

Addendum to the  
Environmental Impact  
Assessment Report

**NISA**  
*North Irish Sea Array*

Volume 8: Introductory Appendices

# Appendix A3.2

## Marine Strategy Framework Directive Assessment



North Irish Sea Array Windfarm Ltd

# Marine Strategy Framework Directive Assessment

North Irish Sea Array Offshore Windfarm

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APEMGroup

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## Acronyms

Term	Definition
DCEE	Department of Climate, Energy and the Environment
DHLGH	Department of Housing, Local Government and Heritage
ECC	Export Cable Corridor
EIAR	Environmental Impact Assessment Report
EUNIS	European Nature Information System
GES	Good Environmental Status
HWM	High Water Mark
km	Kilometre
km <sup>2</sup>	Kilometre squared
LOBE	Level of Onset of Biological adverse Effect
m	Metre
m <sup>2</sup>	Metre squared
MFE	Mass Flow Excavator
MRU	Marine Reporting Unit
MSFD	Marine Strategy Framework Directive
NIS	Non-indigenous Species
OSP	Offshore Station Platform
OWF	Offshore Wind Farm
Pa	Pascal
rms	Root mean squared
SBJ	Suction Bucket Jackets
SSC	Suspended Sediment Concentration
TSHD	Trailer Suction Hopper Dredger
UPBT	Ubiquitous Persistent Bioaccumulative and Toxic
WFD	Water Framework Directive
WTG	Wind Turbine Generator



## 1 Introduction

North Irish Sea Array Windfarm Ltd (NISA, hereafter referred to as ‘the Developer’) has been considering the Request for Further Information (RFI) issued by An Bord Pleanála (now An Coimisiún Pleanála) as well as the third-party submissions received following public consultation. At An Coimisiún Pleanála’s behest, the Developer has also continued to consult with stakeholders in respect of the 2024 planning application throughout 2024-2026. The Developer has refined elements of the design to respond to the third-party submissions, the continued public and stakeholder consultation and the RFI. Full details of consultation undertaken can be found in Appendix A.1.2 Consultation Report.

Any cross reference to a chapter, section, table, image, figure or appendix within this document is to another location within the Addendum to the EIAR unless explicitly stated otherwise. Any cross reference to anything included in the 2024 EIAR will be clearly labelled as such.

The sections relevant to Appendix A3.2: Marine Strategy Framework Directive Assessment in the RFI are included below.

RFI Section	RFI	Relevance to Chapter
1 (b)	The scientific information provided as part of the planning application documentation should be based on up-to-date survey reports and data. Accordingly, the applicant is requested to confirm/provide justification/verification that the information submitted in support of the planning application remains relevant and appropriate at the point of submitting further information or to update same as required.	The timeframes associated with the RFI have necessitated a review of the datasets previously used in the 2024 EIAR to ensure any necessary updates to the baseline environment are captured. Therefore, a review of the baseline resources and waste environment has been undertaken to comply with RFI Section 1 (b).
2 (a)	The Irish Coast Guard (IRCG), through the Department of Transport, has raised concerns in relation to the layout of the proposed development with respect to search-and-rescue (SAR) access. The applicant is requested to consult with the IRCG, in addressing these concerns, and provide	The Developer has undertaken continued consultation with the IRCG since the submission of the 2024 EIAR and the layouts have been revised in liaison with the IRCG in response to RFI Section 2 (a). These layouts include a single line of orientation (SLoO) with a linear configuration which is accompanied by a safety justification ((Appendix A17.4: North Irish Sea Array Offshore Wind Farm - Safety Justification for Single Line of Orientation Layout) in line with the requirements of Marine Guidance Note (MGN) 654. IRCG have confirmed they are content with these revisions and approach



RFI Section	RFI	Relevance to Chapter
	further information and clarification on such matters.	as evidenced in Appendix 17.5. Further details associated with the refined layouts are included in Appendix A5.1: Design Refinements.
2 (b)	<p>The EIAR under Chapter 17, Shipping and Navigation, states that as part of embedded mitigation, the fixed layouts for Project Option 1 and Project Option 2 comply with MGN 654 requirements (UK guidance, Maritime and Coastguard Agency, 2021). The applicant is advised that the Department of Transport Marine Survey Office (MSO) states that the proposed layout does not comply with guidance provided in MGN 654 and the MSO strongly disagrees with the summarisation of the risk to the safety of navigation posed to commercial shipping, fishing vessels, and recreational craft transiting in proximity to the southeastern corner and the Rockabill GAP. The applicant is requested to consult with the Department of Transport MSO in addressing these concerns and provide further information and clarification on such matters.</p>	<p>At that time of the 2024 EIAR, comprehensive Irish guidance was not in place and therefore use of the UK MGN 654 (MCA, 2021) was agreed for use by relevant stakeholders. Since then, the guidance had been published by Department of Transport and in line with its requirements; the Navigational Risk Assessment (NRA), which informs Chapter 17 of the EIAR, is still informed by MGN 654.</p> <p>The refined layouts for Project Option 1 and Project Option 2 have a SLoO with a linear configuration which is accompanied by a safety justification (Appendix A17.4) in line with the requirements of MGN 654. The wind turbine (WTG) layouts for both Project Options 1 and 2 have also been set back from the south eastern corner which was central to the MSO's concerns.</p> <p>Continued consultation has occurred with the MSO since the submission of the 2024 EIAR in response to RFI Section 2 (b). The MSO has since confirmed (during a meeting in March 2026 as outlined in Section 4 of the NRA (Appendix A17.1)) their contentment and acceptance of the new proposed layouts noting that the PIANC guidance (PIANC, 2018) was also applied to the Rockabill Gap and resulted in an increased Structure Exclusion Zone, to which the MSO have deemed suitable for safe navigation.</p>
3.	National Marine Planning Framework Policies: Habitats and Noise	
n/a	<p>The Board notes the information contained in Appendix 3.1 of Volume 8 of the EIAR, titled 'National Marine Planning Framework Compliance Report', which sets out how the project meets the requirements of the NMPF. The Board also notes the March 2024 Commission Notice on the threshold values set under</p>	<p>The MSFD Assessment presents the Developer's assessment of the potential impacts of the proposed development on the MSFD criteria D6C4, and D6C5, D11C1 and D11C2 (further detailed below). The risk to achieving and or maintaining Good Environmental Status (GES) is assessed considering existing environmental targets associated with each descriptor feature and the current status of the descriptor feature in Irish waters.</p> <p>The conclusion of the assessment determined that the proposed development will not result in a</p>



RFI Section	RFI	Relevance to Chapter
	<p>the Marine Strategy Framework Directive 2008/56/EC and Commission Decision (EU) 2017/848, in particular the four thresholds established for habitat loss (D6C4), adverse effects on habitats (D6C5), impulsive noise (D11C1) and continuous noise (D11C2) listed in the Annex to this Commission Notice.</p> <p>The Board considers the use of these thresholds would assist in achieving consistency in the presentation of the results across Irish Sea Phase 1 ORE projects and would facilitate the assessment of the relevant NMPF policies based on EU agreed indicators and thresholds. The applicant is therefore requested to:</p>	<p>deterioration of the current overall status of the Celtic Sea North Inner MRU or broad habitat types therein, or jeopardise the attainment of GES.</p>
3 (a)	<p>Model, map and present the areal and temporal extent of the potential impact of the proposed development (accounting where appropriate for each design option), for the full construction and operation campaign, on the following indicators:</p> <ul style="list-style-type: none"> <li>i. the potential spatial extent of habitat lost (D6C4)</li> <li>ii. the potential spatial extent of habitat adversely effected (D6C5)</li> <li>iii. the modelled impulsive noise (D11C1) with and without abatement; and</li> <li>iv. the modelled continuous noise (D11C2)</li> </ul>	<p>The Developer can confirm that the potential impact of the proposed development on the MSFD criteria D6C4, and D6C5, D11C1 and D11C2 is considered within this document. This draws on assessments presented within the wider EIAR and a summary of the conclusions from the MSFD assessment against indicators i. – iv. is provided below in the RFI responses 3 b-d.</p>
3 (b)	<p>Assess the results obtained for potential habitat loss and habitat adversely affected in a) above, to be assessed</p>	<p>The Developer confirms that the results obtained for potential habitat lost loss (D6C4) and habitat adversely effected affected (D6C5), have been assessed with respect to the 2% threshold in Chapter</p>



RFI Section	RFI	Relevance to Chapter
	<p>against the 2% thresholds established for habitat loss (D6C4) and the 25% threshold for adverse effects on habitats (D6C5) for the MSFD Celtic Seas North Inner Marine Reporting Unit, see Ireland’s Draft Marine Strategy Part 1 Article 8, 9 and 10 report 2024 including its annexes, published in July 2024.</p>	<p>12: Benthic Subtidal and Intertidal Ecology. A summary from this document is presented below:</p> <p>D6C4 – The Developer has assessed the loss of the different habitat types found within the footprint of the proposed development including offshore circalittoral mud; offshore circalittoral sand; circalittoral mud, circalittoral sand, infralittoral sand; and infralittoral rock/biogenic reef. The minor loss of these habitats will not alter the current status of GES.</p> <p>D6C5 – The Developer has assessed effects of the proposed development on the condition of the habitat types (listed in the point above). The percentage of offshore circalittoral mud already adversely effected affected is already above the 25% GES target and as such does not achieve GES. The proposed development contributes to a negligible increase in this area (0.18%). For all other habitats, the proposed development will not change the achievement of GES targets for both loss and adversely affected thresholds.</p>
3 (c)	<p>Assess the results obtained from modelled impulsive (with and without abatement) and continuous noise in a) to be assessed against the relevant thresholds values for impulsive and continuous noise set out in the above referenced Commission Notice.</p>	<p>Following receipt of the RFI and subsequent stakeholder meetings with the IRCG, MSO, Irish Lights and NPWS, careful consideration was given to understanding how a refined design could address specific requests contained within the RFI, whilst also further mitigating potential environmental effects from the proposed development.</p> <p>This includes (but is not limited to):</p> <ul style="list-style-type: none"> <li>• Removal of both driven and drilled monopiles and jackets with pin piles as options for the WTG foundations from Project Option 1 and Project Option 2 and a refinement to the WTG foundation installation methodology to jackets with suction buckets (hereafter referred to as ‘SBJs’) for Project Option 1 and Project Option 2 to address key stakeholder concerns in the RFI around underwater noise. Suction buckets are a low underwater noise solution for WTG installation and a proven technology on other wind farms; and</li> <li>• Removal of monopile foundations for the Offshore Substation Platform (OSP), and refinement of the OSP foundation installation to jackets with suction buckets or drilled pin</li> </ul>



RFI Section	RFI	Relevance to Chapter
		<p>piles which significantly reduces potential underwater noise effects during construction from piling activities and responds to key concerns from NPWS on this matter within the RFI.</p> <p>The installation of these foundation types reduces the level of underwater noise generated by the proposed development as no piling is required (i.e. there is no impulsive noise from their construction) for their installation.</p> <p>A summary from this document is presented below:</p> <ul style="list-style-type: none"> <li>• D11C1 – The Developer has amended the foundation types used for the WTG from monopiles or jackets with pin piles, to suction bucket jackets (SBJ) and the OSP foundations are amended to SBJ with or jackets with drilled pin piles. There is no impulsive noise from the foundation construction and no noise abatement is required. The main source of impulsive noise is the clearance of UXOs in the pre-construction stage, which has been assessed and mitigation proposed, in the unlikely scenario high order UXO detonation is required. The assessment determined that there is no significant effect in EIA terms and no risk in relation to GESW under D11C1 Impulsive Noise.</li> <li>• D11C2 – There has been sufficient assessment undertaken to date to demonstrate a negligible impact or risk from continuous noise for operational offshore wind farms and modelling and mapping is therefore not required (refer to Appendix A3.2 for further details). The Developer has assessed the introduction of vessels during construction and operation and maintenance of the proposed development and this is not expected to significantly increase the existing continuous underwater noise levels. Using the harbour porpoise as the selected receptor organism for the assessment, the continuous noise impacts from vessels will have an imperceptible effect. The assessment concluded that there is no significant effect in EIA terms and no risk in</li> </ul>



RFI Section	RFI	Relevance to Chapter
		relation to GES under D11C2 modelled continuous noise.
3 (d)	<p>Incorporate the output from a), b) and c) and all other relevant updates made as a result of this request for further information, into a revised assessment of the NMPF policies, particularly Biodiversity Policy 2, Seafloor Integrity Policies 1, 2 and 3, Fisheries Policy 5 and Underwater Noise Policy 1. This revised assessment should fully account for the distinction the NMPF places on 'important' species and habitats as defined on page 35 and 36 of the NMPF.</p>	<p>The Developer has prepared a revised Appendix A3.1 National Marine Planning Framework Compliance Report, which addresses policies identified in 3(d) and which fully accounts for the distinction the NMPF places on important species and habitats.</p>
n/a	<p>The spatial extent of the modelled potential habitat loss, habitat adversely effected and impulsive and continuous noise should be provided in GIS format, see Technical Note Appendix A.</p>	<p>The Developer has prepared a package of GIS data which includes the modelled potential habitat loss and habitat adversely effected. Noise contours from impulsive noise have been provided within the package however, noise contours of continuous noise have not been produced for the assessment as they will have an imperceptible effect and are therefore not required.</p> <p>The data files submitted comply with the requirements of Appendix A of the RFI .</p>
10 (a)	<p>The details that have been submitted in relation to underwater noise arising from the proposed development acknowledges the potential for impacts to arise on marine fauna from both Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) over significant areas. The Wildlife Act 1976, as amended, lists marine mammals, including all dolphin, porpoise, seal and whale species as protected, (with subsequent regulations also applying</p>	<p>On foot of the submissions received in response to the Developer's planning application, this continued public consultation and the RFI issued by the Commission, the Developer considers that design refinements to the offshore infrastructure of the proposed development are required in response and to take account of matters raised in the RFI and continued public consultation undertaken.</p> <p>As detailed in Appendix A5.1 Design Refinements, the refinement of WTG foundations installation methodology to jackets with suction buckets significantly reduces underwater noise during installation when compared to monopiles and jackets with pin piles. Suction buckets are an established jacket installation method on windfarms, having been in use since 2015 and on wind farms such as</p>



RFI Section	RFI	Relevance to Chapter
	<p>protections to all species of marine turtles and basking sharks) stating that it is an offence to hunt, injure, or wilfully interfere with/destroy the resting or breeding place of such species. The January 2014 ‘Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources’ published by the Department of Arts, Heritage and the Gaeltacht (NPWS (2014)), notes that sound sources with the potential to induce TTS in a receiving marine mammal has the potential to cause both disturbance and injury. This guidance has a statutory basis under Regulation 71 of SI No. 477 of 2011, and refers to the “offence to injure” under the Wildlife Act, 1976, noting that TTS “may constitute such an injury”.</p> <p>Having regard to information submitted in the EIAR, the NPWS underwater noise guidelines (NPWS, 2014), the strict protections afforded to marine mammals under the Wildlife Act 1976, as amended, in addition to observations from prescribed bodies and observers, the Board requires a comprehensive suite of noise abatement measures to be proposed and assessed in addition to the existing mitigation measures referenced in the planning application documentation. The applicant is therefore requested to submit:</p>	<p>Seagreen in Scotland (1,075 MW wind farm constructed in 2023). They have multiple environmental benefits when compared to monopile foundations and also to a lesser extent, pin pile construction method (noting pin piles are still being considered for the OSP jacket installation for Option 1 and 2, but which also has much reduced underwater noise effects when compared with monopiles).</p> <p>The use of suction buckets removes the option of driven monopile foundations for both Project Option 1 and Project Option 2, meaning no percussive piling is required for the proposed development resulting in a significant reduction in underwater noise generated. Data collected at the Seagreen offshore wind farm during the installation of suction bucket caissons indicated that the overall increase in underwater noise levels was limited, with measured rises of approximately 3–5 dB relative to the pre-installation baseline. Comparison of noise levels during suction and non-suction periods within the same construction day showed similarly small differences (Chudzinska, et al., 2026). These findings suggest that vessel traffic, mobilisation activities and other ancillary operations are major contributors to the elevated underwater noise observed on construction days, with jackets with a suction bucket installation method similar to background noise levels and noise from vessels. This is because the only noise generated is from the pump which installs the suction buckets on the seabed and is supported by evidence during construction of other wind farms like Seagreen in Scotland, which did not require a Noise Abatement System (NAS) for WTG installation (Seaway, 2023). It should be noted that drilled pin piles are being considered for the OSP jacket installation for Project Options 1 and 2 and this method of installation is also associated with lower levels of underwater noise when compared with impact piling. The potential impacts of drilling of the OSP pin piles are assessed in Chapter 14.</p> <p>Based on these design refinements, the Developer in proposing this design mitigation measure of WTG jackets with a suction bucket construction methodology negates the need for noise abatement as a mitigation measure for underwater noise generation in relation to WTG foundation installation</p>



RFI Section	RFI	Relevance to Chapter
	<p>A comprehensive review of relevant mitigation, in addition to what is currently contained in the submitted documentation, specifically appropriate noise abatement measures, which could be applied to the proposed development to reduce/restrict the propagation of noise through the marine environment and provide realistic values for the reduction in sound level possible from these technologies. The review must consider the range of suitable abatement measures available, including consideration of, at a minimum, bubble curtains, casings, resonators, and alternative hammer/piling technologies to reduce noise emissions, and set out in detail the suitability of such measures for the construction of the proposed development at this location, including restrictions in relation to their suitability, where relevant.</p> <p>The applicant must also consider and draw on the best available technology and thresholds, including as applied in other EU jurisdictions (e.g. Germany; Belgium; Netherlands; Denmark), to identify and provide for suitable noise abatement to reduce the level and extent of potential noise impacts arising from the proposed development. Examples include the German 160 dB re 1 <math>\mu\text{Pa}^2\text{s}</math></p>	<p>and has provided further assessment and rationale for this in Chapter 14: Marine Mammal Ecology.</p> <p>Impacts relating to piling have been removed from Chapter 14: Marine Mammal Ecology.</p> <p>Section 14.2.9 Auditory Injury, in Chapter 14: Marine Mammal Ecology. The Developer does not consider TTS to be auditory injury, refer to Appendix A14.4: Temporary Threshold Shift Position Statement which details this position.</p> <p>Section 14.2.9.2 PTS – UXO clearance in Chapter 14: Marine Mammal Ecology. In the event that low order clearance of the UXO is not possible, High order UXO clearance may be required. The Developer has committed to the use of a Noise Abatement System (NAS) (e.g. bubble curtains or similar) if high order UXO clearance is required.</p>



RFI Section	RFI	Relevance to Chapter
	<p>SELss and 190 dB re 1 <math>\mu</math>Pa SPLpeak thresholds that must not be exceeded at a distance of 750m from a piling site; or the frequency weighted SELcum PTS thresholds (e.g. harbour porpoise 155 dB re 1<math>\mu</math>Pa<sup>2</sup>s) that must not be exceeded for a fleeing animal with a starting distance of 200m in Denmark.</p> <p>Revised noise modelling and mapping which provides detailed consideration of the noise abatement strategy selected in response to (i) above and include:</p> <p>The modelled SPLpeak and SELcum PTS and TTS contours, for each functional hearing group potentially present, emanating from the existing locations proposed in the application, which are at the periphery of the proposed development, to demonstrate the full potential spatial extent of underwater noise propagation. Modelling must also show the noise level (SPLpeak, SELss) at 750m from the locations of each of the piling activities selection.</p> <p>The modelled SELss contours for 120-180 dB re 1<math>\mu</math>Pa<sup>2</sup>s at 5 dB increments at the locations in the point above. Mapping provided must show the relevant noise contours in the context of implementing the abatement technologies/ measures identified at (1) above, and should be displayed</p>	



RFI Section	RFI	Relevance to Chapter
	<p>alongside the noise contours in the absence of any such noise abatement measures being implemented.</p> <p>Revised details showing the change in total impacted individuals of each species before and after consideration of noise abatement technologies.</p> <p>Modelling must be performed for monopiles and pin piles, as both are under consideration within the project design envelope.</p> <p>Any additional abatement and / or mitigation measures should also be considered in the context of their potential for reduction of cumulative effects with other projects in terms of underwater noise.</p>	

## 1.1 Background to the Assessment

- 1.1.1 This Marine Strategy Framework Directive Assessment has been prepared by GoBe Consultants Limited (GoBe) on behalf of North Irish Sea Array Windfarm Limited (the Developer).
- 1.1.2 The North Irish Sea Array (NISA) Offshore Wind Farm (OWF) (hereafter the proposed development) is an offshore wind energy project being proposed off the coast of counties Dublin, Meath and Louth.
- 1.1.3 This document sets out the Developer’s assessment of the potential impacts of the proposed development on MSFD criteria (listed below), as requested by An Bord Pleanála in the Request for Further Information (RFI). The incorporation of the outputs within the NMPF are presented within Appendix A3.1 NMPF Compliance Report.



1.1.4 Under RFI Section 3, An Bord Pleanála stated “The Board notes the information contained in Appendix 3.1 of Volume 8 of the EIAR, titled ‘National Marine Planning Framework Compliance Report’, which sets out how the project meets the requirements of the NMPF. The Board also notes the March 2024 Commission Notice on the threshold values set under the Marine Strategy Framework Directive 2008/56/EC and Commission Decision (EU) 2017/848, in particular the four thresholds established for habitat loss (D6C4), adverse effects on habitats (D6C5), impulsive noise (D11C1) and continuous noise (D11C2) listed in the Annex to this Commission Notice. The Board considers the use of these thresholds would assist in achieving consistency in the presentation of the results across Irish Sea Phase 1 ORE projects and would facilitate the assessment of the relevant NMPF policies based on EU agreed indicators and thresholds. The applicant is therefore requested to:

*Model, map and present the areal and temporal extent of the potential impact of the proposed development (accounting where appropriate for each design option), for the full construction and operation campaign, on the following indicators:*

- *the potential spatial extent of habitat lost (D6C4);*
- *the potential spatial extent of habitat adversely effected (D6C5);*
- *the modelled impulsive noise (D11C1) with and without abatement; and*
- *the modelled continuous noise (D11C2).*

*Assess the results obtained for potential habitat loss and habitat adversely affected in a) above, to be assessed against the 2% thresholds established for habitat loss (D6C4) and the 25% threshold for adverse effects on habitats (D6C5) for the MSFD Celtic Seas North Inner Marine Reporting Unit, see Ireland’s Draft Marine Strategy Part 1 Article 8, 9 and 10 report 2024 including its annexes, published in July 2024.*

*Assess the results obtained from modelled impulsive (with and without abatement) and continuous noise in a) to be assessed against the relevant thresholds values for impulsive and continuous noise set out in the above referenced Commission Notice.*

*Incorporate the output from a), b) and c) and all other relevant updates made as a result of this request for further information, into a revised assessment of the NMPF policies, particularly Biodiversity Policy 2, Seafloor Integrity Policies 1, 2 and 3, Fisheries Policy 5 and Underwater Noise Policy 1. This revised assessment should fully account for the distinction the NMPF places on ‘important’ species and habitats as defined on page 35 and 36 of the NMPF.”*

1.1.5 Additionally, in response to the Request for Further Information (RFI) regarding the offshore elements of the proposed development, the Developer has undertaken extensive design work to address the issues raised. As a result, design refinements are now proposed, informed by this engagement and design process. These refinements are detailed in Chapter 6, Description of the Proposed Development of the EIAR, and Chapter 8, Construction Strategy – Offshore of the EIAR.



## 1.2 Report Aim

- 1.2.1 The purpose of this assessment is to determine if the proposed construction, operation and decommissioning of the proposed development is compliant with the objectives of the MSFD (Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008, establishing a framework for community action in the field of marine environmental policy, as amended by Commission Directive (EU) 2017/845 of 17 May 2017). This is to ensure the proposed development does not prevent Ireland's marine environment maintaining or achieving Good Environmental Status (GES) and to protect the resource base for economic and social activities in the marine environment. GES (as defined in Article 3(5) of the MSFD<sup>1</sup>) means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.
- 1.2.2 Additional guidance on the reading of the document is provided in the RFI Report.

## 1.3 General Description of the Site

- 1.3.1 For the purposes of this document, this section is limited to providing an overview of the key characteristics of the site that are directly relevant to the assessments presented. It does not seek to provide an exhaustive description of all site features but rather focuses on those aspects necessary to inform the assessment process and support the conclusions drawn.
- 1.3.2 Ireland's Marine Atlas (Marine Institute, 2022) indicates that the array area is characterised primarily by sandy muds while the Export Cable Corridor (ECC) encompasses areas of sand and muddy sand. Overall, the area surrounding the proposed development can be considered as a region of net deposition fine sediments (fine sands, silts, and muds) which is largely unresponsive to the influence of waves or tides with generally low concentrations of suspended sediment (See Section 12.3 in Chapter 12 Benthic Subtidal and Intertidal Ecology of the EIAR).
- 1.3.3 These attributes are known to be shared with the wider area known as the Western Irish Sea Mud Belt (Coughlan, 2015). Across the ECC sediment transport patterns are driven by increased effects of tidal current and waves associated with the relatively shallow water which results in a lower proportion of fines in bed sediments and increased suspended sediment concentration (SSC) compared to further offshore.

## 1.4 Project Description

- 1.4.1 The proposed development is a combination of offshore infrastructure and onshore infrastructure (refer to Environmental Impact Assessment Report (EIAR) Chapter 1 Introduction). For clarity, while the proposed development is assessed as a whole in the EIAR, the boundary between onshore and offshore infrastructure is the high-water mark (HWM) as defined by Ordnance Survey Ireland mapping. This report considers only those parts of the proposed development to be located below the HWM (referred to as the offshore development area).

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<sup>1</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008L0056>



1.4.2 The offshore infrastructure of the proposed development will consist of the following:

- Array area: The nearest point is approximately 11.3km offshore (Figure 2.1). This includes the wind turbine generators (WTG), inter-array cables and the offshore substation platform (OSP);
- Offshore Export Cable Corridor: This is where the offshore electrical infrastructure, consisting of two subsea offshore export cables that will be routed from the offshore station platform to landfall.

1.4.3 These elements are described in further detail in Chapter 6 Offshore Description Chapter and Chapter 8 Offshore Construction Chapter of the EIAR.

1.4.4 The Developer is including two Project Options for consideration within the planning application. At the detailed design stage post-consent, just one Project Option will be chosen as the Preferred Option and subsequently constructed. This assessment considers Project Option 1 which is deemed to be the option with the greatest magnitude of impact. Project Option 1 consists of:

- 49 WTG with suction bucket jacket (SBJ) foundations;
- One OSP with SBJ foundations or pin pile foundations;
- 111km of inter-array cabling; and
- Two 18km long offshore export cables.

1.4.5 Construction activities are considered when determining the potential for disturbance. . Various options are being considered to develop the cable trench for inter-array and export cables, including mechanical trenching (for harder soils), jetting or ploughing. A full description of the construction activities is provided in Chapter 8: Construction Strategy – Offshore of the EIAR.



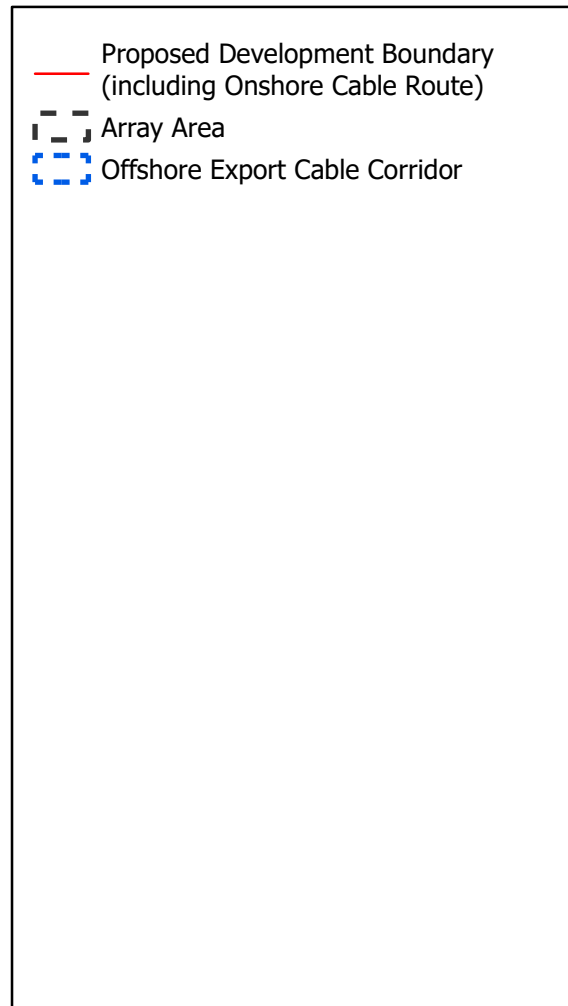
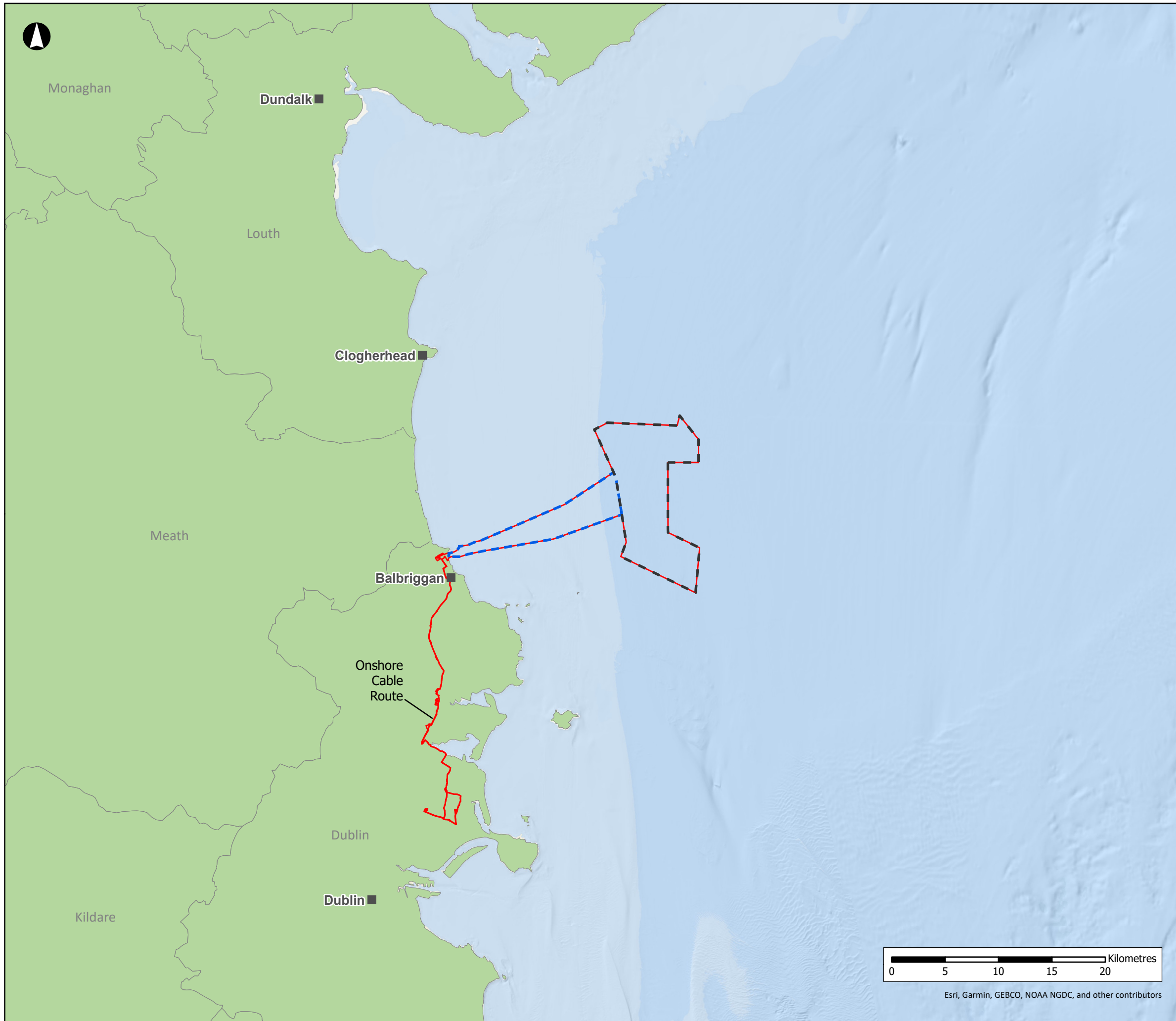
## 2 Policy and Legislative Context

- 2.1.1 Article 3 of the MSFD requires all EU member states, including Ireland, to reach GES in the marine environment by 2020. The purpose of the MSFD is to help develop ocean economy whilst protecting and preserving the marine environment. GES in the marine environment means that the seas are clean, healthy and productive, and that human use of the marine environment is kept at a sustainable level. GES (as defined in Article 3(5) of the MSFD<sup>2</sup>) means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.
- 2.1.2 The MSFD was transposed into Irish law by S.I. 249 of 2011 - European Communities (Marine Strategy Framework) Regulations 2011, as amended by S.I. No. 265/2017 - European Communities (Marine Strategy Framework) (Amendment) Regulations 2017 and S.I. No. 648/2018 - European Communities (Marine Strategy Framework) (Amendment) Regulations 2018 (hereafter referred to as the MSFD Regulations).
- 2.1.3 The MSFD is implemented in six-year cycles, with reporting to the European Commission taking place sequentially every two years. The MSFD is currently in its third cycle (2023-2028), with Article 8 GES assessment of Ireland's marine environment presented in Ireland's Marine Strategy Part 1 (Department of Climate, Energy and the Environment (DCEE), 2025). This document also contains a revised set of environmental targets for each of the 11 qualitative descriptors of the MSFD and a socio-economic assessment on uses and activities and costs of degradation to the marine environment.

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<sup>2</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008L0056>





# NISA

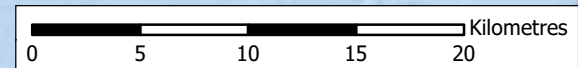
*North Irish Sea Array*

**ARUP**   **GoBe**

**Project**  
**North Irish Sea Array**  
**Offshore Wind Farm**

**Figure Title**  
**Location and Boundaries of the Proposed Development**

<b>Job No:</b> 281240	<b>Datum:</b> WGS84 <b>Projection:</b> UTM30N
<b>Date:</b> Sept 2025	<b>Figure No:</b>
<b>Scale:</b> 1:350,000 @A3	<b>2.1</b>
<b>Status:</b> Issue	



Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

### 3 MSFD Assessment Methodology

- 3.1.1 At the time of writing, no specific guidance has been published regarding how Developers should assess compliance with the MSFD. However, the assessment has been informed by the assessment provided within the Ireland’s Marine Strategy Part 1 Article 8, 9 and 10 report and Appendices (DHLGH, 2024 and DCEE, 2025).
- 3.1.2 Annex I of the MSFD outlines 11 qualitative descriptors for determining GES under Article 9 of the Directive by which GES is measured and monitored. The descriptors are divided into those that characterise the condition of the marine environment and those that refer to anthropogenic pressures, as shown in Table 3.1 below. Article 8 of the MSFD requires an assessment of the status of the marine environment in relation to all 11 descriptors (Article 8.1(a)) and an analysis of the pressures and the effects they have on the state of the marine environment (Article 8.1(b)). The descriptors and current status for Irish waters are given in Table 3.1.
- 3.1.3 The MSFD impact assessment has been carried by completing a detailed assessment for each qualitative descriptor that is considered likely to be affected by the proposed development, and identification of any areas of non-compliance and consideration of mitigation measures. The impact assessment considers what (if any) pressures the activity may create on the marine environment, identifies the receptors likely to be affected and determines whether there is potential for deterioration in the status of the descriptor as a result of the proposed development. The risk to achieving and or maintaining GES is assessed considering existing environmental targets associated with each descriptor feature and the current status of the descriptor feature in Irish waters.
- 3.1.4 This MSFD assessment draws information from the 2024 Environmental Impact Assessment Report (EIAR) (NISA, 2024) submitted as part of the application, and where relevant, information presented in the updated EIAR. Signposts to the relevant aspects of the EIAR are provided.



Table 3.1 Qualitative Descriptors and Descriptor Features for Determining GES and Current GES Status of Irish Waters (green = GES achieved; orange = GES partially achieved; red = GES not achieved; grey = GES unknown; white = GES not assessed) (DHLGH, 2024, and DCEE, 2025).

No	Descriptor (Overall current GES status)	Descriptor Criteria (Current GES Status)	Overall Target
D1	<b>Biodiversity</b> (Ireland has achieved GES for some elements of biological diversity, but the status for many species groups is unknown. Numerous species, in particular a significant proportion of fish species, are not in GES.)	D1C1 Mortality Rate Incidental By Catch (GES Not Achieved)	Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.  The mortality rate per species from incidental bycatch should be below levels which threaten the species, such that its long-term viability is ensured.
		D1C2 Population Abundance (GES Partially Achieved)	
		D1C3 Population Demographic Characteristics (GES Not Assessed)	
		D1C4 Species Distributional Range Extent (GES Partially Achieved)	
		D1C5 Species Habitat Extent (GES Partially Achieved)	
		D1C6 Pelagic Habitat Condition (GES Not Assessed)	
D2	<b>Non-indigenous species (NIS)</b> (GES has been achieved, based on data from 2015-2020.)	D2C1 Newly Introduced Species (GES Achieved)	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
D3	<b>Commercial fish and shellfish</b> (GES has been partially achieved for commercially exploited fish and shellfish in Ireland’s marine environment.)	D3C1 Maximum Sustainable Yield (GES Partially Achieved)	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
		D3C2 Spawning Stock Biomass (GES Partially Achieved)	
		D3C3 Age/Size Distribution (GES Unknown)	
D4	Food webs	D4C1 Trophic guild species diversity (GES Unknown)	All elements of the marine food webs, to the extent that they are known, occur at normal abundance



No	Descriptor (Overall current GES status)	Descriptor Criteria (Current GES Status)	Overall Target
	(Environmental Status for food webs remains unclear.)	D4C2 Abundance across trophic guilds (GES Unknown) D4C3 Trophic guild size distribution (GES unknown) D4C4 Trophic guild productivity (GES unknown)	and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
D5	<b>Eutrophication</b> (GES has been achieved for eutrophication within Ireland's marine environment.)	D5C1 Nutrient - Nitrogen (GES Achieved) D5C1 Nutrients - Phosphorous (GES Achieved) D5C2 Chlorophyll-a (GES Achieved) D5C5 Dissolved Oxygen (GES Achieved)	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
D6	<b>Sea-floor integrity</b> (GES for sea-floor integrity has been achieved in 74% of Ireland's assessment area, however, 15% remains either not assessed or unknown, while 11% is not in good status.)	D6C1 Benthic Habitat Physical Loss (GES Partially Achieved) D6C2 Benthic Habitat Disturbance (GES Partially Achieved) D6C3 Adverse Effects from Physical Disturbance (GES Partially Achieved) D6C4 Benthic Habitat Extent of Habitat Loss (GES Partially Achieved) D6C5 Benthic Habitat Condition (GES Partially Achieved)	Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
D7	<b>Hydrographical conditions</b> (GES has been achieved for hydrographical conditions in Ireland's marine environment.)	D7C1 Permanent Alteration of Hydrological Conditions (GES Achieved)	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.



No	Descriptor (Overall current GES status)	Descriptor Criteria (Current GES Status)	Overall Target
		D7C2 Adverse Effects from Permanent Alteration of Hydrological Conditions (GES Achieved)	
D8	<b>Contaminants</b> (GES has been largely achieved for concentrations of contaminants in seawater, sediments and biota in Irish coastal and marine waters and with few exceptions concentrations are at levels that ensure the protection of the marine environment.)	D8C1 Contaminants Non-Ubiquitous, Persistent, Bioaccumulative, and Toxic (UPBT) Substances and UPBT Substances (GES Achieved) D8C2 Adverse Effects of Contaminants (GES Achieved) D8C3 Significant Acute Pollution (GES Achieved)	Concentrations of contaminants are at levels not giving rise to pollution effects.
D9	<b>Contaminants in seafood</b> (Contaminants in fish and other seafood for human consumption do not exceed levels established by Union legislation or other relevant standards.)	D9C1 Contaminants in Seafood (GES achieved)	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
D10	<b>Marine Litter</b> (GES has not been achieved for beach litter in Ireland's marine environment. The status of macro litter on the seafloor remains unknown, while micro and macro litter floating and micro litter on the seafloor remain unassessed.)	D10C1 Beach Litter (GES Not Achieved) D10C1 Seabed Litter (GES Unknown) D10C2 Micro-Litter (GES Not Assessed)	Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
D11	<b>Energy, including underwater noise</b>	D11C1 Impulsive Noise (GES Achieved)	



No	Descriptor (Overall current GES status)	Descriptor Criteria (Current GES Status)	Overall Target
	(GES has been achieved for continuous and impulsive noise in Ireland's marine environment.)	D11C2 Continuous noise (GES Achieved)	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.



## 4 MSFD Impact Assessment

4.1.1 For the D6 criteria, while the An Bord Pleanála recommendation only required an assessment of D6C4 and D6C5, the way MSFD indicators are structured means this report provides an assessment of all D6 criteria (C1 to C5).

### 4.2 D6 Seabed Integrity

4.2.1 The proposed development is entirely located within the Celtic Sea North Inner Marine Reporting Unit (MRU). As the MSFD required reporting at MRU level, the sections below provide an assessment of the potential impact of the proposed development to seabed integrity within the Celtic Sea North Inner MRU.

4.2.2 The MSFD indicator assessment examples provided in DHLGH (2024) and DCEE (2025) include the contribution of a number of activities, including fishing (benthic trawling), and cabling. The assessments provided below use magnitude calculations presented in Chapter 12 Benthic Subtidal and Intertidal Ecology – Table A12.8. Figures are included for areas of disturbance for a number of activities within Table A12.8 of Chapter 12. However, sediment redistribution (if required) is not within Table A12.8 of Chapter 12, a conservative multiplication of 1.5 is included here for all disturbance area calculations to include the contribution of sediment redistribution.

#### D6C1 Physical Loss of the Seabed Indicator

4.2.3 The targets identified within Ireland’s Marine Strategy (DHLGH, 2024) relating to Sea-floor integrity include:

*Spatial extent and distribution of physical loss (permanent change) of the natural seabed*

4.2.4 Although there are two potential Project Options (as noted in para 1.4.4), the assessment presented below are for Project Option 1, as that has the largest parameters due to there being more turbines.

4.2.5 Of the total seabed habitat within the Celtic Sea North Inner MRU, which extends to 69,000km<sup>2</sup>, 261.5km<sup>2</sup> is considered as currently lost, which represents 0.38% of the total area of the MRU (DHLGH, 2024 and DCEE, 2025).

4.2.6 The area of seabed encompassed by the array area and ECC (the offshore development area) extends to 125km<sup>2</sup>. The area of seabed lost due to placement of WTG and OSP foundations and scour protection and inter array and export cable protection is detailed in Table 4.1. This indicates that 0.527km<sup>2</sup> will be lost which represents 0.0008% of the whole seabed within the MRU.

4.2.7 Consequently, the proposed development represents a negligible addition to the area of seabed already lost and will not impact on the GES of the MRU in relation to overall physical loss of the seabed. The total area of seabed loss will increase from 0.38% to 0.3808%.



Table 4.1 Area of seabed lost under footprint of OWF Infrastructure

Infrastructure	Number of Structures	Footprint of Structure (m <sup>2</sup> )	Total Area (m <sup>2</sup> )	Total Area (km <sup>2</sup> )
WTG with Scour Protection	49	7,543	369,605	0.370
OSP with Scour Protection	1	7,543	7,543	0.008
Inter Array Cable Protection (20% of 111km at 5m wide)	1	111,000	111,000	0.111
Export Cable Protection (20% of 18km at 5m wide)	2	18,000	36,000	0.036
Pre- and Post-lay Rock Berm	5	550	2,750	0.003
<b>Total</b>			<b>526,898</b>	<b>0.527</b>

## D6C2 Physical Disturbance of the Seabed Indicator

*Spatial extent and distribution of physical disturbance pressures on the seabed*

- 4.2.8 Across the Celtic Sea North Inner MRU approximately 43,000km<sup>2</sup>, or 27% of the seafloor in this area, is experiencing some degree of disturbance (DHLGH, 2024 and DCEE, 2025).
- 4.2.9 The area of seabed disturbed due to activities such as jack-up deployments, inter array and export cabling is detailed in Table 4.2. The total area of seafloor that will be disturbed by the proposed development is 9.325km<sup>2</sup>, which represents 0.014% of the whole seabed within the MRU.

Table 4.2 Area of seabed disturbed due to proposed development

Infrastructure	Number of Structures	Area of Disturbance per Structure (m <sup>2</sup> )	Total Area including 1.5 multiplier (m <sup>2</sup> )	Total Area including 1.5 multiplier (km <sup>2</sup> )
Repeat attempts - Caisson Footprint	n/a	7,070	10,604	0.011
Wet Storage allowance - Caisson Footprint	n/a	7,070	10,604	0.011
2x Jack-up deployments at each WTG (No. 49) & OSP (No.1) and Allowance for relocating/micrositing (No.10)	60	1,885	339,300	0.339
Cable seabed preparation and installation in the array area (at 40m wide)	1	4,440,000	6,660,000	6.660
Boulder required to be cleared Array Area	490	19.6	14,432	0.014
Anchors and Buoys Array Area	n/a	75,960	113,940	0.114



Cable seabed preparation and installation in the ECC (at 40m wide)	2	720,000	2,160,000	2.160
HDD Exit Pits	2	2,078	6,234	0.006
Boulder required to be cleared ECC	10	19.6	295	0.000
Anchors and Buoys ECC	n/a	6,480	9,720	0.010
<b>Total</b>			<b>9,325,129</b>	<b>9.325</b>

4.2.10 Consequently, the proposed development represents a negligible addition to the area of seabed disturbed and will not impact on the GES of the MRU in relation to overall disturbance of the seabed. The area of disturbance from the proposed development, could be added onto the current ‘Disturbed’ area, giving a total of 43,009.325km<sup>2</sup> or 27.014% of the MRU.

4.2.11 Currently, the area of seabed in the vicinity of the proposed development, is already almost entirely assessed as ‘Disturbed’ as referenced in Ireland’s Marine Strategy Part 1: Assessment of the Marine Environment – Annex III (DHLGH, 2024 and DCEE, 2025). As such, whilst the proposed development will disturb approximately 0.014% of the MRU, the majority of that area is already assessed as disturbed and would contribute towards the current 27% of the seafloor that is already ‘Disturbed’, and as such is likely to be highly conservative.

### D6C3 Adverse Effects from Physical Disturbance of Broad Habitat Type

*The spatial extent of each habitat type which is adversely affected, through change in its biotic and abiotic structure and its functions (e.g. through changes in species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), by physical disturbance.*

4.2.12 Ireland’s Marine Atlas (Marine Institute, 2022) maps broadscale regional habitats to EUNIS Level 3 which indicates that the dominant habitats across the offshore development area are:

- offshore circalittoral mud;
- offshore circalittoral sand;
- circalittoral mud;
- circalittoral sand;
- infralittoral sand; and
- infralittoral rock/biogenic reef.



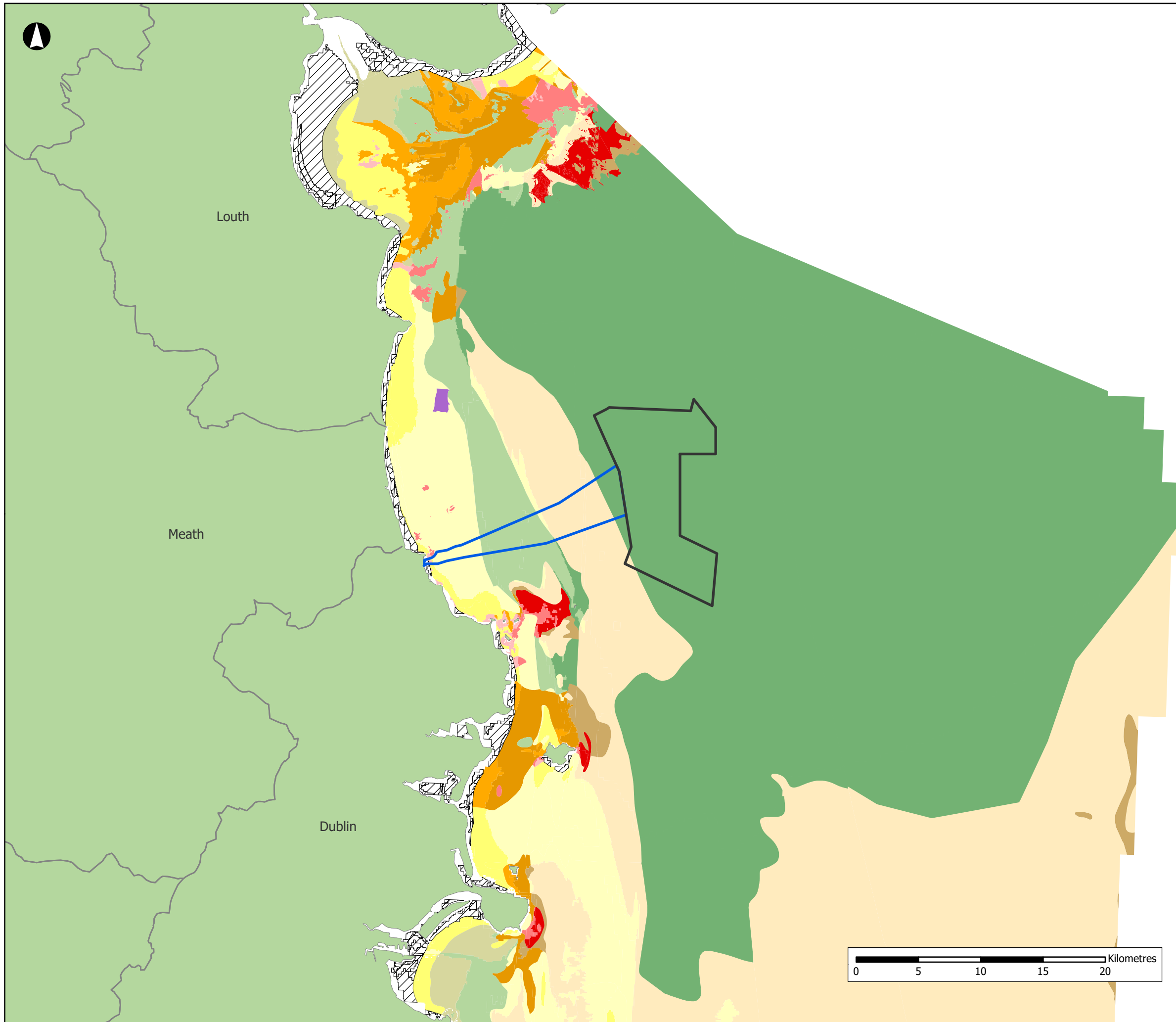
- 4.2.13 The distribution of broadscale habitats in the vicinity of the proposed development is shown in Figure 4.1. The array area is almost entirely offshore circalittoral mud. As such all habitat loss and habitat disturbance calculations within the array area, consider that all activities are solely within the offshore circalittoral mud habitat. As the exact location of the offshore export cables within the ECC is unknown at this stage, the assessment below has been based on a representative location of cable installation through the centre of the ECC. Due to the location of the ECC in relation to the broadscale habitats as shown in Figure 4.1; with circalittoral sand occupying the inshore third of the ECC, offshore circalittoral sand in the offshore third of the ECC and the middle section represented by circalittoral mud, the final placement of the two export cables will result in small differences to the overall areas (slightly larger or slightly smaller) of each of these three habitats within this assessment. However, a small change in area for any of these three broadscale habitats would not change the overall conclusion. As such it is considered an appropriate assessment approach.
- 4.2.14 The assessment of adverse effects from physical disturbance of broad habitat type (D6C3) presented within DHLGH (2024) is based on the OSPAR BH3 Indicator (OSPAR Commission, 2017). The indicator method is based on a series of analytical steps to combine the distribution and intensity of physical damage pressures with the distribution and range of habitats and their sensitivities. The final output to determine the 'adverse' part is a result of a number of factors, including the number of times a particular area is disturbed, and by what activities. As such, it is not possible to determine whether the disturbance related to the proposed development would be considered as causing and/or contributing towards the 'adverse' status. As such a conservative assessment is conducted, whereby it is assumed all of the disturbed area results in an adversely affected area.
- 4.2.15 The areas of each of the broad habitat types within the offshore development area, and within the MRU as a whole, are presented in Table 4.3. The table also includes the areas of each of the habitats that are estimated to be disturbed, and what this equates to as a proportion of the habitat found within the offshore development area and within the MRU as a whole.
- 4.2.16 **Offshore circalittoral mud** It is currently estimated that 43.75% of the broad habitat offshore circalittoral mud is adversely affected by disturbance in the Celtic Sea North Inner MRU (DHLGH, 2024 and DCEE, 2025). In relation to physical disturbance, GES is achieved when no more than 25% of a broad habitat type is adversely impacted, and as such, GES is not currently achieved for offshore circalittoral mud habitats in the Celtic Sea North South Inner MRU. When considering that the area of this habitat likely to be disturbed by the proposed development (1.175%) and that already identified as being adversely affected within the MRU (43.75%), it is evident that the level of disturbance will represent a negligible proportion of offshore circalittoral mud habitat present in the MRU and will not alter the current status of GES.



Table 4.3 Area of broad habitat types adversely affected in the MRU

Broad Habitat Type	Area of Habitat (km <sup>2</sup> )	Area of Habitat Affected by the Proposed Development (km <sup>2</sup> )	Habitat Adversely Affected due to the Proposed Development (%)	Habitat Already Adversely Affected (%) Green = Below 25% GES Target	Total Habitat Adversely Affected (%) Green = Below 25% GES Target
Offshore Circalittoral Mud	4,190	7.352	0.175	43.75	43.925
Offshore Circalittoral Sand	8,486	0.663	0.008	2.17	2.178
Circalittoral Mud	712	0.705	0.099	0.42	0.519
Circalittoral Sand	2,138	0.553	0.026	0.05	0.076
Infralittoral Sand	344	0.014	0.004	0	0.004
Infralittoral Rock/Biogenic Reef	363	0.039	0.011	0.24	0.251
<b>Total</b>	<b>16,233</b>	<b>9.325</b>	-	-	-





Array Area  
 Offshore Export Cable Corridor  
**Broad Benthic Habitat Types (EUSeaMap)**  
 Infralittoral rock and biogenic reef  
 Infralittoral coarse sediment  
 Infralittoral sand  
 Infralittoral mud  
 Circalittoral rock and biogenic reef  
 Circalittoral mixed sediment  
 Circalittoral coarse sediment  
 Circalittoral sand  
 Circalittoral mud  
 Offshore circalittoral rock and biogenic reef  
 Offshore circalittoral coarse sediment  
 Offshore circalittoral sand  
 Offshore circalittoral mud  
 NA

**NISA**  
*North Irish Sea Array*

**ARUP**   **GoBe**

Project  
**North Irish Sea Array  
 Offshore Wind Farm**

Figure Title  
**Broad Benthic Habitat Types**

<b>Job No:</b> 281240	<b>Datum:</b> WGS84 <b>Projection:</b> UTM30N
<b>Date:</b> Sept 2025	<b>Figure No:</b>
<b>Scale:</b> 1:300,000 @A3	<b>4.1</b>
<b>Status:</b> Issue	

- 4.2.17 **Offshore circalittoral sand** It is currently estimated that 2.17% of the broad habitat offshore circalittoral sand is adversely affected by disturbance in the Celtic Sea North Inner MRU and as such, GES is currently achieved (DHLGH, 2024 and DCEE, 2025). When considering that the area of this habitat likely to be disturbed by the proposed development within the MRU (0.008%), this level of disturbance will represent a negligible proportion of offshore circalittoral sand habitat present in the MRU. Even if all the disturbance were to be classified as adversely affected this would mean a total of 2.18%, which would not alter the current status of GES.
- 4.2.18 **Circalittoral mud** It is currently estimated that 0.42% of the broad habitat circalittoral mud is adversely affected by disturbance in the Celtic Sea North Inner MRU and as such, GES is currently achieved (DHLGH, 2024 and DCEE, 2025). When considering that the area of this habitat likely to be disturbed by the proposed development within the MRU (0.1%), this level of disturbance will represent a negligible proportion of circalittoral mud habitat present in the MRU. Even if all the disturbance were to be classified as adversely affected this would mean a total of 0.52% of the offshore circalittoral mud was adversely affected, which would not alter the current status of GES.
- 4.2.19 **Circalittoral sand** It is currently estimated that 0.05% of the broad habitat circalittoral sand is adversely affected by disturbance in the Celtic Sea North Inner MRU and as such, GES is currently achieved (DHLGH, 2024 and DCEE, 2025). When considering that the area of this habitat likely to be disturbed by the proposed development within the MRU (0.026%), this level of disturbance will represent a negligible proportion of circalittoral sand habitat present in the MRU. Even if all the disturbance were to be classified as adversely affected this would mean a total of 0.08% of the circalittoral sand was adversely affected, which would not alter the current status of GES.
- 4.2.20 **Infralittoral sand** It is currently estimated that none of the broad habitat infralittoral sand is adversely affected by disturbance in the Celtic Sea North Inner MRU and as such, GES is currently achieved (DHLGH, 2024 and DCEE, 2025). When considering that the area of this habitat likely to be disturbed by the proposed development within the MRU (0.004%), it is clear that this level of disturbance will represent a negligible proportion of infralittoral sand habitat present in the MRU. Even if all of the disturbance were to be classified as adversely affected this would mean a total of 0.004% of the infralittoral sand was adversely affected and will not alter the current status of GES.
- 4.2.21 **Infralittoral rock/biogenic reef** It is currently estimated that 0.24% of the broad habitat infralittoral rock/biogenic reef is adversely affected by disturbance in the Celtic Sea North Inner MRU and as such, GES is currently achieved (DHLGH, 2024 and DCEE, 2025). When considering that the area of this habitat likely to be disturbed by the proposed development within the MRU (0.011%), it is clear that this level of disturbance will represent a negligible proportion of Infralittoral rock/biogenic reef habitat present in the MRU. Even if all the disturbance were to be classified as adversely affected this would mean a total of 0.251% of the infralittoral rock/biogenic reef was adversely affected and will not alter the current status of GES.

## D6C4 Physical Loss of Broad Habitat Type

*The extent of loss of the habitat type, resulting from anthropogenic pressures, does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.*



4.2.22 It is currently estimated that approximately 0.1% of the broad habitat **offshore circalittoral mud** in the Celtic Sea North Inner MRU have been lost (DHLGH, 2024 and DCEE, 2025). In relation to physical loss GES is achieved when no more than 2% of a broad habitat type is lost, and as such, GES is currently achieved. Loss of this habitat under the footprint of the foundations and associated scour and cable protection will be 0.494km<sup>2</sup>, which represents 0.012% of the habitat across the MRU (Table 4.4). Consequently, a loss of this habitat of this magnitude will represent a negligible proportion present in the MRU, which in total would represent approximately 0.112% of the offshore circalittoral mud habitat (which is below the 2% target) and will not alter the current status of GES.

Table 4.4 Area of broad habitat lost in the MRU

Broad Habitat Type	Area of Habitat in (km <sup>2</sup> )	Area of Habitat Lost due to the Proposed Development (km <sup>2</sup> )	Proportion of Broad Habitat Lost due to the Proposed Development (%)	Habitat Already Lost (%) Green = Below 2% GES Target	Total Habitat Lost (%) Green = Below 2% GES Target
Offshore Circalittoral Mud	4190	0.494	0.0118	0.1	0.112
Offshore Circalittoral Sand	8486	0.011	0.0001	1.5	1.500
Circalittoral Mud	712	0.012	0.0016	0.6	0.602
Circalittoral Sand	2138	0.009	0.0004	0.9	0.900
Infralittoral Sand	344	0.0002	0.0001	1.8	1.800
Infralittoral Rock/Biogenic Reef	363	0.0006	0.0002	0.5	0.500
<b>Total</b>	<b>16,233</b>	<b>0.527</b>			

4.2.23 It is currently estimated that approximately 1.5% of the broad habitat **offshore circalittoral sand** in the Celtic Sea North Inner MRU has been lost (DHLGH, 2024 and DCEE, 2025). Therefore, GES is currently achieved for this habitat. Loss under the footprint of the foundations and associated scour and cable protection will be 0.011km<sup>2</sup>, which represents 0.0001% of the habitat across the MRU (Table 4.4). Consequently, a loss of this habitat of this magnitude will represent a negligible proportion present in the MRU, which in total would represent approximately 1.5001% of the offshore circalittoral sand habitat (which is below the 2% target) and will not alter the current status of GES.

4.2.24 It is currently estimated that approximately 0.6% of the broad habitat **circalittoral mud** in the Celtic Sea North Inner MRU have been lost (DHLGH, 2024 and DCEE, 2025). Therefore, GES is currently achieved for this habitat. Loss under the footprint of the foundations and associated scour and cable protection will be 0.012km<sup>2</sup>, which 0.0016% of the habitat across the MRU (Table 4.4). Consequently, a loss of this habitat of this magnitude will represent a negligible proportion present in the MRU, which in total would represent approximately 0.602% of the circalittoral mud habitat (which is below the 2% target) and will not alter the current status of GES.



- 4.2.25 It is currently estimated that approximately 0.9% of the broad habitat **circalittoral sand** in the Celtic Sea North Inner MRU have been lost (DHLGH, 2024 and DCEE, 2025). Therefore, GES is currently achieved for this habitat. Loss under the footprint of the foundations and associated scour and cable protection will be 0.009km<sup>2</sup>, which represents 0.0004% of the habitat across the MRU (Table 4.4). Consequently, a loss of this magnitude of circalittoral sand habitat will represent a negligible proportion present in the MRU, which in total would represent approximately 0.8004% of the circalittoral sand habitat (which is below the 2% target) and will not alter the current status of GES.
- 4.2.26 It is currently estimated that approximately 1.8% of the broad habitat **infralittoral sand** in the Celtic Sea North Inner MRU have been lost (DHLGH, 2024 and DCEE, 2025). Therefore, GES is currently achieved for this habitat. Loss under the footprint of the foundations and associated scour and cable protection will be 0.0002km<sup>2</sup>, which represents 0.0001% of the habitat across the MRU (Table 4.4). Consequently, a loss of this magnitude of infralittoral sand habitat will represent a negligible proportion present in the MRU, which in total would represent approximately 1.8001% of the infralittoral rock/biogenic reef habitat (which is below the 2% target) and will not alter the current status of GES.
- 4.2.27 It is currently estimated that approximately 0.5% of the broad habitat **infralittoral rock/biogenic reef** in the Celtic Sea North Inner MRU have been lost (DHLGH, 2024 and DCEE, 2025). Therefore, GES is currently achieved for this habitat. Loss under the footprint of the foundations and associated scour and cable protection will be 0.0006km<sup>2</sup>, which represents 0.0002% of the habitat across the MRU (Table 4.4). Consequently, a loss of this magnitude of infralittoral rock/biogenic reef habitat will represent a negligible proportion present in the MRU, which in total would represent approximately 0.5002% of the infralittoral rock/biogenic reef habitat (which is below the 2% target) and will not alter the current status of GES.

## D6C5 Condition of Broad Habitat Type

*The extent of adverse effects from anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.*

- 4.2.28 The overall condition of the habitat type is determined through combining a number of inputs. A hierarchy of assessment components is prescribed in the Article 8 guidance, which includes consideration of:
- Benthic State indicators - for example Water Framework Directive (WFD) or Habitats Directive assessments;
  - Use of other Descriptor Criteria relevant to broad habitat types;
  - Use of the physical disturbance information: Results from the D6C2 and D6C3 assessments; and
  - Use of physical loss information: Results from the D6C4.



- 4.2.29 For the purpose of this assessment, on the potential contribution of the proposed development towards GES, only the proposed development's contribution towards points 3 and 4 from the above list, are considered below. The assessment of overall condition is presented in the available guidance documents (DHLGH, 2024 and DCEE, 2025), however there is insufficient information to determine how the data layers were ranked in order to calculate the overall condition. As such, the assessment presented below on condition only consider the components that can be determined for the proposed development.
- 4.2.30 The achievement of GES is considered to be achieved when the extent of adverse effects in any particular broad habitat type is less than 25% of the habitat extent, of which no more than 2% is habitat loss. When assessed on an MRU wide scale results show that Celtic Sea North Inner MRU has 53% of its area in GES with 11% not in GES, (the reduced percentage of in GES is due to large area of unknown (32.5%) and Not Assessed area of 3%).
- 4.2.31 Table 4.5 provides an overview of the potential for the proposed development to alter the achievement of GES for each broad habitat type within the Celtic Sea North Inner MRU. The percentage of offshore circalittoral mud already adversely effected (43.75%) is already above the 25% GES target and as such does not achieve GES. The proposed development contributes a negligible increase in this area (0.175%). For all other habitats, the proposed development will not change the achievement of GES targets for both loss (less than 2%) and adversely affected (25%), as highlighted by the green shaded boxes in Table 4.5.
- 4.2.32 As such, it is considered that the proposed development of the North Irish Sea Array wind farm will not result in a deterioration of the current overall status of the Celtic Sea North Inner MRU or broad habitat types therein or jeopardise the attainment of GES.

Table 4.5 Condition of broad habitat type in the MRU

Broad Habitat Type	Habitat Already Lost in the MRU (%)	Habitat Lost due to the Proposed Development (%)	Total Habitat Lost (%) Green = Below 2% GES Target	Habitat Already Adversely Affected (%)	Habitat Adversely Affected due to the Proposed Development (%)	Total Habitat Adversely Affected (%) Green = Below 25% GES Target
Offshore Circalittoral Mud	0.1	0.0118	0.112	43.75	0.175	43.925
Offshore Circalittoral Sand	1.5	0.0001	1.500	2.17	0.008	2.178
Circalittoral Mud	0.6	0.0016	0.602	0.42	0.099	0.519
Circalittoral Sand	0.9	0.0004	0.900	0.05	0.026	0.076
Infralittoral Sand	1.8	0.0001	1.800	0	0.004	0.004



Broad Habitat Type	Habitat Already Lost in the MRU (%)	Habitat Lost due to the Proposed Development (%)	Total Habitat Lost (%) Green = Below 2% GES Target	Habitat Already Adversely Affected (%)	Habitat Adversely Affected due to the Proposed Development (%)	Total Habitat Adversely Affected (%) Green = Below 25% GES Target
Infralittoral Rock/Biogenic Reef	0.5	0.0002	0.500	0.24	0.011	0.251

### 4.3 D11 Energy Including Underwater Noise

- 4.3.1 The impact assessment considers what (if any) pressures the activity may create on the marine environment, and identifies the receptors likely to be affected and determines whether there is potential for deterioration in the status of the descriptor as a result of the proposed development. The risk to achieving and or maintaining GES is assessed considering existing environmental targets associated with each descriptor feature and the current status of the descriptor feature in Irish waters.
- 4.3.2 For Descriptor 11: Underwater Noise, the marine reporting unit is the entire MSFD Assessment Area, consisting of a total area of 467,196.5km<sup>2</sup>.



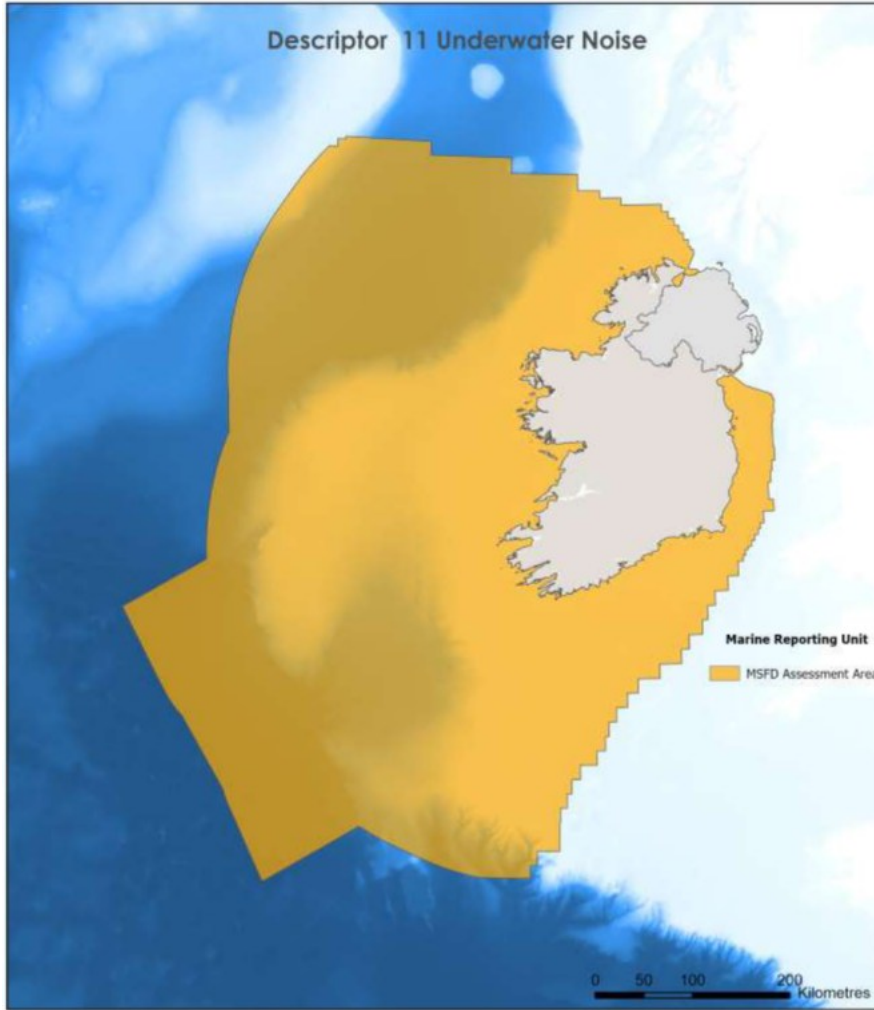


Figure 4.2 Descriptor 11 Underwater Noise MSFD Assessment Area (Annex V in Ireland’s Marine Strategy, 2024)

### D11C1 Impulsive Noise

4.3.3 The targets identified within Ireland’s Marine Strategy (DHLGH, 2024) relating to Impulsive Noise include:

*That the spatial distribution, temporal extent, and levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.*

*Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or sub-regional specificities.*



4.3.4 Section 10 (a) of the RFI outlines the concerns raised by the National Parks and Wildlife Service (NPWS) in relation to noise abatement measures. As a result, the Developer has opted to refine the design of the foundation types used for the WTG from monopiles or jackets with pin piles, to suction bucket jackets (SBJ), and the OSP foundations refined to SBJ with drilled pin piles (see Appendix A5.1: Design Refinements). This refinement has also been implemented in response to RFI Section 2 which requires a realignment of the layout for navigational safety and subsequent foundation change to allow for ground conditions. The installation of these foundation types reduces the level of underwater noise generated by the proposed development as no piling is required (i.e. there is no impulsive noise from their construction) for the turbine installation. Drilling may be required for the project option of jackets with pin piles for the OSP.

### Marine Mammals

- 4.3.5 For impulsive noise the proportion of a habitat of a receptor organism exposed to noise above Level of Onset of Biological adverse Effect (LOBE) is assessed on two timescales:
- Levels of noise must not exceed 20% of the area of the habitat of a receptor organism; and
  - The average daily exposure over a year must not exceed 10% of the habitat.
- 4.3.6 Annex III to Part 1 of Ireland’s Marine Strategy (2025) identifies bottlenose dolphin as the selected receptor organism for the assessment of impulsive noise and identifies a value for LOBE of 176dB re 1  $\mu$ Pa2s SEL, as it was the lowest reported sound level at which bottlenose dolphins experience TTS-onset.
- 4.3.7 Given the refinements to the proposed development design, the main source of impulsive noise is now considered to be the clearance of UXOs in the pre-construction stage. Appendix A14.1 Underwater noise modelling report of the EIAR predicted maximum TTS impact ranges for bottlenose dolphins from UXO clearance to be 1.3km for the high-order clearance of a 525kg UXO + donor. This equates to an impacted area of 5.3km<sup>2</sup>. The Descriptor 11 MSFD assessment area is 467,196.5km<sup>2</sup>, therefore 0.001% of the receptor species habitat is impacted. This is significantly below the 20% area threshold and thus there is no risk to GES.
- 4.3.8 The sensitivity of bottlenose dolphins to low UXO clearance noise is considered to be Low. Given that UXO clearance will be mitigated either through the use of low-order clearance techniques, or using a bubble curtain for high-order clearance activities (if low order fails), the magnitude is considered to be Negligible. Therefore, the effect significance is Imperceptible.
- 4.3.9 In conclusion, there is no significant effect in EIAR terms and no risk in relation to GES under D11C1 Impulsive Noise.

### D11C2 Continuous Noise

*The spatial distribution, temporal extent and levels of anthropogenic continuous low frequency sound do not exceed levels that adversely affect populations of marine animals.*

*Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or sub-regional specificities.*



- 4.3.10 For continuous noise the mean noise level above a threshold LOBE value should not cover an area more than 20% of a receptor species habitat.
- Annex III to Part 1 of Ireland's Marine Strategy (DCEE, 2025) identifies harbour porpoise as the selected receptor organism for the assessment of continuous noise.
  - The exact threshold LOBE value is currently being established on a regional basis. Average sound pressure levels between 100 and 120dB are being considered as threshold values for GES for continuous noise across Europe.
- 4.3.11 There has been sufficient assessment undertaken to date to demonstrate a negligible impact or risk from continuous noise for operational offshore wind farms and modelling and mapping is therefore not required. The latest research on noise from operational wind turbines (Bellmann et al., 2023) indicates they can generate underwater noise levels of approximately 120dB SPL at 100m. The Appendix A14.1 Underwater Noise Modelling Report of the EIAR, estimates that the NOAA Level B behavioural threshold (102dB SPLRMS), may be reached at 150m at the proposed development. Borsani et al. (2023) state that although there is as yet no LOBE threshold value (TV) set for continuous noise, the paper most frequently references 100dB SPL as potentially suitable, which Appendix A14.1 Underwater Noise Modelling Report of the EIAR predicts at approximately 1000m from a turbine at the proposed development. As this noise is dominated by low frequency, it is not expected that harbour porpoise, the most sensitive species, would be able to perceive this noise at this distance (Bellmann et al., 2023). Under circumstances of inaudibility, there can be no adverse biological effect. Therefore, there is no realistic risk that an area in excess of "20% of the target species habitat" will exceed any plausible LOBE and modelling would not provide any additional useful detail in respect of continuous noise.
- 4.3.12 Even if assuming the entire offshore development area (125km<sup>2</sup>) experiences continuous underwater noise at the LOBE threshold level, the Descriptor 11 MSFD assessment area is 467,196.5km<sup>2</sup>, therefore only 0.027% of the receptor species habitat is impacted. This is significantly below the 20% threshold and thus there is no risk to GES.
- 4.3.13 DCEE (2025) conducted an assessment of continuous underwater noise sources, with ship and vessel traffic being the main sources. This showed that the mean noise level throughout the year was below the range of threshold values under consideration for the North East Atlantic, indicating that Ireland is in Good Status for continuous underwater noise. The introduction of 71 vessels (maximum 50 simultaneously onsite) associated with the construction of the proposed development and 12 vessels associated with the operation and maintenance of the proposed development is not expected to significantly increase the existing continuous underwater noise levels.
- 4.3.14 The sensitivity of harbour porpoise to low frequency continuous underwater noise is considered to be Low. Given that operational noise is expected to be inaudible to porpoise at 1km, despite the long duration of impact, magnitude is considered to be Negligible. Therefore, the effect significance is Imperceptible which is not significant in EIA terms.
- 4.3.15 In conclusion, there is no significant effect in EIA terms and no risk in relation to GES under D11C2 Continuous Noise.



## 5 Conclusions

- 5.1.1 The MSFD descriptors and associated targets requested by An Bord Pleanála within RFI Section 3 have been considered in this MSFD assessment. On the basis of the assessment outlined above it is considered that the proposed development will not result in a deterioration of the current overall status of the Celtic Sea North Inner MRU or broad habitat types therein or jeopardise the attainment of Good Ecological Status. This is because with respect to seabed integrity, generally the level of disturbance or loss is negligible in proportion to the area of available habitat with the MRU. In cases where the MSFD target is already breached, the additional amount as a result of the proposed development is also negligible which is not significant.
- 5.1.2 It is considered that the proposed development will result in no significant effect and no risk in relation to GES under D11C1 Impulsive Noise. The sensitivity of bottlenose dolphins to low UXO clearance noise is considered to be Low. Given that UXO clearance will be mitigated either through the use of low-order clearance techniques, or using a bubble curtain for high-order clearance activities (if low order fails), the magnitude is considered to be Negligible which is not significant in EIA terms.
- 5.1.3 Also, there is no significant effect and no risk in relation to GES under D11C2 Continuous Noise. The sensitivity of harbour porpoise to low frequency continuous underwater noise is considered to be Low. Given that operational noise is expected to be inaudible to porpoise at 1km, despite the long duration of impact, magnitude is considered to be Negligible. Therefore, the effect significance is Imperceptible which is not significant in EIA terms.



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