



Sporad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Chapter 15: Offshore Archaeology and Cultural Heritage, Volume 2a

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15 OFFSHORE ARCHAEOLOGY AND CULTURAL HERITAGE

15.1 INTRODUCTION

15.1.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents the results of the assessment of the likely significant effects of the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project') with respect to Offshore Archaeology and Cultural Heritage, including direct impacts to the setting of Onshore Cultural Heritage assets impacted by the proposed offshore elements of the Offshore Project.

15.1.1.2 This chapter should be read in conjunction with the project description provided in **Chapter 3: Project Description, Volume 1a**, and the relevant parts of the following chapters and appendices:

- **Chapter 2: Policy and Legislative Context, Volume 1a** (for the policy and legislation relevant to the Offshore Project and Offshore Archaeology and Cultural Heritage);
- **Chapter 4: Consideration of Alternatives, Volume 1a** (Section 4.4.4 for the alternative turbine layout options that may increase the distance of Wind Turbine Generators (WTGs) from onshore cultural heritage assets);
- **Chapter 9: Physical and Coastal Processes, Volume 2a** (the results indicate the extent of potential indirect impacts on Offshore Cultural Heritage assets as a result of changes to the physical and coastal processes. The assessment draws on the findings of Chapter 9, which provides the modelled evidence for seabed disturbance, scour, erosion, sediment transport and deposition behaviour associated with the project. See Section 9.7 (sediment dispersion) and Appendix 9.2 for drill arisings and jet-trenching plume modelling);
- **Chapter 18: Seascape, Landscape and Visual, Volume 2a** (for the potential impacts on identified Onshore Cultural Heritage assets the views from which have been included within the visualisations and wireframes produced for the seascape, landscape and visual impact assessment);
- **Appendix 15.1: Offshore Archaeology Desk Based Assessment, Volume 2c** (due to information relating to desk-based research and baseline conditions of the Offshore Project);
- **Annex 15.1.2: Archaeological Assessment of Geophysical and Hydrographic Data, Volume 2c** (for the interpretation, analysis and results of the archaeological assessment of geophysical data within the Offshore Project);
- **Annex 15.1.3: Stage 1 Geoarchaeological Review of Geotechnical Data, Volume 2c** (for the interpretation, analysis and results of the geoarchaeological potential of the Offshore Project);
- **Appendix 15.2: Offshore Cultural Heritage Settings Assessment, Volume 2c** (for the detailed setting assessment for the Offshore Project); and
- **Outline Offshore Written Scheme of Investigation, Volume 3** (sets out the methodology for any further investigation and elements of the mitigation strategy. The **Outline Protocol for**

Archaeological Discoveries, Volume 3 is appended to this providing the protocol to follow for unexpected archaeological finds within the Offshore Project).

15.1.1.3 This technical chapter describes the following:

- Legislation, planning policy and other documentation that has informed the assessment (Section 15.2);
- Outcome of consultation and engagement that has been undertaken to date, including how matters relating to Offshore Archaeology and Cultural Heritage have been addressed (Section 15.3);
- Scope of the assessment for Offshore Archaeology and Cultural Heritage (Section 15.4);
- The methods of assessment used for baseline data gathering and impact assessment (Section 15.5);
- Overall baseline (Section 15.6);
- Embedded environmental measures relevant to Offshore Archaeology and Cultural Heritage and the relevant maximum design scenario (Section 15.7);
- Assessment of likely significant effects for Offshore Archaeology and Cultural Heritage, and further mitigation (Sections 15.8-15.10);
- Assessment of Combined effects (Section 15.11);
- Consideration of Onshore Transmission Works Project (Section 15.12);
- Assessment of Cumulative effects (Section 15.13);
- Assessment of transboundary effects (Section 15.14);
- A summary of residual effects for Offshore Archaeology and Cultural Heritage (Section 15.15); and
- Information sources and documentation referred to in this chapter (Section 15.17).

15.1.1.4 The chapter is supported by the following figures:

- **Figure 15.1: Marine Archaeology Study Area, Volume 2b**
- **Figure 15.2: Non-designated Historic Environment Features, Volume 2b;**
- **Figure 15.3: Palaeolandscapes Features, Volume 2b;**
- **Figure 15.4: Seabed Features, Volume 2b;**
- **Figure 15.5: Seabed Archaeological Exclusion Zones, Volume 2b;**
- **Figure 15.6: Site Location Map with Borehole Locations, Volume 2b;**
- **Figure 15.7: Historic Assets Overlain on Blade Tip Zone of Theoretical Visibility (ZTV), Volume 2b;**
- **Figure 15.8: Heritage Wirelines, Volume 2b; and**
- **Figure 15.9: Zone of Influence for Offshore Archaeology and Cultural Heritage CEA, Volume 2b.**

15.2 SUMMARY OF POLICY AND LEGISLATIVE CONTEXT

15.2.1.1 This section outlines the legislation, policy and guidance that are relevant to the assessment of likely significant effects on Offshore Archaeology and Cultural Heritage associated with the construction, operation and maintenance (O&M) and decommissioning of the Offshore Project. In addition, other national, regional, and local policies are considered within this assessment where they are judged to be relevant. Further information on policies relevant to the EIAR is provided in **Chapter 2: Policy and Legislative Context, Volume 1a**.

15.2.1.2 A summary of the legislative policy and guidance relevant to Offshore Archaeology and Cultural Heritage is provided in **Table 15-1** which examined their relevance to the assessment. This legislation provides protection for wrecks of high historical, archaeological or artistic value, as well as allowing military wrecks and aircraft remains to be protected. There are currently no known protected wrecks within the Study Area which is defined in Section 15.4.2.

Table 15-1 Policy, and guidance relevant for Offshore Archaeology and Cultural Heritage

Title	Relevance to Offshore Archaeology and Cultural Heritage
National Legislation	
<i>The Ancient Monuments and Archaeological Areas Act 1979 (as amended)</i>	The Ancient Monuments and Archaeological Areas Act 1979 provides for a schedule of monuments which are protected and sets out measures for their protection and management. Provisions of the act are amended by the Historic Environment Scotland Act 2014. Scheduled monuments can be located within the marine environment. The Offshore Project could have potential effects on scheduled monuments. The protection conferred to these heritage assets through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
<i>The Protection of Military Remains Act 1986</i>	An Act to secure the protection from unauthorised interference of the remains of military aircraft and vessels that have crashed, sunk or been stranded and of associated human remains; and for connected purposes. If encountered, all military aircraft crash sites are automatically protected under the Protection of Military Remains Act 1986. This is applicable to remains found in the marine environment. The Offshore Project could have potential effects on these remains. The protection conferred to these remains through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
<i>The Merchant Shipping Act 1995</i>	Ownership of any wreck remains is determined in accordance with the Merchant Shipping Act 1995. This is applicable to remains found in the marine environment. The Offshore Project could have potential

Title	Relevance to Offshore Archaeology and Cultural Heritage
	effects on these assets. The protection conferred to these assets through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
<i>The Marine (Scotland) Act 2010</i>	Section 67 of this act allows Scottish ministers to designate a Historic Marine Protected Area (HMPAs). These areas consist of marine historic assets (e.g. historic shipwrecks) of national importance within Scottish territorial waters (section 73). In Scotland/ <i>Alba</i> , HMPAs have replaced Section 1 of the Protection of Wrecks Act 1973, which provides protection for designated shipwrecks in the UK. Military wrecks and aircraft are further addressed through the Protection of Military Remains Act 1986. The Offshore Project could have potential effects on these assets. The protection conferred to these marine historic assets through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
<i>The Protection of Wrecks Act 1973</i>	Section 2 of the Protection of Wrecks Act (1973) provides for the designation of a prohibited area around a vessel lying wrecked that is considered to be dangerous due to their contents. The Offshore Project could have potential effects on these assets. The protection conferred to these assets through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
<i>The Treasure Trove Law (as revised Jan 2016; applicable to mean low water springs)</i>	The Treasure Trove system safeguards portable antiquities of archaeological, historical and cultural significance found in Scotland/ <i>Alba</i> , and enables their allocation to Scottish museums. This is applicable to anything found in the intertidal area. The Offshore Project could have potential effects on these remains. The protection conferred to these assets through legislation is accounted for within the scope of the assessment (see Section 15.4) and the embedded mitigation measures within the Offshore Project detailed in Section 15.7.2.
National Policy	
<i>Our Past, Our Future: The Strategy for Scotland's Historic Environment (Historic Environment Scotland (HES), 2023)</i>	Sets out a national mission to sustain and enhance the benefits of Scotland's/ <i>Alba</i> 's historic environment, for people and communities now and into the future.
<i>United Kingdom (UK) Marine Policy Statement (MPS, 2011)</i>	The Marine Policy Statement (MPS) is the framework for preparing Marine Plans and taking decisions affecting the marine environment. Section 2.6.6 relates to the historic environment and states " <i>Marine activities have the potential to result in adverse effects on the historic</i>

Title	Relevance to Offshore Archaeology and Cultural Heritage
	<i>environment both directly and indirectly, including damage to or destruction of heritage assets".</i>
Scotland National Marine Plan (NMP, 2015)	This plan covers the management of both Scottish inshore waters (out to 12 nm) and offshore waters (12-200 nm). The relevant policy is: GEN 6 Historic environment: <i>Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.</i> Sections 4.20-4.25 elaborate on how this policy should be applied and understood.
Comhairle nan Eilean Siar (CnES) (Western Isles Council) Local Development Plan (2018)	The Western Isles Local Development Plan (CnES, 2018) deals with Archaeology in Policy NBH5: Development proposals which preserve, protect, or enhance the archaeological significance of historic assets, including their settings, will be supported. This is elaborated on in the policy subheading, Development Impact on Sites of Archaeological Importance.
National Planning Framework 4 (NPF4) (Scottish Government, 2023)	The NPF4 (Scottish Government 2023) sets out the Scottish Government's planning policies and provides guidance for planning authorities and developers on the conservation and investigation of heritage assets. Part 2 of this 2-part document sets out the specific policies, with Policy 7 addressing cultural heritage and archaeology specifically. The stated policy intent of Policy 7, Historic assets and places (Scottish Government 2023) is to protect and enhance historic environment assets and places, and to enable positive change as a catalyst for the regeneration of places. Of particular relevance to the Offshore Project are policy paragraphs a, n and o.
Technical Guidance	
Marine Directorate – Licensing Operations Team (MD-LOT) Marine licensing and consenting: offshore renewable energy projects (Marine Directorate – Licensing Operations Team, 2025)	Guidance for offshore renewable energy projects on marine licensing and consenting requirements that are administered by the Marine Directorate – Licensing Operations Team (MD-LOT) on behalf of Scottish Ministers.
COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology Ltd, 2007)	The Historic Environment Guidance for the Offshore Renewable Energy Sector provides guidance on the survey, appraisal and monitoring of the historic environment during the development of offshore renewables energy projects in the United Kingdom.
Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (COWRIE, 2008)	This guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy sets out how to consider the potential cumulative impacts of the Offshore Project on the significance of a historic landscape or the setting of heritage

Title	Relevance to Offshore Archaeology and Cultural Heritage
	assets when considered in conjunction with other past or proposed developments.
<i>Guidance for Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector (Gribble and Leather, 2011)</i>	The guidance sets out how best to achieve the integration of offshore geotechnical investigations and their data outputs, arising from offshore renewable energy projects, with archaeological historic environment analysis, and ensure optimum use of geotechnical data.
<i>Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006)</i>	The Code of Practice for Seabed Development provides an overview of procedures for consultation and cooperation between seabed developers and marine archaeologists in which archaeology is given appropriate assessment and consideration.
<i>Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate, 2014)</i>	Guidance for producing a Protocol for Archaeological Discoveries (PAD) that will satisfy anticipated conditions relating to the reporting of archaeological discoveries across the offshore renewable energy industry.
<i>The Chartered Institute for Archaeologists (CIfA) Code of Conduct (2022), Standards and Guidance (2020a-e)</i>	Relevant guidance documents and standards for best practices for archaeological work.
<i>Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects Offshore Renewables Projects, (The Crown Estate, 2021)</i>	High level guidance for producing a detailed plan specifying archaeological mitigation measures, from initial surveys to decommissioning, to protect the historic environment in the offshore wind industry.

15.3 SCOPING AND CONSULTATION

15.3.1 OVERVIEW

15.3.1.1 This section describes the stakeholder engagement undertaken for the Offshore Project. This consists of early engagement, the outcome of, and response to the Scoping Opinion in relation to the Offshore Archaeology and Cultural Heritage assessment and the setting of Onshore Cultural Heritage assets, informal consultation and consultation undertaken through the Preliminary Application Consultation (PAC) process (hereafter referred to as the 'formal consultation'). An overview of engagement undertaken for the Offshore Project as a whole can be found in **Chapter 5: Approach to EIA, Volume 1a** and **Appendix 5.4: Stakeholder Consultation and Engagement, Volume 1c**.

15.3.1.2 Consultation is a key feature of the EIA process and continues throughout the lifecycle of the Offshore Project, from the initial stages through to consent and post consent.

15.3.1.3 Consultation captures all consultation and engagement and has been ongoing with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to Offshore Archaeology and Cultural Heritage. All consultation to date has been undertaken in line with the process described in **Chapter 5, Volume 1a** and **Appendix 5.4, Volume 1c**. Feedback received during this process has been incorporated into the EIAR wherever possible as appropriate.

15.3.2 EARLY ENGAGEMENT

Early engagement was undertaken pre-scoping with a number of consultation bodies in relation to Offshore Archaeology and Cultural Heritage. In accordance with MD-LOT guidance, Spiorad na Mara Limited (hereafter referred to as ‘the Applicant’) held formal scoping workshops in May and June 2023 to inform the Scoping Report. Further details of the consultation undertaken and the post-workshop feedback can be found in Section 5.3 and Table 5.3-1 of the Scoping Report.

Workshop: 13 June 2023

15.3.2.1 MD-LOT, HES, NatureScot and CnES attended a workshop discussing Marine Archaeology and Cultural Heritage. CnES recommended using HES Managing Change Series document on setting, rather than UK Gov guidance, in Marine Archaeology assessment. They requested consistency in terms of setting and clarity on significant non-designated sites to be included. It was also noted that the ZTV needed to be clearer. Further detail is provided in the Scoping Report (Spiorad na Mara Limited, 2023).

Scoping Opinion

15.3.2.2 The Applicant submitted a Scoping Report (Spiorad na Mara Limited, 2023) and request for a Scoping Opinion to MD-LOT in September 2023. MD-LOT is advised in cultural heritage aspects by HES and CnES (Western Isles Council). A Scoping Opinion was received May 2024. The Scoping Report sets out the proposed Offshore Archaeology and Cultural Heritage assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. The comments received in the Scoping Opinion and how these have been addressed in this EIAR is provided in **Appendix 5.2: Response to Scoping Opinion, Volume 1c**.

15.3.2.3 A summary of those responses relevant to Offshore Archaeology and Cultural Heritage is shown in **Table 15-2**. Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.

Table 15-2 Summary of consultation – Offshore Archaeology and Cultural Heritage

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
Scottish Ministers	May 2024, Scoping Opinion	The Applicant considers the potential impact of the Offshore Project on Marine Archaeology and Cultural Heritage receptors	Surveys have been undertaken, and the specifications have been

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
		<p>in Chapter 6.8 of the Scoping Report. Section 6.1.6.1 of the Scoping Report details the offshore site-specific surveys that will be used to inform the EIAR. The Scottish Ministers, in line with HES representation, advise that any surveys carried out should also allow for analysis of archaeological interests. The Scottish Ministers advise the Applicant considers the advice provided by HES in this regard.</p>	<p>considered suitable for archaeological assessment. See Sections 15.5.2 and 15.6.1 for more details on surveys undertaken.</p>
		<p>Section 6.8.3.3 of the Scoping Report provides an overview of the Marine Archaeology and Cultural Heritage baseline. The Scottish Ministers advise the Applicant considers the potential for palaeoenvironmental deposits as well as the inclusion of Unexploded Ordnances (UXOs) that may be present due to the location of the Offshore Project sitting in the Atlantic Approaches and near to the South Uist Test Range. This is in line with the CnES representation.</p>	<p>Potential for palaeoenvironmental deposits has been considered and assessed as part of Annex 15.1.2, Volume 2c and Annex 15.1.3, Volume 2c. See Section 15.6 for the current baseline of the Offshore Project. The potential for UXOs is considered and within the health and safety considerations in Appendix 15.1, Volume 2c.</p>
		<p>The Scottish Ministers, in line with the HES representation, are content with setting impacts for marine archaeological impacts being scoped out of further assessment.</p>	<p>Noted. See scoped out activities in Table 15-6.</p>
		<p>With regard to impacts relating to cultural heritage assets, the Scottish Ministers highlight difficulty in assessing these impacts due to the lack of detail provided on the Offshore Project. However, the Scottish Ministers are content that should the proposed methodology and mitigation measures presented in the Scoping Report be adhered to, the risks to cultural heritage assets will be minimised. This is in line with the HES representation.</p>	<p>Description of design is accurately described and assessed as part of the EIAR (see Section 15.7.1 for maximum design scenario and Chapter 3, Volume 1a for wider design parameters). The methodology and measures detailed in the Scoping Report in relation to Offshore Cultural Heritage and Archaeology</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
			<p>have been adhered to. These are detailed in Section 15.5.</p>
		<p>The Scottish Ministers, in line with the HES and CnES representations, agree that a Written Scheme of Investigations (WSI) and a Protocol for Archaeological Discoveries (PAD) should be completed for the Offshore Project. In line with the mitigation measure of using a project archaeologist, as included in Table 6.8-3 of the Scoping Report, the Scottish Ministers refer the Applicant to the CnES representation on the use of an Archaeological Clerk of Works (ACOW).</p>	<p>An Offshore Written Scheme of Investigations (OWSI) and a PAD is included within the EIAR (Volume 3). The use of a Retained Archaeologist as part of the PAD would serve as an ACOW for the Offshore Development outlined in the OWSI (Volume 3).</p>
		<p>The Scottish Ministers recommend first using the use of ZTV analysis in the study of setting impacts on terrestrial cultural heritage assets.</p>	<p>As outlined in Appendix 15.2, Volume 2c, the use of ZTV analysis, alongside asset data and site visits was used in the identification of the onshore cultural heritage assets which could be affected through a change in their settings. ZTV analysis was also used in the completion of the assessment of effects on settings included as Appendix 15.2, Volume 2c.</p>
		<p>If potential significant impacts on an asset setting are identified due to the Proposed Development, the Scottish Ministers request wireframe illustrations are produced to aid in assessing the impacts. If significant impacts to an asset setting are identified, photomontages should be included in the EIA Report to further illustrate the impacts.</p>	<p>Wireline were prepared for onshore cultural heritage assets included in the assessment of effects on settings and are presented in Figure 15.8, Volume 2b. The assessment of effects on settings included as Appendix 15.2, Volume 2c also makes reference to photomontages within Appendix 18.6: SLVIA</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
			<p>Figures and photomontage Visualisations, Volume 2c where these are relevant to onshore cultural heritage assets.</p>
<p>HES Comhairle nan Eilean Siar (CnES)</p>	<p>May 2024, Scoping Opinion May 2024, Scoping Opinion</p>	<p>Potential setting impacts: There are a number of nationally important historic environment assets within our remit in the vicinity of the Offshore Project whose settings have the potential to be adversely impacted by it. The Report provides little detail on the exact nature of the Offshore Project, so it is difficult to provide any meaningful assessment of potential setting impacts. The attached annex highlights the most obvious issues.</p> <p>HES also recommend that rather than applying study areas with specific distance boundaries (10km and 3km), Zone of Theoretical Visibility studies should be used in the first instance to identify potential setting impacts on designated cultural heritage assets. Where assessment of an asset's setting indicates potentially significant impacts from the proposed development, wireframe illustrations should be produced to help assess those impacts. Where the impacts are identified as significant, photomontages should be produced to illustrate the impacts.</p> <p>Historic Environment Scotland also drew attention in particular to:</p> <ul style="list-style-type: none"> • Scheduled monuments on the western side of the Eye Peninsula near Stornoway; • SM1683 St Ronan's Church and village settlement, Rona; • Butt of Lewis Lighthouse (LB5768); • Early chapels along the western coastline of Lewis; <p>The Calanais complex</p>	<p>The detail of the potential impacts is reported in this chapter, see Sections 15.8-15.10.</p> <p>As outlined in Appendix 15.2, Volume 2c, the use of ZTV analysis, alongside asset data and site visits was used in the identification of the onshore cultural heritage assets which could be affected through a change in their settings. ZTV analysis was also used in the completion of the assessment of effects on settings included as Appendix 15.2, Volume 2c.</p> <p>These comments were reflected in the scope of onshore cultural heritage assets to be included in the scope of the assessment of effects on setting, as described in Appendix 15.2, Volume 2c.</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
		<p>Potential cumulative impacts: We recommend that the potential cumulative impacts of the Offshore Project should be assessed in combination with those of any other developments in the vicinity. This should assess the incremental impact or change when the Offshore Project is combined with other present and reasonably foreseeable developments. This particularly relevant to works near Stornoway where other development proposals are also being considered.</p>	<p>Cumulative impacts are considered and reported in the EIAR, Section 15.12.1.1. Cumulative impacts as a result of future development near Stornoway/<i>Steòrnabhagh</i> has been considered were applicable but is limited to setting impacts on designated assets impacted by the Offshore Development.</p>
		<p>As noted above, the broad nature of the proposals laid out in the Scoping Report makes it difficult for us to identify and assess specific impacts or issues relating to cultural heritage interests. We are content that if the methodology and mitigation measures laid out in the Scoping Report are followed this should minimise the risk of significant impacts. In some cases, such as the marine surveys discussed in section 6.1.6.1., the applicants should ensure that these are carried out in a manner that facilitates their use for archaeological analysis.</p>	<p>Geophysical and geotechnical surveys have been undertaken, and the specifications are considered suitable for archaeological assessment (see Section 15.5.1 for details on geophysical geotechnical survey specifications).</p>
		<p>While we are content for setting impacts to be scoped out for marine archaeological interests, we have some concerns about the treatment of setting impacts on terrestrial assets within the report. Setting impacts are referred to as both direct and indirect impacts in different parts of the report. For the avoidance of doubt, setting impacts resulting from the presence of the wind farm and its associated infrastructure are direct impacts in EIA terms and should be treated and referred to as such in the final EIAR. We also recommend that rather than applying study areas with specific distance boundaries (10 km and 3 km), Zone of Theoretical Visibility (ZTV) studies should be used in the first instance to</p>	<p>It is acknowledged that setting effects are direct. They are treated as such in the EIAR, please see Section 15.6.1.</p> <p>As outlined in Appendix 15.2, Volume 2c, the use of ZTV analysis, alongside asset data and site visits was used in the identification of the onshore cultural heritage assets which could be affected through a change in their settings.</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
		<p>identify potential setting impacts on designated cultural heritage assets. Where assessment of an asset's setting indicates potentially significant impacts from the proposed development, wireframe illustrations should be produced to help assess those impacts. Where the impacts are identified as significant, photomontages should be produced to illustrate the impacts.</p>	<p>ZTV analysis was also used in the completion of the assessment of effects on settings included as Appendix 15.2, Volume 2c. Wireline were prepared for onshore cultural heritage assets included in the assessment of effects on settings and are presented in Figure 15.8, Volume 2b. The assessment of effects on settings included as Appendix 15.2, Volume 2c also makes reference to photomontages within Appendix 18.6, Volume 2c where these are relevant to onshore cultural heritage assets. .</p>
		<p>For our statutory interests, a scheme with offshore substations would appear to be preferable to a scheme with onshore substations as it would reduce the potential for impacts on known heritage assets. However, this could change if important archaeological remains are encountered in the Study Area.</p>	<p>The potential for archaeological remains in the Offshore Project is assessed in the EIAR. Through the iterative design process, known remains have been avoided, where possible, see Sections 15.8–15.10.</p>
		<p>In reviewing this chapter, it was noted that there was no inclusion of UXO's; given the location of the Isle of Lewis within the Atlantic Approaches and also the proximity of the South Uist Test Range, there is a potential for material associated with aircraft of sea going vessels to be encountered.</p>	<p>The potential for UXOs has been considered and is included within the health and safety considerations in the WSI and will be updated if necessary.</p>
		<p>All WSI's must include a generic reference to post- excavation research design (PERD). This phase of works will also have in place a PAD which will respond to all other discoveries identified outside of the embedded mitigation</p>	<p>The WSI references requirement for a PERD including research objectives for any mitigation excavations,</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
		<p>strategies previously noted. It will be useful to specify timeframes for anticipated consultation and reporting. Additionally, the management role of the project archaeologist should be specified; an example of which could be an ACOW.</p>	<p>and post excavation analysis that are deemed necessary for the mitigation strategy. A PAD is included as part of this EIAR, see Offshore Written Scheme of Investigation, Volume 3.</p>
		<p>EIAR to consider cumulative impact from the offshore development on the setting of the landscape character along the coastal edge.</p>	<p>Cumulative impacts from other offshore development will be considered in respect of setting, Section 15.12.1.1.</p>
		<p>Advise that any potential impacts on the setting of historical environment assets or coastal scheduled monuments should be scoped into the Seascape, Landscape and Visual Impact Assessment (SLVIA) and linked to both the Marine Archaeology and Cultural Heritage and onshore archaeology and cultural heritage sections of the EIAR.</p> <p>It is noted that this study area replaced an earlier 45km setting study area; it would be helpful to see the justification for this change.</p> <p>It would be beneficial if the EIAR could show that significant offshore islands have been considered in terms of setting impact from the development, prior to being potentially scoped out. Although island groups like the Flannan Islands, St Kilda and North Rona are beyond the study areas; It would be considered useful to acknowledge their presence in relation to the proposed development. These islands have significant social and cultural links to the heritage of the Outer Hebrides. Additionally, St Kilda is a dual designated World Heritage site.</p> <p>EIAR to consider cumulative impact from the offshore development on the setting of the landscape character along the coastal edge.</p>	<p>The scope of the onshore cultural heritage assets which could be affected through a change in their settings is described in Appendix 15.2, Volume 2c. This has been completed with the use of ZTV analysis, alongside asset data and site visits.</p> <p>Assets identified have been considered, though it is noted that some, such as St Kilda/<i>Hiort</i> and North Rona/<i>Rònaigh</i>, are at a considerable distance and therefore theoretical visibility of turbines would be limited.</p> <p>The closest point of the St Kilda World Heritage Site is approximately 105 km from the Array Area. Although there may be theoretical visibility from elevated areas of St Kilda/<i>Hiort</i>, at distances of > 105 km the WTGs within the Array Area would not</p>

Consultee	Date/Document	Comment	Response/Where This is Addressed in the EIAR
			be distinguishable to the eye to any significant degree and that there would be no potential for significant effects on the Outstanding Universal Value of the St Kilda World Heritage Site at such long range.
		EIAR to consider cumulative impact from the offshore development on the setting of the landscape character along the coastal edge.	Cumulative impacts from other offshore development will be considered in respect of setting, Section 15.12.1.1.

15.3.3 POST SCOPING CONSULTATION

15.3.3.1 Following the receipt of the Scoping Opinion, further consultation relating to Offshore Archaeology and Cultural Heritage has been held with a number of stakeholders. A summary of this consultation is detailed in **Table 15-3**.

Table 15-3 Summary of post scoping consultation

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
Historic Environment Scotland	Meeting with Sporad na Mara 27 June 2024	At this meeting, Historic Environment Scotland highlighted the following assets should be considered for potential impact to their setting: <ul style="list-style-type: none"> • SM5901 Clach Stei Lin, stone circle and enclosure; • SM1661 Clach an Trushal, standing stone, Ballantrushal; • SM5402 Cnoc na Moine, burial cairn, Dalmore; • SM6292 Dalmore Bay, settlement at SW end of beach; • Gallan Head WWI observation point (not designated); 	These have been considered within the scope of onshore heritage assets with the potential for impact through changes in their setting identified in Appendix 15.2, Volume 2c . The impact assessment of the identified onshore heritage assets is also presented in Appendix 15.2, Volume 2c .

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
HES	Written response to proposed scope of terrestrial cultural heritage assets to be included in the assessment of effects on setting. 28 April 2025	<ul style="list-style-type: none"> • Flannan Islands. <p>HES confirmed agreement on the assets which were proposed to be scoped in. However, there were 5 scheduled monuments, which had been proposed to be scoped out of the assessment. In each case, it was stated by HES that insufficient information had been provided to justify that the assets be scoped out. These assets were:</p> <ul style="list-style-type: none"> • Clach an Tursa, standing stones and enclosure (SM1662); • Loch an Duin, dun, Shader (SM5364); • Loch Sgardam, burial chamber, Breasclete (SM5877); • Loch Shiavat, dun (SM5381); • Carn a'Mharc, chambered cairn NW of Gress Lodge (SM1660). 	The scope of the assessment was amended and a response provided to HES on 8 July 2025, either accepting the inclusion or providing further justification for not including an asset. These responses have been incorporated into the scope presented in Appendix 15.2, Volume 2c.
CnES archaeological advisor	Written response to proposed scope of terrestrial cultural heritage assets to be included in the assessment of effects on setting. 27 May 2025	<p>Noted that the approach to the selection of assets was generally appropriate and provided a good coverage along the coast, confirming agreement on the assets which were proposed to be scoped in. However, it was commented that there should be greater consideration of non-designated assets and that, in particular, the following non-designated assets should be assessed:</p> <ul style="list-style-type: none"> • Pabbay Bheag, Uig, Lewis (SMR9701) possible prehistoric or early Christian settlement; • Dun a Bheirgh Shawbost (SMR248) prehistoric Dun located on a promontory; • Gearraidh EitaCliet (SMR13210) identified as shielings, but suggested as having potential prehistoric origin; 	The scope of the assessment was amended and a response provided to CnES Archaeology Service on 8 July 2025, either accepting the inclusion or providing further justification for not including an asset. These responses have been incorporated into the scope presented in Appendix 15.2, Volume 2c.

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
		<ul style="list-style-type: none"> Airigh Ghlas (SMR2993) identified as shielings. 	
HES and CnES archaeological advisor	Consultation meeting, 11 December 2024	The geotechnical and geophysical survey specifications were discussed. Acknowledgement that the nature of the depositional environment may result in dispersed wreck remains. HES will not comment on marine non-designated assets from January 2025. Concerns regarding the impact on the Callanish Stones and the onshore prehistoric ritual environment from the offshore components of the Offshore Project. HES and CnES would like to see intangible cultural heritage considered.	The archaeological assessments of the geotechnical survey and geophysical survey is included within the EIAR as appendices (Annex 15.1.2, Volume 2c and Annex 15.1.3, Volume 2c). The assessment of setting impacts on onshore designated heritage, including the Callanish Stones, is present in this EIAR chapter in Sections 15.8.1, and 15.9.3. Intangible cultural heritage is considered in the assessment (in Section 15.8).

15.4 SCOPE OF THE ASSESSMENT

15.4.1 OVERVIEW

15.4.1.1 This section sets out the scope of the EIA assessment for Offshore Archaeology and Cultural Heritage. This scope has been developed as the Offshore Project design has evolved and responds to feedback received to date as set out in Section 15.3.

15.4.2 SPATIAL SCOPE AND STUDY AREA

15.4.2.1 The spatial scope of the Offshore Archaeology and Cultural Heritage assessment is defined as the Array Area and Offshore Cable Area of Search (OCAS), the two of which comprise the Offshore Project Boundary. The Marine Archaeology Study Area (MASA) is comprised of a 2 km buffer from the Offshore Project Boundary up to the Mean High-Water Springs (MHWS) boundary (**Figure 15.1, Volume 2b**).

15.4.2.2 MASA is a defined technical term used for the purposes of archaeological baseline assessment. The term is retained here because "Marine Archaeology Study Area" is standard terminology used across UK offshore wind EIAs, where the study area typically consists of the development footprint plus an additional buffer to account for uncertainty in the location of recorded assets, the potential for unrecorded assets, and to capture offshore cultural heritage and archaeological receptors that may be impacted by potential indirect effects (e.g. hydrodynamic change, seabed change). The

pathways for indirect effects on the archaeological resource (scour, burial, exposure and sediment redistribution) are informed by the outcomes of Chapter 9, including modelled predictions of sediment plume dispersion and deposition patterns presented in Appendix 9.2.

15.4.2.3 The MASA boundary used for this chapter is consistent with the survey extents, the archaeological desk-based assessment (Appendix 15.1), and supporting geophysical and geoarchaeological analyses. While the wider chapter uses the terminology “Offshore Archaeology and Cultural Heritage” for consistency, MASA is intentionally retained as the formal name of the spatial study area.

15.4.2.4 The spatial scope of the Offshore Project impacts on onshore heritage assets has been determined through extensive consultation with HES, which is detailed in Section 2.3 of **Appendix 15.2, Volume 2c**. As a result of this consultation, the spatial scope of the Offshore Project on onshore heritage assets was delineated as heritage assets located up to a distance of 60 km from the Array Area where potential intervisibility has been indicated on the Zone of Theoretical Visibility and on which changes to the setting would potentially have a significant effect.

15.4.3 TEMPORAL SCOPE

15.4.3.1 The temporal scope of the assessment of Offshore Archaeology and Cultural Heritage is the entire lifetime of the Offshore Project, which therefore covers the construction, O&M, and decommissioning phases. The construction phase is anticipated to commence in 2028/2029 and the anticipated worst-case total construction duration for all offshore works is approximately 5 years. The operational lifetime of the Offshore Project is expected to be 35 years. At the end of the operational lifetime of the Offshore Project, it is anticipated that all structures above the seabed will be completely removed. The decommissioning sequence will generally be the reverse of the construction sequence. Further details of the project description is provided in **Chapter 3, Volume 1a**.

15.4.4 POTENTIAL RECEPTORS

15.4.4.1 Historic assets may be subject to potential effects resulting from physical disturbance or from effects arising from change within the setting of a heritage asset.

15.4.4.2 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the Offshore Project. The receptors identified that may experience likely significant effects for Offshore Archaeology and Cultural Heritage are outlined in **Table 15-4**.

Table 15-4 Receptors Requiring Assessment for Offshore Archaeology and Cultural Heritage

Receptor Group	Receptors included within group
Designated onshore and offshore heritage assets	<ul style="list-style-type: none"> • Scheduled monuments; • Listed buildings; • Historical Marine Protected Areas (HMPAs); • Protected wrecks.
Non-designated offshore heritage assets	<p>Archaeological heritage assets comprising wrecks and obstructions data, findspots, features and deposits of archaeological interest, dating to any period. These include both known and previously unrecorded archaeological remains.</p> <p>Palaeolandscape and palaeoenvironmental remains comprising findspots, features and deposits of enabling reconstruction of past environments and landscapes, dating to any period but primarily prehistoric.</p>

15.4.5 POTENTIAL EFFECTS

15.4.5.1 Potential impacts on Offshore Archaeology and Cultural Heritage receptors that have been scoped in for assessment are summarised in **Table 15-5**.

Table 15-5 Activities or impacts scoped into the assessment for Offshore Archaeology and Cultural Heritage

Receptor	Activity or Impact	Potential Effect
Construction		
Designated and non-designated heritage assets	Impact 1: Direct impact (e.g. drilling, foundation construction, seabed levelling, ploughing and cable lay, cable protection, etc.)	The physical impact on offshore heritage receptors would result in a total or partial loss of assets linked to any construction works on maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential.
Designated and non-designated heritage assets	Impact 2: Indirect impact (e.g. vibration from drilling piles, suspended sediment, changes in current leading to scour/erosion or deposition, etc.)	The changes in the hydrodynamics and sediment distribution linked to the construction activities that may uncover or bury any maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential. Scour and exposure of previously partially buried or buried offshore heritage receptors will potentially constitute total loss (depending on the fragility of the asset) or partial loss of offshore heritage receptors through chemical, biological and mechanical degradation.
Designated and non-	Cumulative effects	The installation of the offshore infrastructure and cable route and their associated effects, has the potential to

Receptor	Activity or Impact	Potential Effect
designated heritage assets		generate cumulative effects, which either temporarily or permanently affect Offshore Archaeology and Cultural Heritage assets. Whilst some may be expected to be fully reversible, others such as cable repair may have longer lasting effects.
Operation and Maintenance		
Designated and non-designated heritage assets	Impact 3: Direct Impact (e.g. repairs, inadvertent loss of equipment or material, cable protection replacement)	The physical impact on offshore heritage receptors would result in a total or partial loss of assets linked to, any operations or maintenance works on maritime, aviation or prehistoric sites of known (i.e. identified through records and surveys) or unknown sites of archaeological potential.
Designated and non-designated heritage assets	Impact 4: Indirect impact (e.g. burial or scour/erosion)	The changes in the hydrodynamics and sediment distribution linked to the operations and maintenance activities that may uncover or bury any maritime, aviation, or prehistoric sites of known (i.e. identified through records and surveys) or unknown sites of archaeological potential. Scour and exposure on previously partially buried or buried offshore heritage receptors will potentially constitute total loss (depending on the fragility of the asset) or partial loss of offshore heritage receptors.
Designated and non-designated heritage assets	Impact 5: Direct impacts that affect the setting of Designated and significant non-designated Onshore Archaeology and Cultural Heritage assets as a result of Offshore Project infrastructure	There is the potential that the proposed offshore project infrastructure could have permanent effects on the setting of an onshore historic environment asset, resulting in changes to the understanding, appreciation and experience, and thus the significance of the Onshore Archaeology and Cultural Heritage assets.
Designated and non-designated heritage assets	Cumulative effects	The O&M of the offshore infrastructure and cable route and their associated effects, have the potential to generate cumulative effects, which either temporarily or permanently affect Offshore Archaeology and Cultural Heritage assets. Whilst some such effects may be expected to be fully reversible, others such as the effect of cable repair may have longer lasting effects.
Decommissioning		
Designated and non-designated heritage assets	Impact 6: Direct Impacts (e.g. Foundation Removal, Cable and Cable Protections Removal etc.)	The physical impact on offshore heritage receptors would result in a total or partial loss of assets or removal linked to any decommissioning works on maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential.

Receptor	Activity or Impact	Potential Effect
Designated and non-designated heritage assets	Impact 7: Indirect Impact (e.g. From Suspended Sediment, Changes in Current Leading to Scour Erosion or Deposition, etc.)	The changes in the hydrodynamics and sediment distribution linked to the decommissioning activities that may uncover or bury any maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential. Scour and exposure of previously partially buried or buried offshore heritage receptors will potentially constitute total loss (depending on the fragility of the asset) or partial loss of offshore heritage receptors through chemical, biological and mechanical degradation.
Designated and non-designated heritage assets	Cumulative effects	The decommissioning of the offshore infrastructure and cable route and their associated effects, have the potential to generate cumulative effects, which either temporarily or permanently affect Offshore Archaeology and Cultural Heritage assets. Whilst some may be expected to be fully reversible, others such as cable repair may have longer lasting effects.

15.4.6 ACTIVITIES OR IMPACTS SCOPED OUT OF ASSESSMENT

15.4.6.1 The 2023 Scoping Report scoped out further assessment of direct impacts on offshore heritage assets through changes within their settings during construction and decommissioning, as it was considered that any such impacts would not result in significant effects. This decision was 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. The conclusions follow (in a site-based context) existing best practice. The rationale for the decision is set out in **Table 15-6**.

Table 15-6 Activities or impacts scoped out of assessment

Activity or Impact	Rationale for Scoping Out
Direct impact (visual) (e.g. from offshore infrastructure) on offshore heritage assets at all phases	Offshore heritage assets, due to their location underwater, have limited visual sensitivities from the Offshore Project. Effects on the assets are assessed through other direct and indirect impacts. Onshore assets that are impacted by the Offshore Project through changes to their setting have been assessed in this chapter in Section 15.9 and Appendix 15.2, Volume 2c . The Scottish Ministers, in line with the HES representation, agreed that setting impacts on offshore archaeology and cultural heritage receptors can be scoped out of the EIA in the Scoping Opinion, May 2024.
Direct impact during construction and decommissioning (visual) (e.g. from offshore infrastructure) on onshore heritage assets	Direct effects during construction and decommissioning will occur for a limited duration and as such are considered not significant. As such these have been scoped out.

15.5 METHODOLOGY FOR BASELINE DATA GATHERING AND IMPACT ASSESSMENT

15.5.1 METHODOLOGY FOR BASELINE DATA GATHERING

Overview

15.5.1.1 Baseline data collection has been undertaken to obtain information over the MASA described in Section 15.4.2. The current baseline conditions presented in Section 15.6 sets out data and information currently available from the MASA.

Desk Study

15.5.1.2 The data sources that have been collected and used to inform this Offshore Archaeology and Cultural Heritage assessment are summarised in **Table 15-7**. A offshore archaeological desk-based assessment for the Offshore Project is provided in **Appendix 15.1, Volume 2c**. The assessment includes a detailed desktop review of a number of data sources within the MASA. Details of data limitations are provided in Section 15.5.2.

Table 15-7 Data sources used to inform the Offshore Archaeology and Cultural Heritage Assessment

Source	Date	Summary	Coverage of Study Area
UK Hydrographic Office (UKHO records).	January 2025	Records of known wrecks and obstructions (ships and aviation) within territorial and international waters.	Full coverage of MASA.

Source	Date	Summary	Coverage of Study Area
Historic Environment Scotland designated assets records	January 2025	Records of designated assets (World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventory Gardens and Designed Landscapes, Inventory Battlefields, Historic Marine Protected Areas, Conservation Areas)	Full coverage of MASA (offshore archaeology study area). Full coverage of the spatial scope for the onshore cultural heritage assets potentially impacted by the Offshore Project (see paragraph 15.4.2.4 for spatial scope details).
Canmore (Scottish National Record of the Historic Environment (SNRHE)) maintained by HES.	January 2025	Terrestrial and maritime records, including documented losses of vessels, and records of terrestrial monuments and findspots, including the archaeological excavation index.	Full coverage of MASA. Full coverage of the spatial scope for the onshore cultural heritage assets potentially impacted by the Offshore Project (see paragraph 15.4.2.4 for spatial scope details).
Western Isles Archaeology Service Historic Environment Record (HER) - Clàr Àrainneachd Eachdraidheil nan Eilean Siar.	July 2024	Primary repository of archaeological information. Includes information from past investigations, local knowledge, find spots, and documentary and cartographic sources.	Full coverage of MASA.
The Client and MSDS Marine Limited (MSDS).	July 2024 and January 2025	Unpublished marine geophysical and geotechnical data assessment reports (Annex 15.1.2, Volume 2c and Annex 15.1.3, Volume 2c)	The survey achieved full coverage of the predefined Array Area, and almost full coverage of the OCAS survey area. Coverage and data limitations are discussed more fully in Section 15.5.2.
GeoIndex (Offshore) Map Viewer. British Geological Survey (BGS).	January 2025	Historic borehole logs and the wider geological background for the region.	Full coverage of MASA.
Existing archaeological studies and published sources.	Various	Background information on the archaeology of the Atlantic Ocean, including recent work undertaken in the wider Atlantic Ocean area. Background	Full coverage of MASA, where applicable.

Source	Date	Summary	Coverage of Study Area
		information relating to submerged landscapes within the Atlantic Ocean.	
Scottish Archaeological Research Framework (ScARF)	January 2025	A research resource for Scottish archaeology managed by the Society of Antiquaries of Scotland and grant funded by HES.	Full coverage of MASA, where applicable

Site Surveys

15.5.1.3 The surveys undertaken and used to inform this Offshore Archaeology and Cultural Heritage assessment are summarised in **Table 15-8** and discussed in full in Section 15.5.2.

Table 15-8 Site surveys undertaken

Survey Type	Scope of Survey	Coverage of Study Area
Archaeological Assessment of Geophysical and Hydrographic Data, 2025 (Annex 15.1.2, Volume 2c)	<p>Geophysical survey data were acquired to undertake an archaeological assessment of geophysical and hydrographic survey data. The data were collected by Ondine, on behalf of Aratellus onboard survey vessels <i>Ondine Jule</i> and <i>Glomar Supporter</i> between 15 May 2023 and 6 December 2023. The data acquired included sidescan sonar (SSS), Magnetometer, multibeam bathymetry (MBES), sub-bottom profiler (SBP) and Ultra High Resolution Seismics (UHRS).</p> <p>The marine geophysical survey data was subject to assessment by a qualified and experienced archaeological contractor in accordance with industry good practice as set out in available guidance such as the Historic England Marine Geophysics: Data Acquisition, Processing and Interpretation (Historic England, 2025).</p>	<p>The survey achieved full coverage of the predefined Array survey area, and almost full coverage of the OCAS survey area. Data was not collected to the shoreward extents of the OCAS, due to the depth of water and underwater hazards (see Plates 5-1 to 5-3 in Annex 15.1.2, Volume 2c for the geophysical data extents). Following post-survey revisions to the Array Area and OCAS boundaries, the coverage extends past the Array Area by >1 km and broadly conforms to the OCAS boundary with the exception of the nearshore area discussed.</p> <p>Unsurveyed areas have not been subject to archaeological assessment.</p>

Survey Type	Scope of Survey	Coverage of Study Area
Stage 1 Geoarchaeological Review of Geotechnical Data, 2024 (Annex 15.1.3, Volume 2c)	<p>A desk-based Stage 1 geoarchaeological review of geotechnical data was undertaken in 2024. The geotechnical data comprised 8 boreholes obtained for engineering purposes using a combination of sonic and push core sampling, which were acquired between the 18 July 2023 and 9 September 2023 (illustrated in Figure 15.6, Volume 2b).</p> <p>The 8 geotechnical logs were reviewed by a qualified geoarchaeologist for a Stage 1 geoarchaeological assessment.</p>	8 locations across the Offshore Project.

15.5.2 DATA LIMITATIONS AND ASSUMPTIONS

15.5.2.1 The records held by the UKHO, CnES HER, SNRHE and Canmore Maritime records maintained by HES 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 offshore 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.

15.5.2.2 Due to the nature of offshore archaeological remains, their identification and assessment necessarily require an element of assumption. The nature, extent, survival, and even the precise location, of offshore 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.

15.5.2.3 Designated heritage assets data was downloaded from the HES website and is assumed to be accurate.

Survey Limitations

15.5.2.4 The geophysical survey achieved full coverage of the Array area, and almost full coverage of the OCAS. Data was not acquired to the shoreward extents of the OCAS. Following post-survey revisions to the Array and OCAS boundaries, the coverage extends past the Array by >1 km and broadly conforms to the OCAS boundary with the exception of the nearshore, an area c.2.5 km at the eastern most extents where there is no data coverage (see **Annex 15.1.2, Volume 2c** for full details). Unsurveyed areas have not been subject to archaeological assessment which affects the assessment of impacts to potential receptors within unsurveyed areas by increasing the uncertainty.

Where there is uncertainty due to lack of survey, this has been identified in the assessment and the uncertainty is included within the assessment as part of the key receptor 'unknown archaeological remains from all periods'. Drone LiDAR surveys were undertaken in October 2025 to address the data gap. The survey data has not been archaeologically assessed and is not included within the assessment.

- 15.5.2.5 The magnetometer 100 m line spacing is too great for the accurate positioning of magnetic anomalies at distances away from the tracklines but can indicate areas of archaeological potential and can be correlated with visible features on the seabed that lie on the same plane. Due to this spacing, there is the potential that buried ferrous material, particularly smaller objects, between the run lines will not have been identified within the data.
- 15.5.2.6 The quality of magnetometer data was affected by the underlying igneous geology of the site. The significant magnetic response of the igneous geology can mask the typically smaller responses from any anthropogenic material that may be of archaeological interest, with the exception of large features such as ferrous wrecks.
- 15.5.2.7 The nearshore SBP and UHRS data was found to be poor quality from an archaeological perspective, limited by the shallow bedrock and hard outcrops that affected penetration and resolution.
- 15.5.2.8 Except where restrictions are noted above, the data is considered to be of an appropriate specification, coverage, and quality to undertake a sufficiently robust archaeological assessment to inform the EIA process, noting that additional targeted data collection to inform detailed design stage and archaeological interpretation of any acquired data will be required prior to construction to further refine understanding and account for the data limitations noted.

15.5.3 METHODOLOGY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Introduction

- 15.5.3.1 The project-wide generic approach to assessment is set out in **Chapter 5, Volume 1a**. The following sections provide the assessment methodology used to assess the potential impacts on Offshore Archaeology and Cultural Heritage only.
- 15.5.3.2 A matrix approach as described in **Chapter 5, Volume 1a** has been used to determine the significance of effects, by comparing impact magnitude against receptor value and sensitivity.
- 15.5.3.3 This methodology has been used to assess the construction, O&M, and decommissioning phases of the Offshore Project.
- 15.5.3.4 The methodology for the assessment of impacts within the setting of heritage assets is detailed in **Appendix 15.2, Volume 2c**.

15.5.4 IMPACT ASSESSMENT CRITERIA

Determining Magnitude of Change

- 15.5.4.1 For EIAR, factors generally considered to determine the magnitude of potential impact include the area of influence/spatial extent, duration, frequency, and reversibility of impact. Physical impacts to Offshore Archaeology and Cultural Heritage receptors are not reversible and the spatial extent of the impact is individual to the receptor being impacted. The duration and frequency of an impact is not relevant as all physical impacts to these receptors would be permanent following the initial impact, any recurrence of the impact would cause further damage increasing the magnitude of the impact.
- 15.5.4.2 Judgements on possible spatial extent resulting from indirect impact from scour have been informed by the modelled physical processes described in Chapter 9, which indicate that changes to seabed form and sediment deposition are highly localised and of limited magnitude.
- 15.5.4.3 In relation to Onshore Archaeology and Cultural Heritage assets, the assessment considers the contribution that setting makes to the overall value of the assets. Setting is the way in which an asset is understood and experienced. It is not an asset in itself. It differs from curtilage (historic/present property boundary); context (association with other assets irrespective of distance) and historic character (sum of all historic attributes, including setting, associations, and visual aspects). The determination of magnitude of impact as a result of changes in setting has been undertaken in accordance with guidance provided within the Managing Change Guidance (HES 2020).
- 15.5.4.4 The assessment has considered the physical surroundings of the Onshore Cultural Heritage and Archaeology assets identified, including topography and intervening development and vegetation. It also considers how the assets are currently experienced and understood through their setting, in particular views to and from the assets and the Site, along with key views, and the extent to which setting may have already been compromised. Changes in setting are considered to be potentially reversible but reversibility is not considered a factor in assessing the potential magnitude of impact.
- 15.5.4.5 The criteria for assessing the magnitude of impact from the Offshore Project on Offshore Archaeology and Cultural Heritage receptors is shown in **Table 15-9**.

Table 15-9 Criteria for assessing the magnitude of impact

Magnitude	Adverse Criteria	Beneficial Criteria
High	<p>Impact occurs over a broad spatial extent of the receptor resulting in a total or substantial change to an asset. Loss or disturbance of defining features of the asset.</p> <p>Comprehensive changes to setting of Onshore Cultural Heritage and Archaeology assets such as extreme visual effects, gross change of noise or change to sound quality, or fundamental changes to use or access to the extent that the way in which the asset is understood, appreciated, and/or experienced is fundamentally altered as is the heritage value.</p>	<p>Preservation of a heritage asset in situ where it would otherwise be completely or almost lost.</p> <p>Changes that appreciably enhance the heritage value of an Onshore Cultural Heritage and Archaeology asset and how it is understood, appreciated, and experienced.</p>
Medium	<p>Impact occurs over a medium spatial extent of the receptor resulting in changes to many key archaeological materials or elements, such that the heritage value of the asset is clearly modified.</p> <p>Changes that negatively affect the way in which an Onshore Cultural Heritage and Archaeology asset is understood, appreciated, and experienced to the extent that the heritage value is fundamentally altered.</p>	<p>Changes to important elements of a heritage asset's fabric or setting, resulting in its heritage value being preserved (where this would otherwise be lost) or restored.</p> <p>Changes that improve the way in which an Onshore Cultural Heritage and Archaeology asset is understood, appreciated, and experienced.</p>
Low	<p>Impact occurs over a small spatial extent of the receptor resulting in slight changes to key archaeological materials or elements, such that the heritage value of the asset is slightly altered.</p> <p>Changes that result in a slight decline in the way an Onshore Cultural Heritage and Archaeology asset is understood, appreciated, and experienced to the extent that the heritage value is altered.</p>	<p>Changes that result in the removal of elements of a heritage asset's fabric or setting that slightly detract from its heritage value.</p> <p>Changes that result in a slight improvement in the way an Onshore Cultural Heritage and Archaeology asset is understood, appreciated, and experienced.</p>

Magnitude	Adverse Criteria	Beneficial Criteria
Negligible	<p>Impact is highly localised resulting in changes to archaeological materials or historic buildings elements such that alterations to the heritage value of the asset are barely perceptible.</p> <p>Very minor changes to setting, such as virtually unchanged visual effects, or very slight changes to use or access, which barely change the way in which an Onshore Cultural Heritage and Archaeology asset is understood, appreciated and experienced to the extent that the heritage value is very slightly altered.</p>	<p>Very minor changes that result in the removal of elements of a asset's fabric or setting that detract from its heritage value.</p> <p>Very minor changes that result in a slight improvement in the way an Onshore Cultural Heritage and Archaeology asset is understood, appreciated, and experienced.</p>
No Change	Changes to fabric or setting that leave heritage value unchanged.	

Asset Value

15.5.4.6 In general, receptor sensitivity for EIAR is determined through a combination of value, tolerance, adaptability and recoverability. Offshore and Onshore archaeology and cultural heritage receptors cannot adapt, tolerate, or recover from impacts that affect their physical remains through material damage or loss. Impacts to the setting on Onshore archaeology and cultural heritage receptors can be recovered from following the removal of the development feature causing the impact but the receptors cannot adapt to or tolerate these impacts while the development features remain in situ. Therefore, the sensitivity of Offshore and Onshore archaeology and cultural receptors are quantified by the value of the receptor.

15.5.4.7 The determination of the cultural significance or value of both Offshore and Onshore heritage assets is based on statutory designation and/or professional judgement against the characteristics and criteria expressed in HES Designation Policy and Selection Guidance and the Historic Environment Policy for Scotland (2019a). The MPS states that *“Significance is the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic.”* The statement reflects the definition of significance provided in NPF4 (2023). This policy document adds that *“Cultural significance means aesthetic, historic, scientific or social value for past, present or future generations. Cultural significance can be embodied in a place itself, its fabric, setting, use, associations, meanings, records, related places and related objects”*. The determination of the value is based on statutory designation and/or professional judgement against these value criteria (they are also identified in Historic Environment Policy for Scotland (HEPS) (2019a) and HES Managing Change in the Historic Environment: Setting, 2020).

15.5.4.8 The categories and definitions of heritage value do not necessarily reflect a definitive level of value of an asset. They are intended to provide a provisional guide to the assessment of perceived heritage value, which is ultimately based upon professional judgement that incorporates the value criteria of the receptor. It is important to note that the value and cultural significance of a receptor can be amended or revised as more information comes to light.

15.5.4.9 For the purposes of this assessment, the criteria for determining the heritage value of any relevant heritage assets are described in **Table 15-10**.

Table 15-10 Criteria for assessing the value of heritage assets

Value	Criteria
Very High	This category contains heritage assets that will be considered to be of international value either for historic associations or their informative potential. This category includes World Heritage Sites (including nominated sites) and assets of acknowledged international importance.
High	This category contains heritage assets that will be considered to be of national value either for historic associations or their informative potential. This category includes heritage assets designated as scheduled monuments, listed buildings, protected military remains, protected wrecks and those heritage assets of schedulable quality and value. Also includes palaeoenvironment remains that are either very well-preserved or particularly important for understanding specific periods as well as very well-preserved palaeolandscape features that are important for understanding the nature of landscape change and its impact on human activity.
Medium	Heritage assets of regional value for historic associations or their informative potential. This category includes above ground structures, landscape, townscape, buried remains, well-preserved 'live' wrecks that are not suitable for designation, palaeoenvironmental remains that are typical of a region and palaeolandscape features that are important for understanding the nature of landscape change.
Low	Non-designated heritage assets of local value for historic associations or their informative potential. This category may include above ground structures, landscape, townscape, buried remains, marine debris or less well-preserved marine material, and generally representative archaeological material or feature types.
Negligible	These include those features that are recorded but no longer extant, which are suggestive of further activity but not of intrinsic value (e.g. findspots, records of losses without identified wreck sites, some 'dead' wrecks, isolated finds of debris).

15.5.4.10 The impact assessment methodology adopted for Offshore Archaeology and Cultural Heritage has defined heritage assets likely to be impacted by the Offshore Project and assessed the level of any resulting beneficial or adverse impact regarding their value. The assessment is not limited to direct (physical) impacts but also assesses possible indirect (physical) impacts upon heritage assets that may arise as a result of changes to hydrodynamic and sedimentary processes and changes to the settings of heritage assets, whether visually or in the form of noise, sediment and vibration, spatial associations and a consideration of historic relationships between places, which may impact their significance.

15.5.4.11 Loss or disturbance of known and unknown heritage assets, palaeoenvironmental deposits and historic landscapes has been considered qualitatively in line with the principles set out in the relevant Offshore Archaeology and Cultural Heritage legislation (Section 15.2). The impact assessment criteria are informed by the Environmental Impact Assessment Handbook (Scottish Natural Heritage (SNH) and HES 2018).

Significance

15.5.4.12 Following the identification of the magnitude of impact and receptors' value, it is possible to determine the significance of effect. The matrix provided in **Table 15-11** has been used to define the significance of the effects identified and apply to both beneficial and adverse effects. This matrix differs from the matrices in Chapter 5 to allow for the inclusion of the 'Very High' category of Value which is included for receptors of international importance.

15.5.4.13 For the purpose of this assessment, significance of effects of moderate or greater are potentially significant in the context of the EIA Regulations and are highlighted in **Table 15-11**.

Table 15-11 Significance of effect

Consequence of effect		Value				
		Negligible	Low	Medium	High	Very High
Magnitude of Change/Effect	No change	Neutral	Neutral	Neutral	Neutral	Neutral
	Negligible	Neutral	Negligible	Negligible	Negligible	Minor
	Low	Negligible	Negligible	Minor	Minor	Moderate
	Medium	Negligible	Minor	Moderate	Moderate	Major
	High	Negligible	Minor	Moderate	Major	Major

15.6 BASELINE CONDITIONS

15.6.1 CURRENT BASELINE

Desk Study

15.6.1.1 Baseline information presented in this section on Offshore Archaeology and Cultural Heritage is a summary of the desk-based study and surveys undertaken within the MASA summarised in **Table 15-6**. Reference numbers included as (HA1, HA2 etc) refer to numbers included in the gazetteer (**Appendix 15.1, Volume 2c**) and shown on **Figure 15.2, Volume 2b**.

Geology and Palaeolandscapes

15.6.1.2 The underlying bedrock within the Offshore Project Boundary is comprised of the Lewisian Gneiss predominantly in the southeast and covering most of the proposed corridor area, and ironstained flowbanded Basalt to the northwest covering most of the proposed Array Area (BGS 2025) (**Figure 15.3, Volume 2b**). Geotechnical investigation and sub-profiler assessment within the Offshore Project Boundary show that gravels with a high density of boulders overlie the bedrock across much of the Array Area, with sands in patches within the southwest and northeast of the Array. The corridor area is largely characterised by outcropping bedrock with distinct gullies extending from the shore, with some sands and gravels. For a full discussion of the geotechnical results and the palaeolandscapes assessment results see **Annex 15.1.2, Volume 2c** and **Annex 15.1.3, Volume 2c**.

15.6.1.3 The MASA was impacted by the advance and retreat of the last British–Irish Ice Sheet (BIIS) during the main ‘Late Weichselian’ (Devensian) glaciation (c. 2611.7 kiloannum (ka) Before Present (BP)). Prior to this, there are indications that the BIIS was also present in the northwest sector between ~4438 ka BP, and ~3230 ka BP (Bradwell *et al.*, 2021). Numerous stages of deglaciation subsequently took place in the northwest sector between ~2825 ka BP, indicated by ice-retreat features and ice-marginal sediments deposited close to the present-day coastline.

15.6.1.4 Available data has indicated that the majority of the MASA is characterised by pre-Quaternary bedrock close to, or at, the seabed, with <5 m Quaternary cover. A discrete increase of the Quaternary thickness (>50 m) is seen in the centre of the Array Area, thought to contain Pleistocene glaciomarine sediments laid down by retreating glaciers, which are unlikely to contain archaeological material. Nearer the inshore there is potential for submerged post-glacial landscapes, where preservation allows. Instances of intertidal peat deposits and buried tree stumps have been recorded along the western shores, particularly around the more sheltered shores of North Uist/*Uibhist a Tuath*.

Palaeolandscapes assessment of sub-bottom profile data

15.6.1.5 The analysis of the features and characteristics of the seabed is detailed in **Annex 15.1.2, Volume 2c** of the EIAR and summarised in this section.

15.6.1.6 The data demonstrates relatively thin sediment cover across the Offshore Project, with the exception of 2 deep basins of sediment identified where depths extend to c. 110 m. The basins are interpreted to be Late Glacial to Early Holocene Annie Formation and are identified incising Unit H4. Evidence of former glaciers in the form of seabed moraines are also visible in the MBES data and have been mapped and interpreted by Bradwell *et al*, (2021) and likely represent the path of the retreating Devensian glaciers (**Figure 15.3, Volume 2b**).

15.6.1.7 The geophysical assessment also identified 2 locations of possible palaeoenvironmental potential identified without the use of seismic data, a probable former channel and the area in the lee of a likely former bedrock 'island' at the mouth of the aforementioned channel illustrated on Plate 10-10 in **Annex 15.1.3, Volume 2c**.

Archaeological and Historical Background

15.6.1.8 The full archaeological and historical background of the Offshore Project and Study Area, and descriptions of the heritage assets that form the baseline for the cultural heritage assessment, are provided in **Appendix 15.1, Volume 2c** of the EIAR (inclusive of gazetteer), and the locations are shown in **Figure 15.2, Volume 2b** of the EIAR.

15.6.1.9 The reference numbers (A1, A2, etc.) on **Figure 15.2, Volume 2b** and used in the background correspond to the reference numbers given by WSP within the Offshore Historic Environment Gazetteer (**Annex 15.1.1, Volume 2c**). A summary of the assets identified and assessed as part of the desk-based assessment is presented in the next section.

Desk-Based Assessment Assets Summary

15.6.1.10 There are no designated heritage assets located within the Offshore Project Boundary.

15.6.1.11 The desk-based assessment has identified 45 non-designated assets within the MASA and 1 non-designated asset within the Offshore Project Boundary (**Figure 15.2, Volume 2b**). The single non-designated asset within the Offshore Project Boundary is a wreck record for the *Maju* (Canmore ID 217551), a mid-19th century iron ship, that wrecked in 1874 while carrying a cargo of coal. Records suggest that the wreck was partially broken up during the wrecking process with 6 of the reported 24 crew on board washing up on the coast of Isle of Lewis/*Eilean Leòdhais*, although all hands were considered lost (Whittaker, 1998). The location for the wreck is considered to be tenuous as it has not been identified by geophysical survey. The historic records for the *Maju* state that the hull of the ship was not recovered but was observed in the 19th century a short distance from the shore in the relative position provided in the Canmore data. Given the nature of the offshore environment and limitations of the magnetometer data, there is potential for remains of this wreck to be present within the Offshore Project Boundary and therefore has been retained in the assessment.

Seabed Features Assessment Summary

15.6.1.12 MSDS undertook an archaeological assessment of geophysical and hydrographic survey data acquired by Ondine Limited (Ondine), on behalf of Aratellus Subsea Solutions PTE Limited (Aratellus), in 2023. The analysis of the seabed features identified during the assessment is detailed in **Annex 15.1.2, Volume 2c** of the EIAR and summarised in this section.

15.6.1.13 Identified anomalies have been assigned an archaeological potential rating summarised below and fully explained in **Annex 15.1.2, Volume 2c**.

- Low – small features, often boulder-like, or likely to represent modern debris such as chain, cable, or rope, or small items of potential debris with no features indicating archaeological potential;
- Medium - characteristics that indicate a likelihood of representing anthropogenic material that has the potential to be of archaeological interest, or where a precautionary approach has been taken;
- High - of anthropogenic origin and with a high potential of being of archaeological significance – high potential anomalies tend to be the remains of wrecks, the suspected remains of wrecks, or known structures of archaeological significance.

High- or medium-potential anomalies are treated as possible archaeological receptors where avoidance or further investigation may be required, whereas low-potential anomalies have a reduced likelihood of containing archaeological material. The value of the potential anomalies cannot be determined without further archaeological investigation to ascertain the nature and survival of the potential remains. To ensure that the magnitude of impact is minimised, high- or medium-potential anomalies are considered to contain high or medium value remains for the purposes of this assessment as a worst-case scenario.

15.6.1.14 A total of 25 seabed features of archaeological potential were identified in the archaeological assessment of geophysical survey data, of which 9 are within the Array Area and 6 within the OCAS. The remaining 7 anomalies are located within the Offshore Project Boundary and 3 are located outside the Offshore Project Boundary but within the data extents. These are discriminated as shown in **Table 15-12** and illustrated in **Figure 15.4, Volume 2b**.

Table 15-12 Anomalies of archaeological potential within the Offshore Project Boundary

Potential	Total Number in Offshore Project Boundary
Low	19
Medium	3
High	0

15.6.1.15 Of the 22 seabed features identified within the archaeological assessment of the geophysical data, 5 are located within the Array Area (AA) and the OCAS of the Offshore Project Boundary and are

considered to be of possible anthropogenic origin. An archaeological exclusion zone (AEZ) has been assigned to each based on their archaeological potential rating and description in **Annex 15.1.2, Volume 2c**, medium potential anomalies have been assigned a 50 m AEZ and low potential anomalies described as potential debris a smaller 25 m AEZ (illustrated in **Figure 15.5**). The Offshore Project adopted a 25 m AEZ around low potential anomalies described as debris as the high-energy environment of the Offshore Project reduces the likelihood of remains surviving intact and this would increase the likelihood that any dispersed material is preserved in situ. The determined AEZs are detailed in **Table 15-13**.

15.6.1.16 For assessment purposes, AEZs form part of the project’s embedded mitigation (M008) and are assumed within the assessment. While AEZs did not define the Project Description parameters, they are fully compatible with the MDS and will be applied during detailed design via micro-siting in accordance with the Offshore WSI and PAD, with final extents to be agreed with the regulator.

Table 15-13 Proposed Archaeological Exclusion Zones

ID Number	Classification	Easting	Northing	Exclusion Zone
SP24_002	Potential debris	641892.3	6477178.4	25 m radius
SP24_009	Potential debris	638087.4	6474402.9	25 m radius
SP24_020	Potential debris	635544.3	6481415.6	50 m radius
SP24_021	Potential debris	636124.4	6481361.2	25 m radius
SP24_026	Mound	628322.9	6474615.5	50 m radius

Setting Assessment

15.6.1.17 There are 38 scheduled monuments, 5 listed buildings and 3 non-designated heritage assets that have been taken forward for the setting assessment. The scope of the assessment is detailed in **Appendix 15.2, Volume 2c**. The scheduled monuments include prehistoric burial cairns, stone circles, including the complex at Calanais or Callanish, standing stones and settlements and brochs or duns. There are also sites of medieval settlement activity and chapels. The listed buildings consist of 3 chapels and 2 lighthouses, while the non-designated assets include a promontory fort, sheiling huts and a World War I observation post.

Likelihood for further archaeological remains

Palaeolandscapes and Palaeoenvironmental

15.6.1.18 The Offshore Project has a moderate likelihood that archaeological remains of palaeolandscapes are present. Palaeolandscape remains, including landforms and deposits, have evidential value for the past environment in which prehistoric and later people lived, and would be of up to medium heritage value, derived from archaeological and historical interest, depending upon their survival and extent.

15.6.1.19 The likelihood for palaeoenvironmental remains within the Offshore development is limited to the nearshore and intertidal areas and is not entirely clear as these areas have not been surveyed. Evidence from other areas of the coast and near shore in the Outer Hebrides/*Na h-Eileanan Siar* suggests remains are moderately likely. Peat deposits, if present, would be of up to medium heritage value.

Prehistoric

15.6.1.20 The Offshore Project has a low likelihood to contain Palaeolithic remains. Remains of lithic material would be of low value if comprised of isolated lithic remains, or of medium value if comprised of lithic scatters, derived from their archaeological interest.

15.6.1.21 The Offshore Project Boundary has a moderate likelihood to contain Mesolithic remains. 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 of low value if comprised of isolated lithic remains or of medium value if comprised of lithic scatters, derived from their archaeological interest.

15.6.1.22 The Offshore Project Boundary has a moderate likelihood to contain evidence of marine resource exploitation during the Neolithic, Bronze Age and Iron Age. 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

15.6.1.23 It is not likely that the Offshore Project Boundary will contain Roman remains as there is no evidence of Roman activity in Isle of Lewis/*Eilean Leòdhais* or the wider Outer Hebrides/*Na h-Eileanan Siar*. If present, evidence of Roman activity within the Outer Hebrides/*Na h-Eileanan Siar* would be of up to very high value, derived from their archaeological and historical interest, given the common understanding that Roman activity did not extend to this area. Evidence of Roman trade goods, likely in the form of isolated remains, would be of low value, derived from their archaeological interest.

Medieval

15.6.1.24 The Offshore Project Boundary has a moderate likelihood to contain medieval remains. If present, remains of medieval ships are unlikely but would be of high value derived from their archaeological and historical value. 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

15.6.1.25 The Offshore Project Boundary has a high likelihood to contain post-medieval remains. Any remains of early post-medieval ships that are present would be potentially of high value, derived from their archaeological and historical interest. Remains of later wooden and iron post-medieval ships would be of high or medium value, depending on type, preservation and extent, derived from their archaeological and historical interest. Early steel shipwrecks would likely be of medium value significance depending on type, preservation and extent, derived from archaeological value. Isolated remains would be of low value derived from archaeological and historical interest.

Modern

15.6.1.26 The Offshore Project Boundary has a moderate likelihood to contain modern remains. Remains of modern shipwrecks would likely be of medium value, derived from archaeological and historical interest. 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 low value, derived from archaeological interest.

15.6.2 FUTURE BASELINE

15.6.2.1 The EIAR requires an outline of the likely evolution of future baseline conditions on Offshore Archaeology and Cultural Heritage, in the absence of the Offshore Project.

15.6.2.2 The existing environment for Offshore Archaeology and Cultural Heritage as set out above 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 offshore 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.

15.6.2.3 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.

15.6.2.4 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.

15.6.2.5 Any future marine infrastructure projects within the Study Area will have the potential to cause adverse direct impacts on 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.

15.7 BASIS FOR ENVIRONMENT IMPACT ASSESSMENT

15.7.1 MAXIMUM DESIGN SCENARIO

- 15.7.1.1 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 consent applications. The assessment of the maximum design scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance would not arise should any other development scenario (as described in **Chapter 3, Volume 1a**) to that assessed within this chapter be taken forward in the final scheme design.
- 15.7.1.2 The maximum parameters and assessment assumptions that have been identified to be relevant to Offshore Archaeology and Cultural Heritage are outlined in **Table 15-14** and are in line with **Chapter 3, Volume 1a**.
- 15.7.1.3 Although pre-construction surveys may involve some limited and temporary interactions with the marine environment, the potential impacts of any such activities fall well within the MDS parameters assessed for this chapter. The MDS includes activities such as WTG foundation drilling and grouting, and Offshore Cable installation which represent a conservative upper bound on seabed disturbance, and vessel presence. These MDS activities therefore encompass the environmental footprint of pre-construction survey methods, which are significantly lower in magnitude, duration, and spatial extent.
- 15.7.1.4 For this reason, the potential environmental interactions of pre-construction surveys are not separately assessed, as they are already inherently accommodated within the worst case assumptions underpinning the MDS for this topic.
- 15.7.1.5 The difference in timing between pre-construction surveys and construction activities does not affect the assessment because the MDS represents the maximum magnitude of change, independent of phasing or scheduling. The pre-construction surveys occur over a much shorter duration and at materially lower intensities than the MDS bounding activities, and therefore do not introduce any temporal additive effects beyond those already assessed.

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Table 15-14 Maximum Design Scenario considered for impacts on Offshore Archaeology and Cultural Heritage

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
Construction			
<p>Impact 1: Direct impact (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.).</p> <p>Potential for total or partial loss or disturbance of offshore heritage receptors through removal or truncation of remains during seabed preparation works, trench and pit excavation, pile drilling, and activities within the water column.</p>	<p>The total seabed disturbance from all components of the Offshore Project is: 12,480,875 m² (12.481 km²). This includes:</p> <p>Total seabed disturbance from WTG boulder clearance and foundation installation:</p> <ul style="list-style-type: none"> • Area required for Jack up vessel installation for up to 60 WTGs; • Hybrid Gravity Base (HGB) foundations; • Number of JUV placements per WTG: 2. <p>Seabed footprint:</p> <ul style="list-style-type: none"> • Seabed disturbance per WTG boulder clearance (area includes for WTG foundation template, JUV placement and clearance): 60,000 m²; • Total seabed disturbance for WTG boulder clearance: 60,000 m² x 60 = 3,600,000 m² (3.6 km²). <p>Offshore Cable boulder clearance disturbance:</p> <p>Seabed disturbance associated with installation of up to Array Cables and Array Cables to Landfall for Scenario 2 (Onshore Landfall Substation):</p> <ul style="list-style-type: none"> • Maximum length of cables: 350 km; • Maximum seabed disturbance corridor width: 25 m; • Installation method: surface lay (across 100% of cable); • Total seabed disturbance for Offshore Cable boulder clearance: 350 km x 25 m = 8,750,000 m² (8.75 km²). <p>Construction vessel anchorage disturbance</p> <p>Anchored vessels may be utilised during the installation of the Offshore Cables. Assumes six-point mooring system with 3 m² anchors deployed every 500 m of cable.</p> <ul style="list-style-type: none"> • Maximum seabed footprint per anchor: 3 m²; • Maximum number of anchor drops: 700; • Maximum seabed footprint: (3 m² x 6) x 700 = 126,000 m² (0.126 km²). <p>Exit Pit Construction:</p> <p>Seabed disturbance associated with HDD exit pits for Scenario 2 (Onshore Landfall Substation).</p> <ul style="list-style-type: none"> • Number of exit pits: excavation of up to 13 HDD exit pits (12 plus 1 spare) by rock cutting or grinding; 	<p>N/A</p>	<p>Seabed preparation has the potential to result in truncation or removal of offshore cultural heritage receptors.</p> <p>The parameters represent the maximum footprint and activities that could cause direct impact to Offshore Archaeology and Cultural Heritage during the construction phase.</p> <p>Total seabed disturbance area has been calculated based on Scenario 2 (without an OSP) and up to 12 Array Cables to Landfall due to the greater amount of disturbance (when compared to Scenario 1 with OSP and 2 Export Cables).</p> <p>Total seabed disturbance area has been calculated based on the greatest number of WTGs (up to 60) with Multi-leg Jacket Foundations as they are considered to have the greater potential impact on Offshore Archaeological Assets due to greater seabed penetration depth and disturbance footprint than Hybrid Gravity Foundations.</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
	<ul style="list-style-type: none"> Exit pit area: 75 m x 5 m = 375 m²; Total seabed disturbance for HDD exit pit: 375 m² x 13 = 4,875 m² (0.004875 km²). <p>The depth of seabed disturbance depends on the activity. The maximum for each activity is:</p> <p>Scenario 2: Installation of up to multi-leg jacket foundations with pin piles via percussive piling or drilling and grouting within the Turbine Area to support up to 60 WTGs.</p> <ul style="list-style-type: none"> Number of piles per and spacing: Each multi-leg jacket pile foundation will have up to 4 legs (1 pin pile per leg), each spaced 30-55 m apart at seabed level and 15-35 m apart at MSL; Installation depth: Pin piles will be installed (via percussive piling or drilling) below the seabed to a depth of 15-120 m. <p>Scenario 2: installation of up to x12 Array Cable to Final WTG (within Array Area) and up to x12 Array Cables to Landfall (within OCAS) via ploughing, jet trenching, or mechanical cutting.</p> <p>Cable Length:</p> <ul style="list-style-type: none"> Array Cables to Final WTG have a maximum length of 160 km; Array Cables to Landfall have a maximum length of 190 km; Maximum length of Array Cables is therefore 350 km and maximum diameter of 300 mm. <p>Cable size:</p> <ul style="list-style-type: none"> A maximum width of 10 m and depth of 2 m; <p>Number of Exit Pits: Excavation of up to 13 HDD exit pits by rock cutting or grinding;</p> <ul style="list-style-type: none"> HDD Exit pit size: maximum size of 75 m length x 5 m width x 3.5 m depth. 		<p>Seabed preparation has the potential to result in truncation or removal of offshore cultural heritage receptors.</p> <p>The parameters represent the maximum depth of activities that could cause direct impact to Offshore Archaeology and Cultural Heritage during the construction phase.</p> <p>Depth of disturbance has been calculated based on Scenario 2 (without an OSP) and up to 12 Array Cables to Landfall due to the greater amount of disturbance (when compared to Scenario 1 with OSP and 2 Export Cables).</p> <p>Disturbance area has been assessed based on the greatest number of WTGs (up to 60) with multi-leg jacket foundations as this has the greatest installation depth.</p>
<p>Impact 2: Indirect Impact (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.).</p>	<p>Installation of the Offshore Project infrastructure (inc. WTGs, Offshore Cables, HDD Exit Pits) will result in the release of marine sediments into the water column and subsequent sedimentation. The maximum design scenarios are outlined in the below rows:</p> <p>WTG Foundation Installation: Scenario 2 (60 WTGs and 12 Array Cables to Landfall): the installation of up to 60 multi-leg jacket foundations with pin piles via drilling and grouting within the Turbine Area to support WTGs.</p>	<p>Drilling of Pin Piles to Install WTG Foundations modelling: modelling results of pin pile drilling activities to install WTG Foundations are presented in Appendix 9.2, Volume 2c and were used to inform this impact assessment;</p>	<p>Scenario 2 (60 WTGs and 12 Array Cables to Landfall): represents the largest spatial extent of infrastructure and greatest volume of potential sediment disturbance during the construction phase.</p> <p>Number of piles per WTG and spacing: The resolution of the model mesh is not small enough for a spacing of sediment sources 30-55 m apart to</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
<p>Direct disturbance of sediments may lead to deteriorate of receptors exposing remains to mechanical and chemical degradation or destroy relationships between offshore heritage features and their stratigraphic context.</p>	<p>Number of piles per WTG and spacing: Each multi-leg jacket pile foundation will have up to 4 legs (1 pin pile per leg), each spaced 30-55 m apart at seabed level and 15-35 m apart at MSL;</p> <p>Pin pile diameter: Each pin pile will have a maximum diameter of up to 5 m;</p> <p>Drilling depths: Pin piles will be drilled below the seabed to a depth of 15-120 m, depending on location within the Turbine Area (i.e. whether it is inside or outside the buried channel);</p> <p>Volume of drill arisings: Per pin pile is 588 m³, and 141,120 m³ for all 60 turbine multi-leg jacket foundations (assuming a 30 m average depth per drill event).</p>	<p>Volume of drill arisings: 4 piles per foundation are modelled in one location; with a volume of 1,374 or 2,356 m³/pile/day (for foundation depths of 70 m and 120 m, respectively);</p> <p>Concurrent pile drilling events: The model assumes that 3 pile drilling events will occur concurrently;</p> <p>Maximum pile depth assumption: Maximum depth of piles within the buried channel (deeper sections of seabed substrate within the Turbine Area) is 120 m and elsewhere within the Turbine Area it is 70 m;</p> <p>Tidal modelling assumption: A neap-spring tidal cycle is modelled with pile installation at the northeastern/southwestern extents of the Turbine Area;</p> <p>Sediment release: Sediment plumes associated with foundation installation construction activities are assumed to be limited to 2 m from the seabed (see justification in Section 2.3.3.2 Appendix 9.2, Volume 2a).</p>	<p>influence the results. Therefore, spacing parameters were not included in the model, this ensures a reasonable computational run time.</p> <p>Concurrent pile drilling events: 3 piles are modelled simultaneously, with the single remaining pile for this location modelled on its own, which represents the maximum design scenario.</p> <p>Maximum pile depth and diameter assumption: Maximum pile depths and diameter have been modelled to ensure a worst-case volume of sediment disturbance.</p> <p>Volume of drill arisings: Maximum design scenario volume of drill arisings per pin pile value is based on a 30 m average embedment depth. Modelling has used depths of 70 m and 120 m to reflect the maximum depths pin piles will be buried e.g. in the buried channel representing worst case.</p> <p>Tidal modelling assumption: A neap-spring tidal cycle has been modelled to allow for an adequate range of tidal levels and current representation in the modelling exercise. Modelled locations at the edge of the Turbine Area shows the maximum extent of sediment disturbance outside the Offshore Project Boundary.</p> <p>Sediment release: Sediment disturbed by project construction activities is assumed to be released from within 2 m of the seabed. This assumption enables a conservative assessment of the concentration of the total suspended sediments and subsequent sediment deposition thickness (see Section 2.3.3, Appendix 9.2, Volume 2c).</p>
	<p>Array Cable Installation: Scenario 2 (60 WTG and 12 Array Cables to Landfall): the installation of 12 66 kV Array Cable to Final WTG (within Array Area) and 12 66 kV Array Cables to Landfall (within OCAS) via jet trenching.</p> <p>Array Cables:</p> <ul style="list-style-type: none"> • Array Cables to Final WTG have a maximum length of 160 km; • Array Cables to Landfall have a maximum length of 190 km; • Maximum length of Array Cables is therefore 350 km and maximum diameter of 300 mm. <p>Installation method:</p>	<p>Array Cable burial modelling: modelling results of Array Cable burial activities are presented in Appendix 9.2, Volume 2c and were used to inform this impact assessment.</p> <p>Sediment release: Assumes Array Cables will be installed at 300 m/hr with 20% of sediment released into the water column.</p>	<p>Scenario 2 (60 WTGs and 12 Array Cables to Landfall): equates to the greatest length (350 km) of Array Cables to be installed and greatest area of potential sediment disturbance during the construction phase.</p> <p>Installation method: jet trenching is the worst-case cable installation method as the sediment release is likely to be at a greater height above the seabed (than the other Array Cable burial methods) where current speeds are higher and therefore sediment has the potential to be dispersed over a greater distance (see paragraph 9.7.1.2 in Chapter 9, Volume 2a for further details).</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
	<ul style="list-style-type: none"> Assumes 60% of cable length (210 km) requires installation via jet trenching; Jetting trench has a maximum width of 7 m and depth of 2 m. Seabed disturbance footprint from jet trenching is anticipated to be approximately 1.47 km². <p>Site Preparation:</p> <ul style="list-style-type: none"> Assumes 60% of cable length (210 km) requires boulder clearance to facilitate jet trenching; Boulder clearance width of 15 m. Seabed disturbance footprint from boulder clearance is anticipated to be approximately 3.15 km². 		<p>Jet trenching extent: Jet trenching 60% of the Offshore Cable length represents a worst case-scenario as it is the maximum amount of jet trenching that could be undertaken to install the Array Cables.</p> <p>Sediment release: Speed and percent of sediment released are reasonable worst-case values based on similar assessments. See Table 2-3 in Appendix 9.2, Volume 2c for details on sediment mass flux in different locations within the Study Area.</p> <p>Seabed Preparation: The potential impacts of seabed preparation activities, including boulder clearance using a boulder plough or boulder grab, were considered as part of the identification of the maximum design scenario for the Physical and Coastal Processes assessment. These activities were reviewed alongside the full range of potential cable installation methods.</p> <p>As outlined in Section 9.7.1.2 in Chapter 9, Volume 2a, a comparison of ploughing, jetting and mechanical cutting indicated that jet trenching would result in the greatest sediment disturbance and seabed change, due to the volume of sediment mobilised.</p> <p>On this basis, jet trenching was selected as the basis for the modelling assessment as it represents a conservative worst-case scenario for sediment mobilisation associated with either cable installation or seabed preparation activities.</p> <p>The potential impacts of seabed preparation are therefore inherently encompassed within the modelling of jet trenching, which captures the upper bound of sediment disturbance and seabed change that could reasonably arise from these activities. Separate modelling of seabed preparation is not required, as it would not result in impacts greater than those already assessed under the maximum design scenario.</p>
	<p>Exit Pit Construction: Excavation of up to 13 HDD Exit Pits by rock cutting or grinding.</p> <p>Sediment volume:</p> <ul style="list-style-type: none"> Maximum volume of sediment excavated per HDD Exit Pit: 75 m length x 5 m width x 3.5 m depth = 1,312.5 m³; Maximum volume of sediment excavated from all 13 exit pits is 17,062.5 m³. 	<p>HDD activities modelling: modelling results of HDD activities are presented in Appendix 9.2, Volume 2c and were used to inform this impact assessment.</p> <p>Sediment types: Assessment considers range of sediment sizes which could be released by rock cutting or grinding.</p>	<p>Number of Exit Pits: 13 exit pits equate to 1 per each of the 12 Array Cables and an additional contingency exit pit to account for exit pit collapse, reflecting the maximum number of exit pits the Offshore Project may construct.</p> <p>Sediment types: The methods (cutting or grinding) for constructing the HDD exit pit construction may release fine or coarse sediment into the water column. There is also uncertainty around sediment properties in the Exit Pit Area and therefore it is appropriate to assess a range of sediment sizes. Coarse and fine sediments behave in different ways and so represent a worst-case for different situations (for example finer sediments can be advected over</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
			<p>a greater distance by currents, however coarser sediments will settle in smaller areas with larger deposition thicknesses).</p> <p>Sediment volume: Represents greatest volume of sediment that could be released into the water column during the excavation of a single exit pit. The HDD drill cutting release models a similar volume of sediment release for fine sediment in the same location and likewise with Array Cable trenching for coarse sediment.</p>
Operation and Maintenance			
<p>Impact 3: Direct Impact (e.g. Repairs, Debris, Cable protection).</p> <p>Truncation or removal of offshore heritage receptors due to seabed disturbance as a result of maintenance activities, anchor deployment, and vessel movements.</p>	<p>Total temporary direct impact from all components of the Offshore Project: 27,610,800m² (27.610km²)</p> <p>The temporary impact during operation and maintenance includes major/minor component replacement and repairs, scheduled inspections and unscheduled maintenance of offshore infrastructure, with repairs and replacement required on an ad hoc basis. Maintenance activities are expected to occur with a lower intensity than those during construction. It is assumed that Array Cables will require reburial/protection up to 6 times across the Offshore Project lifetime, and will be repaired or replaced up to 9 times across the Offshore Project lifetime.</p> <p>It is estimated that the maintenance activities will require:</p> <p>WTG direct impact:</p> <ul style="list-style-type: none"> Major component replacements: up to x3 per WTG over lifetime (180 total); Minor component replacements: up to x10 per WTG per year (21,000 total); Seabed disturbance per replacement using Jack Up Vessel: Area of spun cans (280m²) x number of positions (2) = 560m²; Total short term seabed disturbance of WTGs: 21,180 x 560m² = 11,860,800m² (11.860km²). <p>Offshore Cables direct impact:</p> <ul style="list-style-type: none"> Repair and replacement of Offshore Cables required: up to 9 times during lifetime; Seabed disturbance for Offshore Cables (as per construction): 1,750,000m² (1.75km²); Total short term seabed disturbance of Offshore Cables: 9 x 1,750,000m² = 15,750,000m² (15.750km²). <p>Potential anchor drops based on total O&M vessel movements:</p>	<p>Potential Anchor drops based on Total O&M Vessel Movements (Return Trips) (Total for lifetime of Offshore Project): Assumed that there will be 1 anchor drop per return trip.</p>	<p>The parameters represent the maximum footprint and activities that could cause direct impact to Offshore Archaeology and Cultural Heritage during the operation and maintenance phase.</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
	<ul style="list-style-type: none"> Up to 10 operational and maintenance vessels on site simultaneously; Up to 32,034 total lifetime (return trips). <p>Operational and maintenance programme: Duration is up to 35 years.</p>		
<p>Impact 4: Indirect Impact (e.g. Burial or Scour/Erosion).</p> <p>Potential for indirect impacts through changes in sediment dynamics or exposure of previously buried remains, affecting preservation and contextual integrity.</p>	<p>Scenario 2 (60 WTG and 12 Array Cables to Landfall): the presence of up to 60 WTGs with hybrid multi-leg jacket gravity base foundations.</p> <p>Foundation type and scour protection:</p> <ul style="list-style-type: none"> Hybrid multi-leg jacket gravity base foundations have a maximum seabed footprint per foundation of 105 x 105 m;. Equating to a total area of 661,500 m²; Each hybrid multi-leg jacket gravity base foundations will have up to 24,000 m³ of scour protection. Equate to a maximum volume of 1,440,000 m³. <p>Array Cables:</p> <ul style="list-style-type: none"> Cable length: 12 Array Cables to Final WTG (within the Array Area) and 12 Array Cables to Landfall (within the OCAS) equating to a maximum cable length of 350 km; Installation method: Installation of 100% of Array Cable length via surface lay technique meaning Array Cables are present on the seafloor. <p>Array Cable protection and stabilisation:</p> <ul style="list-style-type: none"> Cable stabilisation: Pre lay carpet will have a maximum width of 5 m, height of 0.3 m and volume of 1,130,000 m³; Cable protection: will be achieved using rock berms, rock bags, concrete mattresses or other inert material and will have a maximum width of 3 m, height of 1.1 m and volume 2,600,000 m³; Total volume cable stabilisation and protection: maximum total volume of material on seabed for cable stabilisation and cable protection combined is 3,730,000 m³. <p>Operation and maintenance programme: duration up to 35 years.</p>	N/A	The parameters represent the greatest number of proposed obstructions and changes on the seabed that could cause or perpetuate scour that could cause indirect impact to Offshore Archaeology and Cultural Heritage during the operation and maintenance phase.
<p>Impact 5: Direct Impacts that Affect the Significance of Assets Caused by Changes to the Setting of Designated and Significant Non-</p>	<p>Visual changes to the setting of onshore designated cultural heritage receptors during the operation phase of the Offshore Project. This includes:</p> <p>Scenario 1 (WTGs with OSP), consisting of:</p> <p>WTGs:</p> <ul style="list-style-type: none"> Larger WTG type: no 44 WTGs; 	N/A	The parameters represent the maximum influence of construction of the WTGs in the Turbine Area that will potentially affect onshore cultural heritage receptors during the operational phase.

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
Designated Onshore Archaeology and Cultural Heritage Assets	<ul style="list-style-type: none"> • Blade tip height above MSL: 338.4 m; • Rotor diameter: 280 m; • Hub height: 198.4 m; • No. of blades per WTG: 3. <p>OSP:</p> <ul style="list-style-type: none"> • Maximum number of OSPs: 1; • Topside structure length and width: 70 m x 70 m; • Height of top of main structure: 90 m above MSL; • Number of legs per foundation: 8; • Diameter of jacket leg: 6 m; • Jacket leg spacing (at surface): 40 m. 		
	<p>WTG lighting to meet aviation and navigation requirements, including:</p> <p>Aviation lights: Red medium intensity aviation warning lights (2,000 candela (cd)) located on either side of WTG nacelle of all peripheral WTGs. Sensor controlled dimming when visibility is >5 km in all directions, brightness of lights reduced to 200 cd (10% of normal intensity). Angle of the plane of the beam of peak intensity emitted by the light must be elevated to between 3-4 degrees above the horizontal plane (as per Air Navigation Order 2016).</p> <p>Marine navigation lights: fitted at platform level on external platform of significant peripheral structures (SPS). Each SPS will have 360° visibility, with synchronised flashing IALA special mark characteristics (Fl.Y.5 s) and range of not less than 5 nautical miles (nm).</p> <p>ID marker board lighting: all structures lit with low-level baffled lighting with a mean luminance between 5-10 candela, controlled remotely.</p>	N/A	<p>The parameters represent the maximum WTG lighting that may potentially affect onshore cultural heritage receptors at night during the operational phase.</p> <p>The aviation lights positioned at their maximum height associated with the larger WTG layout (44 WTGs) is considered the maximum parameter for assessment compared to a lower position of the aviation lights that is required for the smaller WTG type layout.</p>
Decommissioning			
<p>Impact 6: Direct Impact (e.g. Foundation Removal, Cable and Cable Protections removal.</p> <p>Removal or truncation of offshore heritage receptors during extraction of foundations, cable recovery, and associated seabed works.</p>	<p>The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment. Activities equivalent to or less than the Construction phase. This is because, unlike construction, seabed clearance is not expected to be required for foundation installation or along cable routes. Any seabed clearance during decommissioning is likely to be limited to the placement of jack-up vessel legs. The assumptions for the construction phase therefore apply.</p> <p>Following the operation and maintenance phase, components of the Offshore Project may be left in-situ to avoid unnecessarily disturbing the seabed (i.e. where marine habitat has formed). This could include scour protection</p>	N/A	<p>The parameters represent the maximum footprint and activities that could cause direct impact to Offshore Archaeology and Cultural Heritage during the decommissioning phase.</p>

Offshore Project Phase and Activity/Impact	Maximum Design Scenario	Maximum assessment assumptions	Justification
	<p>associated with the WTG foundations and sections of the Offshore Cable. The potential for infrastructure to remain in-situ will be confirmed through consultation on the Decommissioning Programme to ensure the most suitable approach is taken. At this stage it is unconfirmed which components (if any) would remain in-situ. As such, the maximum design scenario for decommissioning it has been assumed that all infrastructure would be removed.</p> <p>Decommissioning programme: Duration is up to 5 years.</p>		
<p>Impact 7: Indirect Impact (e.g. From Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.).</p> <p>Increased sediment disturbance may lead to loss of stratigraphic relationships and exposure of remains to degradation processes.</p>	<p>The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment. Activities equivalent to or less than the Construction phase. This is because, unlike construction, seabed clearance is not expected to be required for foundation installation or along cable routes. Any seabed clearance during decommissioning is likely to be limited to the placement of jack-up vessel legs. The assumptions for the construction phase therefore apply.</p> <p>Following the operation and maintenance phase, components of the Offshore Project may be left in-situ to avoid unnecessarily disturbing the seabed (i.e. where marine habitat has formed). This could include scour protection associated with the WTG foundations and sections of the Offshore Cable. The potential for infrastructure to remain in-situ will be confirmed through consultation on the Decommissioning Programme to ensure the most suitable approach is taken. At this stage it is unconfirmed which components (if any) would remain in-situ. As such, the maximum design scenario for decommissioning it has been assumed that all infrastructure would be removed.</p> <p>Decommissioning programme: Duration is up to 5 years.</p>	N/A	The parameters represent the greatest number of proposed obstructions and changes on the seabed that could cause or perpetuate scour.

15.7.2 EMBEDDED MITIGATION MEASURES

- 15.7.2.1 As part of the Offshore Project design process, a number of embedded mitigation measures have been adopted to reduce the potential for impacts on Offshore Archaeology and Cultural Heritage, and these have evolved as the EIA has progressed and in response to consultation.
- 15.7.2.2 As these measures form part of the embedded mitigation defined in the Project Description (**Chapter 3, Volume 1a, Section 3.4**), there is a commitment to implementing them as part of the Offshore Project design. These measures therefore constitute measures that will be delivered as standard and are assumed in the assessment.
- 15.7.2.3 Best practice favours the preservation in situ of archaeological remains, therefore, the ideal preferred mitigation for archaeological remains is avoidance. Avoidance, through the implementation of AEZs and Temporary Archaeological Exclusion Zones (TAEZs), is considered the primary means of mitigation and will continue to be applied throughout all phases of the Offshore Project. For the purposes of the assessment, AEZs are assumed to be implemented as embedded mitigation within the project design. These AEZs have informed the preliminary layout and will continue to be secured through micrositing during detailed design. The final extents of individual AEZs will be confirmed with the regulator and archaeological advisors; however, proportional buffer zones are assumed in all impact assessments and their refinement will remain within the scope of embedded mitigation (M008).
- 15.7.2.4 If avoidance is not feasible, the measures detailed within the Final Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD), the production and implementation of which is considered embedded in M007) will be utilised to reduce the severity of the impact by halting works to allow for preservation by record through the implementation of archaeological investigation procedures outlined in **Offshore Written Scheme of Investigation and Protocol for Archaeological Discoveries, Volume 3**. All the relevant embedded mitigation measures to Offshore Archaeology and Cultural Heritage have been identified for this impact detailed in **Table 15-15**.
- 15.7.2.5 **Table 15-15** sets out the relevant embedded mitigation measures within the design and how these affect the Offshore Archaeology and Cultural Heritage assessment.

Table 15-15 Relevant Offshore Archaeology and Cultural Heritage embedded mitigation measures

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Offshore Archaeology and Cultural Heritage Assessment
M001	The outputs of the project-specific site investigation surveys will be reviewed to ensure that the final design and location of key project infrastructure takes full account of the physical environment and considers the potential for long-term changes. The mitigation hierarchy will be applied to avoid any sensitive areas identified, as far as is possible, by micrositing wind turbine generators (WTG) and cables.	Pre-Construction, Construction	To be secured through a condition of the Section 36 consent and/or Marine Licence.	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to offshore archaeological receptors and ensure that an appropriate and informed mitigation strategy is developed and implemented.
M002	A Cable Installation Plan will be produced to confirm routing, method of installation and aspects such as target Depth of Burial and need for/location of/type of external cable protection. This Plan will also contain the outputs of a formal Cable Burial Risk Assessment (CBRA). Data from the project-specific geophysical surveys will be used to identify the preferred route, with the use of natural crevasses or channels within the bedrock proposed, where feasible, and areas of thicker Quaternary sediments identified (to maximise opportunities for cable burial).	Pre-Construction, Construction	Secured in the Section 36 Consent and/or Marine Licence conditions. Details will be provided within the Cable Installation Plan.	The Cable Installation Plan will Inform the routing locations, installation method, cable protection, and any required burial trench dimensions (depth) to ensure Offshore Cables are appropriately installed, to minimise the risk to offshore archaeological receptors.
M007	A Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) will be developed prior to commencement of construction (building on Written Scheme of Investigation and Protocol for Archaeological Discoveries, Volume 3) in compliance with	Pre-construction, construction	Section 36 consent and/or marine licence via the condition for a WSI submitted to MD-LOT for approval.	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to offshore archaeological receptors and ensure that an

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Offshore Archaeology and Cultural Heritage Assessment
	legislative requirements and/or best practice standards and guidance and adhered to.			appropriate and informed mitigation strategy is developed and implemented.
M008	Archaeological Exclusion Zones (AEZs), Temporary Exclusion Zones (TEZs) or Areas of Archaeological Interest (AAI) and micro-siting will be developed prior to the construction of the Offshore Project in accordance with legislative requirement and/or best practice guidance, to avoid sites of known archaeological significance.	Pre-construction, construction	To be secured through a condition of the Section 36 consent and/or Marine Licence.	High and medium potential archaeological receptors have been and will continue to be avoided in all phases of the Offshore Project by use of AEZs, TEZs, AAls and micro-siting. A total of 2 x 50 m and 3 x 25 m AEZs have been proposed in Section 15.7.2. AEZs will be included within the following plans: CEMP; Cable Plan (CaP), Design Specification and Layout Plan (DSLPL), and Decommissioning Plan (DP).
M009	Geophysical and geotechnical surveys will be conducted prior the construction of the Offshore Project, to identify unknown sites of archaeological interest, undertaken in consultation with the project archaeologists, to inform AEZs and micro-siting requirements.	Pre-construction, construction	To be secured through a condition of the Section 36 consent and/or Marine Licence.	This measure will help manage risks and interactions depending on what is found. It will also enhance our knowledge of known archaeological remains.
M019	A final Offshore Environmental Management Plan (OEMP) will be developed prior to commencement of construction (building on Outline Offshore EMP, Volume 3) in compliance with legislative requirements and/or best practice standards and guidance and adhered to.	Pre-construction, construction	Secured in the Section 36 Consent and/or Marine Licence via the condition for an OEMP to be submitted to MD-LOT for approval.	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to offshore archaeological receptors and ensure that an appropriate and

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Offshore Archaeology and Cultural Heritage Assessment
				informed mitigation strategy is developed and implemented.
M020	A Decommissioning Plan will be developed prior to the construction of the Project in compliance with legislative requirements and/or best practice standards and guidance and adhered to.	Decommissioning	Section 36 Consent and/or Marine Licence via the condition for a Decommissioning Plan to be submitted to MD-LOT for approval and the Energy Act 2004	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to offshore archaeological receptors and ensure that an appropriate and informed mitigation strategy is developed and implemented.
M025	A final Operational & Maintenance (O&M) Plan (building on Outline Operational & Maintenance Plan, Volume 3) will be developed in compliance with legislative requirements and/or best practice standards and guidance prior to the operation of the Project and adhered to.	Operation and Maintenance	Section 36 Consent and/or Marine Licence via the condition for an EMP to be submitted to MD-LOT for approval	This measure will ensure appropriate archaeological investigation methodologies are in place to minimise the risk to offshore archaeological receptors and ensure that an appropriate and informed mitigation strategy is developed and implemented.

15.7.2.6 For assessment purposes, AEZs are assumed to be applied as part of embedded mitigation, with final extents to be agreed with the regulator.

15.8 ASSESSMENT OF EFFECTS: CONSTRUCTION

15.8.1.1 For the purpose of this assessment, heritage assets comprise the following asset types:

- Known non-designated heritage assets;
- Geophysical anomalies of archaeological potential;
- Non-tangible cultural views;
- Designated onshore cultural heritage assets;
- Palaeolandscape features;
- Palaeoenvironmental deposits;
- Unknown potential remains of all periods.

15.8.1.2 For known archaeological receptors, the incorporation of AEZs into the project design fully removes the potential for direct physical impact by excluding these receptors from all intrusive activities. This avoidance-based embedded mitigation eliminates the impact pathway, thereby reducing the magnitude of effect to negligible for known assets.

15.8.1.3 For unknown archaeological receptors, the PAD and the WSI act as embedded mitigation by ensuring works cease upon encountering material of potential archaeological interest. These measures prevent the continuation of damaging activities and limit the extent of any inadvertent effect, thereby reducing the magnitude of potential impacts.

15.8.1 IMPACT 1: DIRECT IMPACT (E.G. DRILLING, FOUNDATION CONSTRUCTION, SEABED LEVELLING, PLOUGHING AND CABLE LAY, CABLE PROTECTIONS ETC.)

15.8.1.1 Construction activities have the potential to cause total or partial loss of offshore heritage receptors through removal or truncation of remains during seabed construction activities which include seabed preparation works, cable trench and HDD pit excavation, pile drilling, and activities that occur within the water column. Direct disturbance of sediments also has the potential to result in the deterioration or destruction of the relationships between offshore heritage features and the wider environment (stratigraphic context or setting) as well as exposing the remains to mechanical and chemical degradation. These relationships are crucial to developing a full understanding of an asset.

15.8.1.2 The maximum design scenario relating to Impact 1: Direct impact (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) during the construction phase are presented in **Table 15-14**.

15.8.1.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3 and **Chapter 5, Volume 1a**. The footprint and depth of seabed disturbance associated with boulder clearance, foundation installation, trenching and drilling are consistent with the Maximum Design Scenario parameters assessed in Chapter 9, where the extent and nature of direct seabed change are quantified. A

description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

- 15.8.1.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if directly impacted by construction activities. There is potential for the remains of the *Maju* to be impacted during the excavation of the 13 proposed HDD pits or any cable trenches resulting in truncation or removal of material.
- 15.8.1.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and the implementation of mitigation through recording techniques outlined in the WSI and PAD documents (M007). Archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) may relocate the *Maju's* remains prior to any physical impact allowing for them to be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not relocated during the archaeological review of geophysical survey data, the use of PAD (M007) and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the impact through record of the remains. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the exposed remains followed by either avoidance (M008) if the remains can be designed around or Archaeological Watching Brief to record the remains prior to any further impact if the identified remains cannot be avoided. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.8.1.6 The magnitude of impact from direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is predicted to be **no change** (if identified prior to impact through M009 and M008) and as **low adverse** (if mitigated following impact through the M007) because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy.
- 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin*
- 15.8.1.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if directly impacted by construction activities.
- 15.8.1.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an

appropriate AEZ buffer and avoided as part of the design. Therefore, the magnitude of impact from direct impact, with the approved AEZs incorporated into the design, as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is predicted to be **no change** because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

- 15.8.1.9 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by construction activities.
- 15.8.1.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording through the implementation of archaeological mitigation strategies outlined in the WSI (M007). The mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits. The methodology for the works would be documented in a method statement approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation. The magnitude of impact from direct physical impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is predicted to be **low adverse** because the impact would result in slight changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

- 15.8.1.11 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by construction activities.
- 15.8.1.12 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording through the implementation of archaeological mitigation strategies outlined in the WSI (M007). The mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of deposits containing palaeoenvironmental remains. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation. The magnitude of impact from direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is predicted to be **low adverse** because the impact would result in slight changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

- 15.8.1.13 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact if directly impacted by construction activities.
- 15.8.1.14 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007 and M009). Archaeological review of any geophysical data acquired as part of the detailed design (M009) may discover additional currently unknown archaeological remains allowing for them to be avoided if warranted (M008) as part of the embedded mitigation measures. In the event that the remains are not identified during the archaeological review or impact cannot be avoided, the use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the remains and Archaeological Watching Brief to record the remains prior to impact if necessary. The methodology for the works would be documented in a method statement approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.8.1.15 The magnitude of impact from direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is predicted to be **no change** (if identified prior to impact through M009 and M008) and as **medium adverse** (if mitigated through M007) because the impact is likely to occur on a medium spatial extent of the surviving remains which would precipitate changes to multiple key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

- 15.8.1.16 The value described for each receptor is based on the criteria provided in **Table 15-10**.

Maju (Canmore ID 217551)

- 15.8.1.17 The *Maju* is a mid-19th century iron barque, which were only produced for a short period in the mid to late 19th century before steel became the dominant shipbuilding material, the potential for surviving material which can inform on shipbuilding techniques and its documented loss with crew fatalities contribute to its archaeological and historical interest. Therefore, the value of the *Maju* is assessed to be up to **high** depending upon its survival, based on its historical and archaeological interest.

5 geophysical anomalies of medium and low archaeological potential

15.8.1.18 The geophysical anomalies may be comprised of archaeological remains, the nature, type and survival of which are currently undetermined. Therefore, the value of the geophysical anomalies is assessed to be up to **high** depending upon their nature and survival, based on their archaeological and potential historical interest.

Palaeolandscape features

15.8.1.19 The palaeolandscape features identified within the turbine array area are not considered to have potential for archaeological remains but would have the potential to contain evidence of environmental change relating to the development of the islands following the periods of glacial activity. The deposits within the nearshore section of the Offshore Cable Area of Search have not been archaeologically assessed and have the potential to contain evidence of environmental change and archaeological remains. Therefore, the value of the palaeolandscape features is assessed to be **medium**, based on their archaeological interest.

Palaeoenvironmental remains

15.8.1.20 The palaeoenvironmental remains could not be determined through geophysical or geotechnical survey as the nearshore was not surveyed or sampled during these investigations. Palaeoenvironmental deposits containing peats have been recorded within the nearshore of the Outer Hebrides/*Na h-Eileanan Siar* suggesting the possibility of survival within this area. Therefore, the value of the palaeolandscape features is assessed to be up to medium, based on their archaeological interest in understanding the development of the nearshore palaeolandscape, the extent of exposed land surface, and inundation.

Unknown archaeological remains from all periods

15.8.1.21 The unknown archaeological remains from all periods may be found throughout the Offshore Development Area, the nature, type and survival of which are currently undetermined. Therefore, the value of the unknown archaeological remains from all periods is assessed to be up to **high** depending upon their nature and survival, based on their archaeological and/or historical interest and would be determined following their discovery.

Significance of Effect

15.8.1.22 Direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is anticipated to take place during the construction phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-27**.

Table 15-16 Significance of effect of Direct impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) to Offshore Archaeology and Cultural Heritage during the construction phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008, M009	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscape features	Low adverse	Medium	M007	Minor Adverse	Not significant	N/A
Palaeo-environmental Remains	Low adverse	Medium	M007	Minor Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Medium adverse	High	M007, M008, M009	Moderate Adverse	Significant	This is a worst-case scenario assuming that the initial impact during discovery damages multiple key components of the archaeological materials or context.

15.8.2 IMPACT 2: INDIRECT IMPACT (E.G. FROM DRILLING PILES, SUSPENDED SEDIMENT, CHANGES IN WATER CURRENTS LEADING TO SCOUR/EROSION OR DEPOSITION, ETC.)

15.8.2.1 Construction activities may cause changes to the hydrodynamics and sediment distribution linked to construction activities such as piling and scour around turbine and offshore substation following the construction of 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.

15.8.2.2 The maximum design scenario relating to Impact 2: Indirect impact e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc. as a result of vibration or changes in physical processes during the construction phase are presented in **Table 15-14**.

15.8.2.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3, **Chapter 5, Volume 1a** and the results of **Chapter 9, Volume 2a**. Predicted indirect effects, including localised scour resulting in exposure or burial of archaeological material, are underpinned by the sediment plume

and scour modelling presented in Chapter 9 and Appendix 9.2, which show that deposition beyond the immediate works area is thin and of limited spatial extent. A description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

15.8.2.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if indirectly impacted by construction activities.

15.8.2.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). Archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) may relocate of the *Maju's* remains allowing for them to be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not relocated during the archaeological review, the use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the impact through record of the remains. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any exposed remains and record the impacted remains, and Archaeological Sampling to preserve the remains through record. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.8.2.6 The magnitude of impact from indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) is predicted to be **no change** (if identified prior to impact through M009 and M008) and as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy.

5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin

15.8.2.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if indirectly impacted by construction activities.

15.8.2.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an appropriate buffer and avoided as part of the design. Therefore, the magnitude of impact from indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) is

predicted to be **no change** because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

- 15.8.2.9 Based on the maximum design scenario detailed in **Table 15-14** the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by construction activities.
- 15.8.2.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation. The magnitude of impact from indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

- 15.8.2.11 Based on the maximum design scenario detailed in **Table 15-14** the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by construction activities.
- 15.8.2.12 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of deposits containing palaeoenvironmental remains. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation. The magnitude of impact from indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) is predicted to be **negligible adverse**. because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

- 15.8.2.13 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact, if indirectly impacted by construction activities.
- 15.8.2.14 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). Archaeological review of any geophysical data acquired as part of the detailed design (M009) may discover additional currently unknown archaeological remains allowing for them to be avoided if warranted (M008) as part of the embedded mitigation measures. In the event that the remains are not identified during the archaeological review, the use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the impacted and exposed remains, and Archaeological Sampling. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.8.2.15 The magnitude of impact from indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) is predicted to be **no change** (if identified prior to impact through M009 and M008) and as **low adverse** (if mitigated through M007). because the impact is likely to occur on a small spatial extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

- 15.8.2.16 The value described for each receptor is based on the criteria provided in **Table 15-10**.
- 15.8.2.17 The value of the receptors are therefore as described in paragraphs 15.8.1.17 - 15.8.1.21.

Significance of Effect

- 15.8.2.18 Indirect impact as a result of construction activities (e.g. Drilling, Foundation Construction, Seabed Levelling, Ploughing and Cable Lay, Cable Protections etc.) is anticipated to take place during the construction phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-27**.

Table 15-17 Significance of effect of Indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) to Offshore Archaeology and Culture during the Construction Phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008, M009	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Low adverse	High	M007, M008, M009	Minor Adverse	Not significant	N/A

15.8.3 FURTHER ENVIRONMENTAL MITIGATION AND RESIDUAL EFFECT

15.8.3.1 No additional Offshore Archaeology and Cultural Heritage mitigation is considered necessary because the likely effect of further mitigation (beyond the embedded commitments outlined in Section 15.7.2) would not change the significance of effect.

15.9 ASSESSMENT OF EFFECTS: OPERATION AND MAINTENANCE

15.9.1.1 For known archaeological receptors, the incorporation of AEZs into the project design fully removes the potential for direct physical impact by excluding these receptors from all intrusive activities. This avoidance-based embedded mitigation eliminates the impact pathway, thereby reducing the magnitude of effect to negligible for known assets.

15.9.1.2 For unknown archaeological receptors, the PAD and the WSI act as embedded mitigation by ensuring works cease upon encountering material of potential archaeological interest. These measures prevent the continuation of damaging activities and limit the extent of any inadvertent effect, thereby reducing the magnitude of potential impacts.

15.9.1 IMPACT 3: DIRECT IMPACT (E.G. REPAIRS, DEBRIS, CABLE PROTECTION)

15.9.1.1 The operational lifetime of the Offshore Project is, expected to be 35 years. O&M activities have the potential to cause similar effects to those associated with the construction phase activities, though

likely over a smaller scale. These activities have the potential to cause total or partial loss of offshore heritage receptors through truncation of remains during repairs.

- 15.9.1.2 The maximum design scenario relating to Impact 3: Direct Impact from repairs, debris and cable protection which includes activities such as anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities during the O&M phase are presented in **Table 15-14**.
- 15.9.1.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3 and **Chapter 5, Volume 1a**. A description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

- 15.9.1.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if directly impacted by O&M activities.
- 15.9.1.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). Archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) may relocate of the *Maju's* remains allowing for them to be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not located during the archaeological review or the Construction Phase works, use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the impact through record of the remains. The mitigation strategies that would be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of exposed remains and record any impacted remains, and Archaeological Sampling. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.9.1.6 The magnitude of impact from direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) is predicted to be **no change** (if identified prior to impact through M009 and M008) and as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy.

5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin

- 15.9.1.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if directly impacted by O&M activities.

15.9.1.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an appropriate buffer and avoided as part of the design. Therefore, the magnitude of impact from direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) is predicted to be **no change** because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

15.9.1.9 Based on the maximum design scenario detailed in **Table 15-14** the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by O&M activities.

15.9.1.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded features were identified, or the landscape features were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits if not previously undertaken. This recording work would likely have been done during the Construction Phase and, if so, would be sufficient to offset the impact during the Operation Phase activities. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.9.1.11 The magnitude of impact from direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

15.9.1.12 Based on the maximum design scenario detailed in **Table 15-14** the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by O&M activities.

15.9.1.13 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded palaeoenvironmental remains were identified, or known remains were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeoenvironmental remains if not previously undertaken. This recording work would likely have been done during the Construction Phase and, if so, would be sufficient to offset the impact during the Operation Phase activities. The methodology for the

works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

- 15.9.1.14 The magnitude of impact from direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

- 15.9.1.15 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact, if directly impacted by O&M activities.
- 15.9.1.16 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that could be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any impacted anomalies and record the remains, and Archaeological Sampling. The type of mitigation required would depend upon the nature of the archaeological anomaly and would be determined through consultation with the regulator and their archaeological advisor. The methodology for the archaeological works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.9.1.17 The magnitude of impact from direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small spatial extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

- 15.9.1.18 The value described for each receptor is based on the criteria provided in **Table 15-10** .
- 15.9.1.19 The value of the receptors are therefore as described in paragraphs 15.8.1.17 - 15.8.1.21.

Significance of Effect

- 15.9.1.20 Direct Impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) is anticipated to take place during the operation and management phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of direct impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g.

Repairs, Debris, Cable protection) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-18**.

Table 15-18 Significance of effect of Direct Impact as a result of anchorage from maintenance or repair vessels, inadvertent loss off the vessels, and repair activities (e.g. Repairs, Debris, Cable protection) to Offshore Archaeology and Cultural Heritage during the operation and management phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse	Not significant	N/A

15.9.2 IMPACT 4: INDIRECT IMPACT (E.G. BURIAL OR SCOUR/EROSION)

15.9.2.1 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.

15.9.2.2 The maximum design scenario relating to Impact 4: Indirect impact e.g. Burial or Scour/Erosion as a result of changes in physical processes during the construction phase are presented in **Table 15-14**.

15.9.2.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3, **Chapter 5, Volume 1a** and the results of **Chapter 9, Volume 2a**. Modelled hydrodynamic and sediment transport responses presented in Chapter 9 indicate that long-term seabed changes during operation are limited to small footprints around infrastructure, suggesting the conclusion that indirect impacts on archaeological receptors would be localised. A description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

15.9.2.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if indirectly impacted by O&M activities.

15.9.2.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). Archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) may relocate of the *Maju's* remains allowing for them to be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not relocated during the archaeological review, use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the inadvertent impact through record of the remains. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any exposed remains and record the exposed extent, and Archaeological Sampling. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.9.2.6 The magnitude of impact from indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is predicted to be **no change** (if identified prior to impact through M008) and as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy.

5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin

15.9.2.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if indirectly impacted by O&M activities.

15.9.2.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an appropriate buffer and avoided as part of the design. Therefore, the magnitude of impact from indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is predicted to be **no change**. because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

15.9.2.9 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by O&M activities.

15.9.2.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded features were identified, or the landscape features were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.9.2.11 The magnitude of impact from indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is predicted to be **negligible adverse** because the impact would result in slight changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

15.9.2.12 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by O&M activities.

15.9.2.13 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded palaeoenvironmental remains were identified, or known remains were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeoenvironmental remains. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.9.2.14 The magnitude of impact from indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is predicted to be **negligible adverse** because the impact would result in slight changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

15.9.2.15 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact, if indirectly impacted by O&M activities.

15.9.2.16 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that could be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the exposed remains,

and Archaeological Sampling. The type of mitigation required would depend upon the nature of the archaeological anomaly and would be determined through consultation with the regulator and their archaeological advisor. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator’s archaeological advisor prior to the onset of the archaeological investigation.

15.9.2.17 The magnitude of impact from indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is predicted to be **low adverse** because the impact is likely to occur on a small spatial extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

15.9.2.18 The value described for each receptor is based on the criteria provided in **Table 15-10**.

15.9.2.19 The value of the receptors are therefore as described in paragraphs 15.8.2.16 - 15.8.2.17.

Significance of Effect

15.9.2.20 Indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) is anticipated to take place during the O&M phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-19**.

Table 15-19 Significance of effect of Indirect impact as a result of changes in physical processes (e.g. Burial or Scour/Erosion) to Offshore Archaeology and Cultural Heritage during the operation and maintenance phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse	Not significant	N/A

15.9.3 IMPACT 5: DIRECT IMPACTS THAT AFFECT THE SIGNIFICANCE OF ASSETS CAUSED BY CHANGES TO THE SETTING OF DESIGNATED AND SIGNIFICANT NON-DESIGNATED ONSHORE ARCHAEOLOGY AND CULTURAL HERITAGE ASSETS

15.9.3.1 The maximum design scenario relating to Impact 5: Direct Impacts that Affect the Significance of Assets Caused by Changes to the Setting of Designated and Significant Non-Designated Onshore Archaeology and Cultural Heritage Assets during the O&M phase are presented in **Table 15-14**.

15.9.3.2 The full assessment of impacts caused by changes to the setting of heritage assets is detailed in **Appendix 15.2, Volume 2c**. This includes description of the assets and their settings. Of the 46 assets assessed for impacts on their setting, only 2 have significant effects, and these are detailed below. The remaining assets do not have significant effects, and their assessments are provided in **Appendix 15.2, Volume 2c**.

Magnitude

15.9.3.3 Magnitude of impact on onshore archaeology cultural heritage from the operation of the Offshore Project has been assessed according to the criteria outlined in **Table 15-9** and based on the maximum design scenario identified in **Table 15-14**.

SM3926 Teampull Eoin, chapel, graveyard & settlement, Port Mhór Bragar, Lewis

15.9.3.4 As illustrated in **Figure 15.7, Volume 2b**, the Turbine Area would be at a distance of approximately 7.4 km from the monument, with the nearest WTG visible at a distance of 7.60 km. The view from the monument would be open to the Turbine Array; therefore, it is anticipated that all of the WTGs, 44 in the case of Option 2, would be visible (**Figure 15.1.5a-b of Annex 15.2.1, Volume 2c**), though partly screened by land on the western side of Port Mhór Bragar/*Bhràdhagair*. The Turbine Array would comprise a moderate component in outward views of the ocean from the monument itself and would characterise a notable change to the views to the west and northwest, as is also illustrated in a photomontage from Bragar Beach, to the immediate west of the monument (**Figure 18.40, Volume 2c**, Viewpoint 16). Viewpoint 20 for the SLVIA was taken approximately 1.1 km to the south of the Teampull Eoin monument and suggests that the view of the ocean from the slightly higher ground on the approach to the monument would be considerably changed as it would affect about 180° of the total view (**Figure 18.44, Volume 2c**, Viewpoint 20).

15.9.3.5 Associations with the former settlement may indicate that views to the south were particularly important and the view of the chapel and graveyard from the former settlement would be impacted by the presence of the WTGs along the horizon behind the scheduled remains. The outward views contribute to the appreciation of this asset but are not integral to understanding the nature and use of the asset or its connections within the landscape; therefore, it is considered that the magnitude of change would be medium.

SM1669 Dun Borve, broch

15.9.3.6 As illustrated in **Figure 15.7, Volume 2b**, the Turbine Array would be visible from the monument at a distance of approximately 10.1 km, with the nearest WTG at a distance of 10.37 km. The view from the monument would be open to the Turbine Array; therefore, it is anticipated that all of the WTGs, 44 in the case of Option 2, would be visible (**Figure 15.1.13a**). The Turbine Array would comprise a moderate component in outward views to the west/southwest from the monument itself. The closest SLVIA viewpoint is Viewpoint 4 (**Figure 18.28, Volume 2b**) which was taken from approximately 1.2 km southwest of the broch. The WTGs would represent a change to this view and potentially impact the sense of isolation which may detract from the appreciation of this asset. It is not expected that the Turbine Array would detract from understanding the monument in its context. Therefore, it is considered that the magnitude of change would be medium.

Sensitivity or Value of Receptors

15.9.3.7 All onshore archaeology and cultural heritage receptors within the ZTV are vulnerable to impact, but any affected receptors would recover following the removal of the construction equipment and the wind turbine infrastructure. The value of the identified receptors would be between high and low and are detailed in **Table 15-10**.

SM3926 Teampull Eoin, chapel, graveyard & settlement, Port Mhór Bragar, Lewis

15.9.3.8 The scheduled monument is considered to be of national importance and of high heritage value. The remains were designated as they have the potential to increase understanding of later prehistoric settlement and agricultural activity as well as reuse of the site as a medieval church and burial ground servicing the local community with use extending through the post-medieval period. Remains of medieval ecclesiastical buildings are relatively rare, and the remains have potential to inform understanding of the development of local religious observance within the Western Isles/*Na h-Eileanan Siar*.

SM1669 Dun Borve, broch

15.9.3.9 The scheduled monument is considered to be of national importance and of high heritage value. The remains were designated as an example of a prehistoric defended settlement structure which is a characteristic feature type for the Iron Age and therefore has historic interest, with a relationship to other features of this period in the northern part of the Outer Hebrides/*Na h-Eileanan Siar*. It also has archaeological interest as there is potential for more information relating to prehistoric settlement, agricultural economy and society to be learned from the asset.

Significance of Effect

15.9.3.10 As summarised in **Table 15-20**, for SM3926 Teampull Eoin, chapel, graveyard & settlement, Port Mhór Bragar, Lewis and SM1669 Dun Borve, broch, a magnitude of change of medium adverse on an asset of high value would result in a moderate adverse significance of effect, which is significant in EIA terms.

Table 15-20 Significance of effect of direct impacts that affect the significance of assets caused by changes to the setting of designated and significant non-designated onshore archaeology and cultural heritage assets

Receptor	Magnitude	Value	Significance of effect	Significance
SM3926 Teampull Eoin, chapel, graveyard & settlement, Port Mhór Bragar, Lewis	Medium	High	Moderate	Significant
SM1669 Dun Borve, broch	Medium	High	Moderate	Significant

15.9.4 FURTHER ENVIRONMENTAL MITIGATION AND RESIDUAL EFFECT

15.9.4.1 No additional Offshore Archaeology and Cultural Heritage mitigation is considered necessary because the likely effect of further mitigation (beyond the embedded commitments outlined in Section 15.7.2) would not change the significance of effect.

15.10 ASSESSMENT OF EFFECTS: DECOMMISSIONING

15.10.1.1 For known archaeological receptors, the incorporation of AEZs into the project design fully removes the potential for direct physical impact by excluding these receptors from all intrusive activities. This avoidance-based embedded mitigation eliminates the impact pathway, thereby reducing the magnitude of effect to negligible for known assets.

15.10.1.2 For unknown archaeological receptors, the PAD and the WSI act as embedded mitigation by ensuring works cease upon encountering material of potential archaeological interest. These measures prevent the continuation of damaging activities and limit the extent of any inadvertent effect, thereby reducing the magnitude of potential impacts.

15.10.1 IMPACT 6: DIRECT IMPACT (E.G. FOUNDATION REMOVAL, CABLE AND CABLE PROTECTIONS REMOVAL ETC.)

15.10.1.1 Decommissioning activities are expected to be similar in approach to construction activities (see description in Section 15.8.2). A Decommissioning Programme (M020) will be developed and will follow the relevant guidance in place at the time of decommissioning.

15.10.1.2 The maximum design scenario relating to Impact 6: Direct Impact (e.g. Foundation Removal, Cable and Cable Protections removal etc.) during the decommissioning phase are presented in **Table 15-14**.

15.10.1.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3 and **Chapter 5, Volume 1a**. A description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

- 15.10.1.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if directly impacted by decommissioning activities.
- 15.10.1.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). If the remains are identified during the archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) or during the construction or operation and maintenance activities, the remains would be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not relocated during preliminary survey or early phase activities, the use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the impact through record of the remains. The mitigation strategies that would be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any exposed remains and record the surviving extent, and Archaeological Sampling. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.10.1.6 The magnitude of impact from direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) is predicted to be **no change** (if identified prior to impact through M008) and as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy.
- 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin*
- 15.10.1.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if directly impacted by decommissioning activities.
- 15.10.1.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an appropriate buffer and avoided as part of the design. Therefore, the magnitude of impact from direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) is predicted to be **no change** because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

- 15.10.1.9 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by decommissioning activities.
- 15.10.1.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded features were identified, or the landscape features were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.10.1.11 The magnitude of impact from direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

- 15.10.1.12 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if directly impacted by decommissioning activities.
- 15.10.1.13 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded palaeoenvironmental remains were identified, or known remains were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeoenvironmental remains. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.10.1.14 The magnitude of impact from direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

- 15.10.1.15 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact, if directly impacted by decommissioning activities.
- 15.10.1.16 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that could be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the remains, and Archaeological Sampling. The type of mitigation required would depend upon the nature of the archaeological anomaly and would be determined through consultation with the regulator and their archaeological advisor. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.
- 15.10.1.17 The magnitude of impact from direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) as **low adverse** (if mitigated through M007) because the impact is likely to occur on a small spatial extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

- 15.10.1.18 The value described for each receptor is based on the criteria provided in **Table 15-10**.
- 15.10.1.19 The value of the receptors are therefore as described in paragraphs 15.8.1.17 - 15.8.1.21.

Significance of Effect

- 15.10.1.20 Direct Impact (e.g. Foundation Removal, Cable and Cable Protections removal etc.) is anticipated to take place during the decommissioning phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-21**.

Table 15-21 Significance of effect of direct impact as a result of decommissioning activities (e.g. Foundation Removal, Cable and Cable Protections Removal etc.) during the decommissioning phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscapes features	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse	Not significant	N/A

15.10.2 IMPACT 7: INDIRECT IMPACT (E.G. FROM SUSPENDED SEDIMENT, CHANGES IN CURRENT LEADING TO SCOUR/EROSION OR DEPOSITION, ETC.)

- 15.10.2.1 Decommissioning activities relating to the removal of turbine and offshore substation foundations and cables may cause an increase in sediment discharge or changes in local hydrodynamics which may uncover through scour or bury any maritime, aviation, or prehistoric sites of known (identified through records and surveys) or unknown sites of archaeological potential.
- 15.10.2.2 The maximum design scenario relating to Impact 7: Indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) during the construction phase are presented in **Table 15-14**. Potential indirect effects during decommissioning are expected to be similar in nature and extent to those assessed during construction, as supported by the sediment disturbance and deposition modelling in Chapter 9.
- 15.10.2.3 The magnitude of impact is based on the criteria detailed in Section 15.5.3 and Chapter 5, Volume 1a. A description of the likely magnitude of impact on receptors caused by each identified impact is given in the following paragraphs.

Magnitude

Maju (Canmore ID 217551)

- 15.10.2.4 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the *Maju* will likely be permanent, long-term, direct and not reversible if indirectly impacted by decommissioning activities.

15.10.2.5 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008) and mitigation through recording (M007). Archaeological review of any geophysical data acquired as part of the detailed design in the near shore (M009) may relocate of the *Maju's* remains allowing for them to be avoided (M008) as part of the embedded mitigation measures. In the event that the remains are not relocated during the archaeological review or earlier phases of project activity, use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to offset the inadvertent impact through record of the remains. The mitigation strategies that would be utilised would be Archaeological Investigations Using Divers and/or ROVs to confirm and record the nature and extent of any exposed remains, and Archaeological Sampling. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

15.10.2.6 The magnitude of impact from indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is predicted to be **low adverse** because the impact is likely to occur on a small extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the mitigation strategy (M007).

5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin

15.10.2.7 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the 5 geophysical anomalies of medium and low archaeological potential determined to have anthropogenic origin will likely be permanent, long-term, direct and not reversible if indirectly impacted by decommissioning activities.

15.10.2.8 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through avoidance (M008). The known geophysical anomalies have been given an appropriate buffer and avoided as part of the design. Therefore, the magnitude of impact from indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is predicted to be **no change** because the impact would be avoided through the adherence to the proposed AEZs.

Palaeolandscape features

15.10.2.9 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeolandscape features will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by decommissioning activities.

15.10.2.10 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded features were identified, or the landscape features were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeolandscape feature deposits. The methodology for the works would be

documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

- 15.10.2.11 The magnitude of impact from indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Palaeoenvironmental remains

- 15.10.2.12 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to the palaeoenvironmental remains will likely be of medium spatial extent, permanent, long-term, direct and not reversible if indirectly impacted by decommissioning activities.

- 15.10.2.13 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). Further investigation and recording would be warranted in the event that new, unrecorded palaeoenvironmental remains were identified, or known remains were not previously recorded. In that event, the mitigation strategies that would be utilised to mitigate the impact on the asset would be Marine Geoarchaeological Investigation and Archaeological Sampling of palaeoenvironmental remains. The methodology for the works would be documented in a method statement in line with the final WSI and approved by the regulator's archaeological advisor prior to the onset of the archaeological investigation.

- 15.10.2.14 The magnitude of impact from indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is predicted to be **negligible adverse** because the impact would result in imperceptible changes to key aspects following the recording of the asset through sampling and analysis.

Unknown archaeological remains from all periods

- 15.10.2.15 Based on the maximum design scenario detailed in **Table 15-14**, the impacts to unknown archaeological remains from all periods will likely be permanent, long-term, direct and not reversible with varying spatial footprints depending on the remains and the type of impact, if indirectly impacted by decommissioning activities.

- 15.10.2.16 The embedded Offshore Project mitigation measures detailed within **Table 15-15** include mitigation through recording (M007). The use of PAD and the archaeological mitigation strategies outlined in the WSI (M007) would be utilised to mitigate the impact on the asset. The mitigation strategies that could be utilised would be the PAD, Archaeological Investigations Using Divers and/or ROVs to confirm the nature and extent of any anomalies and record the remains, and Archaeological Sampling. The type of mitigation required would depend upon the nature of the archaeological anomaly and would be determined through consultation with the regulator and their archaeological advisor. The methodology for the works would be documented in a method

statement in line with the final WSI and approved by the regulator’s archaeological advisor prior to the onset of the archaeological investigation.

15.10.2.17 The magnitude of impact from indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is predicted to **low adverse** because the impact is likely to occur on a small spatial extent of the surviving remains which would precipitate slight changes to key archaeological materials prior to the triggering of the archaeological mitigation activities outlined in M007.

Sensitivity or value of receptor

15.10.2.18 The value described for each receptor is based on the criteria provided in **Table 15-10**.

15.10.2.19 The value of the receptors are therefore as described in paragraphs 15.8.1.17 - 15.8.1.21.

Significance of Effect

15.10.2.20 Indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) is anticipated to take place during the decommissioning phase of the Offshore Project. Considering the embedded mitigation described in **Table 15-15**, the residual effects of indirect impact as a result of vibration or changes in physical processes (e.g. from Drilling Piles, Suspended Sediment, Changes in Water Currents Leading to Scour/Erosion or Deposition, etc.) on offshore archaeology and cultural heritage receptors are summarised in **Table 15-22**.

Table 15-22 Significance of effect of indirect impact (e.g. from Suspended Sediment, Changes in Current Leading to Scour/Erosion or Deposition, etc.) to Offshore Archaeology and Cultural Heritage during the decommissioning phase

Receptor	Magnitude	Value	Embedded mitigation measures	Significance of effect	Significance	Commentary
<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse	Not significant	N/A
Geophysical Anomalies	No change	High	M008	Neutral	Not significant	N/A
Palaeolandscapes features	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse	Not significant	N/A
Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse	Not significant	N/A

15.10.3 FURTHER ENVIRONMENTAL MITIGATION AND RESIDUAL EFFECT

- 15.10.3.1 No additional Offshore Archaeology and Cultural Heritage mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the embedded commitments outlined in Section 15.7.2) is **not significant** in EIA terms.

15.11 ASSESSMENT OF COMBINED EFFECTS

- 15.11.1.1 The combined effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance, and decommissioning phases of the Offshore Project on the same receptor, or group of receptors. The overall method following in identifying and assessing potential Combined Effects in relation to the offshore environment is set out in **Chapter 5, Volume 1a**.
- 15.11.1.2 Combined effects could potentially arise in one of two ways. The first type of combined effect is a Project lifetime effect, where multiple phases of the Project (construction, O&M, and decommissioning) interact to create a potentially more significant effect on a receptor than in one phase alone.
- 15.11.1.3 The second type of combined effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient, or longer-term.
- 15.11.1.4 Receptor-led effects have been considered, where relevant, in this chapter for potential interactions between Offshore Archaeology and Cultural Heritage and the following environmental aspects:
- Physical Processes;
 - Seascape, Landscape and Visual Impact Assessment.
- 15.11.1.5 Full results of the Project lifetime effects, and receptor-led effects assessment can be found in **Chapter 23: Combined Effects Assessment, Volume 2a**.

15.12 CONSIDERATION OF ONSHORE TRANSMISSION WORKS PROJECT

- 15.12.1.1 A separate application for the Project's onshore elements (the OTW Project) that includes all infrastructure landwards of MLWS within the Onshore Transmission Works Boundary will be made, under the Town and Country Planning (Scotland) Act 1997 to CnES. The OTW Project EIAR will provide a full description of the onshore elements of the Project landward of MLWS and include an assessment of the associated likely significant effects.
- 15.12.1.2 This EIAR has considered the additive interactions between the Offshore Project and OTW Project to understand if there is the potential for any change to the assessment outcomes as a result of both elements of the Project. The approach to identify and consider potential interactions between

the Offshore Project and OTW Project is set out in **Chapter 5, Volume 1a** and key design parameters associated with the OTW Project are summarised in **Chapter 3, Volume 1a**.

- 15.12.1.3 The potential for effects identified in **Table 15-5** to interact with effects associated with the OTW Project at a common receptor included within the Offshore Cultural Heritage assessment which have the potential to experience effects from both projects has been considered.
- 15.12.1.4 For Offshore Archaeology and Cultural Heritage, a Zone of Influence (ZOI) of 2 km has been applied to ensure direct and indirect interactions with the OTW Project effects can be appropriately identified and assessed. The Offshore Archaeology and Cultural Heritage ZOI is shown on **Figure 15.9, Volume 2b**.
- 15.12.1.5 The impact pathways on Offshore Cultural Heritage assets are limited spatially to the marine environment. The only activities to occur between MHWS and MLWS, where there is potentially overlap in the Offshore and Onshore Projects spatially, are associated with HDD cable installation that will occur under the seabed. The works above the seabed associated with this (i.e. HDD Exit Pit construction and cable pull through vessel activities) are considered within this chapter already. Assuming that the works between MHWS and MLWS are below the seabed within the underlying bedrock, there is no potential for impact to Offshore Cultural Heritage receptors. As a result of this, there is no pathway for these effects to interact in combination to the OTW Project and impacts to Offshore Cultural Heritage assets are not considered further.
- 15.12.1.6 For potential cumulative effects on the setting of Onshore Archaeology and Cultural Heritage, a ZOI of 60 km has been applied to ensure direct and indirect OTW Project effects can be appropriately identified and assessed and to align with the SLVIA ZOI and is informed by the ZTV as the outer limit to where Onshore Archaeology and Cultural Heritage settings effects could occur. The ZOI for the setting impacts of Onshore Archaeology and Cultural Heritage is shown on **Figure 15.9, Volume 2b**.
- 15.12.1.7 Impacts to Onshore Cultural Heritage assets through changes within the asset's setting as a result of the Offshore Project (*Impact 5*) would interact with the OTW Project. The potential for effects identified in **Table 15-5** to interact with effects associated with the OTW Project at a common receptor has been considered for *Impact 5: direct impacts that affect the significance of assets caused by changes to the setting of designated and significant non-designated onshore archaeology and cultural heritage assets*. This assessment considers only combined setting effects arising from visibility of both projects (see paragraph 2.2.1.6 in Appendix 15.2 for reasons for scoping out other factors); standalone OTW setting effects are the subject of assessment of a separate OTW EIAR.
- 15.12.1.8 **Table 15-23** provides a summary of the pathways considered in this chapter and the potential for interaction. Where required, this table provides the relevant MDS information for the OTW Project that has been used to inform this assessment.

Table 15-23 Summary of archaeology and cultural heritage (Impact 5) pathways and potential for interaction with the OTW Project

Assessment pathways considered and receptors	Maximum Design Scenario
Construction	
Potential impacts associated with the construction phase of the Offshore Project have been scoped out from further assessment for <i>Impact 5: direct impacts that affect the significance of assets caused by changes to the setting of designated and significant non-designated onshore archaeology and cultural heritage assets</i>) (see Table 15-5).	
Operation and maintenance	
Direct impacts that affect the setting of Designated and significant non designated Onshore Archaeology and Cultural Heritage asset from the Offshore Project, together with the proposed Onshore Project.	<p><u>Offshore Project</u></p> <ul style="list-style-type: none"> - See the Maximum Design Scenario (MDS) for the settings assessment as described in Section 1.4 of Appendix 15.2, Volume 2c. <p><u>OTW Project</u></p> <ul style="list-style-type: none"> - Operation of a Landfall Substation with a platform of approximately 150 m by 150 m and a maximum height of 15 m, plus several other, smaller buildings housing electrical and other equipment. Within the site compound, there will also be safety features such as lightning masts and access paths/roads. - Grid Substation to be constructed northwest of Loch Cnoc a'Choilich, consisting of up to 6 buildings in total, with a maximum height of 20 m, plus a number of other, smaller buildings housing electrical and other equipment. Within the site compound, there will also be safety features such as lightning masts and access paths/roads.
Decommissioning	
Potential impacts associated with the decommissioning phase of the Offshore Project have been scoped out from further assessment for <i>Impact 5: direct impacts that affect the significance of assets caused by changes to the setting of designated and significant non-designated onshore archaeology and cultural heritage assets</i>) (see Table 15-5).	

Operation and Maintenance

Impact 5: Direct impacts that affect the setting of Designated and significant non designated Onshore Archaeology and Cultural Heritage asset from the Offshore Project, together with the proposed Onshore Project.

15.12.1.9 There is the potential for adverse effects associated with the operation of the Offshore Project in combination with the OTW project where infrastructure associated for both projects will be visible from, or within the views of heritage assets where this may affect the setting of the assets in question. The O&M phase of the OTW project will overlap with the O&M phase of the Offshore Project.

15.12.1.10 Heritage assets which may be affected in this way are:

- Barvas, Church of Scotland Category B Listed Building (LB5762); and
- Barvas, Free Church (Near Lower Barvas) Category C Listed Building (LB5763).

Barvas, Church of Scotland Category B Listed Building (LB5762)

- 15.12.1.11 The Offshore Cultural Heritage Settings Assessment concluded that there would be a low magnitude of change to this asset. The church is a Category B listed building which is considered to be nationally significant and of high heritage value so a low magnitude of change would result in a **Minor Adverse** significance of effect from the Offshore Project alone, which is **Not Significant** in EIA terms.
- 15.12.1.12 Based on the information available at this stage, it is not anticipated that Landfall Substation would be theoretically visible from the front of the church or from the road in the immediate vicinity of the church. However, there would be limited visibility from land to the rear of the church and also from further to the north and south within the settlement of Barvas/*Barabhas* and there would overall be a negligible magnitude of change to the significance of this asset as a result of the OTW project. The significance of the cumulative effects as a result of change in the setting of this asset from the Offshore Project in combination with the OTW project during the O&M phase is therefore expected to be no greater than the effects of the Offshore Project alone. This remains as a **Minor Adverse** significance of effect, which is **Not Significant** in EIA terms.

Barvas, Free Church (Near Lower Barvas) Category C Listed Building (LB5763)

- 15.12.1.13 The Offshore Cultural Heritage Settings Assessment concluded that there would be a low magnitude of change to this asset. The church is a Category B listed building which is considered to be regionally significant and of medium heritage value so a low magnitude of change would result in a **Minor Adverse** significance of effect from the Offshore Project alone, which is **Not Significant** in EIA terms.
- 15.12.1.14 Based on the information available at this stage, the Landfall Substation would be theoretically visible from the front of the church and the road on the immediate approach to it at a distance of approximately 3.09 km. The location of the church on slightly elevated ground and with a general lack of surrounding built form which helps emphasise its important function as a church for the community of Lower Barvas/*Barabhas larach*. The presence of the Landfall Substation would not alter the way in which the church is seen in its roadside location but visibility of the Landfall Substation would alter views from the front of the church to some limited degree and therefore there would overall be a low magnitude of change to the significance of this asset. The significance of the cumulative effects as a result of change in the setting of this asset from the Offshore Project in combination with the OTW project during the O&M phase is therefore expected to be of a medium magnitude. To an asset of medium heritage value, this would result in a **Moderate Adverse** significance of effect. As the change would not alter the way in which the church is seen in its roadside location, it would be **Not Significant** in EIA terms.

- 15.12.1.15 No further inter-related effects have been identified for Offshore Archaeology and Cultural Heritage for effects associated with the operation of the Offshore Project in combination with the OTW Project.

15.13 ASSESSMENT OF CUMULATIVE EFFECTS

15.13.1 APPROACH

- 15.13.1.1 A cumulative effects assessment (CEA) examines the potential for impacts of the Offshore Project in addition with 'Other Developments' (including the OTW Project), on the same single receptor or resource and the contribution of the Offshore Project to those impacts. The overall method following in identifying and assessing potential cumulative effects in relation to the offshore environment is set out in **Chapter 5, Volume 1a**.
- 15.13.1.2 The offshore screening approach is based on the Planning Inspectorate's Advice Note Nine (Planning Inspectorate, 2018) and Advice Note Seventeen (Planning Inspectorate, 2024), with relevant components of the RenewableUK (RenewableUK, 2013) accepted guidance, which includes aspects specific to the marine elements of an offshore wind farm, addressing the need to consider a wide range of asset types.
- 15.13.1.3 The screening approach is based on the professional guidance and best practice.
- 15.13.1.4 The conclusions of the assessment of the Offshore Project and any additional effect arising from the OTW Project as identified in this chapter have been considered in this CEA.

15.13.2 CUMULATIVE EFFECTS ASSESSMENT

- 15.13.2.1 For Offshore Archaeology and Cultural Heritage, a Zone of Influence (ZOI) of 2 km has been applied to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The Offshore Archaeology and Cultural Heritage ZOI is shown on **Figure 15.9, Volume 2b**.
- 15.13.2.2 For potential cumulative effects on the setting of Onshore Archaeology and Cultural Heritage, a Zone of Influence (ZOI) of 60 km has been applied to ensure direct and indirect cumulative effects can be appropriately identified and assessed and to align with the SLVIA ZOI and is informed by the ZTV as the outer limit to where Onshore Archaeology and Cultural Heritage settings effects could occur. The ZOI for the setting impacts of Onshore Archaeology and Cultural Heritage is shown on **Figure 15.9, Volume 2b**.
- 15.13.2.3 A short list of Other Developments that may interact with the Project ZOIs during their construction, operation, or decommissioning is presented in **Appendix 5.3: Cumulative Effects Assessment Shortlisted Developments, Volume 1c**. This list has been generated applying criteria set out in **Chapter 5, Volume 1a** and **Appendix 5.3, Volume 1c** and has been collated up to the finalisation of the EIAR through desk study, consultation, and engagement.
- 15.13.2.4 Only those Other Developments in the short list that fall within the ZOIs have the potential to result in cumulative effects with the Project on Offshore Archaeology and Cultural Heritage. All Other

Developments falling outside the ZOIs are excluded from this assessment. There are no Other Developments falling within the Offshore Archaeology and Cultural Heritage ZOI and therefore no cumulative effects on Offshore Archaeology and Cultural Heritage Receptors are anticipated. The following types of Other Development have the potential to result in cumulative effects on Onshore Archaeology and Cultural Heritage Receptors through impacts to setting.

- Onshore and Offshore Wind Farms;
- Onshore Grid Connection and associated infrastructure.

15.13.2.5 On the basis of the above, the Other Developments that are scoped into the Offshore Archaeology and Cultural Heritage CEA are outlined in **Table 15-23**. It should be noted that Other Developments, which are proposed or under construction at the time of writing this chapter, are included in the table below with the information available.

15.13.2.6 The cumulative Project Design Envelope is described in **Table 15-24**.

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Table 15-24 Other Developments considered as part of the Offshore Archaeology and Cultural Heritage CEA

ID	Development type	Application Reference	Description of development	Status	Timescale ¹	Confidence in assessments	Tier ²	Distance to Array Area (km)	Distance to OCAS (km)
1	Onshore OHL	ENG-019	Stornoway to Barvas 33kV OHL	Pre Planning	2026-2074	Low	3	12	4
2	Onshore Wind Farm	ONWF-009	West Coast Community Energy Project	Pre Planning	2030-2068	Low	3	14	6
3	Onshore Grid Connection	ENG-022	Muaitheabhal Wind Farm 132 kV Overhead Line Connection	In Planning - scoping report submitted	2028-2074	Medium	2	31	34
4	Onshore Grid Connection	ENG-021	Stornoway Windfarm Grid Connection	Pre Planning	2028-2074	Low	3	26	19
5	Onshore Energy	ENG-013	Western Isles Connection Project - Lewis Hub	In Planning - Application Submitted	2026-2074	High	1	31	23
6	Onshore Energy	ENG-016	SSE Distribution Balallan Upgrade	Pre Planning	Not known	Low	3	31	34

¹ The Planning Inspectorate Advice Note 17 states 'Where other developments are expected to be completed before construction of the proposed Major Infrastructure Project and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment.'

² Chapter 5 sets out the full definitions of the tiers. Tier 1: high level of certainty or information availability (including under construction or where a planning application has been approved or is awaiting decision). Tier 2: medium level of certainty or information (such as developments where a Scoping Report has been submitted). Tier 3: low level of certainty or information available (no planning applications submitted or identified for potential future development only).

ID	Development type	Application Reference	Description of development	Status	Timescale ¹	Confidence in assessments	Tier ²	Distance to Array Area (km)	Distance to OCAS (km)
7	Onshore Energy	ENG-018	Talisk Floating Offshore Wind Farm (Onshore Components)	In Planning - scoping report submitted	2029-2065	Medium	2	27	20
8	Onshore Wind Farm	ONWF-002	Stornoway Wind Farm	Consented	2027-2056	High	1	26	19
9	Onshore Wind Farm	ONWF-007	Grimshader Wind Farm	In Planning - scoping report submitted	2027-2068	Medium	2	28	23
10	Onshore Wind Farm	ONWF-005	Druim Leathann Windfarm	Consented	2025-2053	High	1	24	17
11	Offshore Harbour Development	POR-014	Deep Water South, Stornoway Port	In Planning – Scoping Report Submitted	2028-2074	Medium	2	30	22
12	Onshore Wind Farm	ONWF-008	Heastabhal Wind Farm	In Planning - scoping report submitted	Not known	Medium	2	27	31
13	Onshore Wind Farm	ONWF-006	Uisenis Wind Farm	Consented	2027-2055	High	1	31	34
14	Offshore Wind Farm	OWF-024	Talisk Offshore Wind Project	In Planning – Scoping Report Submitted	2029-2077	Medium	2	28	32

Table 15-25 Cumulative Project Design Envelope for Offshore Archaeology and Cultural Heritage

Project phase and activity / impact	Scenario	Justification
Construction		
Direct impact resulting in truncation or removal of Offshore Archaeology and Cultural Heritage Receptors	Tier 1: No other developments to consider. Tier 2: No other developments to consider. Tier 3: No other developments to consider.	<p>Potential impacts of the Offshore Project are assessed in Section 15.8.1. Intrusive seabed activities and vessel operations during the construction phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to direct impacts on Offshore Archaeology and Cultural Heritage Receptors as there is no overlap in spatial footprint.</p> <p>There would be no change in significance of effect during the construction phase.</p>
Indirect impact as a result of changes in the hydrodynamics and sediment distribution	Tier 1: No other developments to consider. Tier 2: No other developments to consider. Tier 3: No other developments to consider.	<p>Potential impacts of the Offshore Project are assessed in Section 15.8.2. Intrusive seabed activities and vessel operations during the construction phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to indirect impacts on Offshore Archaeology and Cultural Heritage Receptors as these are local and there are no other projects within range.</p> <p>There would be no change in significance of effect during the construction phase.</p>
Operation		
Direct impact resulting in truncation or removal of Offshore Archaeology and Cultural Heritage Receptors	Tier 1: No other developments to consider.	<p>Potential impacts of the Offshore Project are assessed in Section 15.9.1. Intrusive seabed activities and vessel operations during the O&M phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to direct impacts on Offshore Archaeology and Cultural Heritage Receptors as there is no overlap in spatial footprint.</p>

Project phase and activity / impact	Scenario	Justification
	Tier 2: No other developments to consider. Tier 3: No other developments to consider.	There would be no change in significance of effect during the operation phase.
Indirect impact as a result of changes in the hydrodynamics and sediment distribution	Tier 1: No other developments to consider. Tier 2: No other developments to consider. Tier 3: No other developments to consider.	Potential impacts of the Offshore Project are assessed in Section 15.9.2. Intrusive seabed activities and vessel operations during the O&M phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to direct impacts on Offshore Archaeology and Cultural Heritage Receptors as these are local and there are no other projects within range. There would be no change in significance of effect during the operation phase.
Direct impact through changes in the setting of Onshore Archaeology and Cultural Heritage Receptors	Tier 1: All other developments within Tier 1 (Table 15-24). Tier 2: All other developments within Tier 2 (Table 15-24). Tier 3: All other developments within Tier 3 (Table 15-23).	Potential impacts of the Offshore Project are assessed in Section 15.9.3 and Appendix 15.2, Volume 2c . The addition of modern energy infrastructure both offshore and onshore during the O&M phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 have the potential to have direct impacts on the setting of Onshore Archaeology and Cultural Heritage Receptors.

Project phase and activity / impact	Scenario	Justification
Decommissioning		
Direct impact resulting in truncation or removal of Offshore Archaeology and Cultural Heritage Receptors	Tier 1: No other developments to consider. Tier 2: No other developments to consider. Tier 3: No other developments to consider.	<p>Potential impacts of the Offshore Project are assessed in Section 15.10.1. Intrusive seabed activities and vessel operations during the decommissioning phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to direct impacts on Offshore Archaeology and Cultural Heritage Receptors as there is no overlap in spatial footprint.</p> <p>There would be no change in significance of effect during the decommissioning phase.</p>
Indirect impact as a result of changes in the hydrodynamics and sediment distribution	Tier 1: No other developments to consider. Tier 2: No other developments to consider. Tier 3: No other developments to consider.	<p>Potential impacts of the Offshore Project are assessed in Section 15.10.2. Intrusive seabed activities and vessel operations during the decommissioning phase of the Offshore Project cumulatively with the other projects listed in Table 15-24 do not have the potential to contribute to direct impacts on Offshore Archaeology and Cultural Heritage Receptors as these are local and there are no other projects within range</p> <p>There would be no change in significance of effect during the decommissioning phase.</p>



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15.13.2.7 A description of the significance of cumulative effects upon Offshore Archaeology and Cultural Heritage receptors arising from each identified impact is given below. The cumulative effects assessment has been based on information publicly available in the planning application documents for the Other Developments. It is noted that the maximum assessment assumptions quoted within these planning applications (EIARs/ESs) are often refined during the determination period and in the post-consent phase such that the final scheme's build out may have a reduced impact when compared to what has previously been assessed.

Impacts to the setting of Onshore Archaeology and Cultural Heritage through the introduction of modern infrastructure

15.13.2.8 Direct impacts to Onshore Archaeology and Cultural Heritage receptors as a result of changes within the setting can arise from both visual additions within the views from or to receptors as well as auditory or vibrational changes within the environment.

15.13.2.9 Due to the nature of and distance to the Offshore Project, it was not expected that there would be a potentially significant impact to the settings of Onshore Archaeology and Cultural Heritage receptors as a result of non-visual factors, such as operational noise (see **Chapter 19: Airborne Noise, Volume 2a** for further consideration of operation noise).

15.13.2.10 There is currently limited detail on a number of the other projects detailed in **Table 15-24** due to the stage of the assessment process that these projects are in and therefore it is not possible to make a comprehensive assessment of the significance of effect. However, given that the operation stages of these developments would overlap with the Offshore Project there is potential to impact on the same receptors as the Offshore Project. Where information is available within the planning application documents for the Other Developments this has been used to inform the CEA and where this is lacking then assumptions have been made and are reported in **Table 15-26**.

15.13.2.11 The CEA for Offshore Archaeology and Cultural Heritage is set out in **Table 15-26**.

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Table 15-26 Cumulative effects assessment for Offshore Archaeology and Cultural Heritage

ID (Figure 15.9, Volume 2b)	Development title	Application reference	Assessment discussion	Mitigation
2	West Coast Community Energy Project	ONWF-009	There is potential for limited visibility of West Coast Community Energy Project in views from assets on the west coast of Lewis/ <i>Eilean Leòdhais</i> which were considered in the assessment of effects on settings for the Offshore Project. These include Steinacleit, homestead and field system (SM90284) and Parish Church, Barvas, Lewis (LB5762). However, it would not be seen in views of the Offshore Project out to sea and so this would not give rise to any cumulative effect. It is theoretically possible that both projects would be visible from assets within the Eye Peninsula/ <i>An Rubha</i> including Dursainean, Chambered Cairn, Garrabost (SM5357). However, at a distance of over 30 km to the Offshore Project, it would be a negligible component of the view and this would not give rise to a significant cumulative effect.	None required
3	Muaitheabhal Wind Farm 132 kV Overhead Line Connection	ENG-022	Due to its location south of Loch Eireasort, the Muaitheabhal Wind Farm 132 kV Overhead Line Connection would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	None required
4	Stornoway Wind Farm Grid Connection	ENG-021	The Stornoway Windfarm Grid Connection will include a new overhead line of 1.6 km between the proposed Stornoway Wind Farm Substation and a new cable sealing end structure, located approximately 400 m south west of the Stornoway Grid Supply Point (GSP) Substation. Due to its size and location this would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	None required
5	Western Isles Connection Project - Lewis Hub	ENG-013	The Lewis Hub of the Western Isles Connection would be located approximately 2 km south west of Stornoway/ <i>Steòrnabhagh</i> and so would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	None required

ID (Figure 15.9, Volume 2b)	Development title	Application reference	Assessment discussion	Mitigation
6	SSE Distribution Balallan Upgrade	ENG-016	Due to its location, the Balallan Upgrade would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	None required
7	Talisk Floating Offshore Wind Farm (Onshore Components)	ENG-018	The Onshore Components of Talisk Floating Offshore Wind Farm would be located south of Stornoway/ <i>Steòrnabhagh</i> and would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	None required
8	Stornoway Wind Farm	ONWF-002	The ES for Stornoway Wind Farm (Lewis Wind Power 2019) identifies that some monuments of the Calanais group of monuments would be potentially affected with some visibility of turbines from Calanais I (SM90054) at a distance of over 13 km to the east. They would not be visible in the same view as turbines of the Offshore Project and due to this, and the distance from the asset, this would not give rise to a significant cumulative effect. It is possible that both projects would be visible from assets within the Eye Peninsula/ <i>An Rubha</i> including Dursainean, Chambered Cairn, Garrabost (SM5357). However, at a distance of over 30 km to the Offshore Project, it would be a negligible component of the view and this would not give rise to a significant cumulative effect.	
9	Grimshader Wind Farm	ONWF-007	Grimshader Wind Farm is on the east coast of Lewis/ <i>Eilean Leòdhais</i> and so due to its location would not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. It is theoretically possible that both projects would be visible from assets within the Eye Peninsula/ <i>An Rubha</i> including Dursainean, Chambered Cairn, Garrabost (SM5357). However, at a distance of over 30 km, the Offshore Project would be a negligible component of the view and this would not give rise to a significant cumulative effect.	None required
10	Druim Leathann Windfarm	ONWF-005	It is possible that Druim Leathann Wind Farm would be visible in views toward the Offshore Project from assets within the Eye Peninsula/ <i>An Rubha</i> including Dursainean, Chambered Cairn, Garrabost (SM5357). However, at a distance of over 30 km, the	None required

ID (Figure 15.9, Volume 2b)	Development title	Application reference	Assessment discussion	Mitigation
			Offshore Project would be a negligible component of the view and this would not give rise to a significant cumulative effect.	
11	Deep Water South, Stornoway Port	POR-014	It is possible that the proposed changes to Stornoway Port, which would include activities around the storage, construction, maintenance and repair of offshore wind turbines, would be visible in views toward the Offshore Project from assets within the Eye Peninsula/ <i>An Rubha</i> including Dursainean, Chambered Cairn, Garrabost (SM5357). However, at a distance of over 30 km, the Offshore Project would be a negligible component of the view and this would not give rise to a significant cumulative effect.	None required
12	Heastabhal Wind Farm	ONWF-008	Heastabhal Wind Farm would be located 20 km southwest of Stornoway/ <i>Steòrnabhagh</i> and the scoping report identifies that some monuments of the Calanais group of monuments would be potentially affected, comprising Calanais IV (SM5457), Calanais V (SM6018) and Calanais VI (SM6019) as they are within a 10 km study area from Heastabhal Wind Farm. However, the focus of the Calanais group at Calanais I (SM90054) Standing Stones is 14 km north of the Heastabhal Wind Farm site and not identified as being potentially affected. There is no available information on the extent to which the identified assets may be affected by Heastabhal Wind Farm, but these assets are all located over 20 km from the Offshore Project and with a low or negligible magnitude of change. The Offshore Project would be to the north, with Heastabhal Wind Farm to the south and this would not give rise to a significant cumulative effect.	None required
13	Uisenis Wind Farm	ONWF-006	The consented Uisenis Wind Farm will be slightly visible from Calanais I (SM90054) Standing Stones at a distance of 20 km to the south. The Offshore Project would be to the north and the degree of visibility would not be sufficient to result in a significant cumulative effect in combination with Uisenis Wind Farm.	None required
14	Talisk Offshore Wind Project	OWF-024	Due to the location of the proposed offshore development c. 35 km to the north of the Isle of Lewis/ <i>Eilean Leòdhais</i> it is considered that the Talisk Offshore Wind Project would	None required

ID (Figure 15.9, Volume 2b)	Development title	Application reference	Assessment discussion	Mitigation
			not affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effect.	
1	Stornoway to Barvas 33kV OHL	ENG-019	The Stornoway to Barvas 33kV OHL will connect to the Barvas Primary Substation on a wood pole line to be routed alongside the A858. Whilst at pre-planning stage there is no information on potential cultural heritage effects. However, as a wood pole line adjacent to a road it is not considered that this would affect any of the Onshore Cultural Heritage assets affected by the proposed offshore elements of the Offshore Project. There will therefore be no cumulative effects.	None required

15.14 TRANSBOUNDARY EFFECTS

- 15.14.1.1 Transboundary effects occur when a development in one European Economic Area (EEA) State impacts the environment of another EEA State(s). A screening of potential transboundary effects was undertaken within the Scoping Report (Spiorad na Mara, 2023).
- 15.14.1.2 There are no anticipated transboundary effects on Offshore Archaeology and Cultural Heritage receptors as the impacts are discrete and not located on the boundary between 2 EEA states.

15.15 SUMMARY OF RESIDUAL EFFECTS

- 15.15.1.1 **Table 15-27** presents a summary of the assessment of significant effects, any relevant mitigation measures, and residual effects on Offshore Archaeology and Cultural Heritage receptors.

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Table 15-27 Summary of residual effects

Activity and impact	Receptor	Magnitude of impact	Receptor sensitivity or value	Embedded mitigation measures	Significance of effect (significance)	Further environmental mitigation	Significance of residual effect (significance)
Construction							
Impact 1: Direct impact (e.g. drilling, foundation construction or removal, seabed levelling, ploughing and cable lay, cable protections etc.).	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008, M009	Minor Adverse (Not significant)	N/A	N/A
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Low adverse	Medium	M007	Minor Adverse (Not significant)	N/A	N/A
	Palaeo-environmental Remains	Low adverse	Medium	M007	Minor Adverse (Not significant)	N/A	N/A
	Unknown archaeological remains from all periods	Medium adverse	High	M007, M008, M009	Moderate Adverse (Significant)	N/A	Moderate Adverse (Significant)
Impact 2: Indirect impact (e.g. vibration from drilling piles, suspended sediment, changes in current leading to scour/erosion or deposition, etc.)	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008, M009	Minor Adverse (Not significant)	N/A	N/A
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A

Activity and impact	Receptor	Magnitude of impact	Receptor sensitivity or value	Embedded mitigation measures	Significance of effect (significance)	Further environmental mitigation	Significance of residual effect (significance)
	Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Unknown archaeological remains from all periods	Low adverse	High	M007, M008, M009	Minor Adverse (Not significant)	N/A	N/A
Operation and maintenance							
Impact 3: Direct Impact (e.g. repairs, inadvertent loss of equipment or material, cable protection replacement)	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse (Not significant)	N/A	N/A
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse (Not significant)	N/A	N/A
Impact 4: Indirect impact (e.g. burial or scour/erosion)	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse (Not significant)	N/A	N/A

Activity and impact	Receptor	Magnitude of impact	Receptor sensitivity or value	Embedded mitigation measures	Significance of effect (significance)	Further environmental mitigation	Significance of residual effect (significance)
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse (Not significant)	N/A	N/A
Impact 5: Direct impacts that affect the setting of Designated and significant non-Designated Onshore Archaeology and Cultural Heritage assets as a result of Offshore Project infrastructure	SM3926 Teampull Eoin, chapel, graveyard & settlement, Port Mhór Bragar, Lewis	Medium	High	None Applicable	Moderate (Significant)	N/A	Moderate (Significant)
	SM1669 Dun Borve, broch	Medium	High	None Applicable	Moderate (Significant)	N/A	Moderate (Significant)
	Other Designated and Non-designated Onshore Archaeology and Cultural Heritage assets	See assessment conclusions presented in Appendix 15.2, Volume 2c					

Activity and impact	Receptor	Magnitude of impact	Receptor sensitivity or value	Embedded mitigation measures	Significance of effect (significance)	Further environmental mitigation	Significance of residual effect (significance)
Decommissioning							
Impact 6: Direct Impacts (e.g. Foundation Removal, Cable and Cable Protections Removal etc.)	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse (Not significant)	N/A	N/A
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse (Not significant)	N/A	N/A
Impact 7: Indirect Impact (e.g. From Suspended Sediment, Changes in Current Leading to Scour Erosion or Deposition, etc.)	<i>Maju</i> (Canmore ID 217551)	Low adverse	High	M007, M008	Minor Adverse (Not significant)	N/A	N/A
	Geophysical Anomalies	No change	High	M008	Neutral (Not significant)	N/A	N/A
	Palaeolandscape features	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A
	Palaeo-environmental Remains	Negligible adverse	Medium	M007	Negligible Adverse (Not significant)	N/A	N/A

Activity and impact	Receptor	Magnitude of impact	Receptor sensitivity or value	Embedded mitigation measures	Significance of effect (significance)	Further environmental mitigation	Significance of residual effect (significance)
	Unknown archaeological remains from all periods	Low adverse	High	M007	Minor Adverse (Not significant)	N/A	N/A



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15.16 GLOSSARY OF TERMS AND ABBREVIATIONS

15.16.1.1 A list of key terms and acronyms used in this chapter are provided in **Table 15-28** and **Table 15-29**.

Table 15-28 Acronyms and abbreviations

Term	Definition
AAI	Areas of Archaeological Interest
ACOW	Archaeological Clerk of Works
AEZ	Archaeological Exclusion Zone
BCE	Before Common Era
BGS	British Geological Survey
BIIS	British-Irish Ice Sheet
BP	Before Present
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CnES	Comhairle nan Eilean Siar
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GBS	Gravity-based structures
GCR	Geological Conservation Review
HDD	Horizontal Directional Drilling
HEPS	Historic Environment Policy for Scotland
HER	Historic Environment Record
HES	Historic Environment Scotland
HMPA	Historic Marine Protected Area
JUV	Jack-up Vessel
ka	Kiloannum
MASA	Marine Archaeology Study Area
MBES	Multibeam Bathymetry
MHWS	Mean High Water Spring
MPS	Marine Policy Statement
MD-LOT	Marine Directorate - Licensing Operations Team
MSDS	MSDS Marine Limited
MSL	Mean Sea Level
nm	Nautical Miles
NMP	National Marine Plan
NPF4	National Planning Framework 4
O&M	Operation and Maintenance
OCAS	Offshore Cable Area of Search
OWSI	Offshore Written Scheme of Investigation
PAC	Preliminary Application Consultation

Term	Definition
PAD	Protocol for Archaeological Discoveries
PERD	Post excavation research design
RAF	Royal Air Force
SBP	Sub-bottom Profiler
ScARF	Scottish Archaeological Research Framework
SLVIA	Seascape, Landscape and Visual Impact Assessment
SNH	Scottish Natural Heritage
SNRHE	Scottish National Record of the Historic Environment
SSS	Sidescan Sonar
TEZ	Temporary Exclusion Zones
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
UHRS	Ultra-High Resolution Seismics
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Table 15-29 Glossary

Term	Meaning
Anthropogenic	Man-made
The Applicant	Sporad na Mara Limited (the Project owner).
Archaeology	The study of the material remains of the past
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs / OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.
Array Cables	The offshore electrical and communication cables that connect infrastructure located within the Array Area, for: <ul style="list-style-type: none"> Scenario 1: Array Cables will used to connect Wind Turbine Generators (WTGs) to each other, and to connect WTGs to the OSP. Scenario 2: Array Cables will used to connect WTGs to each other.
Array Cables to Landfall	The offshore electrical and communication cables located in the Array Area and Offshore Cables Area of Search that connect the wind turbine generators (WTGs) directly to Landfall for Scenario 2.
Combined Effects	Combined effect of the individual development on one particular receptor; for example noise, dust and visual. This includes Project-Lifetime Effects and Receptor-Led Effects.

Term	Meaning
Cultural Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions
Cumulative effects	Considers the likely significant effects of multiple impacts and activities from several developments.
Debris	Anomaly identified in geophysical survey data of possible archaeological potential
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Impact Assessment Report (EIAR)	The Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Project on the environment.
Export Cables	The offshore electrical and communication cables located in the Array Area and Offshore Cables Area of Search that connect the Offshore Substation Platform (OSP) (if required) to Landfall for Scenario 1.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded Mitigation is considered as part of the impact assessment, before effect significance is identified.
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 (e.g. bathymetry, surficial sediment type and bedforms, sub surface geology). Geophysical survey outputs typically include multibeam bathymetry, sidescan sonar, magnetometer and sub-bottom profiler data.
Grid Substation	The onshore substation located adjacent to and connecting to the SSEN Lewis Hub. This allows the voltage to be increased to meet onward transmission requirements.
Heritage Asset	An element of the historic environment that has value in policy.
Historic Environment	The physical evidence of past human activity.
Historic Seascape	Maps and describes historic cultural influences which shape present seascape perceptions across marine areas and coastal land.
Horizontal Directional Drill (HDD)	A trenchless crossing engineering technique using a drill steered underground without the requirement for open trenches. This method is able to carry out the underground installation of pipes and cables with minimal surface disruption.
Impact	Change that is caused by an action; for example, foundation installation (action) during construction which results in habitat loss (impact).
Intertidal zone	The area between Mean Low Water Springs (MLWS) and Mean High Water Springs (MHWS).

Term	Meaning
Landfall	This consists of works from offshore Horizontal Directional Drill (HDD) exit pits (located below MLWS) to onshore at the Transition Joint Bays (TJB) (located above MHWS). The infrastructure and installation methods associated with the Landfall involves both onshore and offshore components.
Lease Area	Legal agreement from the Crown Estate Scotland whereby an option over an area of foreshore or seabed is granted to a developer for an agreed purpose. If the required permissions are gained, the developer can exercise their rights to enter into a lease. In this case this is the same spatial area as the Array Area.
Marine Archaeology Study Area (MASA)	The study area used to define the historic baseline and support heritage significance assessment comprising a 2 km buffer around the Offshore Project Boundary up to the MHWS boundary.
Mean High Water Springs	The average throughout a year of the heights of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the tidal range is greatest
Mean Low Water Springs	The average throughout a year of the heights of two successive low waters during those periods of 24-hours (approximately once a fortnight) when the tidal range is greatest
Offshore Application	The application for Marine Licences under the Marine (Scotland) Act 2010 (between 0 and 12nm) and a Section 36 consent under the Electricity Act 1989.
Offshore Cables	Electrical and communication cables located within the Array Area and Offshore Cable Area of Search. The Offshore Cables consist of Array Cables, Array Cables to Landfall, and Export Cables.
Offshore Cable Area of Search (OCAS)	The area within which the offshore electrical and communication cables between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Cultural Heritage	Heritage assets located within the offshore environment below the Mean High Water Spring. These assets comprise designated heritage assets (e.g. Historic Marine Protected Areas) and non-designated heritage assets (assets noted within the United Kingdom Hydrographic Office database, locally held Historic Environment Record and the National Record of the Historic Environment or Canmore).
Offshore Project	The components of the Sporad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS).
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Onshore Application	The application for consent under the Town and Country Planning (Scotland) Act 1997 (as amended).
Onshore Cultural Heritage	Heritage assets located within the onshore environment above the Mean High Water Spring. These assets comprise designated heritage assets (e.g.

Term	Meaning
	world heritage sites, scheduled monuments, listed buildings, inventory gardens and designed landscapes, inventory battlefields, and conservation areas) and non-designated heritage assets (assets noted within the locally held Historic Environment Record and the National Record of the Historic Environment or Canmore).
Onshore Substation (ONS)	<p>A compound housing electrical equipment enabling connection to the grid. The onshore substation also contains equipment to help maintain stable grid voltage.</p> <p>Arnish/<i>Airinis</i>, an ONS, known as the 'Grid Substation', which is east of Creed Industrial Park, will be situated close to the Scottish and Southern Electricity Networks (SSEN) converter & substation, the 'Lewis Hub.' Here, the electricity will be converted to high-voltage direct current (HVDC) before being transmitted across the Minch/A' <i>Mhaoil</i> to mainland Scotland/<i>Alba</i>.</p>
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 (e.g. 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 landscape changed through time as a result of natural processes and human activities.
Project	The Spiorad na Mara offshore wind farm development. This term describes the whole development, including all offshore and onshore components.
Project Boundary	The 'red line boundary' encompassing all offshore and onshore components of the Project.

Term	Meaning
Project Design Envelope	A description of the range of possible components that make up the Project design options under consideration when the exact engineering parameters are not yet known.
Protected Wrecks	High significance shipwrecks designated for their historical, archaeological or artistic importance under the Protection of Wrecks Act 1974.
Receptor-Led Effects	Assessment of the scope for all combined effects to interact, spatially and temporally, to create an effect on a receptor of greater significance than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.
Scoping Opinion	A report presenting the written opinion of the Scottish Ministers, with input from Comhairle nan Eilean Siar (CnES) for the OTW, as to the scope and level of detail of information to be provided in the Environmental Impact Assessment (EIA) for the Project.
SSEN Lewis Hub	This is the National Grid Electricity Transmission (NGET) interface. A transmission system operator substation into which the Project will connect for onward transmission through the existing grid network.
Study Areas	Study Areas are determined for each technical discipline and are described within each technical chapter.
Transition Joint Bay (TJB)	The point at which offshore cables are connected to Onshore Cables. The TJB is located onshore above MHWS.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) and Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder engagement and environmental assessment.
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment

15.17 REFERENCES

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