https://www.historicenvironment.scot/archives-and-research/publications/?publication_type=5. HES do not currently have any new guidance, though we expect that a Managing Change Guidance note on Underwater Archaeology will probably be published before the end of this financial year."*	The draft Managing Change in the Historic Environment: Conserving Our Underwater Heritage was used to inform the assessment.

16.4 Scope of the assessment

16.4.1 Overview

16.4.1.1 This Section sets out the scope of the EIA Report for marine archaeology and cultural heritage. 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 16.3**.

16.4.2 Spatial scope and study area

16.4.2.1 The spatial scope of the marine archaeology and cultural heritage assessment is defined as 5km buffer from the Option Agreement Area (OAA) and offshore export cable corridor as far as MHWS and has formed the basis of the study area described in this Section. See **Volume 2, Figure 16.1: Marine archaeology study area**.

16.4.3 Temporal scope

16.4.3.1 Potential effects arising from the decommissioning of the Project have been scoped out from the assessment as it was considered that any disturbance arising during this stage of the Project will present only minor effects on archaeological remains and / or geoarchaeological deposits that have previously been disturbed and mitigated during the construction or O&M stages. Therefore, the temporal scope of the assessment of marine archaeology and cultural heritage is the construction and O&M stages of the Project.

16.4.3.2 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.

16.4.4 Identified receptors

16.4.4.1 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 significant effects for marine archaeology and cultural heritage are outlined in **Table 16.2**.

Table 16.2 Identified receptors requiring assessment for marine archaeology and cultural heritage

Receptor group	Receptors included within group	Importance
Non-designated heritage assets	Wrecks and obstructions data, findspots, features and deposits of archaeological interest, dating to any period.	High to very low (depending on the nature and survival of remains).
Geophysical anomalies of high or medium archaeological potential	MW_Arr_Arch_0005 Tentatively identified as the SS *Tobol*	High
	MW_Arr_Arch_0016 *Ocean Challenge* (UKHO 67749)	Low

Receptor group	Receptors included within group		Importance
	MW_Arr_Arch_0037 *Emma Jayne* (UKHO 57916)		Low
	MW_Arr_Arch_0040 Tentatively identified as the *Compass Rose 3*		Medium
	MW_Arr_Arch_0052 Tentatively identified as the FV *Lucerne*		High
	MW_Arr_Arch_0053 UKHO record 100224. Date and type of wreck was not able to be determined through geophysical survey.		Medium
	MW_ECC_Arch_001 SS *Magician*		Low
	MW_ECC_Arch_015 SS *Muriel*		High
	MW_ECC_Arch_020 SS *St Magnus* (UKHO Record 2286 and Canmore record 101844)		High
	MW_ECC_Arch_023 Unidentified and previously uncharted wreck. Date and type of wreck was not able to be determined through geophysical survey.		Medium
	MW_ECC_Arch_027 Unidentified and previously uncharted wreck. Date and type of wreck was not able to be determined through geophysical survey.		Medium
	MW_ECC_Arch_046 SS *Louisiana* (UKHO Record 74759 and Canmore Record 324504)		High
	MW_ECC_Arch_059 *Strathclunie* (UKHO record 2284 and Canmore record 202103)		Medium
	MW_ECC_Arch_076 *Bel Lily*		High
Geophysical anomalies of medium archaeological potential	Date and type of remains was not able to be determined through geophysical survey.		High to low (depending on the nature and survival of remains).
Palaeolandscape features	Remnants of the prehistoric landscape (including palaeochannels, depressions) that indicate how the landscape formed, developed, and potentially was used in the past prior to inundation.		Medium
Unknown potential remains of all periods	Prehistoric	Evidence of coastal marine resource exploitation which may	Medium or low depending upon

Receptor group	Receptors included within group		Importance
		include fish traps and remains relating to mollusc or shellfish procurement and processing.	type, extent and survival.
		Isolated remains	Low
	Medieval	Later medieval boats / ships or maritime infrastructure.	High
		Coastal infrastructure	High
		Isolated remains	Low
	Post-medieval	Early post-medieval ship remains.	High
		Later post-medieval wooden, iron, or composite ship remains.	High or medium depending upon type and survival.
		Early steel ship remains.	Medium
		Coastal infrastructure remains.	Medium or low depending upon type, extent and survival.
		Evidence of coastal marine resource exploitation which may include salt manufacture, kelp production, or fish / eel traps.	Medium or low depending upon type, extent and survival.
		Isolated remains	Low
	Modern	Aircraft remains	High
		Ship remains	Medium
		Isolated remains	Very Low

16.4.5 Potential effects

16.4.5.1 Potential effects on marine archaeology and cultural heritage receptors that have been scoped in for assessment are summarised in **Table 16.3**.

Table 16.3 Potential effects for marine archaeology and cultural heritage

Receptor	Activity or impact	Potential effect
Construction stage		
Non-designated heritage assets; Geophysical anomalies of high or medium archaeological potential; Palaeolandscape features; Palaeoenvironmental deposits; Unknown potential remains of all periods	Construction activities have the potential to cause total or partial loss of marine heritage receptors through truncation of remains during excavation. Direct disturbance of sediments also has the potential to result in the deterioration or destruction of the relationships between marine heritage features and the wider environment (stratigraphic context or setting), as well as exposing the remains to mechanical and chemical degradation.	Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed.
Non-designated heritage assets; Geophysical anomalies of high or medium archaeological potential; Palaeolandscape features; Palaeoenvironmental deposits; Unknown potential remains of all periods	Construction activities may cause changes to the hydrodynamics and sediment distribution linked to construction activities such as scour around turbine and offshore substation foundations, which may uncover or bury any maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential.	Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction.
O&M stage		
Non-designated heritage assets; Geophysical anomalies of high or medium archaeological potential; Palaeolandscape features; Palaeoenvironmental deposits; Unknown potential remains of all periods	O&M activities cause similar effects to those associated with the construction stage activities, though likely on a smaller scale. These activities have the potential to cause total or partial loss of marine heritage receptors through truncation of remains during repairs.	Potential harm from disturbance to wrecks in close proximity to the site arising from maintenance of the array or cables.
Non-designated heritage assets; Geophysical anomalies of high or medium archaeological potential; Palaeolandscape features; Palaeoenvironmental deposits; Unknown potential remains of all periods	O&M activities may cause changes to the hydrodynamics and sediment distribution linked to indirect impacts such as scour around turbine and offshore substation foundations, that may uncover or bury any maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological.	Potential harm from disturbance to wrecks in close proximity to the site arising from altered sea-bed conditions, for example scour or differential deposition of sediments.

16.4.6 Effects scoped out of assessment

16.4.6.1 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 16.4**.

Table 16.4 Activities or effects scoped out of assessment

Activity or impact	Rationale for scoping out
Impacts through change of setting of terrestrial heritage assets from visibility of offshore infrastructure during construction and O&M	Potential effects arising from visibility of offshore infrastructure during construction of the Project have been scoped out of further assessment. As the relevant heritage asset receptors are terrestrial, the rationale for scoping out this impact is presented in **Chapter 24: Onshore Archaeology and Cultural Heritage**. Within the Scoping Opinion it was agreed by MD-LOT and HES "*that the impacts of the offshore development on onshore historic environment assets can be scoped out*" (see **Table 16.1**).
Impact on the setting of terrestrial heritage assets arising from visibility of offshore infrastructure during O&M	Potential effects arising from visibility of offshore infrastructure during O&M of the Project have been scoped out of further assessment. As the relevant heritage receptors are terrestrial, the rationale for scoping out this impact is presented in **Chapter 24: Onshore Archaeology and Cultural Heritage**. Within the Scoping Opinion it was agreed by MD-LOT and HES "*that the impacts of the offshore development on onshore historic environment assets can be scoped out*" (see **Table 16.1**).
Decommissioning of offshore infrastructure	Potential effects arising from the decommissioning of the Project have been scoped out from further assessment. In effect, any disturbance arising during this stage of the Project will present only minor effects on archaeological remains and / or geoarchaeological deposits that have previously been disturbed and mitigated during the construction or O&M stages.

16.5 Methodology for baseline data gathering

16.5.1 Overview

16.5.1.1 Baseline data collection has been undertaken to obtain information over the study area described in **Section 16.4**. The current and future baseline conditions are presented in **Section 16.6.**

16.5.2 Desk study

16.5.2.1 The data sources that have been collected and used to inform this marine archaeology and cultural heritage assessment are summarised in **Table 16.5**.

Table 16.5 Data sources used to inform the marine archaeology and cultural heritage chapter

Source	Date	Summary	Coverage of study area
HMPA (2025)	Accessed May 2025.	There is a record for each HMPA. Each HMPA record contains a map, detailed information about the marine historic asset(s), preservation objectives and summary operational advice.	Full coverage of study area.
United Kingdom Hydrographic Office (UKHO) Wrecks and Obstructions data	Accessed June 2025.	An extensive data set containing over 94,000 charted, uncharted, live and dead wrecks and obstructions from around the world.	Full coverage of study area.
Canmore / Canmore Maritime	Accessed May 2025.	Identifies recorded wrecks and losses in Scottish waters from a number of sources.	Full coverage of study area.
Aberdeenshire HER	Accessed May 2025.	An extensive data set containing archaeological investigations and remains as well as non-designated cultural heritage remains.	Partial coverage (nearshore).
Geophysical Survey (Coastal and Offshore Archaeological Research Services)	Preliminary Report for OAA received April 2025. Preliminary Report for offshore export cable corridor received July 2025.	Initial results of geophysical survey of the Project using multibeam echosounder (MBES), magnetometer (MAG), Sidescan Sonar (SSS) and sub-bottom profiling (SBP) and 2D Ultra High Resolution Seismic (2DUHRS) data.	Full coverage of study area.

16.5.3 Site surveys

16.5.3.1 Marine geophysical data of the OAA was collected by Fugro onboard the marine vessel (MV) *Fugro Galaxy* and MV *Fugro Venturer* between 29 April 2022 and 25 August 2022. Marine geophysical data of the offshore export cable corridor was collected by Fugro onboard the MV *Fugro Galaxy* and MV *Fugro Valkyrie* between 4 April 2023 and 13 July 2023 and 8 November 2023 and 4 December 2023. The surveys that have been conducted and used to inform this marine archaeology and cultural heritage assessment are summarised in **Table 16.6**.

Table 16.6 Site surveys undertaken

Survey type	Scope of survey	Survey coverage
Marine geophysical survey of the OAA, between 29 April 2022 and 25 August 2022 (Volume 3, Appendix 16.2)	Geophysical data collected comprised MBES, dual frequency SSS, MAG, pole mounted Innomar SBP and 2DUHRS data.	The geophysical survey comprised 391 main lines varying in length from 0.05km to 35.4km, orientated 028° / 208°, with a variable line spacing of approximately 75m. Thirty-nine crosslines were acquired at 1km intervals, varying in length from 0.5km to 27.8km and orientated 118° / 298°. A total of 100% MBES coverage and >100% (predominantly >200%) SSS coverage was achieved for the study area. The high and low frequency SSS data were collected simultaneously at a 100m range. The horizontal resolution for the high frequency SSS data is approximately 0.1m across track and 0.4m at the range limit.
Marine geophysical survey of the offshore export cable corridor area (Volume 3, Appendix 16.3)	Geophysical data collected comprised MBES, dual frequency SSS, MAG, pole mounted Innomar SBP and 2DUHRS data	The geophysical survey of the export cable corridor comprised nine blocks (A, A2, B, C, C2, D, E, F1 and F2) and the nearshore survey comprised three blocks (ND, NE, NF). On average, approximately 13 main SSS lines were run along each 1km wide corridor, resulting in an average line spacing of approximately 75m. The high and low frequency SSS data were collected simultaneously at a 100m range. The horizontal resolution for the high frequency SSS data is approximately 0.015m across track and 0.45m at the range limit. The SBP and MAG surveys were run along all lines, with the 2DUHRS acquired on the centre line and two wing lines, with crosslines every 3km. The penetration of the SBP dataset is limited to a maximum of 32ms two-way travel time below seabed (approximately 25.6m at 1600m/s). 100% MBES coverage was achieved for the study area.

Survey type	Scope of survey	Survey coverage
Marine geotechnical survey of the offshore export cable corridor area.	28 vibrocores (VCs) were collected within the offshore export cable corridor Red Line Boundary, including eight re-samples. This resulted in 20 different locations being sampled. Core recovery was a maximum of 5.75m in core MRW-ECC-VC-26. Average recovery was 2.38m.	The marine geotechnical survey was undertaken by Fugro GB Limited within the offshore export cable corridor Red Line Boundary onboard the MV *Fugro Galaxy*. Seabed sampling, including VCs, were collected between the 1 July 2023 and 11 July 2023, with cone penetration testing between the 8 November and 4 December 2023. A synthesis of these results, include onshore laboratory testing, was reported by Fugro (2024).

Site survey quality

OAA assessment

16.5.3.2 The MAG survey used line spacing of approximately 75m, in some locations as narrow as 10m. This spacing allowed for reasonable to good positioning of small magnetic anomalies. When anomalies aligned with visible seabed features and coincided with survey lines, their positions were mapped with high spatial accuracy. Even at a wide line spacing, the MAG data can indicate areas of archaeological potential as well as provide some additional information for interpretation purposes.

16.5.3.3 The majority of the seabed is covered by at least two overlapping SSS lines, providing greater certainty in the identification and interpretation of visible seabed anomalies, as recommended by Plets *et al*. (2013).

Export cable corridor assessment

16.5.3.4 The data collected from within the areas of the Red Line Boundary surveyed for the offshore export cable corridor were generally of good quality, with minimal interference or data degradation. The MBES data was generally of a good quality, with swath coverage achieving 150 per cent with 25 per cent overlap and a minimum of 10 hits per square metre hit for the majority of the survey. Data was processed into a gridded resolution of 0.5m in the nearshore area and 1m along the remainder of the offshore export cable corridor; this was sufficient for correlation of the MBES and SSS data at a high-level of precision. There was only minor evidence of roll and heave artefacts within some of the datasets, with little evidence of this remaining in the processed datasets.

16.5.3.5 The majority of the seabed is covered by at least two overlapping SSS lines, providing greater certainty in the identification and interpretation of visible seabed anomalies, as recommended by Plets *et al*. (2013). Some lines show evidence of motion-related artefacts due to weather conditions, but these have not affected the interpretation of the data.

16.5.3.6 The vertical resolution of the SBP data is 0.1m, though it struggled to image the Quaternary geology below the base of the Holocene (approximately 0.2 to 2.8m below seabed). The 2DUHRS data is calculated to have a vertical resolution of 0.3m within the initial 10ms below the seabed, increasing to a vertical resolution of approx. 0.7m at 40ms below seabed. Fugro (2024) adopted a seismic velocity of 1600ms^{-1} for all Quaternary Formations encountered in the 2DUHRS data.

16.5.4 Data limitations

16.5.4.1 No 2DUHRS data was acquired in Block ND of the offshore export cable corridor due to the shallow depth of bedrock both sub-surface and outcropping at the seafloor.

16.5.4.2 The records held by the UKHO, Aberdeenshire HER, National Record of the Historic Environment and Canmore Maritime records maintained by HES (2025) used in this assessment are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these datasets is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

16.5.4.3 Due to the nature of marine archaeological remains, their identification and assessment necessarily require an element of assumption. The nature, extent, survival, and even the precise location, of marine heritage assets are often uncertain, as many sites have not been subject to physical archaeological investigation ('ground-truthing'). Assessment of the value of such sites (as part of the assessment process) is often, therefore, heavily reliant on informed extrapolation from limited data, comparison with similar assets in similar contexts and, ultimately, on professional judgment.

16.6 Baseline conditions

16.6.1 Current baseline

Geology and palaeoenvironmental

16.6.1.1 The shallow Pleistocene and Holocene geological deposits identified within the Offshore Red Line Boundary comprises the following:

- Holocene Marine, expected to comprise of clayey, silty sand and coarse sand with occasional gravel and isolated to scattered cobbles and boulders dating to the Holocene (MIS 1; post 11.7ka);
- Forth Formation (St Andrews Bay Member), comprised of fine medium dense sand with shells and shell fragments, in places rare pockets of organic matter dating to the Late Devensian (Younger Dryas) to Holocene (MIS 2/1; post 12.9ka);
- Forth Formation (Largo Bay Member), comprised of extremely low to low strength clay interbedded with sandy silt, shells and shell fragments dating to the Late Devensian (Windermere Interstadial) (MIS 2; 14.7ka to 12.9ka);
- Witch Ground Formation, comprised of fine sands and silts, often laminated, unit is often acoustically blank but characterised by the occurrence of pockmarks, dating to Late Devensian / Early Holocene (MIS 2/1; post 29ka);
- Swatchway, comprised of extremely low to medium strength sandy clay with occasional gravel thought to date to Middle Devensian (MIS 3/2; approximately 57ka to 26ka);
- Wee Bankie, comprised of fine to coarse loose to very dense sand with high-strength clay, gravel, cobbles, boulders and shells dating to Late Devensian (MIS 2; 29ka to 11.7ka); and
- Coal Pit, comprised of sandy silty clay and interlaminated clay and fine-grained silty sand; clay is generally stiff and over-consolidated with some pebbles, shell fragments and complete valves abundant in places, and boulders. This formation is thought to date between MIS 6 and 2 (approximately 191ka and 29ka).

16.6.1.2 The Holocene Marine and Forth Formation (St Andrews Bay Member) deposits are marine deposits from a deltaic or low to moderate energy marine environment. The Forth Formation (Largo Bay Member), Witch Ground Formation, and Swatchway are glaciomarine deposits. Wee Bankie is a glacial till deposit and the Coal Pit formation is thought to have been laid down as infill deposits within tunnel valleys that were eroded during / immediately after Middle Pleistocene glaciation.

16.6.1.3 The geotechnical survey took 28 vibrocores at 20 locations as 8 cores needed to be retaken, the vibrocore locations can be seen on **Volume 2, Figure 16.5: Site location with borehole locations**. The following three vibrocore sections are recommended for Stage 2 geoarchaeological recording. Core section depths for the samples identified as suitable for Stage 2 recording are provided below:

- For cores MRW-ECC-VC-03 and MRW-ECC-VC-12A, 2.10m to 2.50m, radiography and laminography are recommended during the Stage 2 recording as these will aid the interpretation of the depositional environment, as well as an estimate of mollusc shell abundance and preservation. Radiography and laminography of MRW-ECC-VC-03 and MRW-ECC-VC-12A should be undertaken only if the samples are sufficiently intact.
- For core MRW-ECC-VC-05A, samples between 1.25m and 2.25m should be made available for assessment, most notably those from 2.10m to 2.25m. These samples can consist of both stratified core sections and bagged / post-testing samples from these depths. This will permit sieving to extract the reported wood fragments to enable identification. Up to ten wood fragments should be selected for wood identification.

Archaeological and historical background

16.6.1.4 The full archaeological and historical background of the Offshore Red Line Boundary and marine archaeology study area, and descriptions of the heritage assets that form the baseline for the cultural heritage assessment, are provided in **Volume 3, Appendix 16.1** (inclusive of gazetteer) and the locations are shown in **Volume 2, Figure 16.2: Non-designated heritage assets**.

16.6.1.5 The reference numbers (A1, A2, etc.) used in the background correspond to the reference numbers given by WSP within the Marine Historic Environment Gazetteer (Appendix A) in **Volume 3, Appendix 16.1**.

Desk-based assessment assets summary

16.6.1.6 This section summarises the findings of the desk-based assessment for heritage assets within the Project Site and the marine archaeology study area. There are no designated cultural heritage assets within the Project Site. The assessment identified 153 non-designated assets within the Project Site and 609 within the marine archaeology study area (**Volume 2: Figure 16.2**), comprising predominantly post-medieval and modern ship remains, with additional remains of military watercraft and aircraft. Evidence for earlier activity is limited: flint resources around Boddam (south of the marine archaeology study area) indicate prehistoric activity, but later prehistoric remains within the study area are sparse and largely agricultural in character, with no clear settlement focus. Medieval activity centred on the manor of Inverugie, supported by coastal fishing villages and a small harbour at the mouth of the River Ugie, although the extent of coastal and nearshore use in this period is uncertain. With the post-medieval development of Peterhead, population and commerce shifted towards maritime trade and fishing, and the marine archaeological record within the Project Site and marine archaeology study area is consequently dominated by modern-period shipwrecks, many attributable to the world wars.

16.6.1.7 There are no designated heritage assets located within the Offshore Red Line Boundary.

16.6.1.8 The desk-based assessment has identified 153 non-designated assets within the Project and 609 non-designated assets within the marine archaeology study area (**Volume 2, Figure 16.3: Seabed features**). These assets are primarily comprised of post-medieval and modern ship remains, in addition to the remains of military watercraft and aircraft.

16.6.1.9 There is little known evidence of sustained activity within the Offshore Red Line Boundary or marine archaeology study area until the medieval period. Evidence from the Boddam area of Peterhead, located to the south of the marine archaeology study area, suggests that prehistoric activity was centred in that area as a result of the abundance of flint outcroppings in the gravels there. The little evidence from the later prehistoric periods indicates that the area was sparsely populated with dispersed evidence of agricultural activity, but no centre of settlement has been identified. The centre of activity in the medieval period was the manor of Inverugie, which was supported by small fishing villages along the coast and a small harbour protected by a motte at the mouth of the Ugie River. The extent of medieval activity along the coast and the nearshore has not been determined. The development of Peterhead in the early post-medieval period shifted the focus of the population and allowed for the commercial development of maritime activity through trade and fishing, which continued into the modern period. The remains within the Offshore Red Line Boundary and marine archaeology study area contain large numbers of shipwrecks from the modern period, many of them dating to the world wars.

Seabed features assessment summary

OAA assessment

16.6.1.10 The archaeological assessment of geophysical data of the OAA identified six geophysical anomalies of high archaeological potential, 17 geophysical anomalies of medium archaeological potential and 48 anomalies of low archaeological potential (see **Volume 2, Figure 16.3**).

16.6.1.11 The six high potential anomalies consist of the following:

- MW_Arr_Arch_0005 is a wreck tentatively identified as the SS *Tobol*, torpedoed and sank by UC-52 in 1917;
- MW_Arr_Arch_0016 is the wreck of the *Ocean Challenge* (UKHO 67749), a late 20th century fishing vessel;
- MW_Arr_Arch_0037 is the wreck of the *Emma Jayne* (UKHO 57916), a late 20th century trawler sunk in 1999,
- MW_Arr_Arch_0040 is a wreck tentatively identified as the *Compass Rose 3,* a 1948 YMS-1 class motor minesweeper sunk during a storm in 1975;
- MW_Arr_Arch_0052 is a wreck tentatively identified as the FV *Lucerne*, sunk in 1915 by U-23, now recorded as UKHO record 100044; and
- MW_Arr_Arch_0053 is an unidentified and previously uncharted wreck, tentatively thought to be a mid to late 20th century trawler, now recorded as UKHO record 100224.

Export cable corridor assessment

16.6.1.12 The archaeological assessment of geophysical data of the export cable corridor identified eight geophysical anomalies of high archaeological potential, 16 geophysical anomalies of medium archaeological potential and 54 anomalies of low archaeological potential.

16.6.1.13 The eight high potential anomalies consist of the following:

- MW_ECC_Arch_001 is a wreck identified as the SS *Magician*, run aground in 1994, identified 520m north of the recorded wreck locations within the UKHO and Canmore data (UKHO record 2279 and Canmore record 101741);
- MW_ECC_Arch_015 is a wreck identified as the SS *Muriel*, torpedoed and sank by UC-58 in 1918;
- MW_ECC_Arch_020 is a wreck identified as the SS *St Magnus*, was sunk in 1918 by either a torpedo or a mine, associated with UKHO Record 2286 and Canmore record 101844;
- MW_ECC_Arch_023 is an unidentified and previously uncharted wreck;
- MW_ECC_Arch_027 is an unidentified and previously uncharted wreck, tentatively thought to be a fishing vessel;
- MW_ECC_Arch_046 is a wreck identified as the SS *Louisiana*, torpedoed and sank by UC-45 in 1917, associated with UKHO Record 74759 and Canmore Record 324504;
- MW_ECC_Arch_059 is a steam trawler wreck identified as the *Strathclunie*, sunk following a collision in 1928, associated with UKHO record 2284 and Canmore record 202103; and
- MW_ECC_Arch_076 is a wreck identified as the *Bel Lily*, sunk by a mine in 1917.

Palaeolandscapes assessment summary

OAA assessment

16.6.1.14 Interpretation of the available SBP and 2D UHR datasets for the OAA indicates the presence of thick Middle to Late Quaternary deposits. These comprise the Aberdeen Ground Formation at the base, overlain by the Ling Bank, Fisher, Coal Pit, Swatchway, and Witch Ground Formations, with Holocene (including modern) seabed deposits at the surface. Most formations were deposited in marine to glaciomarine environments. Deep channels within the Ling Bank and Coal Pit Formations suggest multiple phases of subglacial channelling associated with Pleistocene glaciations during the Saalian and Devensian periods.

16.6.1.15 Available evidence suggests that the OAA was likely nearshore or partially intertidal prior to the advance of the Late Devensian ice sheet, with dry land to the south and marine conditions to the north (Clarke et al., 2022). The area would have experienced a palaeoclimate unsuitable for human occupation while covered by ice between approximately 28ka and 19ka. Following ice sheet retreat, the OAA became submerged, resulting in glaciomarine sediment deposition during the Late Glacial and Early Holocene periods (Shennan et al., 2018; Sturt et al., 2013; Bradley *et al*., 2023). Any Late Glacial to Early Holocene shorelines or submerged palaeolandscapes, if preserved, are most likely to occur in shallower waters west of the OAA towards the Scottish coast.

16.6.1.16 The assessment of prehistoric archaeological and palaeoenvironmental potential indicates low potential for prehistoric archaeology. However, opportunities exist to enhance understanding of the Middle to Late Pleistocene and Early Holocene palaeoenvironment of the area.

Export cable corridor assessment

16.6.1.17 The interpretation of the available SBP and 2DUHRS datasets from the export cable corridor indicates the presence of thick Middle to Late Quaternary deposits across the area. The formations likely to be encountered by the Project include the Coal Pit Formation, Wee

Bankie Formation, Swatchway Formation, Witch Ground Formation, Forth Formation and Holocene (including modern) seabed deposits. These are likely to be Late Pleistocene to Holocene in age, mainly associated with the Devensian glaciation and subsequent Holocene marine phase.

16.6.1.18 The stratigraphic sequences record extensive glacial activity. Mega-scale glacial lineations and ridges formed by Devensian ice streams occur across large parts of the route. Features with radial pattern consistent with possible eskers are also present, these can also infer past ice sheet activity and retreat. Geotechnical sampling of such features would permit the opportunity to establish if these are eskers, as well as potentially providing opportunities to understand their source (for example. clast analysis). Probable glaciotectonic features, including moraines associated with the Bosie's Bank and Wee Bankie Formation, are also identified. The dataset collected from the offshore export cable corridor Red Line Boundary provides an opportunity to map these glacial features along the route. Currently, the mapping of glacial landforms in this offshore area is lacking (Clark *et al.*, 2018). The offshore export cable corridor Red Line Boundary is also within an area critical for understanding ice stream dynamics, particularly due to the complex nature of multiple converging Devensian ice streams in the Buchan area (Merritt *et al.*, 2003).

16.6.1.19 Glacial and glaciomarine environments are not conducive to archaeological activity. Therefore, the archaeological potential of many of these formations is low to non-existent. There is no evidence within the SBP data to suggest that sediments of archaeological interest (fine-grained or organic) are present within the nearshore area that could provide a palaeoenvironmental record for the late glacial to Holocene. However, the deposits mapped within the offshore export cable corridor Red Line Boundary do offer the potential to enhance understanding of Devensian ice-stream activity and glacial dynamics in the region, leading to an improvement in palaeogeographic reconstructions that can aid the interpretation of the archaeological record.

16.6.1.20 Within the nearshore areas, possible dune or beach deposits sitting upon the bedrock surface at the Scotstown landfall (Block ND) might yield evidence of a submerged palaeo-landsurface, whereas at the Lunderton landfall (Block NE) a possible palaeochannel is present incised into the bedrock through the centre of this bay. The geoarchaeological potential of these features could be established through geotechnical techniques (for example.

Archaeological potential

Palaeolandscapes and palaeoenvironmental remains

16.6.1.21 The Offshore Red Line Boundary has low potential to contain palaeolandscape remains. The Offshore Red Line Boundary experienced repeated glaciations throughout the Pleistocene epoch, resulting in periodic glacial cover that made the broader landscape uninhabitable at times. The interpretation of the marine geophysical data indicates the presence of thick Middle to Late Quaternary deposits across the area. These deposits include formations such as the Aberdeen Ground Formation, Ling Bank Formation, Fisher Formation, Coal Pit Formation, Swatchway Formation, Witch Ground Formation, which were likely deposited in marine to glaciomarine environments, with deep channels observed within the Ling Bank and Coal Pit Formations indicating multiple phases of sub-glacial channelling due to Pleistocene glaciations over the Offshore Red Line Boundary during the Devensian period. Glacial and glaciomarine environments are not conducive to archaeological activity resulting in little archaeological potential for many of these formations. However, analysis of the SBP data suggests that the deposits mapped within the export cable corridor section of the Project has the potential to enhance understanding of Devensian ice-stream activity and glacial dynamics in the region, leading to an

improvement in palaeogeographic reconstructions which can aid the interpretation of the archaeological record. These deposits, therefore, would likely be of up to medium value derived from archaeological interest.

16.6.1.22 Any shorelines or submerged palaeolandscapes dating from the Late Glacial to Early Holocene would only be present, if preserved, in shallower waters west of the Offshore Red Line Boundary toward the Scottish coast. Within the nearshore areas, possible dune or beach deposits sitting upon the bedrock surface at the Scotstown landfall might yield evidence of a submerged palaeolandsurface, whereas at the Lunderton landfall a possible palaeochannel is present incised into the bedrock through the centre of this bay. The geoarchaeological potential of these features is currently undetermined.

16.6.1.23 Given the predominately marine deposits throughout the Offshore Red Line Boundary it is considered the there is no potential for palaeoenvironmental remains through much of the Offshore Red Line Boundary. There is undetermined but possibly low potential for palaeoenvironmental remains in the nearshore areas.

Prehistoric

16.6.1.24 The Offshore Red Line Boundary has low potential to contain Palaeolithic remains. Any potential Palaeolithic sites (such as middens or hearths) or objects (tools or weapons) that may have survived the glacial processes due to the rocky nature of the area would be either buried within sheltered areas, such as gullies, or in previous lowstand sea caves. Any potential archaeological remains would be highly significant, due to the rarity of such sites across the region. Isolated findspots of stone tools or faunal remains dated to this period are possible within or at the interface between Pleistocene deposits and later geological deposits.

16.6.1.25 If present, Palaeolithic temporary settlement remains would be of **high** or **very high** value, depending on preservation and extent, derived from their archaeological interest. Remains of lithic material would be **low** value if comprised of isolated lithic remains or **medium** value if comprised of lithic scatters, depending upon the type and extent.

16.6.1.26 The Offshore Red Line Boundary has moderate potential to contain Mesolithic prehistoric remains. In addition to the Early Mesolithic flint blades identified within the onshore study area, extensive fieldwalking and excavation along the River Dee, which runs through Aberdeenshire to the coast at Aberdeen (south of Peterhead), have uncovered over 11,000 lithic artefacts dating through the Late Upper Palaeolithic to the Mesolithic and into later periods (Wickham-Jones *et al*. 2021). These finds include microliths and other flakes stone typical of Mesolithic hunter-gatherers and demonstrate that early prehistoric communities were widespread and active in this landscape, especially near water sources and on postglacial gravel terraces (Wickham-Jones *et al*. 2021). Peterhead would have been attractive to Mesolithic groups due to access to marine and terrestrial sources; however, much of the Mesolithic evidence in Scotland is found in river valleys or terraces rather than exposed coastal sites, possibly due to later landscapes changes, sea-level rise, or limited investigation of the coastal zone (Wickham-Jones *et al*. 2021). While evidence of Mesolithic activity is generally limited to lithic scatters, it is possible that temporary settlement is present linked to the abundant natural resources, both marine and terrestrial, that would have been available during this period.

16.6.1.27 If present, Mesolithic temporary settlement remains would be of **high** or **very high** value, depending on preservation and extent, derived from their archaeological interest. Remains of lithic material would be **low** value if comprised of isolated lithic remains or **medium** value if comprised of lithic scatters, depending upon the type and extent.

16.6.1.28 The Offshore Red Line Boundary has moderate potential to contain evidence of marine resource exploitation dating to the Neolithic, Bronze Age, and Iron Age. While no direct

evidence of watercraft, marine resource exploitation or maritime structures from these periods has been identified within the Offshore Red Line Boundary and marine archaeology study area, HERs from the onshore Project and study area have documented assets linked to these periods. These findings suggest locations of potential archaeological interest that may serve as proxies for past offshore activities.

16.6.1.29 If present, evidence of later prehistoric remains would be of up to **medium** value, depending on preservation and extent, derived from their archaeological interest. Isolated remains would be of **low** value derived from archaeological interest.

Roman

16.6.1.30 There is low potential for the Offshore Red Line Boundary to contain Roman remains. Remnants of Roman ports and maritime structures are rare in Britain, particularly in northern and peripheral regions of Scotland, as Roman influence did not reach these areas extensively. The nearest evidence of Roman material culture is found at Dunnicaer promontory fort located on the coast about 68km to the south of the Offshore Red Line Boundary. Further research is required to better understand the extent of Roman activity and influence in this area.

16.6.1.31 If present, Roman ships and maritime infrastructure would be of **high** or **very high** value, depending on preservation and extent, derived from their archaeological interest. Isolated remains would be of **low** value derived from archaeological interest.

Medieval

16.6.1.32 The Offshore Red Line Boundary has low potential to contain Pictish remains. While evidence from the Onshore Red Line Boundary suggests a possible Pictish presence and trade activity in Peterhead, there is currently limited direct archaeological evidence to substantiate Pictish engagement in maritime contexts in this area. Although the Picts were historically associated with coastal regions and may have participated in seafaring activities, the archaeological record lacks definitive proof of such involvement in this area. Many coastal Pictish sites have suffered from erosion, which can remove and occasionally expose artefacts, but also means much has been lost to the sea, rather than intentional deposition of artefacts in marine or coastal settings (University of Aberdeen, 2025). The discovery of submerged Pictish material is exceedingly rare; most known Pictish artefacts in Scotland have been recovered from terrestrial contexts, hoards, or eroded coastal settlements (University of Aberdeen, 2024).

16.6.1.33 If present, remains of Pictish boats or maritime infrastructure would potentially be of **high** value derived from their archaeological and historical interest. If present, remains of medieval coastal infrastructure would be of **high** or **medium** value, depending on preservation and extent, derived from archaeological and historical interest. Isolated remains would be of **low** value, derived from archaeological interest.

16.6.1.34 The Offshore Red Line Boundary has low potential to contain Viking remains. While the northeast coast of Scotland was within the sphere of Norse influence and experienced some Viking activity, aside from the battle at Cruden Bay near Peterhead, there is no additional evidence currently available to indicate a Viking presence within the Offshore Red Line Boundary. The likelihood of offshore discoveries of Viking ship remains is similarly low, as there have been no confirmed finds along the northeast mainland coast near the Offshore Red Line Boundary or in the broader Aberdeenshire region. Although, this does not rule out the potential for future discoveries.

16.6.1.35 If present, remains of Viking boats or maritime infrastructure would be of **high** value derived from their archaeological and historical interest. If present, remains of medieval coastal infrastructure would be of **high** or **medium** value, depending on preservation and extent,

derived from archaeological and historical interest. Isolated remains would be of **low** value derived from archaeological interest.

16.6.1.36 The Offshore Red Line Boundary has moderate potential to contain post-Viking medieval remains. Although small-scale fishing activities and coastal occupation occurred throughout the medieval period, no substantial harbour constructions or documented maritime infrastructure are recorded before the late 16th century at Peterhead. Furthermore, any remains of medieval vessels or maritime infrastructure offshore are yet to be identified in this area. The proximity of Keith Inch and the known engagement with fishing activities from at least the 1500s (notably Dutch fishermen using Peterhead Bay in the mid-1500s) hints at some maritime use during this period. The lack of early major harbour works could mean smaller-scale, more ephemeral maritime features or artefacts related to fishing and coastal trade such as fishing gear, wooden structures, or small boat remains might survive, especially within intertidal or nearshore deposits.

16.6.1.37 If present, remains of medieval boats / ships or maritime infrastructure would be of **high** value derived from their archaeological and historical interest. If present, remains of medieval coastal infrastructure would be of **high** or **medium** value, depending on preservation and extent, derived from archaeological and historical interest. Isolated remains would be of **low** value derived from archaeological interest.

Post-medieval

16.6.1.38 The Offshore Red Line Boundary has high potential to contain post-medieval remains. Peterhead Bay has long served as an important hub for fishing and shipbuilding since the establishment of Port Henry. The harbour's development provided improved safe anchorage, enabling it to accommodate numerous vessels and increasing the potential of maritime archaeological remains in the area. Historical and contemporary accounts confirm several hundred wrecks within the Offshore Red Line Boundary and marine archaeology study area boundaries, as well as in nearshore waters, suggesting that additional undiscovered remains may exist, either buried or exposed due to seabed sedimentation and erosion. The harbour and coastal infrastructure evolved significantly from the 17th century onwards, with breakwaters and piers built and expanded to protect the port, yet this period also witnessed frequent and extensive shipwrecks on offshore rocks. Given the high density of maritime traffic and the North Sea’s challenging conditions, and documented loss incidents, the Offshore Red Line Boundary and marine archaeology study area likely hold several well-preserved or partial wrecks from this period, though some may be buried or obscured by sediment. Additionally, due to the area's longstanding history as a maritime hub and fishing port, there may be remnants of vessels used for whaling, fishing, and trade, along with associated materials.

16.6.1.39 Remains of early post-medieval ships and maritime infrastructure would potentially be of **high** value derived from their archaeological and historical interest if present. Remains of later wooden and iron post-medieval ships and maritime infrastructure would be of **high** or **medium** value, depending on type, preservation and extent, derived from archaeological interest. Early steel shipwrecks would likely be of **medium** value depending on type, preservation and extent, derived from archaeological interest. Isolated remains would be of **low** value, derived from archaeological interest.

Modern

16.6.1.40 The Offshore Red Line Boundary has high potential to contain modern ship and military watercraft remains. In addition to its commercial maritime activities, Peterhead was involved in naval operations during both world wars. The existence of shipwrecks from this period within the Offshore Red Line Boundary and marine archaeology study area substantiates evidence of such activities and suggests that additional remains may still be undiscovered

or concealed beneath the seabed. Peterhead was heavily bombed 28 times during the war due to its strategic position. Defensive installations, in addition to the identified pillboxes along the nearshore of the Offshore Red Line Boundary and marine archaeology study area, such as gun batteries, anti-aircraft positions, or shelters may remain along the coast of or near the Offshore Red Line Boundary, although specific surviving structures are not widely documented.

16.6.1.41 The Project has high potential to contain military aircraft remains. There have been identifications of aviation remains within the offshore and nearshore marine archaeology study area. Aircrafts rarely leave articulated remains on the seabed after crashing; impact scatters wreckage, and lightweight materials often cause debris to drift before sinking. If further remains are found, they are most likely to be found in a disarticulated state.

16.6.1.42 Remains of modern shipwrecks and maritime infrastructure would likely be of **medium** significance derived from archaeological and historical value. Sunken military and aircraft remains would be of **high** value derived from archaeological and historical interest. Submarine remains would be of **high** value derived from archaeological and historical interest. Isolated remains would be of **very low** value derived from archaeological interest.

16.6.2 Future baseline

16.6.2.1 The existing environment for offshore archaeology and cultural heritage, as set out above in **Section 16.6.1**, has been shaped by a combination of factors, with the most prevalent being changes in global sea levels and associated climatic and environmental conditions. These conditions have affected, and continue to affect, the burial and preservation of remains. HES (2019b) outlines all the potential impacts from climate change on coastal and marine historic environment receptors, which recognises that, though these environments have always been dynamic, the intensity of the impacts have increased as a result of anthropogenic climate change.

16.6.2.2 Marine physical processes, including the cycle of burial and exposure due to storm events, have an ongoing effect on the preservation of archaeological material. Sediment cover provides protection from physical marine processes, reducing the risk of erosion and degradation, while sediment depletion can expose previously buried remains to mechanical and chemical degradation. It is not possible to assess the effect of this impact upon individual heritage assets as this will depend on the nature of the exposed heritage asset and site-specific conditions.

16.6.2.3 Underwater cultural heritage is under threat from warming waters caused by climate change. As the sea levels rise, the impact of the tidal activity on heritage assets within and adjacent to the intertidal will increase. In addition, warming waters result in the northward migration of invasive species, which may include the blacktip shipworm (*Lyrodus pedicellatus),* which is considered to be a major threat to wooden wrecks and other wooden structures within the marine environment.

16.6.2.4 Future marine infrastructure projects within the study area will have the potential to cause adverse direct impacts on cultural heritage assets or contribute to beneficial impacts. Adverse direct impacts include the removal or truncation of archaeological remains during construction or maintenance, and degradation of the archaeological remains as a result increase in scour. Potential beneficial impacts include large-scale enhanced understanding of the archaeological resource through large-area geophysical / geotechnical survey data released to the public domain, or the enhanced knowledge of key characteristics, features or elements derived from site-specific survey and investigations.

16.7 Basis for EIA Report

16.7.1 Maximum design scenario

16.7.1.1 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 licence applications and section 36 (s.36) consent.

16.7.1.2 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.

16.7.1.3 The maximum design scenario parameters that have been identified to be relevant to marine archaeology and cultural heritage are outlined in **Table 16.7** and are in line with the project design envelope (**Chapter 4: Project Description**).

Table 16.7 Maximum design scenario for impacts on marine archaeology and cultural heritage

Impact / activity	Maximum design scenario parameter	Justification
Construction		
Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed	**Wind turbine generators (WTGs): 6.75km²** • up to 225 WTGs; • mooring concepts: catenary; • maximum seabed displacement: Anchor type: drag embedment[1] fully buried (breadth 12.5m). 300m drag length. Seabed impact of 3,750m² per anchor; and • total anchor disturbance (assuming 225 WTGs, each with 8 anchors) is 6.75km². **Array cables: 20.4km²** • 225 array cables; • 680km total array cable length; • assumed jet trenching installation method as worst-case for sediment mobilisation with 30m disturbance width; • temporary construction disturbance assumed 100% of total array cable length is buried by jet trenching; 680km x 0.03km = 20.4km² **Subsea distribution centres (SDC): 125,280m²** • up to 45 SDCs; • assumed worst-case is gravity base foundations; • SDC construction footprint: 58m x 48m, footprint is 2,784m² per SDC; and • total disturbance is 125,280m² for 45 SDCs. **Offshore substations: 57,200m²** • 4 offshore substations with jacket foundations secured with suction caisson;	The parameters represent the largest area and activities that could cause direct impact to marine archaeology and cultural heritage remains.

[1] Should the drag embedment end point be out of tolerance then it would be required to lift the anchor and re-lay increasing the seabed displacement by the same amount. At the design stage, it is not possible to accurately determine the level of installation failure or damage when laying the anchors. There will remain a residual risk that some anchors may need to be re-laid as they are out of tolerance or moved during service. This will depend on seabed conditions and other factors associated with offshore operations of the install vessels.

Impact / activity	Maximum design scenario parameter	Justification
	• offshore substation construction footprint: 130m x 110m = 14,300m^2 per offshore substations; and • total disturbance is 57,200m^2 for four offshore substations; **Offshore export cables: 21km^2** • 5 offshore export cable trenches; • 140km offshore grid transmission route length per trench; • assumed jet trenching installation method as worst-case for sediment mobilisation with 30m disturbance width, • temporary construction disturbance assumed 100% of total export cable length is buried by jet trenching of 140km x 0.03km = 4.2km^2 per cable; and • total disturbance is 21km^2 for five cables. **Reactive compensation platforms (RCPs): 14,450m^2** • 2 RCPs with jacket foundations secured with suction caisson; construction footprint: 85m x 85m = 7,225m^2 (per RCP); and • total disturbance is 14,450m^2 for 2 RCP's. **Landfall(s): 80m^2** • Scotstown, Lunderton North and Lunderton South; • 8 HDD ducts; HDD exit pit dimensions: assumed 5m x 2m as worst-case, 10m^2 per exit pit; and • total disturbance is 80m^2 for 8 exit pits.	
Impact C2: Potential permanent loss or disturbance of palaeoenvironmental and archaeological remains during construction	Refer to Impact C1.	The parameters represent the largest area and activities that could cause direct impact to marine archaeology and cultural heritage remains.

Impact / activity	Maximum design scenario parameter	Justification
O&M		
Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables	O&M stage of up to 35 years per phase. **Offshore export cable corridor:** • anchorage of maintenance equipment along the length of the five offshore export cable trenches.	The parameters represent the largest area and activities that could cause direct impact to marine archaeology and cultural heritage remains.
Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments	Each phase will be operational for 35 years. **Maintenance of:** • replacement of mooring line components; • replacement of mooring or anchors using the same process as construction; • replacement or repair of array cables including routine inspection (recovery and reburial); • SDC and subsea substations includes routine inspections and scour protection repair / replacement; and • offshore substations and RCPs including routine inspections, removal of marine growth and replacement of scour protection.	The parameters represent the greatest number of proposed obstructions and changes on the seabed that could cause scour.
Decommissioning		
Decommissioning has been scoped out of assessment (see **Table 16.4**).		

16.7.2 Embedded environmental measures

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

16.7.2.2 These measures also include those that have been identified as good or standard practice and include actions that 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 this EIA Report.

16.7.2.3 **Table 16.8** sets out the relevant embedded environmental measures within the design and how these affect the marine archaeology and cultural heritage assessment.

16.7.2.4 Further detail on the embedded environmental measures in **Table 16.8** 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.

Table 16.8 Relevant marine archaeology and cultural heritage embedded environmental measures

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to marine archaeology and cultural heritage assessment
M-034	An **Outline WSI (Offshore)** has been submitted with this Application (**Volume 4**). An approved WSI will be in place during the Project, with method statements for specific activities identified and added throughout the project life cycle, along with reference to the Protocol for Archaeological Discoveries (PAD). This will include oversight of activities including geophysical and geotechnical survey specification, planning and review of data, list of recommended mitigation, watching briefs and ground truthing surveys (ROV assisted and diver surveys), where required, as well as consultations, and reporting.	Scoping Amended at EIA Report.	s.36 conditions, marine licences conditions and Environmental Management Plan.	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to marine archaeological receptors and ensure that an appropriate and informed mitigation strategy is developed and implemented.
M-035	Where practical, marine archaeological remains of lesser significance will be avoided by the temporary and permanent offshore footprint.	Scoping Amended at EIA Report.	Description of Project / Environmental Management Plan.	This measure will ensure the impact to lesser significance receptors are minimised.
M-036	Loss or disturbance of possible submerged historic landscape elements arising from altered seabed conditions (e.g. scour) will be mitigated, as far as possible, through sensitive design including utilising the mechanisms of Areas of Archaeological Interest (AAI) and exclusion zones where necessary.	Scoping Amended at EIA Report.	Description of Project / Environmental Management Plan.	This measure will ensure the impact to lesser significance receptors are minimised.
M-037	Loss or disturbance of possible submerged historic landscape elements arising from works will be mitigated, as far as possible, through selection of appropriate working methods including utilising the mechanisms of Areas of Archaeological Interest (AAI) and exclusion zones where necessary.	Scoping Amended at EIA Report.	Description of Project / Environmental Management Plan.	This measure will ensure the impact to lesser significance receptors are minimised.
M-115	The UXO Management Plan will mitigate any potential for UXO within the offshore construction area and also disposal once encountered.	Scoping	s.36 conditions and marine licences conditions.	UXO may provide information on the historical and archaeological aspects

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to marine archaeology and cultural heritage assessment
				of marine and coastal heritage assets.
M-120	An **Outline Construction Method Statement** (CMS) has been submitted with this Application (**Volume 4**). The Final CMS will be completed prior to construction commencing and submitted to MD-LOT for approval. The Final CMS will include: a) details of the commence dates, duration and phasing of key elements of construction, working areas, the construction procedures and good working practices; b) details of the roles and responsibilities; and c) details of how the construction related mitigation step proposed are to be delivered.	EIA Report	s.36 conditions, marine licences conditions and Environmental Management Plan.	Construction method statement will provide information on potential receptor impact pathways.
M-122	Development of and adherence to a Offshore Operations and Maintenance Plan, which will confirm the Project's operations and maintenance activities. This will be submitted to MD-LOT for approval post-consent.	EIA Report	s.36 conditions, marine licences conditions and Environmental Management Plan.	The Offshore Operations and Maintenance Plan will provide information on potential receptor impact pathways.
M-199	Avoidance of known sites of archaeological significance- Use of Archaeological Exclusion Zones (AEZs), Temporary Exclusion Zones (TEZs) or Areas of Archaeological Interest (AAI) and micrositing. Any sites of significant archaeological interest will be recommended for implementation of a proportional AEZ / TEZ / AAI, in line with standard guidelines, which take into account significance of the heritage asset and the local hydrodynamics and seabed level changes including possible scour. Micrositing will also be taken into consideration as part of the design and planning of the Project, to ensure that avoidance is first priority in line with the mitigation hierarchy.	EIA Report	s.36 conditions, marine licences conditions and Environmental Management Plan.	This measure will ensure high and medium potential archaeological receptors are avoided during all phases as appropriate in line with the mitigation hierarchy.

16.8 Methodology for EIA Report

16.8.1 Introduction

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

16.8.1.2 The methodology for establishing a detailed historic environment baseline is provided below, together with the methodology for assessing the significance of effects. To establish a detailed baseline, appropriate and proportionate assessments and surveys have been carried out following refinement of the offshore project components. These include:

- a desk-based review of data within the marine archaeology and cultural heritage study area, using sources detailed in **Table 16.5**, as well as relevant readily available contextual studies, desk and field studies, geological and geotechnical data;
- geophysical survey data from the site-specific site investigations undertaken in summer 2022 (OAA) and undertaken in spring / summer 2023 (offshore export cable corridor); and
- cross-referencing with other workstreams where appropriate to ensure an integrated approach to assessment.

16.8.2 Significance evaluation methodology

Overview

16.8.2.1 The significance level attributed to each effect has been assessed based on the value of the affected receptor and the magnitude of change resulting from the Project. The level of significance has then been determined by the combination of value and magnitude.

16.8.2.2 The sensitivity or value of a receptor is largely a product of its importance, as informed by legislation and policy, and as qualified by professional judgement. The rationale contained within **Table 16.9** is based on information provided within the NPF4 (Scottish Government, 2024) and Historic Environment Policy for Scotland (HES, 2019). Note that the categorisation of the relative importance of those assets that are of less than national importance generally relies on the professional judgement of the marine archaeology and cultural heritage EIA team.

Value of receptor

16.8.2.3 **Table 16.9** sets out the generic guidelines for the assessment of sensitivity and value of a receptor or feature.

Table 16.9 Guidelines for the assessment of sensitivity or value

Value or sensitivity	Guidelines
High	This category contains heritage assets that will be considered to be of national or international importance either for historic associations or their informative potential. This category includes heritage assets designated as scheduled monuments, protected military remains or HMPAs and those of equivalent value, or palaeoenvironment remains that are either very well preserved or particularly important for understanding specific periods.
Medium	Heritage assets of regional importance for historic associations or their informative potential. This category includes well-preserved live wrecks that are not suitable for designation, or paleoenvironmental remains that are typical of a region.
Low	Non-designated heritage assets of local importance for historic associations or their informative potential may include marine debris or less well-preserved marine material, or generally representative archaeological material or feature types.
Very low	These include those features that are recorded but no longer extant, which are suggestive of further activity but not of intrinsic value (for example. records of losses without identified wreck sites, some 'dead' wrecks, isolated finds of debris).

Magnitude of change

16.8.2.4 The magnitude of change affecting a receptor that will result from the Project will be identified on a scale from minor alterations of change, up to major changes or the total or substantial loss of the receptor. In this case, the magnitude of change is a matter of professional judgement to determine the magnitude of change, using descriptive terminology.

16.8.2.5 **Table 16.10** sets out the generic criteria of the assessment of the magnitude of change.

Table 16.10 Generic criteria for the assessment of magnitude of change

Magnitude of Change	Criteria (adverse)	Criteria (beneficial)
High	Total or substantial change to an asset. Loss or disturbance of defining features of the asset.	Large-scale increase in understanding and preservation of a heritage asset beyond the scale of any disturbance.
Medium	Partial alteration of an asset. Very limited disturbance to key features of the asset or loss of minor features.	Benefits to understanding or preservation of a heritage asset not requiring disturbance.
Low	Minor alteration of an asset. Limited disturbance of minor features.	Minor benefits to understanding or preservation not requiring disturbance of a heritage asset.

Magnitude of Change	Criteria (adverse)	Criteria (beneficial)
Very low	Very limited alteration of minor features of an asset.	Minor alteration of elements of an asset, which are sensitive but do not contribute discernibly to sustainable use and / or management.

Significance evaluation

16.8.2.6 **Table 16.11** has been prepared to guide the assessment of whether effects on the historic environment for the purposes of EIA Report are to be considered **Significant** or **Not Significant**. The classification of the effect is judged on the relationship of the magnitude of impact to the assessed heritage significance of the resource.

Table 16.11 Significance of Effect matrix

Receptor value	Magnitude of change			
	High	**Medium**	**Low**	**Very low**
High	**Very Large (Significant).**	**Very Large** or **Large (Significant)**.	**Moderate** or **Minor (Not Significant)**.	**Minor (Not Significant)**.
Medium	**Very Large** or **Large (Significant)**.	**Moderate (Significant)**.	**Minor (Not Significant)**.	**Minor (Not Significant)**.
Low	**Moderate** or **Minor (Not Significant)**.	**Minor (Not Significant)**.	**Minor (Not Significant)**.	**Minor** or **Neutral (Not Significant)**.
Very low	**Minor (Not Significant)**.	**Minor (Not Significant)**.	**Minor** or **Neutral (Not Significant)**.	**Minor** or **Neutral (Not Significant)**.

16.8.2.7 All assessments will be presented as narrative discussions, setting out the significance of the relevant heritage asset(s), and where appropriate contribution of their settings to significance, providing a description of the anticipated change and setting out the magnitude of change in line with **Table 16.11**.

16.9 Assessment of effects: construction stage

16.9.1 Introduction

16.9.1.1 This Section provides an assessment of the effects for marine archaeology and cultural heritage from the construction of the offshore elements of the Project.

16.9.1.2 The assessment methodology set out in **Section 16.8** has been applied to assess effects to marine archaeology and cultural heritage from the Project.

16.9.2 Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed, within the footprint the OAA

Overview

16.9.2.1 The maximum assessment scenario relating to the potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the OAA is presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects, has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.9.2.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.9.2.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.9.2.4 Geophysical anomalies of both **medium** and **high** archaeological potential: the magnitude is **no change**, as AEZs will avoid these assets and preserve them *in situ* (see **Volume 2, Figure 16.4: Seabed archaeological exclusion zones**).

16.9.2.5 Known non-designated heritage assets: the magnitude is **low**, as assets will be avoided where practicable and any unavoidable effects mitigated through preservation by record under an approved Written Scheme of Investigation (WSI).

Significance of residual effect

16.9.2.6 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of high and medium archaeological potential (M-199) to minimise the disturbance of the identified sites.

16.9.2.7 For geophysical anomalies of high archaeological potential (M-199), receptor sensitivity is up to **high** and the magnitude is **no change**; the residual effect is **Neutral** (**Not Significant**) in EIA terms.

16.9.2.8 For geophysical anomalies of medium archaeological potential (M-199), receptor sensitivity is up to **medium** and the magnitude is **no change**; the residual effect is **Neutral** (**Not Significant**) in EIA terms.

16.9.2.9 For known non-designated heritage assets, with preservation by record implemented under the approved WSI (M-034) where impacts are unavoidable (M-035), receptor sensitivity is up to **medium** and the magnitude is low; the residual effect is **Minor** (**Not Significant**) in EIA terms.

16.9.3 Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the offshore export cable corridor

Overview

16.9.3.1 The maximum assessment scenario relating to the potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the offshore export cable corridor are presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.9.3.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.9.3.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.9.3.4 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of high archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoid, preserving them *in-situ*.

16.9.3.5 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of medium archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoided, preserving them *in-situ*.

16.9.3.6 Therefore, the magnitude of the impact that construction activities relating to the Project will have on known non-designated heritage assets is considered to be **low**, as these will be avoided if practical and any unavoidable impact mitigated through preservation by record techniques.

Significance of residual effect

16.9.3.7 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of high archaeological potential (M-199) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.9.3.8 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of medium archaeological potential (M-199) to minimise the disturbance of the identified sites. Overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.9.3.9 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the known non-designated heritage assets under an approved WSI (M-034) where impact is unavoidable (M-035) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.9.4 Impact C2: Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction within the OAA

Overview

16.9.4.1 The maximum assessment scenario relating to the potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the OAA are presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.9.4.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.9.4.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.9.4.4 Therefore, the magnitude of the impact that construction activities relating to the Project will have on known non-designated heritage assets is considered to be **low**, as these will be avoided if practical and any unavoidable impact mitigated through preservation by record techniques.

16.9.4.5 Therefore, the magnitude of the impact that construction activities relating to the Project will have on palaeolandscape features is considered to be **low**, as these will be localised in nature and are not expected to impact the entirety of the receptor.

16.9.4.6 Therefore, the magnitude of the impact that construction activities relating to the Project will have on currently unknown potential remains of all periods is considered to be **medium**, as these may be impacted during the act of discovery, causing unavoidable damage.

Significance of residual effect

16.9.4.7 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the known non-designated heritage assets under an approved WSI (M-034) where impact is unavoidable (M-035) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the

receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.9.4.8 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the palaeolandscape features (M-034) and through the use of appropriate working methods (M-037) to minimise the disturbance of the identified sites. Overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.9.4.9 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts on the currently unknown potential remains of all periods following their discovery (M-034) to minimise further disturbance of the receptors. Overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **medium**. The effect is of **Large** (**Significant**) in EIA terms.

16.9.5 Impact C2: Potential permanent loss or disturbance of palaeoenvironmental and archaeological remains during construction within the offshore export cable corridor

Overview

16.9.5.1 The maximum assessment scenario relating to the potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the offshore export cable corridor are presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.9.5.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.9.5.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.9.5.4 Therefore, the magnitude of the impact that construction activities relating to the Project will have on known non-designated heritage assets is considered to be **low**, as these will be avoided if practical and any unavoidable impact mitigated through preservation by record techniques.

16.9.5.5 Therefore, the magnitude of the impact that construction activities relating to the Project will have on palaeolandscape features is considered to be **low**, as these will be localised in nature and are not expected to impact the entirety of the receptor.

16.9.5.6 Therefore, the magnitude of the impact that construction activities relating to the Project will have on currently unknown potential of all periods is considered to be **medium**, as these may be impacted during the act of discovery, causing unavoidable damage.

Significance of residual effect

16.9.5.7 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the known non-designated heritage assets under an approved WSI (M-034) where impact is unavoidable to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.9.5.8 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the palaeolandscape features (M-034) and through the use of appropriate working methods (M-037) to minimise the disturbance of the identified sites. Overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.9.5.9 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts on the currently unknown potential remains of all periods following their discovery (M-034) to minimise further disturbance of the receptors. Overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **medium**. The effect is of **Very Large** (**Significant**) in EIA terms.

16.9.5.10 A summary of the effects arising from the construction stage of the Project are provided in **Table 16.12**.

16.10 Assessment of effects: O&M stage

16.10.1 Introduction

16.10.1.1 This Section provides an assessment of the effects for marine archaeology and cultural heritage from the O&M of the offshore elements of the Project.

16.10.1.2 The assessment methodology set out in **Section 16.8** has been applied to assess effects to marine archaeology and cultural heritage from the Project.

16.10.2 Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables

Overview

16.10.2.1 The maximum assessment scenario relating to the potential harm from disturbance to historic assets in close proximity to the Offshore Red Line Boundary arising from maintenance of the offshore export cables are presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects, has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.10.2.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.10.2.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.10.2.4 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of high archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoided, preserving them *in-situ*.

16.10.2.5 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of medium archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoided, preserving them *in-situ*.

16.10.2.6 Therefore, the magnitude of the impact that construction activities relating to the Project will have on known non-designated heritage assets is considered to be **low**, as these will be avoided if practical and any unavoidable impact mitigated through preservation by record techniques.

16.10.2.7 Therefore, the magnitude of the impact that construction activities relating to the Project will have on palaeolandscape features is considered to be **low**, as these will be localised in nature and are not expected to impact the entirety of the receptor.

16.10.2.8 Therefore, the magnitude of the impact that construction activities relating to the Project will have on currently unknown potential remains of all periods is considered to be **medium**, as these may be impacted during the act of discovery causing unavoidable damage.

Significance of residual effect

16.10.2.9 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of high archaeological potential (M-199) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.10.2.10 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of medium archaeological potential (M-199) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.10.2.11 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the known non-designated heritage assets under an approved WSI (M-034) where impact is unavoidable (M-035) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.10.2.12 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the palaeolandscape features (M-034) and through the use of appropriate working methods (M-037) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**)in EIA terms.

16.10.2.13 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts on the currently unknown potential remains of all periods following their discovery (M-034) to minimise further disturbance of the receptors. Overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **medium**. The effect is of **Large** (**Significant**) in EIA terms.

16.10.3 Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example scour or differential deposition of sediments

Overview

16.10.3.1 The maximum assessment scenario relating to the potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore infrastructure within the Offshore Red Line Boundary are presented in **Table 16.7**. 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 16.8.2**. The magnitude of change, and hence the significance of potential effects has been assessed on the assumption that the embedded environmental measures from **Table 16.8** have been implemented as part of the Project.

Sensitivity or value of receptor

16.10.3.2 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

16.10.3.3 All marine cultural heritage receptors are vulnerable to impact and would not recover once impacted. The sensitivity of any receptor would be between **high** and **low** and would depend upon the type of remains (see **Table 16.2**).

Magnitude of impact

16.10.3.4 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of high archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoid, preserving them *in-situ*.

16.10.3.5 Therefore, the magnitude of the impact that construction activities relating to the Project will have on geophysical anomalies of medium archaeological potential is considered to be **no change**, as the implementation of AEZs would allow these assets to be avoid, preserving them *in-situ*.

16.10.3.6 Therefore, the magnitude of the impact that construction activities relating to the Project will have on known non-designated heritage assets is considered to be **low**, as these will be avoided if practical and any unavoidable impact mitigated through preservation by record techniques.

16.10.3.7 Therefore, the magnitude of the impact that construction activities relating to the Project will have on palaeolandscape features is considered to be **low**, as these will be localised in nature and are not expected to impact the entirety of the receptor.

16.10.3.8 Therefore, the magnitude of the impact that construction activities relating to the Project will have on currently unknown potential of all periods is considered to be **low**.

Significance of residual effect

16.10.3.9 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of high archaeological potential (M-199) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.10.3.10 The Project commitments (as shown in **Table 16.8**) include the use of AEZs and TEZs to avoid direct impacts to the geophysical anomalies of medium archaeological potential (M-199) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **no change**. The effect is of **Neutral** (**Not Significant**) in EIA terms.

16.10.3.11 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the known non-designated heritage assets under an approved WSI (M-034) where impact is unavoidable (M-035) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.10.3.12 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts to the palaeolandscape features (M-034) and through the use of appropriate working methods (M-036) to minimise the disturbance of the identified sites, overall, it is predicted that the sensitivity of the receptor is up to **medium**, and the magnitude is **low**. The effect is of **Minor** (**Not Significant**) in EIA terms.

16.10.3.13 The Project commitments (as shown in **Table 16.8**) include the use of preservation by record techniques to mitigate the direct impacts on the currently unknown potential remains of all periods following their discovery (M-034). The use of TEZs and AEZs may be used to reduce the impact of further disturbance through the creation of a buffer around assets of high sensitivity. It is predicted that the sensitivity of the receptor is up to **high**, and the magnitude is **low**. The effect is of **Moderate** (**Significant**) in EIA terms.

16.11 Assessment of effects: decommissioning stage

16.11.1.1 As outlined in **Table 16.4** the decommissioning of the offshore infrastructure has been scoped out and therefore not assessed.

16.12 Summary of effects

16.12.1.1 A summary of the effects arising from the construction and O&M stages of the Project in relation to marine archaeology and cultural heritage are summarised in **Table 16.12**.

Table 16.12 Summary of effects during the construction and O&M stages of the Project on marine archaeology and cultural heritage

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effect
Construction					
Geophysical anomalies of high archaeological potential	**High**	Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive construction activities on the seabed within the Offshore Red Line Boundary of the OAA.	M-199	**No change**	**Neutral** (**Not Significant**).
		Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive construction activities on the seabed within the Offshore Red Line Boundary of the offshore export cable corridor.			
Geophysical anomalies of medium archaeological potential	**Medium**	Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive construction activities on the seabed within the Offshore Red Line Boundary of the OAA.	M-199	**No change**	**Neutral** (**Not Significant**).
		Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive construction activities on the seabed within the Offshore Red Line Boundary of the offshore export cable corridor.			
Known non-designated heritage assets	**Medium**	Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the OAA.	M-034 M-035	**Low**	**Minor** (**Not Significant**).

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effect
		Impact C1: Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed within the Offshore Red Line Boundary of the offshore export cable corridor.			
		Impact C2: Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction within the Offshore Red Line Boundary of the OAA..			
Palaeolandscape features	**Medium**	Impact C2: Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction within the Offshore Red Line Boundary of the OAA.	M-037	**Low**	**Minor** (**Not Significant**).
		Impact C2: Potential permanent loss or disturbance of palaeolandscape features during construction within the Offshore Red Line Boundary of offshore export cable corridor.			
Unknown potential remains of all periods	**High**	Impact C2: Potential permanent loss or disturbance of potential paleoenvironmental and archaeological remains during construction within the Offshore Red Line Boundary of the OAA.	M-034	**Medium**	**Large** (**Significant**).
		Impact C2: Potential permanent loss or disturbance of potential archaeological remains during construction within the Offshore Red Line Boundary of the offshore export cable corridor.			

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effect
O&M					
Geophysical anomalies of high archaeological potential	**High**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-199	**No change**	**Neutral** (**Not Significant**).
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).			
Geophysical anomalies of medium archaeological potential	**Medium**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-199	**No change**	**Neutral** (**Not Significant**).
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).			
Known non-designated heritage assets	**Medium**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-034 M-035	**Low**	**Minor** (**Not Significant**).
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).			

Receptor	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effect
Palaeolandscape features	**Medium**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-034 M-037	**Low**	**Minor** (**Not Significant**).
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).	M-036		
Unknown potential remains of all periods	**High**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-034	**Medium**	**Large** (**Significant**).
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).		**Low**	**Moderate** (**Significant**).

16.13 Transboundary effects

16.13.1.1 Transboundary effects arise when impacts from a development with one European Economic Area (EEA) State affect 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 Ltd., 2023).

16.13.1.2 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 marine archaeology and cultural heritage receptors from the Project.

16.14 Inter-related effects

16.14.1.1 A description and assessment of the likely inter-related effects arising from the Project on marine archaeology and cultural heritage is provided in **Chapter 32: Inter-Related Effects**.

16.15 Assessment of cumulative effects

16.15.1.1 A description and assessment of the cumulative effects arising from the Project on marine archaeology and cultural heritage is provided in **Chapter 33: Cumulative Effects Assessment**.

16.16 Summary of residual likely significant effects

16.16.1.1 **Table 16.13** presents a summary of the residual likely significant effects on marine archaeology and cultural heritage receptors assessed in this Chapter.

Table 16.13 Summary of assessment of residual likely significant effects for marine archaeology and cultural heritage

Receptor	Sensitivity or value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Assessment of residual likely significant effects
Construction					
Unknown potential remains of all periods	**High**	Impact C2: Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction within the OAA (including WTG floating units (including platforms and station keeping system) and array cables.	M-034	**Medium**	**Significant**
		Impact C2: Potential permanent loss or disturbance of palaeoenvironmental and archaeological remains during construction within the offshore export cable corridor.			
O&M					
Unknown potential remains of all periods	**High**	Impact O1: Potential harm from disturbance to historic assets in close proximity to the site arising from maintenance of the offshore export cables.	M-034	**Medium**	**Significant**
		Impact O2: Potential harm from disturbance to wrecks in close proximity to the site arising from altered seabed conditions, for example. scour or differential deposition of sediments within the Offshore Red Line Boundary (OAA and offshore export cable corridor).		**Low**	**Significant**

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16.18 Glossary of terms and abbreviations

16.18.1 Abbreviations

Acronym	Definition
2DUHRS	2D Ultra High Resolution Seismic data
AEZ	Archaeological Exclusion Zone
EEA	European Economic Area
EIA	Environmental Impact Assessment
HDD	Horizontal Directional Drill
HER	Historic Environment Record
HES	Historic Environment Scotland
HMPA	Historic Marine Protected Areas
MAG	Magnetometer
MBES	Multibeam Echosounder
MD-LOT	Marine Directorate – Licensing Operations Team
MHWS	Mean High Water Springs
MW	Megawatts
O&M	Operation and Maintenance
OAA	Option Agreement Area
PAD	Protocol for Archaeological Discoveries
s.36	Section 36
SBP	Sub-bottom profiler
SSS	Side Scan Sonar
RCP	Reactive Compensation Platforms
TEZ	Temporary Exclusion Zone
UKHO	United Kingdom Hydrographic Office
VC	Vibrocore
WSI	Written Scheme of Investigation

16.18.2 Glossary of terms

Term	Definition
Anthropogenic	Man-made.
Archaeology	The study of the material remains of the past.
Designated Heritage Asset	An element of the historic environment that has value in policy and is designated by statute.
Geoarchaeology	A multi-disciplinary approach that uses the techniques and subject matter of geography, geology, geophysics and other earth sciences to examine and inform archaeological knowledge and thought.
Geophysical survey	Activities to obtain data on the distribution and nature of geophysical properties of the seabed (for example. bathymetry, surficial sediment type and bedforms, sub surface geology). Geophysical survey outputs typically include multibeam bathymetry, SSS and sub-bottom profiler data.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Heritage Asset	An element of the historic environment that has value in policy.
Historic Environment	The physical evidence of past human activity.
Listed Buildings	High and medium significance buildings designated for their historical, architectural or artistic importance under the Planning (Listed Buildings and Conservation Areas) Act 1990.
Moraine	Accumulation of glacial debris.
Ordnance survey	OS stands for Ordnance Survey, which is the national mapping agency for Great Britain. It carries out the official surveying of Great Britain and provides the most accurate and up-to-date geographic data for the country, which is relied on by government, business and individuals.
Palaeoenvironmental remains	Minerogenic deposits such as alluvial silts and clays that have potential for ecofact preservation (such as diatoms, ostracods molluscs), the assessment of which can provide information on depositional environments (for example. the salt or freshwater nature of deposits) that can enhance interpretation of the palaeolandscape. Peat deposits can preserve floral remains such as pollen, seeds and plant fragments and other organic remains. Organic material can also be dated by radiocarbon techniques, important for establishing the chronology for the depositional sequence.
Palaeolandscape	Palaeolandscape refers to an ancient / relict landscape that has been preserved in the geological record, in this case submerged by rising sea levels and seabed sediments. These landscapes provide insights into past environments, including the physical and ecological conditions that existed at different times. The study of the remnant palaeogeographic features provides insight into how ancient environments were exploited by early humans and how the

Term	Definition
	landscape changed through time as a result of natural processes and human activities.
Protected Wrecks	High significance shipwrecks designated for their historical, archaeological or artistic importance under the Protection of Wrecks Act 1974.
Scheduled Monument	A site or structure having statutory protection under the Ancient Monuments and Archaeological Areas Act 1979.

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